

RURAL REAL ESTATE TRANSFERS IN 1970
FOR CLAY COUNTY, KANSAS

by

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CHAPTER I

INTRODUCTION

Rural real estate is a major asset of the farm business operation. In 1971, farm real estate was valued at 212.4 billion dollars in the United States. This represents 67 percent of total farming assets.¹

In Kansas, the statistics are equally impressive. In 1964, the value of farm land and buildings was 5,790 million dollars and in 1970, 7,754 million dollars, representing 75 and 74 percent of the total farm investment for the respective years.² The change in total values indicates the increased average value of land per farm. As farm numbers have declined, the average land per farm has risen to absorb approximately the same total acreage while value per acre has increased 34 percent during this six year period.

The magnitude of these figures shows the significance of land to the farmer. They indicate that land has become increasingly important as a productive factor and stress the need for a viable and efficient market. Paramount to the effective market is a good information system for the buyer and seller of property.

The major purpose of this study is to augment knowledge of the

¹U. S. Department of Commerce, Statistical Abstract of the United States: 1971, U. S. Bureau of the Census, (92 Edition), Washington, D.C., p. 580.

²Kansas State Board of Agriculture, Farm Facts, 1970-1971, Kansas Department of Agriculture, Topeka, Kansas, 1971, p. 11F.

rural real estate transactions occurring in Kansas. Inadequate data are available to make definite responses to questions regarding the transfer of farm land. Questions like, what factors influence the price of land? What causes land transfers? Who is involved in land transfers? How are the terms affected by the method of financing?

The need for this information evolves from the increased complexity of the market, the small number of transactions, and alternative methods of transfer.

Any analysis of real estate sales indicates the numerous individual and associated factors which determine the real market value of a land tract. Regional differences may exist in land values. The average per acre sales price for small tracts may be higher than for large tracts. Physical differences as well as variations in intended use may distinguish property. Properties may have extensive improvements representing a large part of the total sales price. The market may be affected by availability of credit, loan limits, and interest rates. Location to a trading center or to other farm land may also affect the value of a tract.

Land transactions are not common to many individuals nor do they occur frequently. In 1968, only 2 percent of the U.S. farmland changed hands. Since the early 1950's, the number of transfers have followed the downward trend in farm numbers.³

In the year ending March, 1971, there was 17.9 voluntary sales and trades per thousand farms in Kansas. An additional 15.4 forced sales, sales resulting from inheritance and gifts, administrators' and executors' sales, and unclassified sales brought the total to 33.3 sales per thousand farms for

³ Economic Research Service, Farm Real Estate Market Developments, USDA, CD-72, March, 1969, p.11.

all categories.⁴

Land may be transferred in a variety of methods. Land is sold voluntarily for cash, with a mortgage loan, on the basis of an installment contract, and even traded in exchange. Some sales are forced due to foreclosure or taxes and other reasons.

Another reason for the study is investigative. It is known that land is transferred by those several methods mentioned above, but we have little understanding of the influence these sales may have on the market. Although each sale must be a signed contractual agreement, there are elements common to a type of sale or to a particular sale. Each of these characteristics add to the knowledge needed by each party to protect his interest. It is only when the parties are aware of the alternatives that an intelligent choice can be made.

Generalization of the impact of the sales analyzed is limited because: (1) the scope of this study includes the transfers in one county in the state for only one year, (2) installment contract sales are not generally recorded in Kansas and deeds not recorded until terms of agreement are fulfilled so even knowledge of the purchase price is unknown, and (3) land is not a homogeneous commodity for comparison. Such factors as location, soil type, fertility, size of tract, and improvements may cause large variation in per acre prices. Realizing these limitations, it is still desirable to attempt to arrive at some conclusions.

More information should also aid price stability. Of course, there may be many reasons for variations in land prices, but it is questionable when values fluctuate greatly from the average. For the year ended November,

⁴Economic Research Service, Farm Real Estate Market Developments, USDA. CD-76, August, 1971, Table 10, p. 19.

1968, Kansas' land values rose 8 percent while the national average was 6 percent. For the year ending March, 1971, Kansas' land values declined 3 percent while the average national increase was 3 percent.⁵

⁵ Economic Research Service, Farm Real Estate Market Developments, USDA, CD-72, March, 1969, p. 5 and CD-76, August, 1971, p. 6.

CHAPTER II

REVIEW OF LITERATURE

Studies of rural real estate transfers in the past have been predominantly concerned with the sale and or market value for land. These studies have precipitated a much broader understanding of the forces leading to land values. They have also focused attention on particular aspects of real estate transfers. Studies have evolved about factors which affect price. For instance, such things as the time period, the land quality, the location, and accessibility, to mention only a few, have been analyzed. At the same time, studies have been heavily involved in gathering a larger background of knowledge on the infrequent sales of this valuable resource.

Research is usually conducted in a particular area or region. Usually an attempt is made to study a cross section of sales in one year or over a period of years. It is then possible to make comparisons and perform statistical analyses. Transfers are tabulated in various manners to make comparisons. Usually classifications are based on a common characteristic of the soil which is vital to a determination of the value of the property.

Studies commonly utilize multiple regression techniques to analyze the effects of factors on farmland prices. There are several reasons cited for the use of the multiple regression type of analysis. These reasons are commonly accepted as valid. The three below were mentioned in one study:

Firstly, many factors affect the price of farmland and interrelationships exist among these factors which are difficult to measure in a classification type of analysis. The multiple regression procedure

estimates the average effect of a given factor while holding all other factors constant at their averages. Secondly, predictions of the sale price of a given tract can be obtained more precisely with an estimating equation from a multiple regression analysis than an estimate for the same tract obtained by using the results of a classification study. Finally, multiple regression analysis allows the use of an error term which accounts for the effects of factors not included in the study--a classification analysis has no such provision.⁶

Kansas

Two studies which occurred in Kansas were consulted to plan and supply background for this study. Both were research projects for Ph.D. dissertations. One is published in a bulletin⁷ as well as a written dissertation.⁸ It considered the effects of roads and other factors on land market values. The second study dealt not only with the factors which affect land prices but also those factors which cause farmland prices to vary between years.⁹

In the first study (Edwards), four areas of Kansas were analyzed and compared with multiple regression analysis. Each area consisted of five or six contiguous counties. Sales data were obtained for two or three time periods.

Three hypotheses were tested in Edward's study: (1) An increase in the quality of road adjacent to a tract of farmland will increase its market

⁶Terry P. Sutton, "Temporal Stability of the Effects of Factors Causing Intertract Variations in Farm Real Estate Prices in Kansas," (Ph.D. dissertation, Dept. of Economics, Kansas State U., 1970), p. 5.

⁷Jack D. Edwards, Wilfred H. Pine, Arlin M. Feyerherm, Effects of Roads and Other Factors on Farm Real Estate Values in Kansas, Bulletin 469 (Manhattan, Kansas: Agricultural Experiment Station, Kansas State University; October, 1964).

⁸Jack D. Edwards, "An Economic Analysis of Highway Improvements and Other Factors Affecting Farm Real Estate Values in Selected Areas of Kansas," (Ph.D. dissertation, Dept. of Economics, Kansas State U., 1968).

⁹Sutton, "Temporal Stability of the Effects of Factors Causing Intertract Variations in Farm Real Estate Prices in Kansas."

value, all other factors held constant. (2) Other factors such as type of soil, land use, and value of improvements affect farmland market more than road improvement. (3) Prediction equations developed to test the first two hypotheses will explain the same amount of variation in the dependent variable (total consideration) over time, when the same combination of independent variables is used.

Although the results were not consistent for each time period and standard errors were large in some samples, land prices appeared to be influenced by the quality of road adjacent to the tract. Dummy variables were utilized to indicate the best type of road which connected the land with other areas. Clay county was not included in any area of the study. However, for the north central area, closest to Clay county, a gravel road contributed from \$3 to \$5 per acre in 1956-1958. Hard surfacing added about \$15 per acre more than graveling in the north central area.¹⁰

Several other factors were statistically significant and explained a large proportion of the sale price. Each mile of distance to town (1,000 or more population) reduced land price from a few cents to more than \$1 per acre. Improvements (dollars of assessed valuation) lent \$2 to \$3 toward the purchase price. Quality of soil also significantly contributed to the price paid for land. This variable was developed from soil reconnaissance survey maps of the Soil Conservation Service. Acres of cropland also contributed to the purchase price.

The model selected for the north central area derived from data for 1956 through 1958 is as follows:

¹⁰ Edwards, Pine, Feyerherm, Effects of Roads and Other Factors on Farm Real Estate Values in Kansas, p.3.

$$Y_R = 555. = 64.X_{20} + 87.X_{30} + 8.X_{31} + 4.X_{46} + 1.X_{47} + 2.57X_{29} - .96X_{44}$$

where

Y_R = total price in dollars

X_{20} = total acres

X_{30} = acres of soil I

X_{31} = acres of soil II

X_{46} = total acres if gravel road, zero otherwise

X_{47} = total acres if hard road, zero otherwise

X_{29} = assessed value of improvements

X_{44} = miles to town times total acres.

The second Kansas study (Sutton) dealt with data on farmland sales from five Kansas counties for thirteen selected years from 1947 through 1967. In this study the primary concern was year to year changes of factors causing variation in land prices. Its second objective was to derive an estimation equation from which prices of tracts could be predicted. The dependent variable was price per acre.

The results indicated that inflation and technology are the only significant causes of changes in factor effects on price. It was also found that farmland prices inflated at a faster rate than consumer prices in that period. In the prediction equation, the consumer price index times an index of productivity was then utilized to help account for interyear variations. Other variables utilized were: total acres, improvement value (assessed valuation), distance to a town larger than 1,000, percent of soil type I & II (Soil Conservation Service), dummy variable for hard road, and a dummy variable for gravel road.

Nevada

The study in Nevada is a one county survey over a five year period. Its intention was to gather information about nonagricultural competition in the rural real estate market.¹¹ The study was basically a general survey of the individual buyer, his occupation, and reason for buying.

Evidence indicated that the price of agricultural land was based on agricultural productivity or land quality. Statistical analysis was performed for the total market which included all types of buyers. The major factors explaining variation in land prices were those reflecting soil capability class of the land and the value of buildings per acre.

The study tried to show what factors were most important for each type of buyer: full-time farmers and ranchers, part-time farmers and ranchers, and nonagriculturalists. Respectively, the most important factors for each submarket are: (1) quality of soil as depicted by land capability classes II and III, (2) value of the residence on the parcel, and (3) average gross returns per acre.

Although 76.1 percent of the nonagricultural buyers indicated that their purchases were made for reasons other than agriculture, it appears that returns to the land, anticipated through visual examination of growing crops and or cattle, were most influential in transaction price determination.

Land values in the county were still tied to the agricultural productivity of the soil. Full-time farmers purchased parcels which were comprised of potentially more productive land as well as land which was presently more productive. Higher average prices were paid by full-time

¹¹ Ronald L. Shane and John W. Malone, Jr., The Agricultural Land Market in Nevada, Phase I, Churchill County, Nevada, Number R84 (Reno, Nevada: Division of Agricultural and Resource Economics, University of Nevada; December, 1971).

farmers than those paid by part-time farmers and nonfarmers.

It was found that differences in price per acre of real property were associated with variations in parcel size and value of buildings. As parcels increased in size, the price per acre of real property decreased.

Multiple regression analysis was used to estimate the influence of twenty-four variables on the price paid per acre. Six variables were found to be significant at the 10 percent level.

The estimation equation is:

$$Y_R = 238.40 - .20X_1 + 4.57X_2 + 1.43X_3 - 1.97X_4 + .30X_5 + .96X_9$$

where

Y_R = average price per acre of agricultural land

X_1 = total acres of water right for flood irrigation

X_2 = index of parcel density of privately owned land within one quarter mile of subject property perimeter

X_3 = percent of parcel in land capability classes II and III

X_4 = percent of parcel in land capability classes VII and VIII

X_5 = value of buildings per acre

X_9 = average gross returns per acre.

New Mexico

A study in New Mexico encompassed sale prices for 1961-1964 for agricultural land sold in twelve counties. The counties were chosen to represent all areas of New Mexico. The purpose of the study was to compare sale prices with the tax assessments for the property and also to evaluate the effect of certain land characteristics on the price.¹²

¹²James R. Gray and Ronnie G. Gollenon, Sale Prices and Assessment Values of Agricultural Lands, Bulletin 519 (Las Cruces, New Mexico: Agricultural Experiment Station, New Mexico State U.; April, 1967).

To select the counties for the study , the state was divided into four quadrants, each with approximately the same number of counties. Two highly populated, urban counties were excluded as they contained little agricultural land. Three counties in each quadrant were then selected at random. The deed transfer records in each of these counties were then studied to find information on all agricultural land transfers between December 1, 1961, and June 1, 1964.

In each county, lists were made of sales which (1) involved agricultural land of five acres or more, (2) were documented with a recorded warranty deed, and (3) was made for 100 percent ownership.

From the lists, a random sample of five sales each of grazing and irrigated crop lands was drawn in each county. Alternate sales were selected in case the information from the first selections could not be obtained.

Each buyer was interviewed with a prepared questionnaire. The questionnaire included sections dealing with a description of the property, the price paid, and the estimated value of improvements. A multiple regression model was used to measure the relationships between the various land characteristics and sale price.

The assessment values on land and all improvements for each sale were divided by the sale price. The resulting assessment-sale ratios were then compared to determine if there were statistically significant differences in the assessment-sale ratios within counties, among the counties in each quadrant of the state, and among quadrants. Another test was made with the ratios when improvement values were excluded.

The characteristics of grazing land which were expected to affect sale price were: carrying capacity in animal units per acre, miles to the closest trade center, miles of dirt road on the route, average percentage of

slope of the land, average depth of top soil, and percentage of mineral rights included in the sale.

The standard partial regression coefficients show the effect of each characteristic on land price. The location of the ranch as measured by miles of dirt road was the most important characteristic, followed by grazing capacity. Altogether, the six variables accounted for only about 13 percent of the price variations.

The relevant characteristics considered for irrigated land included an estimated return per acre above variable costs, percentage of land with crop allotments, the depth of soil, the percentage of slope, the miles to the trade center, the miles of dirt road, and the percentage of the mineral rights which had been transferred. Among these characteristics, the return per acre above variable costs had the strongest effect on the price of land. The next most important characteristic was the crop allotment.

A dollar increase in returns above variable costs was associated with \$1.43 increase in the average sale price. An increase of one percent in the slope of land meant that average sale prices decreased by \$20.39 per acre.

Analysis of the assessment-sale ratios showed large variations within and among counties and areas of the state. One county had a weighted average ratio of 3.8 percent and a neighboring county in the same area had one of 22.8 percent. The ratio for irrigated land proved greater than that of grazing land.

When all the sales were grouped according to total price, the weighted average assessment-sale ratio decreased as the size of the sale increased. When the sales were grouped according to the number of acres, the general trend was that as the number of acres increased, the assessment-sale ratios decreased.

Indiana

This study in Indiana attempts to evaluate determinants of land value which are both endogenous and exogenous to the agricultural economy. There is an analysis of such factors as the non-farm demands for land, the spatial efficiency of the factor market, and the role of property taxes. The study uses a cross section of land in the state of Indiana and makes use of secondary data and regression analysis.¹³

The basis for the study evolves from the continuous and changing impact on land as an economic resource. Increases in income and population lead to an increased demand for land services. A major portion of this impact is to enlarge demand for food and fiber. At the same time, growing population and rising incomes lead to increases in the demand for non-agricultural land requirements. This is evidenced in such needs as residential dwellings, commercial and industrial business, public utility installations, recreation, and transportation networks.

Another dimension of economic change is through spatial shifts of economic activities. The changing pattern of development may add value to some locations while detracting from others. This phenomenon is especially noticeable on the immobile land resource which cannot respond to changes in patterns of economic development. Major urban growth, for example, enhances the importance of land as a productive input in this area relative to areas of less growth.

It is because of these many dynamic characteristics, according to the study, that we must continuously revalue our resources. The objective of

¹³G. Edward Schuh and Wesley C. Scharlach, Farm and Non-farm Determinants of Agricultural Land Values, RB No. 821 (Lafayette, Indiana: Department of Agricultural Economics, Purdue U.; November, 1966).

this study is to determine the weight which should be given to each of several such factors determining land value. With the help of this information, it may be possible to attain a more efficient allocation of this resource.

The ability of the regression model to predict prices on a county by county level is impressive. The coefficient of determination is 88 percent and the standard error is a relatively low 36.6.

The empirical findings are: (1) Differences in the quality of rural land is a major factor explaining geographic differences in land values. (2) A positive relationship exists between land quality and value. A positive relationship exists between local population density and agricultural land values. (3) Property taxes have a negative impact on land values. (4) The distance from a major metropolitan area, Chicago, determines variation in land values. Land values decrease as the distance increases. (5) Higher agricultural wages tend to depress the value of agricultural land. (6) Increased non-farm inputs, which also may be a resort of rising agricultural wages, lead to higher values for agricultural land. (7) Economies of scale appear to be capitalized into higher land values.

It is always helpful for an investigator to gain an insight into the work which has preceded him. It offers a valuable tool to compensate for incomplete knowledge of the subject and offers diverse approaches to study the topic. It is with these facts in mind that publications were carefully read before the present study was organized. The group of publications included in this review includes only a few of the many which have offered valuable information.

Several factors were used and many more remembered in an attempt to find the best possible approaches to answer questions. It is, of course, not

possible to try every method or bring the necessary resources together to perform an error-proof study. At the same time, the foremost objective is to begin, knowing that the course has been planned.

CHAPTER III

THEORETICAL FOUNDATIONS AND HYPOTHESES

The theory of property value deals with the ability of an object to call forth a desire to possess that object. There may be a variety of individual reasons to acquire ownership in an article. At the same time, there can be a different value set for each of the reasons attributed to ownership in property.

Although it is usually a prime consideration, ownership may or may not be justified by a productive use. It is possible to say that value is determined by several factors. "The property in question must have use-value or utility to its owner or user; otherwise, no one would want it. It must be sufficiently scarce in supply to command a price. Otherwise, it would be a free good. And it must have futurity-a basis for an expected future flow of returns or satisfactions to its user."¹⁴

Ultimately, the value of real estate property is the consideration in the market place that a willing buyer will agree to pay to a willing seller in a manner prescribed by law. In the exchange market, the various factors of demand and supply enter into the actual determination of price. However, no guarantee can be made that two relatively homogeneous plots will sell for the same price depending on the extent of the market.

¹⁴Raleigh Barlowe, Land Resource Economics (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1958), p. 158.

Many people have suggested that there is some fair value of property in the sense that similar tracts should sell alike. Whether this fair value should be determined as a function of the physical productivity, highest use, or some other measure, it is subject to debate as no one answer is absolute. One is hard pressed to take only a fair price when the market is riding a speculative wave and no one would like to take less than fair value if the market is resting in a lull. It is, nevertheless, important to have a good idea of what could be considered a fair price for real estate for court judgments and purposes of appraisal or tax assessment.

In a very brief manner, the preceding paragraph touches upon the dilemma of the concept of property value. It is easy to understand why everyone would like to have an idea of a standard of value by which every tract of land or other resource could be compared and given a "fair value," but at the same time it is realized that the real value of a marketable good is equivalent to the price that it will demand in the exchange market.

Approaches to Land Valuation

Real estate is a good which, due to its nature, is often more difficult to evaluate than other goods. A tract of real property often has special characteristics which makes it distinct from any other plot. For instance, a certain tract of land may be characterized by its soil texture, drainage, size, location, improvements, access, past use, and others. With so many factors involved in the tract itself not to mention the particular likes and dislikes of the person interested in the land, the means of valuation is a recurrent problem.

As a practical consideration, an agricultural producer often will judge the value of real property on the basis of the returns in future monetary flows or satisfaction that he will receive through its possession and

use. At the same time, one's knowledge of the past has led him to be skeptical of predicting tomorrow with any degree of accuracy. So more emphasis might be placed on the consideration of what other people are doing now in an attempt to rationalize a medium path without a threat of exceeding one's threshold. This cautious philosophy is what Keynes called the conventional judgment.

Knowing that our own individual judgment is worthless, we endeavor to fall back on the judgment of the rest of the world which is perhaps better informed. That is, we endeavor to conform with the behavior of the majority or the average. The psychology of a society of individuals each of whom is endeavoring to copy the others leads to what we may strictly term a 'conventional judgment.'¹⁵

This knowledge still does not give one a precise answer to the quest of land valuation, but it tells one that he should regard economic society for an answer. In doing so, it will be found that there are some basic approaches commonly utilized to determine property values in the real estate market. A basic assumption required to use these practices is profit maximization of the individual.

Three methods include: (1) the income-capitalization or income approach; (2) the market-comparison or market approach; and (3) the replacement-cost approach to property valuation.

Income-capitalization is a method to estimate the value of property by considering the present value of the future returns expected from its ownership. To invest in a tract of land, the buyer will theoretically be willing to pay according to the revenue that he can expect to receive over a period of time. Because there is uncertainty involved in future expectations as well as opportunity cost from alternative investments, an individual must

¹⁵ John M. Keynes, "The General Theory of Employment," Quarterly Journal of Economics, February, 1937, Vol. 51, p. 214.

decide on a discount rate at which he considers his investment safe.

A simple formula to represent this concept is stated

$$V = \frac{R}{r}$$

where V represents the value of the property, R represents the estimated average net return of economic rent expected in the future, and r represents the rate of interest used in the capitalization process. As an example, if an expected net return of an acre of land is \$50 a year and 8 percent is considered a rate equivalent to the return for alternative uses plus an allowance for risk, then the value of the acre is \$625 (\$50/.08).

There are two restrictions necessary to validate the use of this formula. The net returns are required to be constant indefinitely and the rate of capitalization cannot be changed each year. Hence, the investor must use some average numbers, cognizant of the fact that they may change over time.

It is altogether common that income from property will not be an even flow in the future. Adjustments in the formula should then be made to account for rising or falling returns or perhaps a limited time over which the returns can be expected.

Several formulas might be utilized to better typify the real situation. Land often embodies both stock services which may be terminated and variable income which decreases or increases with time. Decreases in income may occur with loss of fertility, soil erosion, and price decline; increases may take place as prices increase. If prices are known and the increase or decrease in income is at a constant arithmetic rate, the present value can be expressed as

$$V = \frac{R}{r} \pm \left(\frac{I}{r}\right)^2$$

where the squared term accounts for the expected change in revenue.¹⁶

The determination of rent requires consideration of several factors. For rural land, the basic factor is the productivity of the soil. Crop yields are a good indicator of productivity. Cropping patterns, topography, and soil type may also be considered as a guide to land productivity. Of course, there are other factors, some of which have no scientific basis but individual judgment. A knowledgeable individual may be able to estimate the returns with a high degree of accuracy. Physical productivity multiplied by the anticipated price for the productive goods gives the gross receipts from the land. Then based on operating expenses, insurance, taxes, and a return for management, the expenses may be subtracted from the income to derive the net returns.

Although returns may often be associated with endogenous characteristics of the soil, it must be remembered that major considerations center around the demand for inputs and outputs and equilibrium conditions. For a competitive firm, prices of the factors of production and the product are given or exogenously determined. The firm adjusts the quantity of its inputs in response to these prices, and in turn determines the level of output.

Because land is relatively inelastic in supply, its value or price will be established largely by demand considerations. The demand price for a productive input is its marginal value payment in the production process. To the extent that the value of land is endogenously determined within the firm, changes in the prices of other inputs, the quantities of other inputs used, and the quality of the land will affect its marginal value product and

¹⁶Earl O. Heady, Economics of Agricultural Production and Resource Use (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1952), p. 399.

in turn its demand price.

Even with stable conditions the estimation of future production, business conditions, and price levels for net returns is a difficult task. And no less important is a realistic rate of capitalization. For this rate one considers the physical and economic risk factors, the loss of liquidity caused by the investment or the possibility of resale, and the competition for capital from related investments. Overall, one's effort is directed toward the accurate prediction of the fair market value for a tract of land.

A second approach is called market-comparison. In this method, one attempts to evaluate sales of comparable properties and determine what a property is worth. This approach is efficient for determining the current sale price. At the same time, the valuation will be more subject to error caused by fluctuations in the market over time. If one's concept of value is concerned with the long run average of land, then this method will be inaccurate.

Comparing the value of a tract with recent sales requires a thorough understanding of the real estate market. Unlike grains which can be graded and sold as homogeneous units, properties are seldom alike. Various physical and economic aspects of the property cause tracts to be distinguished or not perfect substitutes. The rationale for this approach is in the economic principle of substitution. Informed buyers will not pay more and informed sellers will not take less than a price already established in the market.

Again, a difficulty may enter due to judgment error caused by comparison. Only a small number of real estate properties are sold in a year's time and in a given area there may be a great deal of heterogeneity among those tracts transferred. At the same time, prices can be expected to vary by the likes and dislikes of the people in the market as well as the number

of people actually taking part in the market process.

In general it can be said that a wide range of prices exists for comparable properties. No means to standardize property has been found to include factors for the incomplete knowledge of the participants, the large number of possible combinations of characteristics peculiar to a tract of land, and the fact that some properties probably sell for more than a comparable tract while others sell for less.

Raleigh Barlowe suggests, that to use the market-comparison method, special emphasis should be given to time, circumstances, and conditions of the sale. It is only by making a precise analysis of these factors that an accurate appraisal can be made of property values.¹⁷

Replacement-cost is another method of evaluating property value. Its basis comes from the classical concept that a close relationship can be found between production costs and value. This means that real estate should be worth the present replacement cost (or the cost of an acceptable substitute) less an allowance for accumulated depreciation and obsolescence.

The rationale is basically the same as for the market-comparison method. Just as an individual will not pay more than what a comparable substitute is valued; then also, he will not be willing to pay more than what a replacement will provide at a particular price. A replacement being that which provides similar desires or utilities.

The difficulty inherent in this process is the capricious nature of many real estate developments. For example, an individual may develop a tract for his personal desire of a sprawling ranch-style home far from any neighbors. In selling the property he may find it difficult to sell his

¹⁷ Barlowe, Land Resource Economics, p. 196.

magnificent edifice to someone with similar tastes. A similar situation might involve land irrigatable with a sprinkler system which required a large family for labor or a crew of hired employees. If it is necessary to hire labor then the system may be impractical to own at its actual value.

Replacement-cost has the same problems as for using the market-comparison approach. To estimate replacement-cost requires a knowledge of construction costs as well as building design. Materials and techniques of construction change over time so it is necessary to have an understanding of comparative size, design, and use capacity of buildings. Another factor which is subject to the individual's discretion is depreciation. The useful life of a property may be highly dependent on its intended use, expectations of the future, taxes, and other considerations. With an objective appraisal of the pertinent facts of the land, this analysis may be quite useful.

Factors Causing Intertract Variation in Land Prices

The theory of land valuation is not necessarily restricted to the theory of the production unit. Location theory, developed by von Thunen, recognized that land use is determined or restricted by its location.¹⁸

Transportation cost has a bearing on the returns to land. As distance required to reach the trading center increases, the total transport charges per unit of product or factor rises. As distance between markets and farm increases, land rent is reduced on the one hand by the increasing costs of moving factor inputs to the farm, and on the other hand by the increasing costs of moving products from the farm. Therefore, a negative relationship is expected between land values and the distance to the trading center.

Increasing attention has also been given to the impact of nonagricul-

¹⁸Michael Chisholm, Rural Settlement and Land Use (Chicago, Illinois: Aldine Publishing Co., 1968), p. 20.

tural land requirements on land values. Competition between farm and non-farm is not the only consideration that gives rise to higher land values in the vicinity of population centers. There seems to be a special impetus to land values caused by the interrelation of growth and location. "Both agricultural location and development theory provide a clear basis for expecting that urban-industrial development will exert a differential impact on agricultural land values through the factor and product markets."¹⁹

Studies have indicated that urban-industrial development exerts an impact on farm returns through local factor (especially labor) and product markets. They suggest that this growth will be capitalized into land values.

Economic theory has suggested several relative influences on farmland values. An attempt to obtain operational variables is not always an easy task given that a researcher desires to test certain characteristics. It is often necessary to regard the limitations of one's data or the ability to quantify a factor in a testable and feasible manner.

This is true for variables to test locational factors as well as others. Introducing distance variables into an aggregate model is not as operationally straightforward, as it is logical. Further explanation concerning the development of variables will be given later in the analysis.

Hypotheses

Perplexing questions which arise in the real estate market require a large degree of understanding before they can be explained. Questions about the quantity of land transferred, the sale process, the land quality, and its value can be answered only when one is familiar with the conditions of the

¹⁹ Vernon W. Ruttan, "The Impact of Local Population Pressure on Farm Real Estate Values in California," Land Economics, Vol. 37, 1961, pp. 125-131.

market, the direct as well as the indirect forces leading to the transfer.

It was decided in a lead study of one county, that the major purpose should be to learn all of the facts available concerning the transfers of rural real estate property. With a survey of the entire spectrum of transfers, it should be possible to understand better the intricacies of the pricing system and the vagaries of land ownership.

With this simple starting point and in light of the theory with respect to land values, several tentative hypotheses were selected for evaluation. An hypothesis is defined as a pure statement of fact to be tested, a tentative solution to a problem. The hypotheses may be divided into two general categories. The first is to grasp the scale and significance of each means of transfer, and second, to document the reasons for variability in the real estate market pricing system.

The list below presents the hypotheses:

1. That (a) approximately 50 percent of farm real estate sales are transferred by installment contracts and (b) deeds of these transfers are recorded 15 years later.
2. That prices and terms for installment contract sales differ from other sales; therefore, recorded sales do not represent all sales.
3. That approximately three-fourths of sales are tracts to be added to existing farms.
4. That a classification problem exists in comparing sales of real estate which is caused by existing recording practices, limiting the number of transfers which can be used for comparison.
5. That variability in real estate, buyers and sellers, and in other factors is high in relation to number of sales (sample) causing unreliable estimates of prices and other indicators derived from real estate market information.
6. That approximately 50 percent of all rural real estate transfers are made through gifts, inheritance, and other non-sale methods.

The means to verify these hypotheses are an extensive information gathering process and the use of statistical analyses appropriate to make comparisons.

CHAPTER IV

EMPIRICAL ANALYSIS

Area of Study

As shown by the map on the following page, the area considered for this study involved eleven counties in north central Kansas. These eleven counties are: Clay, Cloud, Dickinson, Ellsworth, Jewell, Lincoln, Mitchell, Ottawa, Republic, Saline, and Washington. This classification is an arbitrary grouping determined by the degree of common agricultural practices, soil types, and other factors related to agriculture. The use of this classification was a logical choice for this study. Hence, the area serves as a beginning point for a county selection.

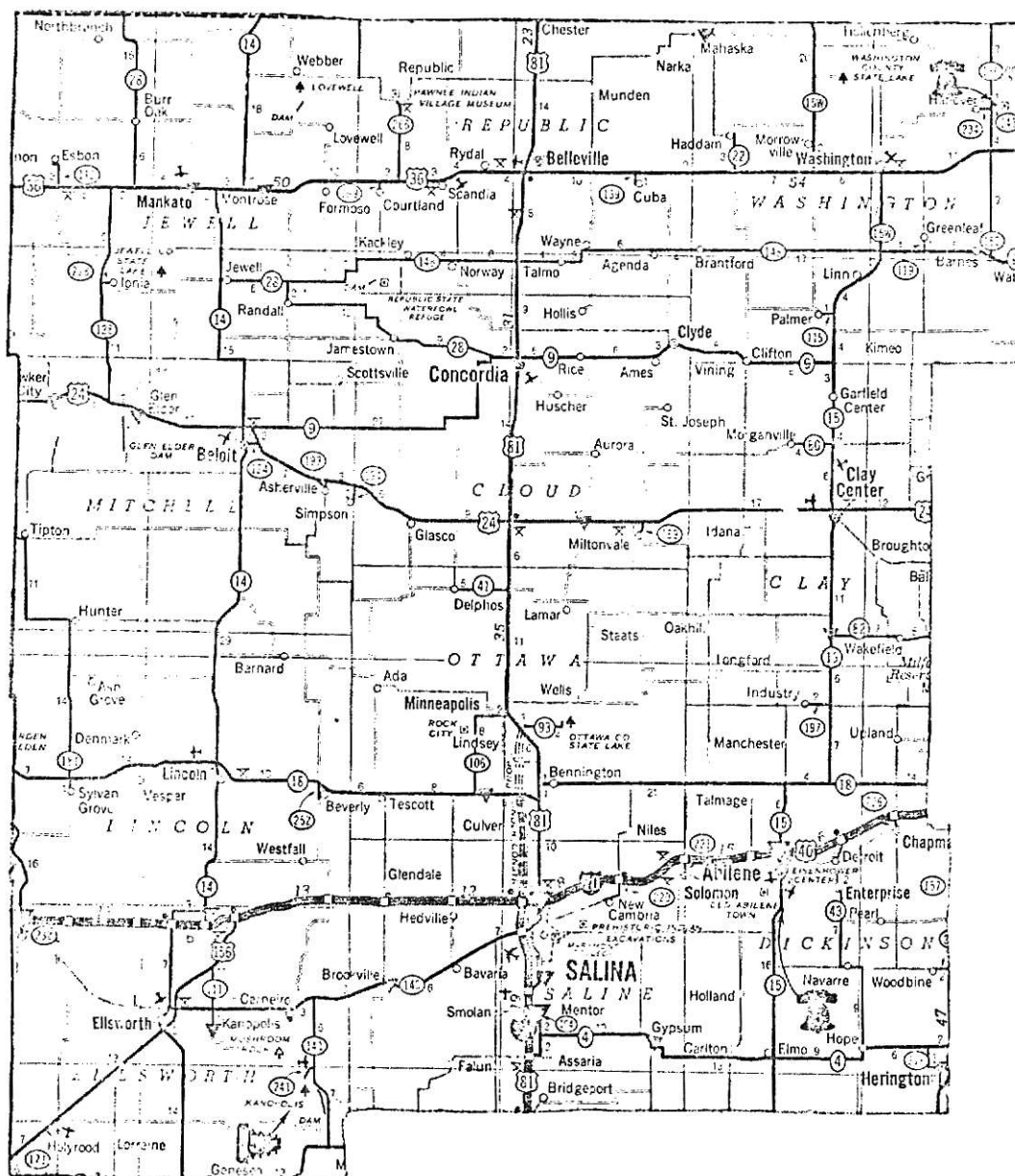
The eleven counties were evaluated with respect to six variables in an attempt to find the most typical or average county. These six factors are thought to be important for the development of land values. The six factors are: population density per square mile, the percent of land in crops, the average size of farms, the average value of land and buildings per acre, the average farm income in 1969, and the per capita property tax for 1969. Table 1 (page 28) shows the comparative statistics for each of the counties, with the counties ranked low to high for each variable.

Clay county was picked as being representative of the other counties in the region on the basis of the six factors. The selection process was an attempt to regard counties in a rather homogeneous farming area and pick, first of all, the county "most typical" of the group. That is, attempt to

**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH DIAGRAMS
THAT ARE CROOKED
COMPARED TO THE
REST OF THE
INFORMATION ON
THE PAGE.**

**THIS IS AS
RECEIVED FROM
CUSTOMER.**

Fig. 1. Map of Eleven County Area in North Central Kansas.



Source: Conoco touraide map of Kansas.

TABLE 1
COMPARISON OF ELEVEN COUNTY AREA IN NORTH CENTRAL
KANSAS FOR SELECTED FACTORS

County	Population density	Percent cropland	Ave. size of farms	Improvements value/acre	Ave. farm income	Property Taxes
Clay	15.0	47.1	457.5	\$138.2	\$7756.	\$260.4
Ottawa	8.6	41.1	620.4	133.5	3446.	330.0
Cloud	18.9	47.2	457.5	119.4	5100.	245.7
Mitchell	11.2	45.9	620.1	138.3	6001.	252.3
Washington	10.4	44.0	406.5	114.9	9982.	278.1
Jewell	6.7	41.1	533.6	105.0	8097.	326.3
Lincoln	6.3	35.4	657.5	112.9	4170.	342.5
Republic	11.8	48.5	400.5	132.6	8027.	306.3
Dickinson	23.4	51.1	446.2	138.2	8035.	221.1
Ellsworth	8.6	33.3	721.3	116.5	3863.	337.8
Saline	64.7	40.7	593.6	162.6	4338.	190.4
Average	16.9	43.2	541.0	128.4	6256.	281.0
Std. dev.	16.7	5.5	108.4	16.4	2224.	51.3

Sources: U. S. Department of Commerce, Bureau of the Census, 1964 Census of Agriculture and 1960 Census of Population.

Kansas State Board of Agriculture, Farm Facts, and data of the Kansas State Department of Agriculture.

select the county which could be considered average or descriptive of selected factors pertinent to the many possible influences on farmland prices. The ranking of the counties was as follows: (1) Clay, (2) Ottawa, (3) Cloud, (4) Mitchell, (5) Washington, (6) Jewell, (7) Lincoln, (8) Republic, (9) Dickinson, (10) Ellsworth, and (11) Saline.

It may be beneficial in a second phase of this study to regard a county less typical of the selected factors, either at the top or bottom of the list of counties. In this way comparisons may be made as to the degree of variation in the counties which may be caused by certain factors describing the county.

Geographically located in the north central part of Kansas, Clay county's main industry is agriculture. According to the 1964 Census of Agriculture there were 1,039 farms in Clay county. These farms produced field crops valued at \$8,994,780 and livestock valued at \$12,151,430 in 1970.²⁰ The value of retail trade was \$17,443,000 and wholesale marketings were \$9,522,000 in 1963.²¹

The average farm size in the county was 457.5 acres. It was estimated that 47.1 percent of the land was cropland. The average farm income was \$7,756. The largest farm income commodity was beef production followed by hogs. The total land area in the county is 421,120 acres.²²

The county's population numbered 9,890 residents in 1970. This was a 7.4 percent decline from 1960. Clay Center, the only urban city, had a pop-

²⁰Kansas State Board of Agriculture, Farm Facts 1970-1971, p. 12F.

²¹U.S. Department of Commerce, Bureau of the Census, 1963 Census of Business, Retail Trade, Kansas (1965).

²²Kansas State Board of Agriculture, Farm Facts 1970-1971, p. 72F.

ulation of 4,963 which was an increase of 7.6 percent since 1960. Because Clay Center comprises a relatively large part of the total county population, the county is 50.2 percent urban.²³

Clay Center, containing approximately half of the population, is also the county seat. It is located almost in the geographic center of the county and is connected by two major highways, one to points east and west and the other to areas north and south of the city. Clay Center has two major sources of industrial employment, both firms construct agricultural equipment. They are Gilmore & Tatge Mfg. Co. and Hutchinson Division-Royal Industries.

The residents of the county must travel a distance greater than twenty miles to reach a city larger than Clay Center for their services and supplies. Some of the largest cities in neighboring counties include Abilene, Junction City, and Manhattan.

The Republican river runs diagonally northwest to southeast through the county. The river basin offers some of the most productive cropland. In the southeast corner of the county, the river becomes the major tributary of Milford resevoir. The main residential and commercial development along the resevoir occurs further downstream in Geary county. However, Wakefield is a small community in Clay county which is developing recreational facilities to accommodate boating, fishing, and other related activities. There has not been sufficient development to warrant any belief that the resevoir has affected land values in Clay county significantly.

Also in the southeast corner of the county, some land is owned by the federal government as part of the Fort Riley Military Reservation. It has several years since there has been any military expansion, so this factor

²³U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Kansas Advance report, PC(V1)-18 (Washington, D.C., January 1971), pp. 3,6.

too, is not considered a significant influence on land values. Likewise, the tenants forced to vacate their land over five years ago, when the Corp of Engineers began filling Milford resevoir are no longer thought to have any impact on land values.

Several small towns in the county (see map page 27) have small stores for general supplies for home and farm needs. Besides Clay Center, the largest community is Wafefield. It offers some limited opportunities for trading in machinery and equipment.

Sources of Data

When the study was initiated, 1970 was the latest full year for which complete information about the transfers could be obtained. That year or any year might not be a typical market period for real estate sales. Land sales and acreage sold declined for Kansas from 1969 to 1970. Also, the average price for rural land decreased in the period. This may be at least partially due to the depressed economic conditions and the relatively high interest rates.²⁴

To gain ideas of the sources of transfers, one should visualize the methods by which transfers occur. Real estate is sold under conditions of cash and credit financing. Some sales are part-interest transactions where the deed relinquishes only a portion of the ownership rights in the property. Exchange transfers involve a trade of properties without large cash consideration being involved in the transfer. Nonsale transfers are composed mainly of property conveyed through gifts, inheritance, and devised by the will of a deceased property owner.

These methods of real estate property transfer can be identified from

²⁴Economic Research Service, Farm Real Estate Market Developments, USDA, CD-76, August, 1971, pp. 3-6.

different sources. Each source may reveal a different type of information, so that one may be of more value than another. The prime source of sale transfers was the Property Valuation Department's assessment-sale ratio cards. A photo copy of one of these cards is shown on the following page.²⁵

The ratio card denotes the parties involved in the land transfer, the legal description and county tract number, and the full consideration paid for the property. This is in addition to the assessed value-sale value ratio utilized by the Property Valuation Department.

Ratio study cards are not available for all transfers which occur in the county. The state requires that an assessment-sale card be completed for all bona fide sale transfers which are recorded in the county in each calendar year. Some of the reasons that a transfer is not used in the ratio analysis may be found on the reverse of the ratio card (see page 33). All of the information found on the ratio card is obtained from the parties to the transfer when the title is recorded. This information is secured by the register of deeds according to Kansas law.

58-2223a. Certificates of value upon transfer of title to real estate; use of information. No deed or instrument providing for the transfer of title to real estate, shall be recorded in the office of the register of deeds unless such deed or instrument shall be accompanied by a certificate of value by the grantor, grantee or his agent concerning the property transferred. The register of deeds shall in conjunction with the county clerk use the information derived from said certificate in preparing the report to the director of property valuation as provided for in K.S.A. 1967 Supp. 79-1436.²⁶

A photo copy of the certificate of value is shown on page 34. Reasons when it may not be completed are:

²⁵Ratio cards were made available for this research with individual information treated confidentially.

²⁶Kansas Statutes Annotated 1967, Ch. 310, 1, 58-2223a.

ILLEGIBLE DOCUMENT

**THE FOLLOWING
DOCUMENT(S) IS OF
POOR LEGIBILITY IN
THE ORIGINAL**

**THIS IS THE BEST
COPY AVAILABLE**

Fig. 2. Copy of Assessment-Sale Ratio Card.

County	Co. No.	Date Deed Recorded	Certificate of Value \$	Total Assessed Value \$	Class and Sub-Class of Real Estate at Time of Sale	
Grantor		Date of Sale	Price Shown by Deed \$	Assumed Mortgage \$		
Grantee		(The following question may be answered by the Reg. of Deeds, Co. Assessor or Co. Comm.) In your opinion, is this sale indicative of the value of the Real Estate sold? <input type="checkbox"/> Yes <input type="checkbox"/> No. If answer is "No" briefly explain:			URBAN 1 <input type="checkbox"/> Residential 2 <input type="checkbox"/> Multifamily 3 <input type="checkbox"/> Commercial 4 <input type="checkbox"/> Industrial 5 <input type="checkbox"/> Vacant Lot	
City or Township Name	Number-Range				RURAL 1 <input type="checkbox"/> Agricultural Investment 2 <input type="checkbox"/> Agricultural Non-Investment 3 <input type="checkbox"/> Home Sites 4 <input type="checkbox"/> Planned Subdivision 5 <input type="checkbox"/> Commercial 6 <input type="checkbox"/> Industrial 7 <input type="checkbox"/> Recreational	
Addition/Section						
Block/Lot/Quarter						
Book No.	Page No.				1. Property was <input type="checkbox"/> Improved when assessed <input type="checkbox"/> Unimproved	
Assessor's Code No.					2. Property was <input type="checkbox"/> Improved when sold. <input type="checkbox"/> Unimproved	
Report of Real Estate Sales P.V.D. (S-1 169) K.S.A. Supp. 79-1435 etc. Original to be mailed to Property Valuation Dept. Duplicate to be retained by County Assessor					3. Sub-class has been changed since time of sale to _____	
					Signed: _____ Use back of this sheet for additional space.	

side A

I. The following are some reasons why a sale cannot be considered for the sales/assessment ratio study.
 (Appropriate "X" may be listed on the original in lieu of copying the statement.)

1. The price shown on the certificate of value includes the purchase of some item of personal property, such as farm machinery, motor vehicles, etc.
2. The price shown on the certificate of value includes leasing other land, purchase or leasing of property in other counties, etc.
3. The class or subclass of the land involved in this sale has been or will be changed from the class or subclass at the time of the last assessment.
4. The improvements on the land are different at the time of sale from the time of the last assessment.
5. The assessed value is for more or less real property than the real property described in this sale.
6. A sale which the Kansas statutes do not require the filing of a certificate of value.

II. See PVD Memo 5-14-70 relative to some circumstances which we would like to know about relative to formulating an opinion regarding fair market value. Feel free to comment about each transaction.

III. We want the best possible sales/assessment ratio study. Remember, the certificate of value price is to be for only the real property described in this transaction, and further the assessed valuation is to be for the same property under identical situations.

IV. The sales/assessment ratio is not necessarily the assessment ratio to fair market value for ad valorem tax purposes.

side B

Fig. 3. Copy of Certificate of Value Statement.

INFORMATION REQUESTED				COUNTY OFFICIALS USE ONLY	
Grantee: _____ <small>(Property Location: Condense lengthy legal descriptions)</small>				Reg. of Deeds Book _____ Page _____	
(City or Twp.) _____	(Add. or Sec.) _____	(Blk. or Twp.) _____	(Lots or Rng.) _____	Co. Assessor Code No. _____	
Street or R.F.D. No. _____					
CERTIFICATE OF VALUE					
I hereby certify that the total consideration paid for the property transferred by the deed or instrument of which this certificate is appended covering is, to the best of my knowledge or belief as follows:					
\$ _____					
I further certify that the present use of the property is _____					
_____ and its intended use is _____					
_____ and that as a result such property is properly classified for the					
purpose of determining the fair market value thereof as _____					
<small>(See back for list of classifications)</small>					
I further certify that the address to which tax statements for the property are to be sent is _____					

<small>(Mailing address for tax statements)</small>					
Given this _____ day of _____, 19____					
Signature _____					
<small>(Grantor, grantee or his agent)</small>					
Address _____					
<small>(K.S.A. 58-2223a-58-2223a Incl. 1st amended) & Senate Bill No. 89 (69 Session)</small>					

CONSOLIDATED-BALINA

side A

A. Urban Property**CLASSIFICATIONS**

1. **RESIDENTIAL.** Residential property shall include land and improvements thereon used or if unoccupied designed for use as a single family dwelling or home.

2. **MULTIFAMILY.** Multifamily property shall include land and improvements thereon containing independent dwelling units for two or more families in a single structure.

3. **COMMERCIAL.** Commercial property shall include land and improvements thereon concerned with all activities of business or trade engaged in for the purpose of producing income but shall not include industrial property.

4. **INDUSTRIAL.** Industrial property shall include land and improvements thereon used for the conversion of materials into finished manufactured products or for the purpose of warehouses or minor processing plants.

5. **VACANT LOTS.** Vacant lots shall include unimproved property which has been platted into lots and blocks.

B. Rural Property

1. **AGRICULTURAL INVESTMENT.** Agricultural investment shall include those properties presently used and operated as units with a source of economic life from the production of agricultural products that originate from land productivity.

2. **AGRICULTURAL NONINVESTMENT.** Agricultural noninvestment shall include those properties presently used and operated as noneconomic agricultural units upon which some agricultural goods are produced but the primary source of value of which is as a rural home with cash needs derived from other than nonagricultural sources.

3. **HOME SITES.** Home sites shall include those properties that provide residential uses only with rural atmosphere that permits the use of horses, pets, etc. but do not produce goods or income from agricultural products.

4. **PLANNED SUBDIVISIONS.** Planned subdivisions shall include those properties planned and plotted for community residential uses, developed and sold as a commodity through wide mass sales exposure.

5. **SPOT INDUSTRIAL AND COMMERCIAL.** Spot industrial and commercial properties shall include land and rural areas developed for spot industrial and commercial uses at selected locations to satisfy isolation or decentralized needs of industrial plants.

6. **RECREATIONAL.** Recreational properties shall include properties located in rural areas where lakes, streams, forest and mountain terrain and physical characteristics permit recreational uses of the commercial nature so that the source of economic life are from commercial improvements and not based on land capabilities and associated productivity responses.

The Value shown on the Certificate of Value shall be the amount of the full actual consideration thereof, paid or to be paid, including the amount of any lien or liens assumed.

side B

58-223c. Same; inapplicability to certain transfers. The certificate of value required by this act shall not apply to transfers of title: (1) recorded prior to the effective date of this act; (2) to the United States of America, the state of Kansas or any of the instrumentalities, agencies, or political subdivisions thereof; (3) made solely for the purpose of securing or releasing security for a debt or other obligation; (4) made for the purpose of confirming, correcting, modifying or supplementing a deed previously recorded, and without additional consideration; (5) by way of gift; (6) on sales for delinquent taxes or assessments; (7) to cemetery lots; or (8) by leases and transfers of severed mineral interests.²⁷

The Clay county register of deeds and county assessor complete a certificate of value and a ratio card for every recorded transfer. If a transfer is the result of a gift, a part-interest sale, exchange or other type of transfer which is not required to be recorded, then the card is appropriately marked and not used for further study.

With the assistance of the county treasurer, a list was made of properties which might have been sold by installment contract. Installment contracts are rarely recorded and deeds are not recorded until full payment has been received usually several years after the sale. It is generally agreed that whoever "owns" a tract of land is responsible for the taxes levied on the same real property. By regarding the changes made in the payor of property taxes in either December of 1970 or June of 1971, it was possible to detect transfers which were not recorded. The county court house tax list for owners of rural property as well as files of county property tax receipts were made available to ascertain this data.

The process necessary to utilize the tax records was time consuming but considered necessary to develop a complete account of installment contract transfers. The installment contract is not usually recorded, but held in escrow along with a signed deed which is recorded only after provisions

²⁷ Kansas Statutes Annotated 1967, Ch. 310, 3, 58-2223c.

of the contract have been fulfilled. Since taxes on real property may be paid partially (one-half) in December and partially in June, the situation was further complicated.

If the list of taxpayers for each township showed a nonowner (individual without title) paying the taxes for a tract, then the 1969 tax receipts were checked to see, assuming the individual was buying on installment contract, if he had begun payments prior to 1970. If the answer was positive then there was no need for further checking as the study encompasses only 1970 transfers. If the answer was negative and the payee assumed payments sometime in 1970, then both the June and December receipts for 1970 taxes were utilized to verify that the individual was paying the taxes. It was also possible that a buyer in 1970 did not begin payments until 1971, in which case, later tax records were checked. The latter situation would be possible under the agreement of the transfer.

The procedure outlined above produced a list of transfers felt to be seller financed installment contract sales. It was realized, however, that there may be reasons for a party, not buying the real property and without possession of title, to be paying the taxes. These cases had to be eliminated either by personal interview or from other sources. Certain cases were open to suspect immediately and were eliminated. For example, a family member paying for the mother, sister, or brother in whose name the property had title. Also, a lawyer could be authorized to pay property taxes, especially in the case of an estate of a deceased individual or when the owner lived in another state.

Members of the court house staff and other officials of the court house were able to substantiate that some transfers had or had not been made. Instances where no assurance could be obtained meant that one of the parties

on the tax record was contacted before the situation could be described with certainty.

A third source of information for a list of transfers was the Agricultural Stabilization and Conservation Service (ASCS). This agency keeps records of the owners of all rural land in the county in order to administer the government sponsored agricultural programs. They learn of the ownership changes from producers-both renters and owners. They learn from neighbors of the property owners and they scrutinize the county newspapers to learn of deaths of property holders which transfers the land into an estate of the deceased. It is necessary that a farm owner or operator keep these data up to date for acreage allotments, a determination of base acreage, and payments; so they are necessarily verified once a year.

As these revisions are made in their records, the ASCS office in Clay Center completes a form which cites the name change and farm identification number, the tract identification number, and the reason for the alteration. This source was of secondary use because of the difficulty deciphering exactly what kind of change had taken place. The same form is completed for changes such as: a new tenant, change due to an estate being settled, estate property being transferred to an administrator's name, change in program acreage, name correction, change in address, and others besides a change in ownership. Also, the date when a change in ownership occurred was not recorded on the form. At the same time the information proved to be very sketchy and in coded form.

So this source was used mainly as a check on those sale transfers identified from the county court house files and was also a source of identification for nonsale land transfers. The ASCS also made available on a confidential basis information on acres owned and operated for buyers and

sellers of land.

The major source of nonsale estate transfers in Clay county was the office of the probate court. The probate court must sanction the inheritance of all real property from the estate of a deceased individual. The court has records of all cases filed in the county, the date filed and settled, a description of the real property, its appraised valuation, and a description of the proceedings until final settlement of the estate.

As estates are normally not settled or fully documented until at least a year has lapsed, it would not have been possible to find a complete list of real estate property transfers by estate for the calendar year 1970. The criteria, then, was to find all of those cases which were finalized in 1970 and study these cases.

The probate court has a continuous record book of all estates of deceased individuals who resided in Clay county. This book gives the date the case was filed as well as the date the case was settled. With this list of names it was possible to check the corresponding file of each case to determine which individuals owned rural real estate.

The file contains the legal description of the property and its appraised value. It will also indicate the devisees to the property if the deceased died testate or the legal heirs if the deceased died intestate.

Some of the farmers and rural residents of the county were also asked if they were aware of any real estate transfers which had occurred in 1970. It is not easy for most people to remember precise dates of transfers and the circumstances involved; however, this source was used as a check and a means to identify the activity in the market place.

Discussions were held with bankers, abstractors, realtors, and lawyers in Clay Center in an attempt to gain a better understanding of the real

estate market for the year. It was generally considered that 1970 was not an active year in the Clay Center area.

Although many real estate transfers were conducted between individuals, a third individual is often asked to help implement the transfer. This party may draw the contract or simply offer his professional advice to the individuals. Because of this connection to the market, professionals were familiar with the activity.

Collection of Data

Having made a tentative list of all of the rural real property transfers which occurred in the year, the next step was to set forth the criteria for the particular transfers which would be studied in more detail. According to the hypotheses, more information was needed on sale transfers of rural real estate. It was felt that certain sales of small tracts would be bought primarily for improvements or for investment purposes and should be excluded. This would be especially true for those sales of rural land close to a town. It was decided to restrict sale transfers of rural property to those transactions in rural areas (outside any city boundaries) which was greater in size than twenty acres.

This restriction was necessary to achieve rather homogeneous cases which would not be greatly influenced by factors not common to rural property. It was not necessary to exclude transfers with considerable improvements, but it was desirable for statistical analysis not to have a particular part of the sample unduly influenced by correlation with one factor.

To set a firm foundation for the survey, terms were defined before any judgments had to be made.

Personal property (chattel) is meant to be any movable item which may

possess value to the owner.

Real estate is property composed of land, improvements, and any crops on the land. Property is (1) the legal right to the possession, use, enjoyment and disposal of a thing; an unrestricted and exclusive right or interest in or to a thing; (2) anything that may be owned or possessed.

Rural real estate is property located outside the corporate limits of a city except land which is subdivided into lots or small acreage tracts and used for non-farm purposes. For the study, tracts in the sample and used for regression analysis must exceed twenty acres.

A sale of real property is a bona fide transfer as reflected by the actual price paid in the open market by or between a willing buyer and a willing seller. A sale is a contract under which property is transferred from one person (called the seller or vendor) to another (called the buyer or purchaser) in return for the latter's payment or promise of payment of a fixed price of money or property. A cash sale is the purchase of real estate with money from one's own earnings or funds. In a cash sale the deed is obtained immediately. A mortgage sale is the purchase of real estate with money borrowed on the value of the land. The mortgagee has a lien upon land as security until repayment is made. The deed is given to the buyer and usually recorded. In case of default, under Kansas law, there is a twelve month redemption period. An installment contract land sale is the credit purchase of real estate with the vendor being the original source of credit. Contract sales usually involve annual installment payments. Rather than the buyer pledging the land as security, the seller retains title to the land as protection against default until a specified proportion of the purchase price has been paid. In case of default by the buyer, Kansas law provides no specific redemption period during which a buyer remains in possession.

Full consideration is the monetary value offered and accepted in the formation of the purchase contract.

Down payment is a partial payment given in the first year of the sale and is generally the first payment.

A contract is a legally enforceable agreement between two or more parties to perform the sale upon sufficient consideration.

A deed is a written document that contains a contract. A deed is the instrument by which land is transferred from one person to another.

A title is the legal evidence of a person's right of property. Also, it is the grounds by which the owner has the just possession of ownership in property.

A questionnaire was structured to interview a sample of the parties involved in the transfer of land. The questionnaire was designed to obtain information needed to test the hypotheses. It was divided into six general sections: (1) the real estate, (2) the seller, (3) the buyer, (4) the terms of the transfer, (5) the title, and (6) the use of the real estate. Each section and each question involves specific information necessary to understand and analyze the transfer. A copy of the questionnaire may be found in the appendix, 1-A.²⁸

The section on real estate provides for a description of the physical characteristics of the tract. Certain questions were included to relate the productivity of the soil to the price per acre.

Agricultural capability is sought by the question on cropland acres in the tract. This approach has been used in other studies (New Mexico, Edwards-Kansas). Acres of cropland was further subdivided into acres of bottom and

²⁸All information was made available with the expressed right that individual information be held confidentially.

acres of upland. This variable was found not to be a good question as such a classification is not commonly defined by all farmers. Bottom is normally considered more adapted to intensive farming than upland. However, some farmers distinguish between first bottom and second bottom. Also, some farmers indicated that bottom is not more productive than upland, but the opposite. It could be that management practices are also involved in these respective answers.

The questions on improvements were an attempt to evaluate this land attribute without dollar estimation being required. Since it would be impossible to ask everyone to appraise their property improvements, the parties were asked only to judge the improvements on the basis of condition-good, fair, or poor. In later analysis an index could then be utilized for purposes of comparison. By using an index, it was hoped that the buyer could judge his improvements on the basis of what he felt they were worth when he paid for them. That is, they could be judged in relation to the overall value of the tract and not as being separate from it. Also, this would do away with discrepancies caused by large variations in dollar values.

An index was developed on the basis of all improvements-house, buildings, and land; also, another index was based solely on the condition of the house. The scale describing all improvements ranged from zero to six. At the top of the scale, six designates highly improved property with good improvements in at least two categories. At the bottom of the scale, zero represents no improvements whatsoever while one designates at least some improvements, but rated poor. Each type of improvement is given equal rank towards the final index value. Home improvements were based on a scale from zero to three with a similar interpretation.

A question about the best road refers to the best road adjoining the

property. The objective was to classify the road into one of three types-hard or oil base, gravel, and dirt road. The condition otherwise was not asked as the description is generally indicative of the quality of the road. This question about the type of road parallels those asked in a survey conducted in sections of the state to determine the effects of the type of road on the value of the property (Edwards-Kansas).

The distance to Clay Center was a variable, measured in miles, of the type found to be significant in several studies (Nevada, Indiana, Kansas-Sutton, Edwards). Clay Center seems to be particularly well-suited for this purpose due to its location as well as its influence as a trading center on the surrounding area. The map on the following page designates the location and relative size of tracts which were full consideration transfers in 1970.

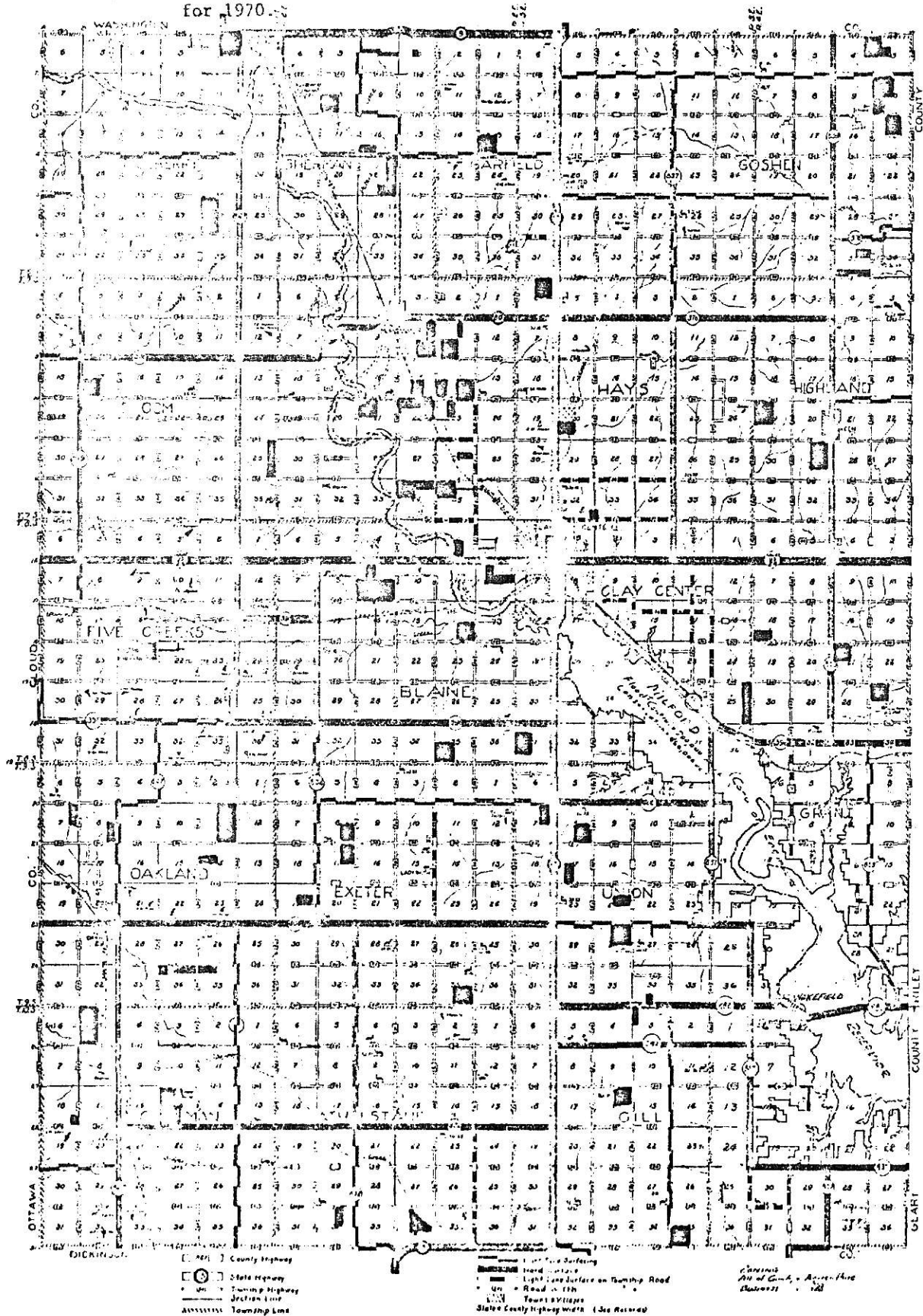
Two other questions asked about distance to the grain market and livestock market did not prove successful as a great deal of variability existed in their answers. The grain market was often the closest small community, but it also turned out that many farmers did not market any grains but stored and fed the crops on the farm.

Also, it seems that the area farmers utilize several livestock markets with no particular pattern. Feeder cattle may be sold as far away as St. Joseph, Kansas City, and Wichita. Hogs, as well as cattle, may also be sold to packer buyers or at auction markets in Manhattan, Emporia, Abilene, Clay Center, and other places. Based on this information it was not possible to analyze the effect of distance to commodity markets as a determinant of property value.

A question was asked to see if any of the tracts being sold were irrigated; however, it was found that none were developed for irrigation before the sale. Yet, some property was bought with the intention to invest

MAP OF CLAY COUNTY KANSAS

Fig. 4. Location of Full Consideration Sale Transfers in Clay County for 1970-83



in a watering system. If irrigation had been present in any tract, it has been shown that it would have been a factor determining the land price (New Mexico, Nevada).

In the sections on the seller and buyer, the questions were structured to learn more about these individuals. Most of the variables can be used for comparative purposes and a few were planned for inclusion in multiple regression analysis. Acreage owned and operated were planned to indicate the scale of the farm operation for the buyer. The acres operated could be a proxy for the desire to enlarge as might net income be a factor in enlargement. Similar variables have been found to be significant determinants of price variability (Indiana).

Distance from the farm operation was expected to work in a manner like the distance to a trading center. But considering that distance to pasture would not be as significant as the same distance to cropland, complications seemed to arise in any use of this variable.

Net income was broken into seven classes for purposes of comparison. The reason for this was an expectation that the responses would be better if a specific answer was not required.

The section on the terms of the sale was established mainly to compare the methods of financing and to show variability hypothesized to exist in the market. The questions in this section were descriptive of the conditions of payment. They encompassed the full consideration, the down payment, credit arrangement, and other conditions of the contract.

The final two sections were meant to be mainly informative. The first was to describe the nature of the title and the second was to indicate the intended use of the property.

It was uncertain as to whether both the buyer and the seller could be

contacted; however, it was felt necessary that all of the information be completed concerning the buyer and his action in the transfer. In the event that the buyer could not be questioned, then a spouse, other close relative, or the seller would be asked to see if any of these people could supply the information.

Realizing that most of the questions in the survey were related to the buyer and limited by the extra time required for individual interviews, it was decided not to interview the seller. In cases where the buyer could not be located or a particular question might be substantiated if the seller was questioned, then an effort was made to find him; otherwise, he was not questioned.

In cases with questions left unanswered, other sources of information including neighbors, seller, lawyer, realtor, ASCS, and court house records often provided answers.

It was to be expected that a survey of every case randomly selected for study could not be obtained. An alternative procedure was outlined to be followed for those selected but not completed. Failure to complete questionnaires arose from inability to locate certain people who did not live in Clay county, the buyer declined to answer questions about his purchase, the party could not be found after three attempts to find him at home, and the case was found not to fit the criteria. The procedure authorized the survey to take the next case on the list after one which was not collected and attempt to complete it. In this manner a case was probably taken out of the same township and hence, in the same area.

Assessment-Sale Study

While data was being compiled for land transfers in Clay county, an evaluation was also made with regard to those tracts utilized by the state

for comparison of property tax assessments. In 1970, the Property Valuation Department utilized forty-seven sales of rural property in Clay county for the assessment-sale ratio study. The study included only recorded sales (full consideration) in 1970.

Of the 47 rural transfers, 7 were sales made earlier than 1970; 3 were exchange transfers; 1 was an installment contract made earlier and converted to a mortgage; 2 were deeds representing the legal transfer of ownership rights to a creditor, "grantee," under an installment contract agreement while possession remained with the "grantor." Subtracting these 13 transfers not representing either cash or mortgage sales for the year, leaves 34.

This means that only 37 percent of the 91 full interest sales of rural property were utilized in the study. Disregarding the 35 installment contract sales for the year, 60.7 percent of the recorded cash and mortgage transfers were used (see Table 2).

The twenty-two recorded transfers not used in the ratio study were excluded for various reasons. Some were not regarded as representative of other sales in the county; others were subject to recording errors. The following list enumerates the reasons for excluding these transfers:

- 8 Transfers initiated in 1970 but recorded in subsequent years, 1971 or 1972. As the assessment-sale study is conducted on the basis of the date recorded, it would not have been possible to include any of these cases.
- 7 Transfers connected to land purchased by four parties with financing provided by a mortgage and an installment contract encompassing eight transfers. One of the eight was used. The others were not used partly because of the complexity of the transfers and partly due to error in marking the ratio cards. Problems in understanding complex cases are evident as two cards, cited as representing installment contracts, were used instead of the cards dealing with cash and mortgage financing.
- 2 Transfers excluded by the county assessor because each involved an assumed mortgage representing part of the consid-

TABLE 2

RECORDED TRANSFERS OF RURAL REAL ESTATE SALES IN CLAY
COUNTY WITH RESPECT TO USE IN RATIO STUDY, 1970

Township	Recorded sales-1970	Used in 1970 Ratio study		Not used in 1970 study	
		cash	mortgage	cash	mortgage
Athelstane	2	:	2	:	:
Blaine	4	:	1	:	3
Bloom	2	:	:	1	1
Chapman	2	:	1	1	:
Clay Center	16	:	4	4	2
Exeter	:	:	:	:	:
Five Creeks	:	:	:	:	:
Garfield	1	:	:	:	1
Gill	1	:	:	1	:
Goshen	4	:	2	1	1
Grant	2	:	:	1	1
Hayes	3	:	:	1	1
Highland	3	:	1	2	:
Mulberry	1	:	:	1	1
Oakland	3	:	:	2	:
Republican	:	:	:	:	:
Sherman	12	:	1	2	3
Union	:	:	:	:	:
Total	56	:	12	22	11

eration. The mortgage value could have been added to cash consideration to correctly complete the ratio card, however, this is a matter of judgment.

- 3 Transfers excluded by the county assessor because they were not considered typical of similar property sales in the county. Each was a cash transfer; each was a tract less than five acres; each had an assessment-sale ratio which is extreme (3, 4, 84).
- 1 A transfer excluded by the county assessor because it had been transferred earlier in the year for the same consideration.
- 1 A transfer which was misplaced and left out of the study.

Of the transfers used in the study, six were very small tracts, five acres or less, and two more had less than forty acres in each. Classification of these small tracts as "agricultural investment" tracts (see page 34) might be questioned if the price paid had been inconsistent with normal (justifiable or fair market value) of farmland. However, ratios for all eight were within a reasonable range of 15 to 39 percent.

Observation of these twenty-two cases not used in assessment-sale study, lends credence to the fourth hypothesis that a classification problem exists in comparing sales. The major factor which seems to contribute to this problem is the few sale transfers which are available in this predominantly rural county.

One classification problem is caused by the use of sales which were recorded in 1970, regardless of when they were sold. A survey of the transfers reveals that some properties are sold some time prior to the date in which they are recorded. This is especially true of installment contract sales which are often sold five years or more before the sale is recorded. Another problem occurs when improvements occur which will change the sale value of a property. One individual may have not made any changes on his property; yet, outside factors may affect his property value. These are related to the location of the property, the development of neighboring property, and other factors.

Statistical Methods

There are several possible procedures by which statistical comparisons may be conducted-ranging from simple observation of the data to complex mathematical algorithms. Each may be equally important as a means to indicate the relationships in data.

A comparison of two factors may reveal a large degree of correlation in the manner by which they vary. At the same time, it is possible that the movement in one factor may best be described by a set of variables. That is, a combination of two or more variables may in turn influence or determine the variation in another. It is this type of relationship which was anticipated. One of the statistical tools utilized to test the causal effect of several variables on a particular variable, often called the dependent variable, is multivariate analysis. In this study, both analysis of covariance and multiple regression were used to study the method of financing as an influence on the value of real estate property.

The analysis of covariance procedure is a statistical technique designed to eliminate the effects of variations in a particular variable to provide more accurate estimates of the dependent variable. The model for the covariance analysis may be written

$$Y_{ijk} = u + a_i + b_j + c(X-X) + e_{ijk}$$

where Y_{ijk} is the dependent variable, u is the intercept, a_i and b_j are the coefficients of the independent variables, and c is the coefficient of the variable held constant. The e_{ijk} stands for the error term or unexplained variation.

In this analysis, the test is to detect the influence of c on Y_{ijk} , given the effect of the other variables. Or in the case of discrete variables, one may determine if their individual coefficients are different

from each other. In this manner one is testing the hypothesis that specified variables cause different fluctuations in the dependent variable. Also, a particular variable may be tested to see if its regression coefficient is significantly different than zero.²⁹

The dependent variable commonly used with respect to real estate analysis is its price. Some studies have attempted to estimate the full consideration of the real property while others have utilized price per acre.

In a Kansas study by Sutton, a multiple regression model of price per acre yielded the most reliable estimate of the selling price.³⁰ Comparing both forms of the price model by estimating the selling price of an average tract, Sutton found that price per acre gave a standard error of estimate \$631.58 smaller than the estimate utilizing full consideration.

In another Kansas study by Edwards dealing with the value of roads, the full consideration model consistently explained more of the variation in price than did a model using price per acre. It was felt that road and location factors were affected by different size tracts and that a better representation would be achieved utilizing the larger value associated with full consideration.³¹

Given an adequate sample size, it is questionable that the effect of roads or location would be any less evident using price per acre than full consideration. It seems more reasonable that the selection of a dependent variable is more dependent upon the form of the data available

²⁹William G. Cochran and Gertrude M. Cox, Experimental Designs (New York, N.Y.,; John Wiley & Sons, Inc., 1957), pp. 82-83.

³⁰Sutton, "Temporal Stability of the Effects of Factors Causing Intertract Variations in Farm Real Estate Prices in Kansas," p. 49.

³¹Edwards, "An Economic Analysis of Highway Improvements and Other Factors Affecting Farm Real Estate Values in Selected Areas of Kansas," p. 140.

and the desired use of the results.

Utilization of full consideration enables one to combine acres and price per acre. It should then be realized that any factor dealing with acres in the tract will have a high correlation with the dependent variable. At the same time, the result will indicate a value not readily comparable with other tracts of unequal size without adjustment.

One might also expect that the variation of the dependent variable (total consideration) will be greater with larger tracts than with smaller tracts. A problem of this nature is called heteroscedasticity.³² Some of the reasons causing this phenomenon are: (1) larger tracts contain a more diverse representation of land characteristics; (2) larger tracts may not attract the same set of buyers as an average tract; and (3) there will be fewer large tracts sold; and hence, they are less subject to comparison.

It was concluded that for this study the price per acre would be the best representation of the value of land. The reasons for this decision are: (1) the study encompasses a rather small number of transfers with a rather wide range of price; and (2) comparing tracts by the method of finance would be facilitated if acres were random.

As many independent variables were developed from the questionnaire as possible. The list of all variables is shown on the following page (figure 5). Due to the nature of some variables, it was not possible to use only continuous variables designating a magnitude or weighting factor. For discrete variables, the interpretation is slightly different. They are used solely to indicate that a force was present. It can mean that a factor contributes on the basis of its existence or absence in the model.

³²J. Johnston, Econometric Methods (New York, N.Y.; McGraw-Hill Book Company, 1963), pp. 207-211.

Fig. 5. Variables used in multivariate analysis.

Discrete:

- X₁ cash sale
- X₂ mortgage sale
- X₃ installment contract sale
- X₄ surfaced road
- X₅ gravel road
- X₆ dirt road
- X₇ property was rented to buyer
- X₈ property was rented, but not to buyer
- X₉ property was not rented
- X₁₀ property bought for enlargement
- X₁₁ property bought for reasons other than enlargement

Continuous:

- X₁₂ number of acres in tract
- X₁₃ index of improvements on tract (0-6)
- X₁₄ distance to Clay Center (miles)
- X₁₅ age of the buyer
- X₁₆ number of acres operated by the buyer
- X₁₇ number of acres owned by the buyer
- X₁₈ percent of cropland in tract
- X₁₉ distance to base of operations (miles)
- X₂₀ repayment period (years)
- X₂₁ index of the number of people interested in buying the tract (0-2)
- X₂₂ percent of full consideration paid down the first year
- X₂₃ percent interest paid
- X₂₄ buyer's net income
- X₂₆ average price per acre paid
- X₂₇ percent of soil classes I and II (Soil Conservation Service)
- X₂₈ percent of soil classes III and IV (Soil Conservation Service)
- X₂₉ percent of soil classes V and VI (Soil Conservation Service)
- X₃₀ ratio seller acres rented to another to acres seller owned (before sale)
- X₃₁ ratio net income to acres operated by buyer (before purchase)
- X₃₂ number acres seller owned (before sale)
- X₃₃ (number of acres in tract)²
- X₃₄ (distance to Clay Center)²
- X₃₅ number of acres in tract x percent soil classes I and II
- X₂₅ index of house improvements (0-3)

The use of discrete or dummy variables is common in social studies.³³

The thirty-five variables utilized in analysis may be divided into three general categories. They are: (1) characteristics of the real estate; (2) a description of the parties involved; and (3) the conditions of the market transfer. Some are considered important because they are based on economic theory; others seemed to be logically related to the farming operation, and hence, might be helpful as determinants of the price of land.

The rationale for including many of these variables is fundamentally the same as that already mentioned in a description of the questionnaire and will not be reiterated. In addition to those variables taken directly from the questionnaire, others were utilized to determine if there was any effect external to the market activity and the individuals in the sale.

The use of these variables in a regression model requires some understanding of the procedure involved in such an analysis.

The regression model utilized in the study is linear. The term linear regression refers to the character of the estimated relationship. Using the method of least squares, a functional relationship estimates a linear equation in which the dependent variable changes a constant amount for every unit change in any of the explanatory variables. Because the explanatory variables are assumed to be independent, their individual effects on the dependent variable can be added. A two-variable prediction equation describing the model is

$$Y_R = b_0 + b_1X_1 + b_2X_2$$

where Y_R denotes the mean value of the frequency distribution of Y for

³³Ibid., pp. 221-228.

specified values of the independent variables.³⁴

In a population, the value of Y is not constant but can be visualized as forming a frequency distribution for a specific combination of the independent variables, X_1 and X_2 . Y_R is the mean of this distribution or in mathematical notation, $Y_R = E(Y/X_1, X_2)$. B_0 is the intercept or the mean value of Y without the effect of the independent variables. The B_1 's are vector quantities of the average or expected change in Y .

Given X_1 and X_2 , it is assumed that the individual values of Y vary about the regression plane in a normal distribution with mean zero and variance σ^2 . Hence, the general model may be expressed

$$Y = a + B_1X_1 + B_2X_2 + e \quad e = N(0, \sigma^2)$$

where e is the residual or deviation for the estimated line from the population value. Each e_i , which may be positive or negative, is squared and summed. The residual quantity will vary directly with the spread of the points from the regression plane. Different values of the estimated parameters, (a, B_1, B_2) , will give different estimates of the regression plane and affect the magnitude of the sum of squared residuals about the regression plane.

It may be said $\sum e_i^2 = f(a, B_1, B_2)$. The principle of least squares is that the estimates of the parameters a , B_1 , and B_2 are chosen to minimize $\sum e_i^2 = \sum (Y_i - \hat{Y})^2 = \sum (Y_i - \hat{a} - \hat{B}_1X_{i1} - \hat{B}_2X_{i2})^2$. Using the least squares regression model, it can be shown that the resulting estimates of the parameters are unbiased and have the smallest standard errors of any unbiased estimates

³⁴George W. Snedecor and William G. Cochran, Statistical Methods (Ames, Iowa; Iowa State University Press, 1968), p. 382.

that are linear expressions in the Y_i 's.³⁵

In any study of factors related to land, it is necessary to recognize the limit of variables which may be measured to explain the variation in the dependent variable, price per acre. Some factors which influence the value of real estate are subjective, capricious or personal and are difficult to identify with random variables. An attempt was made to build some of these factors into the model through the use of discrete values indicating that they were present or influential and if they were not.

It must be expected that all of the influences of this type could not be included in one model. There is a limitation on the number of variables that one can feasibly build into a model and also as one attempts to be more complete, it is likely that correlation among the variables will develop. This correlation among independent variables is called multicollinearity. In order to utilize the least squares analysis, it is necessary that $E(e_i e_{i+j}) = 0$ or that the variables are not highly correlated so that the X matrix may be inverted and estimates of the parameters may be computed.

A list of critical assumptions necessary to obtain the best linear unbiased estimates of the parameters are shown below:

1. $E(u) = 0$. The expectation of the error term is zero for all cases.
2. $E(uu') = \sigma^2 I$. This assumption states that the product of the error term has constant variance, σ^2 , for all i . That a product of the error for two cases $i \neq j$ is equal to zero. The latter may be expressed as, the error term is independent of interaction among the explanatory variables.
3. The matrix, X, is a set of fixed numbers. That is, the independent variables can not change so that the properties of the estimators and tests are conditional upon X.
4. X has rank k less than n. The number of observations must exceed the number of parameters to be estimated and that no

³⁵ Johnston, Econometric Methods, pp. 108-115.

exact linear relations exist between any of the X_i 's.³⁶

It is not uncommon to find variables in an economic analysis which are highly correlated. It is necessary to minimize the influence of these variables. A correlation matrix of selected variables from the model is in the appendix (table 2-A).

Although multicollinearity does not affect the explanatory power of all the independent variables, it may impede accurate estimation of parameters. Multicollinearity will cause the estimated variance of the estimators to be larger than what they should be. Increasing levels of intercorrelation is reflected in increasing standard errors of net regression coefficients, and lower reliability for the individual regression constants.

The most efficient means to deter multicollinearity is to analyze the variables for high intercorrelation and drop those which could cause problems. When it is desirable to test certain hypotheses, some variables may be held in the model. Sometimes a simple operation as dividing or multiplying two variables aids the estimation process without danger of correlation. A combined (transformed) variable may provide some of the estimating characteristics of both individual variables.

To test as many variables as possible, a stepwise deletion multiple regression program was selected to provide a logical order to test a set of variables, eliminate the least significant, and retest the remaining set. The program performs the usual simple and multiple regression analysis and provides the "best" regression model by successively dropping variables from the model that do not contribute sufficient information about the dependent variable. The full model of specified variables is fitted and the least

³⁶ Johnston, Econometric Methods, pp. 107-108.

significant variables are dropped, one at a time, until all remaining variables are significant at the specified level.

In economic studies it is not always possible to reject variables at a level of significance used in the biological sciences. It was decided to first find the model which provides the best estimates of the parameters with the smallest error variance. Depending on the resulting model, the significance level was anticipated to be less than 10 percent. One may be critical of a degree of error which enables too many variables to enter the model but at the same time the accuracy of the prediction equation is a major objective.

CHAPTER V

ANALYSIS AND RESULTS

Classification of Land Transfers

Since a major objective of the study was to see how well the installment contracts could be identified, all of the forty-eight transfers were checked at least to verify that they were installment contract transfers initiated in 1970. The results show that the effort was not completely successful.

Error entered into the list when cases were found to be the wrong type of sale, a nonsale, estate transfer, and a sale of the wrong year. The latter was the chief reason for error in selecting the cases. It was not possible to detect the exact date of the transfers within one or two years from the tax record. Most which were incorrect were within two years of 1970; however, one transfer had been made in 1964.

The difficulty in dating a particular case seems to arise in the procedure used to change the list of real estate taxpayers. Normally, notation is written on the tax receipt if the tax is paid by an individual other than the title holder. The person with the title is mentioned then under his name is written "paid by" and the name of the party who pays the tax. A copy of the tax receipt may be found in the appendix (table 3-A).

Evidently, the seller of real estate does not always notify the county treasurer before he receives his tax notice and since receipts are then not altered until the next billing of the tax, there may be some discrepancy

in who is paying the taxes. At other times, the seller may pay the taxes either indirectly from a check by the buyer or directly by agreeing with the buyer that he will do so.

Because a change is made only after the fact is known, there are cases of sales actually made in 1969 but not changed until 1970. Due to recording practices, no easy method is available to verify the exact date that an installment contract has been made. The contracts are not recorded in the court house, but they are held in escrow along with the deed until the terms of the contract have been met. Agencies which hold these contracts, commonly banks, usually do not reveal the names of the parties whom they serve in this capacity.

The correct year and classification of each of the forty-eight transfers, thought to be installment contracts, are shown below:

<u>Installment contract</u>				Non- earlier sale	Cash	Mort- gage	Less 20 Ac.
1970	1969	1968					
32	3	2	1	7	1	1	1
3 (found later)							

Seven cases turned out not to be sales. These were cases resulting from estates paid by an administrator after the death of the owner. Since the estates require a period of time before they are settled, the property may retain the deceased name as owner. This shows on the tax receipts along with the name of the individual who is paying the taxes for the estate. Therefore, unless one can determine that a party is deceased, it is necessary to check with the payor himself. It was possible to eliminate some of these nonsales in developing the list when someone was acquainted with the situation. Besides estates of deceased, nonsales

occurred when a second party pays for the title holder. This situation is also difficult to trace and confirm except by personal communication.

The one mortgage case was the result of an estate sale. It was not recorded until late in 1971. The sale was from the estate to a son who had been farming the property. According to the terms of the will, he had the option to buy the property within a six month period after the admission of the will to probate. The individual agreed to buy in May of 1970 and sometime later mortgaged the property to buy the farm. Hence, the records in the treasurer's office showed the land as owned by one party (actually the estate) with the taxes being paid by another (the mortgaged buyer).

The case of the cash transfer was also a sale out of an estate with the estate selling land to a brother of the deceased. The buyer was the administrator to the estate and was paying the taxes. He agreed to buy and got a short term bank note to complete the transfer.

One other case was selected but was later found to be a small tract in a townsite. Sometimes it is difficult to determine the size of a tract by the brief description; however, it is possible to determine the acreage from records of ownership in the county clerk's office.

Three cases of installment contract buying were not found in the county tax records, but discovered later from other sources.

Mortgage and cash transfers were readily identifiable from the Property Valuation Department's assessment-sale ratio cards. It was not possible, however, to determine which cases were cash and which were mortgage without some additional knowledge. Of the fifty-six cases which had been recorded and were finalized by a mortgage loan or personal funds, several were for small tracts. There were ten cash sales for less than twenty acres and one mortgage financed sale. Ten out of twenty-three cash

sales represents 43 percent of sales which were relatively small.

A total of 179 transfers of rural real property occurred in 1970 in Clay county. These transfers may be divided among seven types of transfer-ranging from full interest cash, mortgage, and installment contracts to part-interest, exchange, estate settlements, and nonsale transfers of property (see Figure 6).

Slightly over 50 percent or 91 of the 179 were full interest sales. There were 23 cash sales, 33 mortgage financed sales, and 35 installment contract sales which occurred in sixteen of the eighteen townships. Other types of transfer involved: 35 estates settled, 33 nonsale transfers, 11 part-interest sales, and 9 exchange transfers (see Table 3).

In answer to part (a) of the first hypothesis, it can now be said that 38.5 percent of the sales were financed by an installment contract. This is a plurality of all types of sale transfers, but less than what was hypothesized.

Property transferred from a deceased estate in 1970 compose a large segment of the total land transferred. Of the many estates settled annually, 35 were estimated to contain 9,444 acres of rural real estate, an average of 269.8 acres per estate. The largest estate consisted of 1,200 acres while the smallest was 47.5 acres. The median size was 160 acres.

Most of the deceased had written wills to dispose of their properties. Twenty-nine individuals died testate while six died intestate. The land was distributed in various manners. Some tracts were sold by the executor of the estate to make distribution simpler for the heirs or perhaps to help pay for the expenses of the estate.

In a few cases, land had been sold on installment contract before the death of the legator resulting in some part equity being transferred

Fig. 6. Rural Real Estate Ownership Changes in Clay County with Respect to Type of Transfer, 1970.

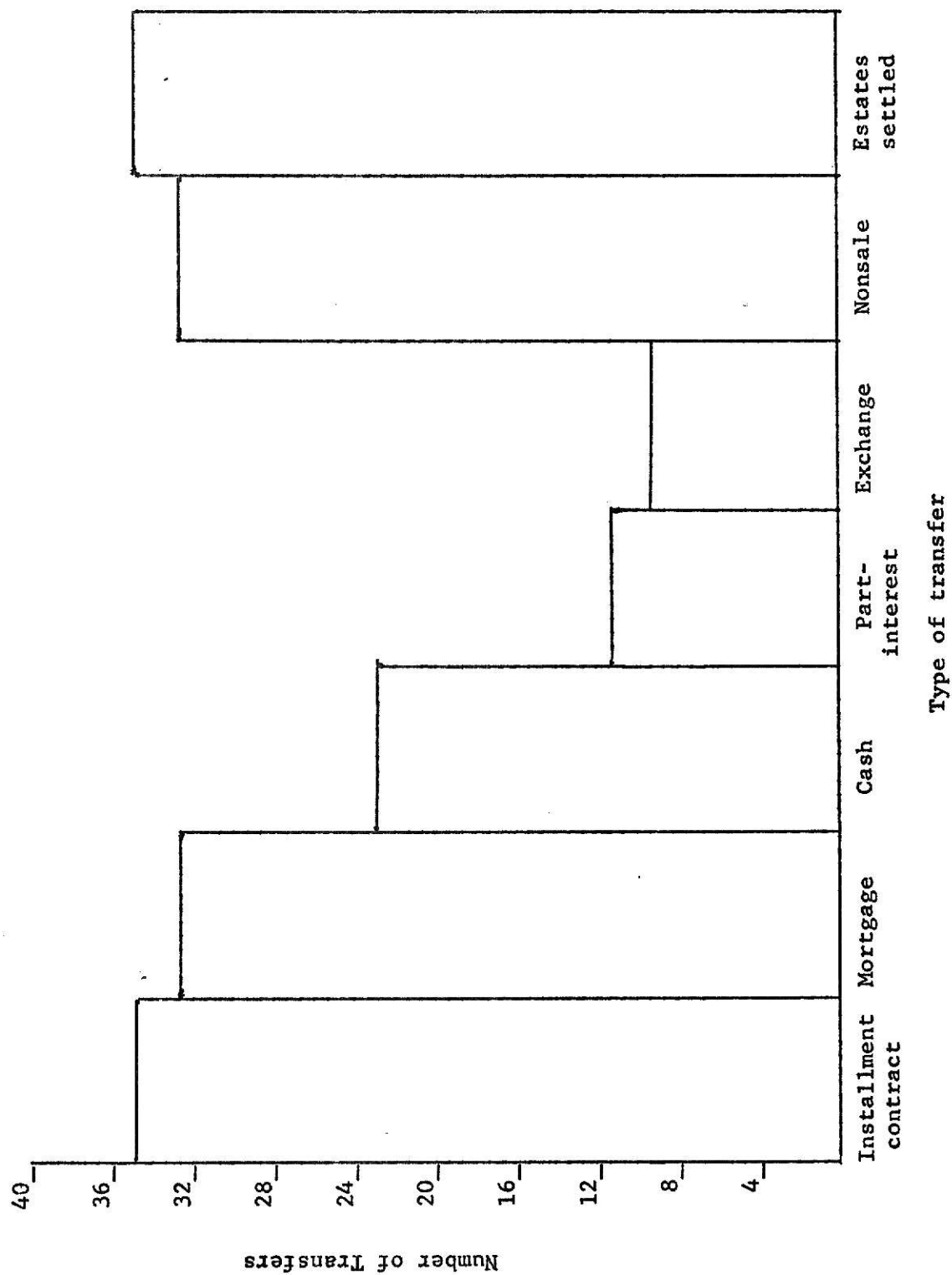


TABLE 3
RURAL REAL ESTATE OWNERSHIP CHANGES IN CLAY COUNTY BY
TOWNSHIP WITH RESPECT TO TYPE OF TRANSFER, 1970

Township:	Real estate transferred in 1970	Full consideration cash mortgage installment contract	Part-interest sale	Exchange transfers	Nonsale transfers	Estates settled
Athelstane	8	2		2		2
Blaine	16	1	4		3	4
Bloom	13	1			6	4
Chapman	9	2	1		2	1
Clay Center	28	8	1		6	1
Exeter	6				1	1
Five Creeks	2					1
Garfield	6			2		2
Gill	4					1
Goshen	14			3	2	2
Grant	3	3				1
Hayes	6	1	1			1
Highland	11	1		2		4
Mulberry	5	1			2	
Oakland	11				3	1
Republican	6				5	5
Sherman	19	3			1	2
Union	12		4		2	1
Total	179	23	11	9	33	35

in lieu of payments agreed to under the terms of the contract. Part equity was transferred on outstanding contracts in five cases. One sale had been made as early as 1965, while the others were more current.

Most commonly, the legatees were close relatives-a spouse, brothers, sisters, and children. One individual bequeathed his real property to a local hospital.

The appraisal of property, required in each estate, indicates that land values ranged from \$106.25 to \$375.00 per acre. The median value was \$162.50.

Some tract appraisals were missing from the reports, so not much can be said about the values of the real estate. Also, the estates were valued at full interest, even though in many cases, the deceased only had partial ownership of the property. A simple comparison was made among estate appraisals, installment contracts, and mortgage financed sales to determine if an F-test would indicate a difference among the valuations. The results (appendix table 4-A) indicate no differences at a 15 percent significance level.

Reviewing the nonsale transfers of real property shows that land was granted in thirty-three cases with no consideration given by the individual who received the land title. These gifts may be the result of different circumstances. Some people distribute land to avoid inheritance taxes, others give real estate to their children as a gift in lieu of money or other articles.

One aspect of nonsale transfers as well as other types is that they are not always full interest transfers. A part-owner may deed his share of the ownership to a second party who had owned the other portion. This is occasionally done among family members who receive part-interest in

land by a will.

In response to the sixth hypothesis, it was found that a large number of the transfers were nonsales. Estate, gift, and exchange transfers occurred in 77 cases for 43 percent of all transfers.

Part-interest sales, numbering eleven in Clay county for 1970, usually occurred between two parties who possessed a part-interest in the land. Usually they were related and desired to consolidate their holdings to make management simpler.

Part-interest sales present a problem for any type of analysis either by the county assessor or by another party. The problem is that the consideration established between the buyer and seller is a legal and often large amount, yet, there is no practical way to utilize these cases to indicate the full value. This is especially true without knowing what improvements or special use rights may be included in the provisions of the sale.

This problem is found by the Property Valuation Department when they attempt to analyze sales of real estate for equitable taxation. They have decided to exclude the use of part-interest and other transfers (not sales) for practical reasons which often leaves them with a relatively small sample of all transfers.

Nine title transfers in Clay county involved exchange of tracts among eight parties. These tracts involved 1,120 acres. In only one instance did an individual include consideration in addition to the land he offered in exchange.

The motive for property exchange is normally a personal preference, such as a preference for a home or a location. About half of the tracts exchanged were improved. The tracts which were traded were usually

approximately equal in size and assessed value.

One party to an exchange was interviewed and in this case, it was determined that the two were related and were swapping properties in order to make location more accessible for farming. An error in the certificate of value and consequently in a ratio card caused this particular set of three exchanges to be used in the ratio study. This probably resulted from a misinterpretation of the parties when they recorded the title transfers. This evidence indicates that due to the nature of the transfers and the secrecy of information, it may not be possible to determine the authenticity of all sales. For example, if an exchange took place and a certificate of value was given, then the register of deeds or the county assessor must expect that the transfer was a sale.

Comparisons and Tabulations

Preliminary analysis was conducted with the information collected from records and from interviews. The objectives of this descriptive phase was to regard some of the many possible factors involved in the real estate market-the characteristics of the property, the people, the situation, and the contractual agreement. It is from these specific features of the market that one can expect to find those factors which are most important in a study of real estate transfers (Table 4 indicates sale characteristics).

At the conclusion of the survey a total of forty-eight cases had been interviewed and were subject to analysis. Other cases had been surveyed, but these turned out to be of poor quality or they did not fit the criteria. The forty-eight comprise twenty-two mortgage surveys, twenty-one installment contract surveys, and five cash surveys. Altogether, they

TABLE 4
DESCRIPTION OF RURAL REAL ESTATE SALES IN CLAY COUNTY
WITH RESPECT TO METHOD OF FINANCE, 1970

Method of finance	Selected Statistics				
	No. of sales	Total acres	Average acres/sale	Range of tract size	Median tract size
Installment contract	35	4,881	139.5	48-320	150
Mortgage	33	4,824	146.2	5-400	160
Cash	23	1,537	66.8	1-480	39
Total	91	11,242	123.5	xxx	xxx
				xxx	xxx

represent 53 percent of the full consideration sales in 1970.

It was found that 4,488 acres or approximately 67 percent of all acres transferred were considered cropland by the buyer. This compares with approximately 67.5 percent for all acres in the county as estimated by data from the 1964 Census of Agriculture. The estimation of upland sold was 5,198 acres or approximately 76 percent of that which was sold.

The primary reason for most purchases was agricultural investment. Approximately 94 percent of those buyers surveyed had operated farmland prior to the purchase, even though only 52 percent owned any farmland. In response to the third hypothesis, it is evident that well over three-fourths of the sales are to be added to existing farms (interval of 86.8 to 100 at 95 percent confidence level).

All of those buyers surveyed planned to maintain the agricultural use of the property. Some indicated that they intended to make building or land improvements, but none had serious plans to develop any real estate into industrial or commercial uses. The general consensus was that the purchase was not made with the expectation of any great appreciation in the land value.

One insight into the nature of the sales is the number who bought ground which they had already been renting or even those properties which had been rented out to any individual. Of the forty-eight transfers, twelve individuals had already operated and many lived on the property which they purchased. Twenty-one of the tracts had been rented to another individual, not to the buyer, prior to the sale.

The age of the seller was relatively greater than that of the buyer. The average age of the seller was 62 years while that of the buyer was 43 years. Many transfers were made out of estates. These transfers were made

with the authority of the administrator or trustee. For these cases, numbering nineteen, there is no comparison of ages. Thirteen of these estate transfers were financed by mortgages. Three were cash sales and five were financed by installment contracts. The largest estate sold in the county in 1970 comprised 2,434 acres, resulted in 20 transfers, and accounts for twelve of those cases interviewed. When estates account for a large part of the selling parties, less can be said about the type of people selling.

The age of the buyer was expected to be somewhat less than that of the seller. An analysis of variance test computed to determine if the age levels differed among the sales in the sample based on the method of finance was significant at the 10 percent level (appendix table 5-A).

A possible influence in a sale of real property is the relationship between the buyer and seller. In the survey, it was determined that nine transfers were between relatives-either in the immediate family or between families related by marriage. These relationships were randomly distributed among the sales based on the method of finance.

A factor influencing the increasing size of farm operations is partner farm operators. A partnership received title to the real estate in only one case; but, in other instances the buyer was operating some land in cooperation with another. All together, five cases were found to involve partnerships.

The reasons for selling or buying were somewhat varied and as expected, classification required some rather broad generalizations. In some cases two or more factors were important.

The most dominant reason given for the seller's land transfer was to liquidate an estate. This was cited in twenty cases as being an impor-

tant factor. It is to be expected that most of these cases would be financed by either a mortgage or cash for purposes of quick settlement. This is shown below:

Seller	Method of finance		
	mortgage	I. contract	cash
estate	14	2	4
individual	8	19	1

The next most often cited reason was a sale caused by age, health, or due to retirement. This description, in general, implies that the seller had decided to gradually get out of farming. This reason was cited eleven times. An explanation indicating that the landlord wanted to shed his responsibility of ownership or that he desired to relinquish title when a buyer met his price was a reason in ten cases.

The reason for selling involved location in a few instances. Either it was too far to move machinery or that a move to a new residence would make the duties of ownership difficult to perform. In two cases, the owner was liquidating to purchase some other ground and help finance the purchase or to improve the quality of his farmland without increasing farm size.

The reasons for buying are even more numerous; however, the desire to enlarge was predominant and accounted for thirty-four cases. A factor in thirteen cases was to obtain or retain the residence sold with the land. In cases where the house was an important consideration, at least one other factor associated with the land was cited.

If the purchaser had been renting the tract he bought, a desire to retain the ground was significant. It was cited in eleven cases. Location was felt to be a reason to purchase a tract. The buyer felt that the

availability of land close to his present operation was a motivating force to buy. Ownership, itself, was given three times as a reason for purchase. Ownership allows an individual to make building improvements without the fear of future landlord-tenant difficulties. Also, ownership is an important means to obtain credit and use financial leverage.

The buyer was asked if he could have rented the land instead of buying it. It was possible that he had been renting, that someone else had rented, or that the land was owner-operated. The results seem to show that in most instances the grantor desired to liquidate his ownership, but in eight cases the buyer felt he could have rented instead of buying.

Results indicate that less than half of the buyers were at least considering alternative land properties besides the tract they purchased. Seventeen respondents seriously considered other land. This result is probably somewhat indicative of the small number of sales which occur and the location of the tract as being important.

The method in which the contract was negotiated proved to be largely divided between real estate brokers and the owner on the selling side of the transfer. An administrator served as representative of the owner in some cases. In twenty-nine cases, the owner was the salesman. In order to draw a contract, a lawyer was usually consulted and helped facilitate the transfer. A realtor was involved in seventeen transactions.

A broker was much more evident in mortgage financed sales than in installment contract sales. Only one sale was found to be a public auction sale and it was bought with cash.

The information system utilized by participants in the market seems to be primarily information from the property owner. In thirty cases, the buyer learned that the land was for sale from the owner. In cases where

the buyer had been renting, this is to be expected. In a few cases the buyer had asked the seller for an opportunity to purchase when the land became available.

This is also shown in a question on the scope of the market. In twenty-three cases, the seller had only discussed a transfer with the buyer or the buyer was given the first opportunity to buy. In the remaining cases, the market was open to the general public and usually for some period of time.

In eleven cases, the buyer learned of the availability of the land through public means as a newspaper advertisement or sale notice. In six cases, the buyer first learned of the tract from another individual, not the seller.

Land was transferred throughout most of the months of the year. The first four months did, however, account for more sales than the rest of the months. This might be expected as buying would most likely occur before planting or grazing in spring.

The time between the contract for sale was signed and the sale recorded varies according to the circumstances of the sale. Unless installment contract sales are paid ahead of schedule, the recording will be several years later. Regarding only the cash or mortgage financed sales, it can be seen that the majority of transfers are recorded within three months. The period is often dependent upon the time required to arrange financing of purchase. The range for the period was immediately to eleven months.

In answer to part (b) of the first hypothesis, the sample indicates that installment contracts are repaid from two to thirty-three years after the sale. The average time was 9.5 years and the mode was ten years.

This is slightly shorter than hypothesized.

An attempt was made to determine how government payments were split between the buyer and seller. It was felt that this could be an important factor when a crop was already in production at the time of sale. The survey seems to show, however, that most commonly the payments will not be divided unless the buyer had been renting. In the latter case, the buyer receives the operator's share. Wheat, planted in the fall, may cause some payments to be retained by the seller. This is due in part to the time of sale. Although it is difficult to evaluate a small number of cases, payments were generally established in advance and were not affected by a transfer. The contingent factors are type of established crops, if any, the time, and tenure at the date of sale.

Real estate property taxes were most often paid entirely by the buyer, the first payment after the sale. In thirty-eight cases, the respondent (buyer) indicated that he paid 100 percent of the tax for the year of the sale. Four said that the taxes were divided in half; four paid none of the taxes; one paid in proportion to the months of ownership.

The reason for the tax being paid by the buyer seems to be linked to the time that the owner is notified of his tax obligation and how it is paid. Taxes for the calendar year are not levied and mailed until late in the year. They may be paid in two installments, one by December 20 and the other by June 20 of the following year. It appears that the buyer accepts payment responsibility based solely on his possession when the taxes are levied.

Alternatively, one may say that the individual who receives the income from the land will be liable for the tax obligation. Again, this is based on the fact that feed grains are harvested in July through October

and calves are sold in late fall. Or there could simply be a failure to include a provision on tax payments in the buying contract.

Of particular interest with respect to taxes was the manner in which taxes were distributed under arrangement of installment contract transfers. Until the title is relinquished, the seller has some property rights and hence might retain some tax payments. It was discovered that there is no tendency for the grantor to pay taxes if he is selling by installment contract.

The title to the real estate was planned to be placed in joint tenancy in over two-thirds of those cases interviewed. Joint tenancy was indicated as the form of ownership in thirty-seven of the forty-eight cases. The remainder were all individually owned with no tenancy in common.

Two cases of individual ownership were found where the wife of the buyer was given title. The reason cited for this practice was to simplify inheritance procedures. If the husband dies before the wife then this particular ground will not need to enter probate and she may sell the property if her situation warrants it.

Very few responses were obtained to show that any major changes would be made on the property by the buyer within several years after the purchase. Several indicated that they intended to remodel improvements or build terraces or irrigation systems; one planned to convert some pasture into tillable soil.

Only one individual had thought of developing his newly acquired property into a nonagricultural enterprise. His land was located adjacent to a major highway and he felt that a service station would be profitable. He had no definite plans to initiate this project. No plans had been made to construct any residential dwellings either for the buyer or for sale.

Multivariate Analysis

In order to learn about the combined effects of selected variables, multivariate tests were next utilized.

The objective of using the analysis of covariance was to see if certain particular variables were significantly different from zero or from each other. With respect to the method of finance, the test was to determine if each had an effect on the price per acre different from another. That is to say, if the regression coefficient of each variable is significantly different from each other. Or $B_1 = B_2 = B_3$, where B_1 is equal to the effect of a cash sale, B_2 is the effect of a mortgage financed sale, and B_3 is the effect of an installment sale. From the analysis of covariance test, no reason was found to reject the hypothesis that the type of financing does not affect the price per acre (appendix table 6-A). Similar tests for other discrete variables (type of road, previous rental practices, and reason for buying) as well as the continuous variables (acreage, distance, age, and others) found that none of the hypothesized effects were significant.

It was felt that the results of the analysis of covariance tests indicate strong correlation among some of the independent variables in the model. This may be masking the effects of the variables as they relate to the dependent variable. This reasoning was warranted as none of the independent variables were found to be significant at the 10 percent level of confidence. It was decided that a multiple regression program might offer more definite results.

In a stepwise deletion multiple regression program, by deleting those variables which were found not to be significant, it was possible to test the significance of each variable's influence on price and select a prediction model. Also, it was possible to perform additional analysis not

possible using covariance analysis.

The first regression model contained essentially the same variables used in the covariance analysis. One of each set of discrete variables was dropped to avoid multicollinearity in the sample. If, for example, all three methods of finance were utilized, then there would be perfect correlation among these variables which would cause error in the parameter estimates.

In order to avoid model error, four variables were excluded in this trial. The variables representing an installment contract sale, dirt road, property was not rented, and reason for buying other than enlargement, were dropped. This meant twenty-one variables were utilized. The final model, significant at less than 10 percent error, consisted of five variables. These five are listed in Table 5 along with their respective regression coefficients, value of the coefficient of determination if each would be deleted and the type one error. A complete list of the variables, designating at what significance levels they were rejected, can be found in the appendix (table 7-A).

TABLE 5

VARIABLES FOUND TO SIGNIFICANTLY EXPLAIN THE VARIABILITY IN
PRICE PER ACRE OF RURAL REAL ESTATE IN CLAY COUNTY,
KANSAS, 1970, MODEL II

Var. no.	Description	B	R ² at deletion	Significance level
14	Distance to Clay Center	-5.73	.570	.083
20	Repayment period	2.85	.544	.029
18	Percent cropland	1.40	.544	.027
12	Acres in tract	-0.50	.535	.020
17	Buyer owned acres	0.17	.511	.008

This model explained 61 percent of the variation in price per acre.

The standard error was 100.7. The five represent characteristics closely related to the tract, circumstances of the buyer, and the conditions of the sale. The relation of each variable was as expected.

A more detailed analysis of the variables left in the final model will not be given until model VI is described. The earlier models are presented simply to show progression and changes which occurs. The model was altered until the final results were considered to best utilize the data available.

Model development in a regression analysis is an attempt to seek the best reproduction of those factors which explain the dependent variable. In this study with price per acre as the dependent variable, the objectives were to achieve an accurate prediction equation and also to test the significance of certain factors regarding the method of finance. Depending upon the data available it is not possible to represent every variable which may be related to a particular study. Yet, it is necessary to focus attention upon realistic relationships among strategic variables which may aid the classification and explanation of a specific economic phenomenon.

The next model, III, was formed from the same list of variables. Although this time, the cash and mortgage variables were not utilized, while the indicator of an installment contract sale was included. Dirt road and buying for reasons other than enlargement were still excluded. Property was rented to a person other than the buyer and property was not rented were also excluded.

The principle reason for this model was to determine if the installment contract would show any effect not shown by the other methods of financing. It was deleted from the model and the significant variables were unchanged.

The evidence from these initial regression programs, supported by earlier analysis of variance and covariance tests, verified that the method of finance does not affect the price of real estate. This negates the hypothesis that the installment contract purchase does affect the price. But at the same time, the repayment period, a term of the financing agreement, does affect the price. The repayment period was found to be related to the method of financing by use of analysis of variance tests (appendix table 8-A).

In model IV, the same list of variables was augmented by four new variables. It was anticipated that by adding these variables that the explaining power might be better and the error could be decreased.

The program effectively did both increase the coefficient of coefficient of determination to 73 percent and lower the error to 86.2. Changes from the previous final model were deletion of percent cropland and addition of age of the buyer, buyer's net income, and percent soil classes I & II. Age of the buyer had been included in earlier models, but only when combined with the variables of this model did it become significant. The model of variables selected may be seen in Table 6.

TABLE 6

VARIABLES FOUND TO SIGNIFICANTLY EXPLAIN THE VARIABILITY IN
PRICE PER ACRE OF RURAL REAL ESTATE IN CLAY COUNTY,
KANSAS, 1970, MODEL IV

Var. no.	Description	B	R ² at deletion	Significance level
15	Age of buyer	-2.25	.704	.087
24	Buyer's net income	-0.004	.688	.035
12	Acres in tract	-0.42	.682	.025
14	Distance to Clay Center	-7.35	.669	.013
20	Repayment period	3.11	.654	.006
17	Buyer owned acres	0.17	.649	.005
27	Percent soil classes I & II	1.31	.612	.001

It seems that various factors related to the buyer's farming operation as well as descriptive features of the purchased tract are functionally related to the price paid. This can be expected from research results of other studies. At the same time this does not exclude the influence of other factors, some of which may not be evident because of the combination of variables used or because it has been found difficult to describe them in mathematical notation. If either of these possibilities is present then it may not be possible to get an accurate picture of the variables affecting the price.

Since repayment period and method of finance are known to be related, it was felt that to exclude the repayment period may allow the installment contract variable to enter the model. In model V this approach was taken; however, the variable was still deleted at a significance level of 53 percent. This evidence indicates again that the installment contract sale is not a major influence on the price of real estate.

One additional model, VI, was programmed in an attempt to build a better prediction equation. This was done by adding four new variables, two to represent curvilinear relations, one transformation by multiplying two variables, and a different representation of a variable. The new variables are: acreage squared, distance to Clay Center squared, acreage times percent soil classes I & II, and house improvements.

The outcome of this model was the best explanation of price. The coefficient of determination was approximately 86 percent and the standard error was 67.8. Ten variables were significant at less than 10 percent. The final selected model may be seen below, Table 6, and the complete model is shown in the appendix (table 9-A).

TABLE 7

VARIABLES FOUND TO SIGNIFICANTLY EXPLAIN THE VARIABILITY IN
PRICE PER ACRE OF RURAL REAL ESTATE IN CLAY COUNTY,
KANSAS, 1970, MODEL VI

Var. no.	Description	B	R ² at deletion	Significance level
31	Net income/acres operated	2.14	.820	.071
15	Buyer's age	-2.33	.820	.071
35	Acres in tract x percent soil classes I & II	0.005	.815	.047
16	Acres operated by buyer	0.17	.788	.006
13	Index of improvements	20.32	.778	.003
24	Net income	-0.01	.775	.003
34	Distance to Clay Center- squared	1.17	.762	.001
32	Acres seller owned	0.06	.754	.001
12	Acres in tract	-0.69	.731	.000
14	Distance to Clay Center	-37.82	.694	.000

The prediction equation may be represented in the following manner:

$$Y = 491.61 + 2.14X_{31} - 2.33X_{15} + .005X_{35} + .17X_{16} + 20.32X_{13} - .009X_{24} + \\ 1.17X_{34} + .06X_{32} - .69X_{12} - 37.82X_{14}$$

where Y is the price per acre and the numbered variable corresponds to a particular variable listed in the table above.

Multiple regression analysis produces a model in which each variable is a linear determinant of the designated dependent variable. The coefficient designates the type of relationship which exists. It is also possible to include variables which are second or third power functions. These variables are utilized in the same manner as any other variable once the relation has been established in the model.

In the final model, VI, one squared variable remained in the model, distance to Clay Center-squared. It is interesting in the aspect that the simple variable, distance to Clay Center, also remained in the model. The

latter having a large negative coefficient, -37.82, while the former a small positive coefficient, 1.17. Both are highly significant.

Evidently, there is a curvilinear relation between this distance variable and the price per acre. At small mileage values, distance will cause a negative influence on the price. But as the miles become greater the coefficient of the squared term will become relatively more meaningful and moderate the falling price trend. This seems to indicate that distance has a substantial impact on price.

Among the other variables remaining in the model, a transformation devised by multiplying percent of soil classes I & II by the acreage in the tract was significant. This means the percentage of soil classes I & II in the tract sold. It was found to be significant at less than 5 percent error and serves as one indicator of the land capability.

Multiplying the regression coefficient by 100 will give the cents per acre of soil classes I & II that will add to the acre price. For every acre of this soil, the price will rise by \$0.50.

The number of acres being sold is expected to be inversely related to the sale price. Larger acreage tracts are naturally less homogeneous and commonly of less quality than smaller tracts. Some of the larger tracts may also limit the number of people with the ability to buy the property. For every acre in the tract, the price of the tract will decrease by \$0.69.

Although this is a linear relation, the result of this variable, as well as others, should not be extrapolated for extreme cases. It is unrealistic to say that one will pay less for an acre of ground than for no ground. But it does make sense to say that you are willing to pay \$6.90 less per acre for a 160 acre tract than for a 60 acre tract.

The number of acres operated by the buyer is a variable which seems to show that there is a positive relation between the size of a buyer's operation and the amount that he is willing to spend for land. The regression coefficient indicates that for every acre already being operated, the buyer will pay an additional \$0.17 to own an acre of land.

The number of acres that the seller owned prior to the sale was included in the final model with a coefficient of \$0.06. It may be that the seller who also owned a large farm could hold his property until his price was met or in a sense, ask a higher price than for a smaller owner. It seems plausible to accept this argument based on the knowledge that a larger owner has greater capital reserves and will not need to sell as fast.

The net income per acre operated for the buyer is shown to have some affect on the price. For every dollar of net income per acre, the buyer will pay \$2.14 toward the price of an acre of land. This variable was expected to represent the managerial capability of the buyer. With respect to the model, it may mean that this individual is willing to pay more for the ground that suits his needs. That is, if the ground is desirable for its location, soil capability, or fits the individual's plans to expand, then based on his knowledge as an entrepreneur, he will agree to pay more than another not so confident in his ability to make profitable decisions.

The buyer's net income is another factor related to the management ability of the buyer. In contrast to the last variable, its coefficient is negative. It is not easy to explain why this variable has a negative coefficient. Perhaps an individual who has a good income now does not feel that he needs to enlarge his land holdings and will only buy when he can pay a price relatively less than a farmer with a smaller net income. Or,

in other words, this man may not buy the most expensive land, when his judgment and resources enable him to make improvements or investments on his present operation which might offer a more attractive return.

The index of improvements was found to have a positive coefficient of \$20.32. Considering the variation in quality of improvements as typified by the scale below, this figure seems to be a reasonable value. On a scale from zero to six, it may be expected that a tract with average improvements, class 3, would sell for \$60.96 less per acre than a similar tract which is highly improved, class 6.

Index value	No. of cases
0	10
1	3
2	2
3	11
4	2
5	6
6	4

As it was not possible to gather more precise data on the dollar valuation of improvements, it is felt that the index did an adequate job. Any dollar valuation of improvements by the buyer would be a highly subjective estimate and is subject to error caused by techniques of depreciation. In most sales, improvements were not valued apart from the ground.

The buyer's age, interestingly, had a negative influence on the price of real estate. For each year, the buyer paid \$2.33 less per acre. This was the only variable in the final model not connected with the buyer's farming operation or character of the tract. Although this variable is significant at the 7 percent error level, it may be indicative of the classification problem. It is possible that an older man buys a different type of land, that he is buying land he has rented, that he is a shrewd bargainer. All of these factors may be indiscriminately working in a

manner difficult to represent.

Several variables dropped out of the regression analysis between 10 and 25 percent error. Although it is possible that they may influence the dependent variable, statistical theory does not warrant saying that they are statistically different than zero.³⁸

A type one error of 20 percent means that in one out of five cases one can expect a particular variable not to have any effect on the price of land. A significance level equal to or less than 10 percent offers some additional security that a particular model offers an accurate explanation.

For this reason no variable was accepted in the final model at greater than 10 percent. It occurred that the ratio of net income to acres operated was significant at approximately 7.1 percent and the next deletion in the model was the square of the number of acres in the tract which was significant at approximately 10.9 percent (appendix table 9-A).

Another statistic of the model is the mean square error or variance estimate for each analysis after a deletion. As some of the variables are deleted at a very high error, the variance becomes less. This occurs because these variables probably do not contribute to the explanation of the price and by including them, error is forced into the estimation procedure. The variability in the explanatory factors causes greater discrepancy in the prediction of the parameter values than if they were excluded.

The variance in regression analysis may be depicted as:

$$\frac{\text{sum of squares total} - \text{sum of squares regression}}{\text{degrees of freedom}}$$

where the sum of squares total is the summation of all the variation both

³⁸ Snedecor and Cochran, Statistical Methods, p. 27.

among different cases and in each case. The sum of squares regression is that part of the variability which is explained by the model. The degrees of freedom are obtained by subtracting the number of parameters which must be estimated from the number of cases which are available for study in the sample. As the number of independent variables are eliminated, the degrees of freedom become correspondingly greater. A glance at the computational formula reveals the impact of the degrees of freedom.

Since the number of degrees of freedom is the divisor, they influence the size of the variance. A large sample size aids the estimation procedure by decreasing the variance. Unfortunately, in this study it was not possible to achieve a large size, although over 30 percent of the population was used and is considered adequate to obtain good parameter estimates. As the number of independent variables becomes smaller, the degrees of freedom become larger. However, as these factors are deleted, the explanatory power may also be decreased. This is equivalent to a decline in the coefficient of determination or R^2 .

The coefficient of determination, like the variance, is a measure of the goodness of fit of the model. It is computed as follows:

$$\frac{\text{sum of squares regression}}{\text{sum of squares regression} + \text{sum of squares error}}$$

where the sum of squares regression is equal to the explained variation in prices and sum of squares error or residual is equal to that not explained. The ratio represents that proportion of the variation which is explained by the model.

An R^2 of 86 percent is relatively high for an economic study of this type. In some earlier research studies, the R^2 has not been so high. A Kansas study on the effects of roads and other factors on farm real estate

values had a R^2 of .72.³⁹ In a Nevada study, the total market coefficient of determination was .54.⁴⁰ In an Indiana study on determinants of agricultural land values, the best R^2 was .88 with a standard error of 36.6.⁴¹

The fact that earlier studies have had limited success in explaining the price of real estate does not mean that they are worthless, but it does point to the variability in real estate sale transfers. This is exactly the meaning of the fifth hypothesis of this study. The many factors involved in the price determination of real estate including the character of the real estate and the parties involved in the transfers as well as other related factors make it difficult to predict real estate values.

It is not simply because it is difficult to quantify some variables, although this is a problem, but it is also a problem of multicollinearity or intercorrelation of the variables. One of the necessary assumptions for regression analysis is that the sample variables are independent. It seems that some multicollinearity in the data causes a relatively large degree of variability in the estimates.

The influence of the factors on the variance can be seen in the appendix (table 9-A). The variance or mean square error gradually declines until it stops at 4070.07 or a standard error of approximately 63.8. Then the variance gradually rises again until the final model is selected at 4608.31. The fact that some variables are not significant at the 10 per-

³⁹Edwards, Pine, Feyerherm, Effects of Roads and Other Factors on Farm Real Estate Values in Kansas, p. 36.

⁴⁰Shane and Malone, The Agricultural Land Market in Nevada, p. 17.

⁴¹Schuh and Scharlach, Farm and Non-farm Determinants of Agricultural Land Values, p. 17.

cent error level, but account for some variability in the price, indicates the interrealtion of the variables. Also, the variables may not be accurately representing the factors for which they were designed.

One way in which this problem might be corrected is to stratify the cases based on factors which could be causing difficulty. For example, the cases might be designed to separate effects caused by differences in size of tracts, variation in improvements, or method of financing. In a sense, this is a classification problem (hypothesis 4). In order to use this approach it is necessary to have a larger sample than was available in this study.

Another means to make the variables more precise is to purify outside effects by forming transformations of two or more variables. This was attempted by forming ratios and by multiplying to form combined variables. This proved to be successful as two of the transformed variables were included in the final model. Earlier trials, which did not contain any combined variables, did not prove to explain the price as well nor did they have as small an error.

A regression program utilizing repayment period as the dependent variable was analyzed in an attempt to learn its relationship with the sale data. After utilizing the regression model of per acre price, it was expected that there may be two distinct sets of variables governing the value of land and the terms of the financial agreement. If this is true then it would lend evidence to the claim that the method of finance is not a determinant of the price of real estate.

Repayment period, or the time stipulated by the financing agreement to fulfill the obligation to present payment, was considered to be the best choice for this purpose. Besides the interest rate, the repayment period

is the most important consideration of the financial terms. Varying in time from immediate payment to forty years, the repayment period is subject to wide variation in the sample of property sales.

The program began with twenty-three selected variables and found six which contributed to an explanation of the repayment period. All six were significant at less than 10 percent with number of acres possessing the largest error of 5.8 percent. The coefficient of determination was calculated at 81.5 percent and the standard error was 6.7.

The model did produce a set of variables almost completely different than the one explaining price. The only correspondence between the two models is with the number of acres in the tract. Otherwise, all of the factors explaining the repayment period are distinct.

The prediction equation for the repayment period may be written as follows:

$$Y = 20.16 + 18.5X_2 - .24X_{22} + 4.6X_{25} - 2.58X_{23} - .0003X_{33} + .09X_{12}$$

where

Y = repayment period in years

X_2 = mortgage sale

X_{23} = percent of interest paid

X_{25} = index of house improvements

X_{22} = percent of full consideration paid down the first year

X_{33} = number of acres in tract-squared

X_{12} = number of acres in tract

The complete list of variables used in the program and related statistics may be found in the appendix (table 10-A).

Based on knowledge of sale financing these variables possess the

correct sign of relationship. A mortgage sale contributes 18.5 years and shows the long term nature of this method of finance. The percent paid down has a negative coefficient, -0.24 . This means that for every percent of the sale price paid at the time of the sale, the remaining time for repayment will decrease .2 of a year. If the property contains a dwelling, the repayment period will be 4.6 years longer than if there was none. Also, a good house will extend the period 4.6 years over a fair dwelling. The percent interest has a negative relation with repayment by almost 2.6 years. This is certainly reasonable from the viewpoint of the buyer who must consider interest as a large part of the cost ownership. Acreage, squared and unsquared, reflects the additional time required to pay for a larger tract. But the increment is small, .09 years for every acre and is lessened by the square of the tract size, $-.0003$.

CHAPTER VI

SUMMARY AND CONCLUSIONS

When the analysis of rural sales in Clay county was completed, it was possible to evaluate some of the strengths and weaknesses of the study methods, to comment on the results of statistical testing, and to suggest approaches to continue research on land sales.

In an analysis of one county it was not possible to obtain a sample large enough to develop a general conclusion about sale transfers for a large area in Kansas. By selecting a county which was predominantly rural, rather homogeneous in soil quality and cropping patterns, it was easier to compare sales within the county. It was expected also that it would be easier to develop estimates of price and other variables given the nature of the county. At the same time it must be expected that it is not possible to make inferences to other counties which do not possess similar characteristics.

It is felt that with an analysis of another county in the north central region, that the results of this study may be more definite. To compare and contrast results in two counties may offer some valuable insights into land sales affected by varying circumstances. It may be possible to determine the effects of different size cities, counties with a more urban oriented population, and even with a different composition of agricultural income.

This study was largely directed toward a general development of data

of all land transfers, the procedure to locate all transfers and the collection of data concerning these transfers. Some of the observations concerning this procedure is that almost all transfers may be obtained from county court house records, but it could be at least one year after the sale occurred that the court house is notified. Then, it is difficult to secure an accurate list free of nonsale transfers or, in the case of tax records, an accurate list of transfers (taxes paid by party other than the buyer or owner). At the same time it is difficult to obtain an accurate date for the sale of any real estate property.

Statistical testing by means of analysis of covariance and regression analysis showed that the price per acre of real estate was not affected by the method of finance in Clay county. This means that a sale of land financed by an installment contract can not be expected to vary from that of a mortgage or personal financed sale. Accepting this statement as true, then it is not necessary to make any adjustments to compare the price for similar tracts of land financed by different methods.

This does not mean that the terms of the sale with respect to other conditions do not vary. Based on a regression model where repayment period was the dependent variable and on tests of individual factors, it seems that the method of finance is involved in a determination of how the consideration is to be paid and over a certain period of time.

It should also be mentioned again that a larger sample would make it possible to stratify the sale transfers based on the method of finance and lead to more accurate parameter estimates. This is not to say that the sample utilized in this study is inadequate. It only means that statistical procedures enable estimates to be more precise when a larger sample is studied. The sample variance in the study was large and caused error in

price estimation. With a small sample, a few cases with large errors or deviations between the estimated and actual price will be weighted heavily and may account for a large part of the unexplained variation.

The personal interview provided a thorough, complete, and accurate representation of facts concerning a sale transfer. This procedure did prove to be time consuming and would be difficult to follow for a larger study. Some research has used data entirely from court house records and other sources of public information. It was impossible for these research studies to test the accuracy of their data. At the same time, they could not obtain information on certain factors like net income, rental practices, motives for the transfer, and others.

It might be appropriate to attempt at least two things in further study. One is to select a county in the north central region which is not as typical as Clay county. Comparisons and contrasts may be made and at the same time they could be combined. A second possibility is to mail a questionnaire to the list of property buyers in another county. This questionnaire could be developed on the basis of the response obtained in the Clay county questionnaire. Also, it is now possible to direct these questions to a study of the factors found to be important in this study.

A synopsis of the hypotheses tested in the study leads to the following conclusions:

Transfers of real estate property occur by various methods and diverse reasons. Besides full consideration sales by means of cash, mortgage, and installment contract payments, there are part-interest sales, gift transfers, estate or inheritance transfers, and exchange transfers. A large percentage of full consideration sales occur by installment contract, but the estimated 50 percent. These transfers are recorded much later than

any other type of sale. But again, they are not recorded as late as estimated. If was found that no installment contract is recorded, only the deed is recorded.

Prices of real estate were not found to be affected by the method of finance. The terms of the agreement did vary according to the method of finance. The repayment period and interest rate were different for each type of financing, but neither of these variables were found to be significant in a regression model explaining the price per acre.

Fundamentally, there may be two divisions in a sale transfer. These are the explanation of the sale price and a description of the factors related to the conditions of payment. The sale price is based on acreage, land quality and improvements, management capability of the buyer, and other characteristics of the buyer and seller, and location. The terms of the sale as evidenced by the regression on repayment period are dependent on factors unrelated to the land itself or to the parties of the transfer. The significant variables were method of finance, conditions of repayment, improvements, and acreage.

It was quite evident in Clay county that the majority of the sales were made to farmers. In fact, 94 percent of the sales sampled were purchased by individuals already engaged in agriculture. This fact may have been inherent in the selection of the county.

Collection and classification of sales in Clay county proved to be a difficult task. Records were found to contain incorrect and incomplete information. Many sales, notably installment contract purchases, are recorded years after the purchase. Other sales are complicated by particular circumstances. These are due to changes in tract size, in land development, and conditions specific to a particular transfer. This means

that it is often necessary to make analyses with only a small number of the total sales. Also, in the sales recorded, a large degree of heterogeneity among factors like acreage, quality, improvements, and location is present. These factors were found to be important in determining the price of land. Yet, with a small sample they all must be combined for any estimating procedure. This may hinder the efficient use of recorded land sales for assessment-sales studies, appraisal studies, and other uses.

It is not easy to estimate parameters related to sale transfers of real estate property. Normal procedures are complicated not only by the paucity of cases which can be included, but also by the number of factors which are involved in value determination. These factors seem to be different among individuals and are often complex to differentiate. The estimation procedure is weak when a regression model requires a standard error of \$67 per acre.

A complete list of transfers in Clay county indicates that 43 percent of the transfers were nonsales composed of gifts, inheritance, and exchange transfers. This proportion of the transfers indicates that analysis based on sale prices alone may often give an unclear picture of the value of land to certain individuals.

APPENDIX

Kansas Agricultural Experiment Station
Department of Agricultural Economics

Study of Rural Real Estate Sales

Date_____

County_____

A. THE REAL ESTATE

1. Legal Description_____
2. Acres: Total_____ : Cropland_____ Pasture_____
3. Acres: Bottom_____ Upland_____
4. Improvements:
a) House: Yes_____ No_____. Condition: Good_____ Fair_____ Poor_____
b) Bldgs.: Yes_____ No_____. Condition: Good_____ Fair_____ Poor_____
c) Land Improvements: Yes_____ No_____. Condition: Good_____ Fair_____ Poor_____
5. Best road: Hard_____ Gravel_____ Dirt_____
6. Distance to:
a) Closest town greater than 1,000 population_____
b) Livestock market_____ c) Grain market_____
7. Irrigation: Yes_____ No_____. If yes, acres developed_____
8. List any personal property included in sale:_____

B. SELLER

1. Name(s)_____
2. Address_____
3. Age_____. Relation to buyer_____
4. Major business: Before_____ After_____
5. Operated this land_____ Rented out this land_____
6. Before selling, acres of land:
a) owned_____ b) farmed_____
7. Reason(s) for selling:
a) Health, age_____ b) Reduce size of present farm_____
c) Financial reasons_____ d) Renting not satisfactory_____
e) To buy other land_____ f) Good price offered_____
g) To take nonfarm job_____ h) Other (describe)_____

8. Number of persons interested _____

9. Length of time land offered for sale _____

C. BUYER

1. Name(s) _____

2. Address _____

3. Age _____. Relation to buyer _____

4. Major business: Before _____ After _____

5. Reason(s) for buying:

a) Enlarge existing farm _____ b) For son or relative _____

c) Rural residence _____ d) Commercial or residential development _____

e) Non-operator investment _____ f) Own land previously rented _____

g) Begin farming _____ h) Other (describe) _____

6. Could have rented this land: Yes _____ No _____

7. Considered other land before buying this tract: Yes _____ No _____

8. Distance this land from existing farm operation: _____

9. Acres of pre-existing farm operation _____ Acres owned _____

10. Method of negotiating the land purchase:

a) Real estate broker _____ b) Individual seller _____

c) Auction sale _____ d) Other (describe) _____

11. Knowledge that this land was for sale came from:

a) Newspapers _____ b) Friend _____

c) Seller _____ d) Sales ad. _____

e) Other (describe) _____

12. Net Income from farming in 1970:

a) \$None _____ b) \$ 1-4,999 _____

c) 5,000-9,999 _____ d) 10,000-14,999 _____

e) 15,000-19,999 _____ f) 20,000-24,999 _____

g) 25,000 _____

D. TERMS OF TRANSFER

1. Method of land purchase:

a) Cash _____

b) Mortgage, institutional credit _____

c) Installment contract, individual credit _____

d) Other (describe) _____

2. Full consideration _____. Amount for land _____ Improvements _____

3. Amount paid down or first year _____

-3-

4. Credit:

- a) Amount _____ (includes assumed mortgages)
- b) Source(s) _____ c) Interest rate _____
- d) Date(s) of payments _____ e) Number of payments _____
- f) Amount of payment (if includes interest) _____
- g) Amount of payment (if does not include interest) _____

5. Conditions of non-cash sale:

- a) Distribution of government program payments year of sale:
Percent to seller _____ Percent to buyer _____
- b) Distribution of taxes year of sale:
Percent to seller _____ Percent to buyer _____
- c) Distribution of mineral rights:
Percent to seller _____ Percent to buyer _____
- d) Other (describe) _____

6. Dates:

- a) Binding contract _____
- b) Possession _____
- c) Received title _____

7. Recording:

- a) Deed: Yes _____ No _____. If not, why? _____
- b) Contract: Yes _____ No _____. If not, why? _____

E. TITLE

1. Individual: Yes _____ No _____
2. Tenancy in common: Yes _____ No _____. How many _____. Who _____

3. Joint tenancy: Yes _____ No _____. How many _____. Who _____

F. USE OF REAL ESTATE

1. Anticipate any changes in land use or improvements:

a) Within 5 years: Yes _____ No _____ Maybe _____

New use: _____

b) Within 10 years: Yes _____ No _____ Maybe _____

New use: _____

INTERVIEWEE

1. (Buyer, seller, etc.) _____

3-A. Copy of tax statement and receipt.

TREASURER'S OFFICE
CLAY CENTER, CLAY COUNTY, KANSAS

Tax Statement and Receipt
Received of:

Tract No.

1st Rec. No.

2nd Rec. No.

197 197

Penalty After
Dec. 20th &
June 20th.

1970

CHECK

CASH

TAX

CHANGE

BEING TAXES OF 1970 AGAINST FOLLOWING DESCRIBED
PROPERTY ON THE TAX ROLLS OF CLAY COUNTY, KANSAS

DESCRIPTION	SEC. OR LOT	TWP.	RNG. OR BLK.	SCHOOL DIST.	HIGH SCHOOL	CEME- TERY	ACRES OR LOTS
-------------	-------------------	------	--------------------	-----------------	----------------	---------------	---------------------

Unpaid Taxes 1966

Unpaid Taxes 1967

Unpaid Taxes 1968

Unpaid Taxes 1969

VALUATION	GEN. TAX	SPEC.	SPEC.	SPEC.	TOTAL	FIRST HALF	LAST HALF
	INTAN.						
GRAIN BU.	TAX						

County Treasurer

Allice L. Bender

INT.

AMT.
PAID

Countersigned:

Effie Ward
County Clerk

By _____

TABLE 5-A. Use of analysis of variance to compare the buyer's age by three classes of sale finance.

Classes:	Installment contracts	Mortgage	Cash
Summary statistics:			
$\sum X_i$	767	774	292
n_i	20	17	6
\bar{X}_i	38.35	45.52	48.66
$\sum n_i \bar{X}_i^2$	29,414.4	35,225.2	14,206.7
$\sum X_i^2$	32,505.	37,170.	15,672.
	Correction factor = 78,107.8		
Analysis of variance table:	degrees of freedom	sum of squares	mean squares
source			F
populations	2	738.5	369.8
error	40	6,500.7	162.5
total	42	7,239.2	
F-test:	$F(2,40) \approx 2.28$ at 10%		

$$\sum \sum X_{ij} = 1,833$$

$$\sum n_i = 43$$

$$\bar{X}_{..} = 42.62$$

$$\sum n_i \bar{X}_i^2 = 78,846.3$$

$$\sum \sum X_{ij}^2 = 85,347.$$

TABLE 6-A. Use of analysis of covariance to test the significance of method of finance (three classes) on price per acre.

Analysis of variance table				
Source	Degrees freedom	Sum of squares	Mean squares	F value
Unrestricted	19	2,964,284.99		
Hypothesis	2	3,726.74	1,863.37	0.136
Error	17	232,464.26	13,674.37	
Total	38	3,200,476.00		
Significance level: $F(2,17) = 0.136$ is greater than 25%				

TABLE 7-A. Variables utilized to explain the variability in price per acre of rural real estate in Clay county, Kansas, stepwise deletion multiple regression model II.

Var. No.	Variable Name	Significance level	Model variance after deletion	R ² at deletion
23	Percent interest paid	0.983	12,311.93	0.734
22	Percent paid down	0.979	11,664.38	0.734
10	Bought for enlargement	0.957	11,082.87	0.733
7	Property rented to buyer	0.877	10,568.00	0.733
4	Surfaced road	0.828	10,111.03	0.733
19	Distance from base	0.706	9,735.82	0.731
15	Age of buyer	0.616	9,435.12	0.728
8	Property was rented, not to buyer	0.584	9,173.99	0.724
13	Index of improvements	0.712	8,870.50	0.723
1	Cash sale	0.501	8,695.20	0.718
21	Index of number of people interested	0.283	8,757.04	0.705
16	Number acres operated	0.286	8,813.00	0.693
2	Mortgage sale	0.171	9,098.81	0.672
5	Gravel road	0.107	9,618.90	0.641
Selected model				
14	Distance to Clay Center	0.834	10,153.66	0.570
20	Repayment period	0.286		0.570
18	Percent cropland	0.272		0.544
12	Acres in tract	0.195		0.535
17	Buyer owned acres	0.080		0.511

TABLE 9-A. Variables utilized to explain the variability in price per acre of rural real estate in Clay county, Kansas, 1970, stepwise deletion multiple regression model VI.

Var. No.	Variable Name	Significance level	Model variance after deletion	R ² at deletion
30	Ratio seller acres rented out to acres owned	0.873	6,967.81	0.916
18	Percent cropland	0.916	6,351.48	0.916
5	Gravel road	0.938	5,849.11	0.916
22	Percent paid down	0.914	5,451.90	0.915
19	Distance from base	0.672	5,119.38	0.914
27	Percent soil classes I&II	0.608	4,841.92	0.913
7	Property was rented to buyer	0.480	4,622.28	0.911
3	Installment contract sale	0.623	4,492.49	0.908
10	Bought for enlargement	0.552	4,305.56	0.907
17	Buyer owned acres	0.465	4,162.45	0.905
25	Index of house improvements	0.277	4,070.07	0.902
23	Percent interest paid	0.187	4,118.49	0.896
29	Percent of soil classes V and VI	0.224	4,280.10	0.887
21	Index of number of people interested	0.221	4,386.09	0.878
4	Surfaced road	0.188	4,492.69	0.870
20	Repayment period	0.379	4,643.63	0.861
33	(No. acres in tract) ²	0.109	4,608.31	0.856

TABLE 9-A continued.

Var. No.	Variable Name	Significance level	Model variance after deletion	R ² at deletion
Selected model				
31	Ratio net income to acres operated	0.071	4,908.08	0.820
15	Buyer's age	0.071		0.820
35	Acres x percent soil classes I & II	0.047		0.815
16	Number acres operated	0.006		0.788
13	Index of improvements	0.003		0.778
24	Buyer's net income	0.003		0.775
34	(Distance to Clay Center) ²	0.001		0.762
32	Acres seller owned	0.001		0.754
12	Acres in tract	0.000		0.731
14	Distance to Clay Center	0.000		0.694

TABLE 10-A. Variables utilized to explain the variability in the repayment period of rural real estate in Clay county, Kansas, 1970, stepwise deletion multiple regression model VII.

Var. No.	Variable Name	Significance level	Model variance after deletion	R ² at deletion
16	Number acres operated	0.891	59.89	0.883
14	Distance to Clay Center	0.873	56.24	0.882
35	Acres x percent soil classes I & II	0.650	53.64	0.881
30	Ratio seller acres rented out to acres owned	0.675	51.21	0.879
5	Gravel road	0.693	48.94	0.878
31	Ratio net income to acres operated	0.609	47.16	0.877
10	Bought for enlargement	0.727	45.20	0.876
3	Installment contract sale	0.586	43.77	0.874
24	Buyer's net income	0.457	42.96	0.871
27	Percent soil classes I&II	0.356	42.74	0.866
18	Percent cropland	0.438	42.10	0.862
32	Acres seller owned	0.378	41.78	0.858
34	(Distance to Clay Center) ²	0.226	42.61	0.850
15	Buyer's age	0.203	43.68	0.840
17	Buyer owned acres	0.215	44.60	0.831
26	Price per acre	0.291	44.84	0.824
4	Surfaced road	0.238	45.49	0.816

TABLE 10-A continued.

Var. No.	Variable Name	Significance level	Model variance after deletion	R ² at deletion
Selected model				
12	Acres in tract	0.058	45.49	0.792
33	(Acres in tract) ²	0.019		0.779
23	Percent interest paid	0.000		0.718
25	Index of house improvements	0.000		0.710
22	Percent paid down	0.000		0.674
2	Mortgage sale	0.000		0.503

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RURAL REAL ESTATE TRANSFERS IN 1970
FOR CLAY COUNTY, KANSAS

by

ROBERT M. RONNAU

B. S., Kansas State University, 1971

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Economics

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Our understanding of rural real estate transfers seems to become more demanding every day. Challenged by the small turnover of properties, the increased complexity of the land marketing system, and the diverse nature of land and improvements, the task of this study was to gain an insight into the nature of rural land transfers. To do this, one county in north central Kansas (Clay) was chosen and all types of sale and nonsale transfers were examined for 1970.

Six hypotheses were chosen to be tested:

1. That approximately 50 percent of farm real estate sales are transferred by installment contracts.
2. That prices and terms for installment contract sales differ from other sales; therefore, recorded sales do not represent all sales.
3. That approximately three-fourths of sales are tracts to be added to existing farms.
4. That a classification problem exists in comparing sales of real estate which is caused by existing recording practices, limiting the number of transfers which can be used for comparisons.
5. That variability in real estate transfers is high in relation to the number of sales available for analysis, causing unreliable estimates of prices and other indicators derived from real estate market information.
6. That approximately 50 percent of all rural real estate transfers are made through gifts, inheritance, and other nonsale methods.

Data were collected from various public agencies and from individuals by means of a questionnaire for sale transfers. Principle sources identifying transfers were the Clay county court house records of the register of deeds, county treasurer, county assessor, and probate court. The county Agricultural Stabilization and Conservation Service, realtors, abstractors, lawyers, and financiers also cooperated with their information about land sales. The buyer of real estate provided the information about the terms of his transfer, descriptive features of the real estate, and other characteristics.

A total of 179 transfers occurred in 1970, of which 91 were full

consideration transfers. Of the 91, 35 or 38.5 percent were financed by installment contracts, less than was hypothesized. Estate settlements, gifts, and exchanges totaled 77 or 43 percent of all transfers for the county. Again, this figure is less than was hypothesized.

Approximately half of the full consideration transfers were selected for interviews. From the two lists, recorded cash and mortgage financed transfers and nonrecorded installment contract transfers, forty-eight interviews were completed. The interviews consisted of twenty-two mortgage, five cash, and twenty-one installment contract transfers. Thirty-eight of the forty-eight transfers contained sufficient information to be used in multivariate analysis.

Statistical tests in the form of analysis of variance and covariance and multiple regression programs indicated that the method of finance was not a factor significantly related to the price of farmland. At the same time, the repayment period and the interest rate were two factors which distinguished installment contracts from recorded mortgage and cash transfers.

In the sample (48) of 1970 transfers, 94 percent of the tracts were found to be sold to farm operators. A 5 percent confidence interval verifies that well over three-fourths of all sale transfers were added to existing farms.

Analysis of those transfers included in the 1970 assessment-sale ratio study indicates the difficulty encountered from comparisons of recorded deeds. Installment contracts and some other transfers are not recorded and may not be utilized in the year they were initiated or any year; discrepancies occur in ratio cards from inadequate information; family sales, exchange transfers, part-interest transfers, and sales with assumed mort-

gages are distinguished from sale transfers; and tracts which are divided or improved between assessment and the sale date are not utilized.

Only 34 of the 179 transfers in 1970 were utilized by the assessment-sale study and just 37 percent of the full consideration sales were used. Of those not utilized, thirty-five were installment contract sales and twenty-two were excluded for other reasons mentioned above.

Although wide variability was found within factors associated with real estate, the parties and other factors related to sales, a multiple regression model with ten variables explained 85 percent of the variability in land prices. At the same time, the standard deviation could not be reduced below \$67 per acre. It was concluded that due to the small number of transfers and their variability, it is difficult to derive reliable coefficients for independent variables.

The ten variables were: net income per acre operated, buyer's age, acres in tract times percent soil classes I & II, acres operated by buyer, index of improvements, net income of the buyer, distance to Clay Center squared, acres seller owned, number of acres in tract, and distance to Clay Center.