NON-FARM FACTORS AFFECTING RURAL LAND PRICES IN A SELECTED AREA OF KANSAS

by

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CHAPTER I

INTRODUCTION

Rural land prices have had a general upward trend, but in recent years this trend has been increasing at an increasing rate. Land values in Kansas increased approximately 365 percent from 1940 to 1967.[1] This indicates an average yearly increase over the 27 year period of approximately 13.5 percent. In the early stages of this trend, the increase could largely be attributed to increasing net farm income. Beginning in the 1950's, however, the upward trends in land prices began to increase faster than net farm income. Since March 1, 1967, nationwide farmland values have increased 70 percent,[2] indicating a national yearly average of 10.8 percent increase over a $6\frac{1}{2}$ year period. However, data indicates that land prices increased over 20 percent between November, 1972, and November, 1973.[3] The largest increase shown by any state was 33 percent for Colorado, ranging down to a low of 10 percent in Louisiana, with Kansas hitting the average of 21 percent increase.[4] The most recent figures to date indicate a yearly increase of almost one third.

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[1] Merton L. Otto and J. E. Pallesen, Trends in Land Values in Kansas, Bulletin 521 (Manhattan, Kansas: Agricultural Experiment Station, Kansas State University; January, 1969).

[2] U. S. Department of Agriculture, Economic Research Service, Farm Real Estate Market Developments (Washington, D. C.: Government Printing Office, January, 1974), p. 2.

[3] Ibid.

[4] Ibid.

From March 1, 1973 to March 1, 1974 land values in Kansas jumped 30 percent.[5]

There are indications that land purchased for non-farm uses and for potential capital gain have been major contributors to the sharp increase in the interest in land. Historically, the value of land has been related to its productivity. However, in many recent instances it appears the price paid for land cannot be justified from its potential farm income.

The rural land market is different from most other markets in the economic system because each unit is unique. Tracts of land probably differ in fertility, erodability and topography, among other things. If the land should appear identical to another tract of land, there is one aspect that invariably sets them apart--location.

Each of the variables involved in the land market may have a different effect on the price of the land, depending on the preferences of the buyers or sellers involved. With such a large number of variables, it is necessary to categorize the factors.

Many factors affecting the price of land cannot be labeled specifically farm or non-farm in nature. For instance, a good road located near a tract of land would give the land additional value regardless of whether it was to be used for farming or a non-farm use.

The sharp increase in land prices has raised numerous questions about the factors affecting rural land prices. Is the recent increase caused by a "mad land grab", or are there definite patterns to the market? Are people

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[5]U. S. Department of Agriculture, Economic Research Service, Farm Real Estate Market Developments (Washington, D. C.: Government Printing Office, June, 1974), p. 5.

"panic buying" to protect themselves against inflation, or are they carefully evaluating and looking for specific characteristics in land? Prospective buyers, land owners, and farm mortgage lenders among others are asking these questions and are interested in knowing what factors contribute to the market value of land.

Changes in our mode of living have caused many people to ponder on the factors affecting land value. Location seems to be a popular influence on the value of land. It is characteristic of people to desire to be near what they own; therefore, a tract of land located near a densely populated area would have a high demand relative to a tract located far from urban developments.

With todays mobile society, a trend seems to be developing toward movement away from the city. With this in mind, many people are seeking rural land suitable for building a home and still close enough to the city to commute to their jobs. Location of the land with respect to good roads plays an important role here.

Shortened work days and work weeks are causing many people to look for land that has scenic and recreational value, a place to spend their leisure time. Wooded areas, creeks, ponds, hills, all seem to attract people who are seeking rural land for recreation.

Previous studies in Kansas have dealt primarily with factors important in evaluating land for farm uses. Some of these factors such as improvements, quality of roads and distance to town, likely appeal to buyers with non-farm interests. These are significant factors, but have explained only a small part of the apparent influence of non-farm interests.

The purpose of this study was to identify some of the major non-farm factors affecting rural land values and to estimate the effect of these factors. More precisely, an attempt was made to: (1) identify the major non-farm factors affecting rural land value, (2) quantify farm value of land, (3) determine through various sources the market price of land, and (4) estimate the effect of the non-farm variables on the rural land price.

The general approach used in attaining the goals of the study began with determining a location to study. A sample of rural land owners was drawn from the area chosen, followed by the development of a questionnaire which was used in a mail survey. Economic and statistical analyses were used to determine if the variables affected the price of land and to what extent.

CHAPTER II

REVIEW OF LITERATURE

Most studies dealing with factors affecting rural land prices have concentrated their efforts on the farm factors involved. The rapidly increasing trends in the land market in recent years have caused more interest in the non-farm factors that affect rural land prices. Selected studies have been reviewed and grouped into three general categories: (1) trends in land values, (2) factors affecting rural land prices, and (3) stability of factors affecting land prices. Many of these studies include multiple regression analyses and were included in this review for purposes of comparison with the present study.

Trends in Land Values

The interest for this study has been generated primarily by the rapidly increasing trends in land values. Information on trends in land values in Kansas, the market structure, and factors influencing land values are described in a manuscript by Wilfred H. Pine and Raymond R. Hancock.[1] This was a revision of an earlier study conducted by Merton L. Otto and J. E. Pallesen[2]

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[1] Wilfred H. Pine and Raymond R. Hancock, "Trends in Land Values in Kansas," contribution no. 553, (manuscript for publication, Agricultural Experiment Station, Kansas State University, 1974).

[2] Merton L. Otto and J. E. Pallesen, Trends in Land Values in Kansas, Bulletin 521 (Manhattan, Kansas: Agricultural Experiment Station, Kansas State University; January, 1969).

in which trends in land values up to 1967 were discussed.

With the exception of three years, land prices in Kansas have continued to increase since 1941. The three years ending March 1, 1950, March 1, 1954 and March 1, 1970 may have been the result of expectations of post-war declines in land prices, according to the authors. It is emphasized that these were only slight declines and, like the general economy, no depression or major recession occurred in the land market.

In 1950, the average value per acre for the United States as a whole was $65, while Kansas averaged $66. The U. S. average for 1974 is 310 and 265 for Kansas. Kansas, as well as other principal agricultural regions of the U. S., has not had as rapid an increase in land prices as other regions.

Factors affecting land prices discussed in the publication include income, foreign markets, available capital, farm enlargement, technology, general inflation, investment opportunities, and other factors. It is traditional to think of a resource as having value because of the value of the goods and services it produces or is expected to produce. From 1940 to 1950 the relationship between net farm income and land prices in Kansas was rather close; however, from 1950 to 1957 income moved downward and land prices moved upward. Income only showed a slight upward trend between 1958 and 1968, but land prices increased significantly; and since 1968, income appears to lead the increase in land prices.

With the doubling of agricultural exports from 1969 to 1973, the foreign market may have exerted an influence on land prices. Lack of available capital causes a reduction in potential land buyers; however, outstanding farm real estate debt has doubled in the 8 years between 1965 and 1973. Farm enlargement purchases constitute four out of five real estate transfers in the

Northern Plains states, therefore exerting a strong influence on the demand for land. Farm productivity per unit of input in the United States increased 50 percent from 1950 to 1972. Part, if not all, of this increase is likely to be capitalized into the price of land. Inflation causes many people to seek investment opportunities that will grow in dollar value sufficiently to offset the decreases in the value of the dollar. Land has served well for this purpose in recent years.

Other factors discussed in this publication include population increases, improvement of diets requiring more land, and "consumptive uses." These consumptive uses include factors such as sunshine, recreation, and the idea of owning a tract of land.

Most of the buyers of farm real estate have been farmers. In 1971, for example, 80 percent were farmers. For the last 15 years there has been no apparent major change in the kinds of buyers and sellers.

Total farm mortgage debt in Kansas as of January 1, 1973, was 10 percent of the value of farm land and buildings. The debt to asset ratio increased from 1950 to 1970, but decreased slightly since then because real estate values increased more rapidly than the debt.

This publication and its predecessor show that trends in land values are increasing at an increasing rate. Trends in land prices in future years will depend on the factors described above, and indications are that these factors will place increased demands on a limited resource, this supporting the popular conclusion that land values will continue to increase.

Factors Affecting Rural Land Prices

Kansas. A study was conducted to determine the effects of road

improvements on land values by Jack D. Edwards and was presented in his unpublished dissertation.[3] A report on the project was originally published in a bulletin by Edwards, Pine, and Feyerherm.[4] Although the study's primary consideration was the effects of road improvements on land values, a concurrent examination of the effects of other major factors on farm real estate values was required.

Four areas of Kansas were selected for study, each consisting of five to six contiguous counties. Data were available for four of the areas from 1956 to 1958. Data for one of the areas included the years 1947 through 1949.

Three major hypotheses were tested in the Edwards study: (1) improving the quality of roads adjacent to a tract of farmland will increase its market value, all other factors held constant, (2) factors such as type of soil, land use, and value of improvements will have a more significant effect upon the market value of farm real estate than road improvement, (3) prediction equations developed for testing the first two hypotheses will explain the same amount of variation in farm real estate prices over time when the same combination of independent variables is used.

Edwards concluded in his study that multiple regression analysis was the most applicable analytic technique to use. The study demonstrated that analysis by single classification and averaging produced biased estimates of the effects of an individual factor on land value.

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[3] Jack D. Edwards, "An Economic Analysis of Highway Improvements and Other Factors Affecting Farm Real Estate Values in Selected Areas of Kansas," (unpublished Ph.D. dissertation, Department of Economics, Kansas State University, 1968).

[4] Jack D. Edwards, Wilfred H. Pine, and Arlin K. 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).

Two basic multiple regression models were used: (1) price per acre and (2) total price or consideration for the tract. After examination of earlier studies, Edwards concluded that the factor of size by itself exerts a strong influence on the price of rural land.[5] He criticized the price per acre model in that it eliminated the important size variable by dividing through by acres. Such factors as actual acres of cropland, wheat allotment, and soil type are most often associated with tracts as units, and therefore, justified the total consideration model. However, it was pointed out that in using the total price model with various kinds of land, it should be recognized that the size of the tract alone has a major influence on the total price.

With the qualifications that the results varied for the four areas and the different time periods, and standard errors were large in some samples, it was the conclusion of the study that land prices were influenced by the quality of roads servicing the tract. In the north-central area, a gravel road added about $5 per acre over a dirt road from 1956 to 1958. Effects were uncertain for other areas studied. The eastern Kansas area showed hard surfaced roads added from $20 to $35 an acre to the value of the land. Little influence, if any, was detected in the two western areas, with the exception of hard surfacing in Northwest Kansas. Although road quality proved a significant factor in some cases, other factors for which data were available for all observations (total acres, assessed value of improvements, distance to a town of population greater than 1,000, acres of soil type 1, and acres of

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[5]One of the earlier studies is Wilfred H. Pine and Arlin M. Feyerherm, "Land Value in Relation to Size of Tract and Volume of Land on the Market," unpublished manuscript, Kansas State University, 1963.

soil type 2)[6] consistently had effects that were statistically significant and explained a larger portion of dependent variable variation than road quality.

The prediction equations obtained in the study gave significant results (1 percent level of confidence). For purposes of comparison with the present study, the prediction equation selected by Edwards for the eastern area[7] is presented in Table 1. The dependent variable employed in this equation was the total consideration paid for farmland.

Georgia. In Georgia, Wise, Dover and Miller,[8] found that building value per acre was the most significant determinant of North Georgia land prices. The objectives of this study were: (1) to determine the factors that affect rural property values in North Georgia and to determine their relative importance, and (2) to determine the practicability of the use of statistical land valuation models in predicting rural property prices in the area studied.

To represent the North Georgia area a seven-county sample was selected. The counties were selected on the basis of their location to roads, cities, lakes, and recreational areas, and on the basis of the type of land area. Two of the counties were selected as agricultural counties, three were selected as "rapid growth" counties, and two were selected as mountainous, forested counties.

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[6] As in the present study soil type 1 includes Land Use Capability classes I and II and soil type 2 includes Land Use Capability classes III and IV.

[7] The eastern area considered in the Edwards study includes Pottawatomie and Wabaunsee counties, which are the two counties used in the present study. Other counties included in the eastern area of the Edwards study are Chase, Lyon, and Morris.

[8] James O. Wise, H. Jackson Dover and Bill R. Miller, Factors Affecting the Value of Rural Property in North Georgia, Research Bulletin 103, Agriculture Experiment Station (College Station, Athens, Georgia: University of Georgia, February, 1972).

TABLE 1. Estimating equation of total sale price of farm real estate derived by Edwards for Chase, Lyon, Morris, Pottawatomie, and Wabaunsee counties in Kansas for 1956 through 1958.[a]

Variable	Coefficient	Standard Error
Constant	540	
Total acres	52	6
Acres of soil type 1	73	8
Acres of soil type 2	16	5
Total acres if gravel road, zero otherwise	7	5
Total acres if hard road, zero otherwise	28	6
Assessed value of improvements	3.00	0.62
Distance to a town of population greater than 1,000	-1.02	0.30
Coefficient of Multiple Determination (R^2) = 0.725		

[a]Edwards, Pine, and Feyerherm, p. 32.

Tabular analysis and multiple regression analysis were used to determine the influences of variables that were thought to be important in explaining value. More specifically, tabular analysis was used to obtain an average price per acre for different ranges of values of the independent variables to establish some basic price relationships. Regression equations were developed to test the influences of 100 variables on the value of rural property.

Their finding that building value was the most significant determinant of property value, suggested to the authors that as expenditures for other factors of production are increased, the land is more valuable because of its increased use intensity. A demand for land other than for forestry and agriculture was indicated by the tendency of the farm and forest variables to be negatively associated with the price of property.

Over 70 percent of the variation in property prices of the complete sample was explained by use priority variables. The three use priority variables used were forest, farm, and residential. These variables replaced the land use variable from the initial analyses. Other findings of the study showed that location variables were more important in explaining rural property price variations in the rapid growth areas than in farm and forest areas. Of the variables classified under "condition of sale variables", reasons for purchase, the sale date, and the size of the acreage, proved to be most significant. Specific land use variables for farmland and productivity of farmland were not found to be significant price determinants. This seemed to indicate to the authors that factors other than those which measure the productive quality of farmland were responsible for explaining the price variation.

An estimating equation was developed from an analysis of 45 cases in three rapid growth counties. This prediction equation is presented in Table 2 for purposes of comparison with the present study.

TABLE 2. Estimating equation for price per acre calculated from rural land sales in three rapid growth counties in North Georgia, 1969.[a]

Variable	Coefficient	Standard Error
Building value	1.27	0.38
Dominant city population	-0.07	0.33
Distance to interstate highway	-18.87	9.46
Size	-2.85	1.31
Sale date	-3.37	3.26
Purchase for speculation	220.20	144.11
Distance to closest town	-13.54	28.21
Percent forest land	-1.27	1.71
Rail distance	-7.67	12.83
Closest town population	-5.01	10.90
Distance to lake	-2.05	3.23
State or Federal road frontage	-42.78	103.96

Constant = $1225.20

Standard Error of the Estimate = $\pm$ $277.64

$R^2 = 0.6765$

[a]Wise, Dover and Miller, p. 25.

Oklahoma. The effects of watershed development and flood protection on farmland values were studied in Oklahoma by John Waldrop for his Ph.D. dissertation[9] and presented in a paper by Daniel D. Badger.[10] Data for the six watersheds selected were obtained from public records at the local courthouses and by interviewing farmers selected by sampling farms in the study area. Even though a large sample time period was used--1947 through 1962--the number of observations available was relatively small. There were 95 observations available in the developed watersheds and 89 in the undeveloped watersheds.

Multiple regression analysis was used to derive estimating equations for the watershed areas. Three of the watersheds had been developed for purposes of flood protection and their estimating equations were presented in Badger's paper. The three presented were Barnitz Creek Watershed, Cavalry Creek Watershed and Saddle Mountain Watershed.

A total of 27 sales provided data for the Barnitz Creek area. The estimated revenue from sales was the dependent variable in each of the estimating equations. The following independent variables were used in the Barnitz Creek equation.

1. Acres of land in the sale
2. Acres of upland suitable for crops

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[9]John E. Waldrop, Jr., "Effects of Upstream Watershed Development Upon Prices and Values of Affected Farmland in Selected Areas of Oklahoma," (unpublished Ph.D. dissertation, Department of Agricultural Economics, Oklahoma State University, May 1965).

[10]Daniel D. Badger, "Land Values and Returns to Land," A Report to the Conference on Economic Analysis and Economic Research in Relation to Watershed Planning, February 9, 1965, Prepared by the Department of Agricultural Economics, Oklahoma State University (Stillwater, Oklahoma: Department of Agricultural Economics, Oklahoma State University, 1965).

3. Acres of flood plain land

4. Effect of flood protection on the sale (i.e., value of flood protection if sale occurred)

It was found that with a capitalization rate of 5 percent, a net annual benefit was $6.06 per acre. It was concluded that these benefits have been capitalized into land values. All the coefficients of the regression equation were statistically significant and the R^2 was 0.81.

The Calvary Creek Watershed, with 39 observations, was the second watershed discussed. With the same dependent variable as in the Barnitz Creek equation, the following independent variables were used:

1. Acres of land in the sale

2. Percent of mineral rights transferred

3. Assessed value of improvements

4. Acres of upland suitable for crops

5. Effect of flood protection on the sale

6. Year of sale multiplied by acres of flood plain land

A high correlation between year of sale and the variable for flood protection was eliminated by multiplying the year of sale by acres of flood plain land. The coefficient of multiple determination for this equation was 0.76 and all coefficients except the variable for flood protection were significant.

The Saddle Mountain Watershed was the third watershed discussed by Badger. There were 29 observations available for this estimating equation, but the results were primarily unsatisfactory and insignificant.

Arizona. The effect of the goals and attitudes of Arizona ranchers on their willingness to sell their ranches was the subject of a study

conducted in Arizona. Arthur Smith and William Martin[11] found a significant difference between the goals and attitudes held by those ranchers who were willing to sell and those held by ranchers not willing to sell. The authors reviewed other literature that showed a price differential between the income producing value and the market value, and attempted to explain this differential using factors that indicated the goals and attitudes of Arizona ranchers.

Personal interviews containing questions on both economic and attitudinal variables were obtained from a random sample of 89 Arizona ranch owners. A factor analysis was used to extract 11 factors from a total of 33 examined, that indicated the significant goals and attitudes held by ranch owners. These factors were: (1) land fundamentalism, (2) family fundamentalism, (3) rural fundamentalism, (4) resource protection goal, (5) conspicuous consumption/speculative attitudes, (6) income satisficing, (7) wealth satisficing, (8) agricultural orientation, (9) immobility, (10) local orientation, and (11) local social satisficing. These 11 factors explained 69.2% of the variance of the original variables.

A discriminant analysis using the 11 factors was conducted to determine if a significant difference in goals and attitudes existed between those ranchers who were willing to sell their ranches and those who were not. The resulting estimations showed 79.8 percent accuracy in predicting the rancher's choice to sell or not to sell.

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[11] Arthur H. Smith and William E. Martin, "Socioeconomic Behavior of Cattle Ranchers, with Implications for Rural Community Development in the West," American Journal of Agricultural Economics, Vol. 54, No. 2, May 1972, p. 217.

Many of the factors used in this study are rather intangible, perhaps more so than some of the factors in the present study. Indications from this study show that there are possibly three general classifications of factors affecting land values; those that influence farming and farm income, those that influence non-farming sectors and non-farm income, and those factors influenced by goals and attitudes of buyers and sellers.

United States. A study to identify factors affecting farmland value in the United States as a whole was conducted by John E. Reynolds and John F. Timmons.[12] The purposes of the study were: (1) to identify the major variables affecting farmland value, (2) to describe and quantify the relevant variables, (3) to develop a method to test the importance of the variables identified, and (4) to apply this procedure to estimate the importance of relevant variables in explaining farmland values.

The period chosen for the time series analysis used in the study was 1933-1965 because crop and marketing controls were initiated by the Agricultural Adjustment Act of 1933. Time-series data of the aggregate U. S. farmland market were used to fit a recursive model.[13] An annual U. S. average (Alaska and Hawaii excluded) for each variable was the unit of observation in the time-series analysis. Problems of multicollinearity and autocorrelation were avoided with a cross-sectional analysis used as an alternative approach. The unit of observation for this analysis was the state average for each of the variables.

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[12]John E. Reynolds and John F. Timmons, Factors Affecting Farmland Values in the United States, Research Bulletin 566 (Ames, Iowa: Department of Economics, Iowa State University, February, 1969).

[13]Reynolds and Timmons, p. 336.

The average value of farmland per acre and the average value of farmland without the farm buildings are the two dependent variables explained in the study. Independent variables used to explain the changes in farmland value included expected net farm income, government farm-program payments, expected capital gains, technological advance, farm enlargement, the number of voluntary transfers of farmland, and an increasing demand for land from a growing population.[14]

The model was specified into two equations. Results of the study indicated the following relationships.

1. The value of farmland is assumed a function of the following variables:

   $$V = f(T; NFI, GP, Cg, r, A)$$

   where T is endogenous and the remaining variables exogenous.

   V = Value of farmland
   T = Number of voluntary transfers of farmland
   NFI = Expected net farm income
   GP = Government payments
   Cg = Expected capital gains
   r = Rate of return on common stock (a proxy variable for the capitalization rate)
   A = Increase in farm size (farm enlargement)

2. The voluntary transfer of farmland is assumed a function of exogenous variables:

   $$T = f(Cg, F/NF, TE, D/E, N)$$

   Cg = Expected capital gains
   F/NF = Ratio of farm to nonfarm earnings
   TE = Measure of technology (hours of labor per acre)
   D/E = Ratio of farm mortgage debt to equity
   N = Change in number of farms

With the value of farmland function it was estimated that with a decrease of 1,000 voluntary transfers, the average value of farmland increases 23 cents

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[14]For inclusive list of variables see Reynolds and Timmons, p. 337.

per acre. It was found that government payments for land diversion are capitalized into farmland values at a higher rate than are conservation payments. A $1 increase in expected net farm income was estimated to increase the value of farmland $2.02 per acre during 1933 to 1955 and $2.25 per acre from 1956 to 1965.

From the voluntary transfer of farmland function, the authors estimated that with a 10 percent decrease in hours of labor per acre (an increase in the level of technology), the number of transfers declined by 10.3 percent. A decrease of 3,350 voluntary transfers was estimated to occur when the average farm size in the U. S. increased 1 acre. An increase of $1 per acre in expected capital gains was associated with an increase of 1,900 farms transferred during 1933 to 1941 and an increase of 4,860 farms transferred during 1942 to 1965.

The general conclusion from the study was that farmland value in the United States is affected by a number of variables. Expected net farm income, government payments for land diversion, conservation payments, expected capital gains, farm enlargement, non-farm population density, technological advance, and the ratio of debt to equity, all exerted a positive effect. However, a negative effect was exerted by voluntary transfers of farmland, the capitalization rate, and the expected ratio of farm to non-farm earnings.

Stability of Factors

The stability of factors affecting farm real estate prices in Kansas was presented in an unpublished dissertation by Terry P. Sutton[15] and later

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[15]Terry P. Sutton, "Temporal Stability of the Effects of Factors Causing Intertract Variations in Farm Real Estate Prices in Kansas," (unpublished Ph.D. dissertation, Department of Economics, Kansas State University, 1970).

published in a bulletin.[16] A series of nested hypotheses were tested to analyze the problem in that study. The series consisted of four major levels of hypotheses.

I. The influences or importances of factors causing intertract variations in farmland market prices are stable over time.

II. (a) The sole cause of temporal instability in the influences of factors causing intertract variations in farmland market prices is inflation, with inflation defined as a decrease in the purchasing power of the dollar.

(b) Since factor influences do not change over time, any increase in farmland prices over time is caused by inflation increasing the base amount to which the influences of the various factors are added.

III. (a) The only causes of temporal instability in the effects of factors causing intertract variations in farmland prices are inflation and changing levels of technology in Agriculture.

(b) Increases in land prices over time are the result of inflation and changing levels of technology in agriculture, increasing the base amount to which the influences of the various factors are added.

IV. This level was concerned with identifying the forces, other than inflation and changing technology, that cause changes in the effects of factors causing intertract variations in land prices.

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[16] Wilfred H. Pine, and Terry P. Sutton, Stability of Factors Affecting Land Prices, Research Paper 13 (Manhattan, Kansas: Agricultural Experiment Station, Kansas State University; February, 1973).

The testing of II (a) was contingent upon the rejection of the first level hypothesis, and the testing of II (b) was contingent upon the acceptance of the first level hypothesis. The rejection of II (a) would lead to the testing of III (a), and the rejection of II (b) would lead to the testing of III (b), and finally the rejection of III (a) would lead to the fourth level of hypotheses.

Five contiguous counties in North Central Kansas were chosen as the sample area for this study. The counties were Osborne, Mitchell, Ottawa, Lincoln, and Cloud. These counties were chosen because of the availability of data. Much of the data used in the study were taken from an unpublished dissertation by Jack Edwards.[17] Besides the data gathered by the Edwards study for years 1947, 1948, 1949, 1956, 1957, 1958, 1961 and 1962, a questionnaire was mailed to grantees in the five counties seeking data from 1963 to 1967.

Price per acre was the dependent variable used in the various statistical analyses which included multiple regression and associated analyses. Factors employed as explanatory variables in the model included total acres, acres of each of three soil types, assessed value of improvements, distance to a town with a population greater than 1,000, and type of road adjacent to the tract. A mail questionnaire was used to obtain additional data on acres of wheat allotment transferred, acres of cropland not in wheat allotment transferred, and distance from the tract purchased to any other land owned by the buyer.

An analysis of variance computer program was used to test the hypotheses concerning temporal instability of factor effects. The analysis revealed

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[17] See "Review of Literature--Kansas" of this study.

that the effects of the percentages of soil types 1 and 2, distance to a town of population greater than 1,000, and assessed value of improvements per acre changed significantly over the sample period while road type and total acres were found not to change significantly. The tests also indicated that the three land use variables--percentage of wheat allotment, percentage of other cropland, and distance to other land owned--did not change significantly over time.

To determine the causes of the interyear instability of factor effects, a preliminary study indicated that three general forces could have caused changes in the yearly effects of those factors causing intertract differences in farmland prices: (1) changes in the purchasing power of the dollar, (2) changing levels of technology in agriculture and in the sample area, and (3) forces which could have influenced the importance of individual factors to the land market.

This third category of forces was of major interest to the study; therefore, an effort was made to remove the influence of inflation and changing technology, and identify the forces that affected individual factors. The procedure used to remove the effects of inflation was the deflation of the observed value of the dependent variable. The data were deflated according to changes in the values of the consumer-price index. This initial deflation removed some, but not all of the change in factor effects. Next the data were adjusted not only for inflation, but also for changing technology. To accomplish this, an index derived by multiplying the consumer-price index times the index of productivity was used to deflate the observed values of the dependent variable.

Using multiple regression analysis, an estimating equation was derived

using data from selected years from 1947 through 1967. (The estimating equation derived from data available from 1963 through 1967 proved to be largely unsatisfactory.) This estimating equation included the derived index (consumer-price index times the index of productivity) as an explanatory variable to account for interyear changes in farmland prices. Explanatory variables to account for intertract changes in farmland prices were: (1) total acres, (2) assessed value of improvements per acre, (3) distance to a town with a population greater than 1,000, (4) percentage of soil type 1, (5) percentage of soil type 2, (6) dummy variable for hard road, and (7) dummy variable for gravel road.

TABLE 3. Estimating equation for price per acre, utilizing the derived index as an explanatory variable, calculated from data on farmland sales in five Kansas counties for selected years from 1947 through 1967.[a]

Variable	Coefficient	Standard Error
CPI times index of productivity	0.7881	0.0235
Total acres	-0.0429	0.0074
Assessed value of improvements per acre	2.5671	0.2025
Distance	-0.8213	0.1405
Percentage of soil type 1	0.7204	0.0296
Percentage of soil type 2	0.1631	0.0272
Dummy variable for hard road	5.7417	2.3414
Dummy variable for gravel road	4.7585	1.7991

Constant = -45.2227

Standard Error of Estimate = 36.681

R^2 = 0.5285

[a]Pine and Sutton, p. 9.

CHAPTER III

THEORETICAL FOUNDATIONS AND HYPOTHESES

Theory of Land Value

Prices, which are values expressed in terms of a common monetary unit, function as regulators of consumption and production. Land values, in turn, function to furnish a guide for the utilization of land.[1] A consumer will buy only those goods and services he can afford on his limited income. He purchases first those goods and services that fulfill his absolute needs, and if the prices of these necessary commodities or services are so high that most of his income is used up, then the remaining wants are unsatisfied. A producer must also regulate the purchases of his means of production according to the prices he expects to get for the finished product. Through a pricing system such as this, the supply of and demand for, commodities and services are brought into equilibrium.

This same pricing process determines the value of land in the land market, but not as effectively as in most markets. Land as a commodity, however, has distinct and peculiar characteristics that set its market apart from other markets. The land market differs from other markets as follows:[2]

1. Market is local in character (cannot be moved from place to place)

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[1]Richard T. Ely and Edward W. Morehouse, Elements of Land Economics (New York, N. Y.: Macmillan Company, 1924), p. 234.

[2]Alfred A. Ring, Real Estate Principles and Practices (Englewood Cliffs, New Jersey: Prentice-Hall, 1972), p. 34.

2. Transactions are private in nature

3. Commodity is not standardized

4. Market is unorganized and lacks central control

5. Absence of short selling (selling, when prices are high, a commodity the seller does not own)

6. Poor adjustments of market supply and demand

Land is primarily indestructible and will last forever. Improvements on the land will last a long time if properly maintained. It is this durability of land that causes the maladjustments in supply and demand in the land market. If demand falls, for any reason, the inability to adjust or withdraw supply will depress land prices on the market. Demand for land is determined by the discounted future marginal profits.

The most common type of land transaction would be a simple form of trade. This is isolated bargaining.[3] Although most land transactions do not fit the description perfectly, their characteristic privacy and isolation resemble this type of market trading close enough to be classified as such. Scitovsky defines pure isolated bargaining as occurring "between two parties who must either trade with each other or not trade at all because there are no third persons with whom either of them could trade." The argument may be raised that there are third parties with whom the buyer or seller could trade in the land market; however, the general nature of a land transaction is that two parties are involved in arriving at a price mutually satisfactory to each.

In summary, the price of land is not determined by the demand or the supply of land alone. As emphasized before, it is the interaction of the

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[3]Tibor Scitovsky, Welfare and Competition (Georgetown, Ontario: Richard D. Irwin, Inc., 1971), p. 12.

two, however instable the market may be, that determines the price and hence the value of land.

Hypotheses

It has been established in previous studies[4] that a significant difference exists for many tracts of land between the market value and the value it has for farming purposes. The major concern of this study was to identify the non-farm factors contributing to this differential and attempt to measure their effect. A set of hypotheses was formulated as a tentative explanation of the situation and to provide a basis for further investigation. A major hypothesis was set forth, followed by a sub-hypothesis to help explain the possible rejection of the major hypothesis and a series of sub-hypotheses to analyze the major hypothesis.

The non-farm factors tested in these hypotheses include:

1. Scenic and recreational influence
2. Expected capital gain
3. Location to non-farm developments
4. Location to towns
5. Location to road
6. Improvements

The first three factors listed are considered the most "pure" non-farm factors, while the last three factors contain some non-farm influence as well as possible farm influence.

The major hypothesis was: non-farm factors contribute significantly to the difference between the market value for a tract of land and the value

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[4] See Review of Literature.

it has for farming purposes. The alternative to this hypothesis was that the difference between market value for a tract of land and the value it has for farming purposes is not caused by non-farm factors.

The sub-hypothesis contigent upon the rejection of the major hypothesis is: since non-farm factors have not contributed significantly to the increasing farm prices, the differential between market value and farming value can only be explained by nonsensical "panic buying."

The purpose of the following series of sub-hypotheses is to not only further establish the major hypothesis, but also to establish a basis to identify and measure the factors. The testing of the sub-hypotheses is contingent upon the acceptance of the major hypothesis. Also, each hypothesis in the series is contingent upon the acceptance of the sub-hypothesis previous to it.

The first sub-hypothesis is that there is a significant difference in the effects of the various non-farm factors. The second is that the "pure" non-farm factors exerted a stronger influence on the difference between market value and farming value than the "non-pure" factors. Last in the series of sub-hypotheses is that scenic and recreational influences exert the strongest affect on land values of any of the "pure" non-farm factors tested.

The word "significant" in these hypotheses refers to significance in a statistical sense. This meaning of the word significant is used in the remainder of this thesis.

In summary, the analysis of non-farm factors affecting rural land prices was accomplished through the testing of a series of hypotheses:

I. Non-farm factors contribute significantly to the difference between the market value for a tract of land and the value it has for farming purposes.

A. Since non-farm factors have not contributed significantly to the increasing farm prices, the differential between market value and farming value can only be explained by nonsensical "panic buying." (Testing contingest upon the rejection of hypothesis I.)

B. There is a significant difference among the effects of the various non-farm factors. (Testing contingent upon the acceptance of hypothesis I.)

1) The "pure" non-farm factors exerted a stronger influence on the difference between market value and farming value than the "non-pure" factors. (Testing contingent upon the acceptance of hypothesis I-B.)

a) Scenic and recreational influences exert the strongest affect on land values of any of the "pure" non-farm factors tested. (Testing contingent upon the acceptance of hypothesis I-B-1.)

CHAPTER IV

METHODOLOGY

Sample Area

The area for this study included one and one-half Northeast Kansas counties, including Pottawatomie and the north half of Wabaunsee County (see Figure 1). Time requirements on the study necessitated studying an area near the University, but the primary reason for selecting this area to study was that it has experienced rapid non-farm development in recent years and promises to continue this trend in the future. The area includes all of Pottawatomie County and is bounded on the south by Township line 12 South. The southern portion of Pottawatomie County along State Highway 24 appears to be developing most actively in the area. All of Wabaunsee County was not sampled in the study because, although there are several bridges crossing the Kansas River which divides Pottawatomie and Wabaunsee, it was apparent from preliminary observations that the real estate market in Southern Wabaunsee was not reacting to the non-farm developments in Southern Pottawatomie County.

Characteristics of Pottawatomie and Wabaunsee counties are presented here to give an idea of the type of farmland and rural communities that were considered. The data available did not give partial data for the portion of Wabaunsee considered in the studies; therefore, the characteristics presented here reflect all of Wabaunsee County. In 1969, 1,751 farms existed in the two counties. In 1972, 572,000 acres of pastureland and 234,210 acres

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

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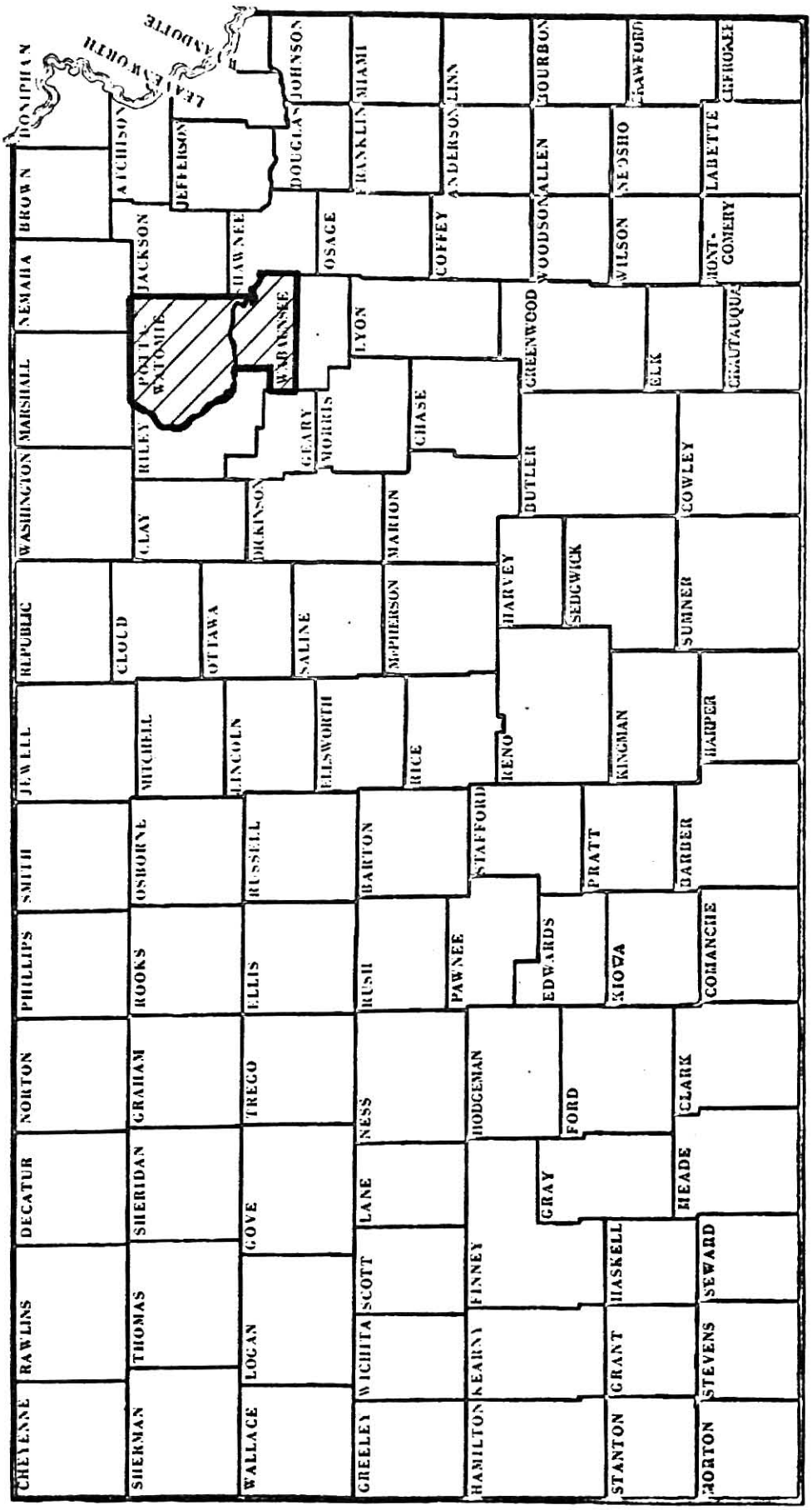

Figure 1. Map of Kansas showing sample area.

of cropland were harvested in the two counties.[1] The major crops harvested in the area are wheat, grain sorghum, corn, and soybeans. In 1972, 41,000 acres of wheat were harvested with an average yield of 37 bushels per acre. Grain sorghum was produced on 57,500 acres averaging 70 bushels per acre. There were 28,420 acres of corn harvested in 1972 averaging 80 bushels per acre and 6,600 acres of soybeans averaging about 33 bushels per acre. In 1972, 54,000 beef cattle and 3,800 dairy cows were in the two counties. Hogs in the area numbered approximately 80,000 head.

The topography of the two counties is primarily rolling flint hills. The Kansas River basin runs between the two counties which is primarily silty clay loam soil, but the majority of the soil in the two counties is primarily shallow, stony soils.

Major non-farm influences in the area include increased residential building primarily in the southern and western portions of Pottawatomie County, Tuttle Creek Reservoir which borders the majority of the western edge of Pottawatomie County, the city of Manhattan with a population of approximately 30,000 which joins Pottawatomie in the southwest corner, Kansas State University located in Manhattan, and State Highway 24 which passes through the extreme southern portion of Pottawatomie County. There are several announced proposals of major non-farm developments in Pottawatomie County that are expected to have exerted an influence on the real estate market. Among these is a proposed Kansas Power and Light electric energy center. The total plant site area will be approximately 13,500 acres and

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[1] Kansas Agriculture, Annual Report of the State Board of Agriculture (Topeka, Kansas: State Board of Agriculture, 1973).

will be located just north of Belvue, Kansas.[2] A water storage reservoir of about 3,000 acres surface area will be constructed on the site. The first unit which is proposed to be constructed by 1978 will generate 700,000 kilowatts. Over a ten year period, four generating units are proposed to be built on the site, employing an estimated average workforce of 600 people to build the units.

Another proposed major non-farm development is a pork processing plant to be constructed by the Oscar Mayer Company and located adjacent to Wamego. The plant site is to include 730 acres and will employ 700 people.[3] The announcement date on this facility was February 23, 1972.

The U. S. Army Corps of Engineers has announced plans to begin construction of a reservoir in Central Pottawatomie County by 1976.[4] The large reservoir will have a flood pool of 10,600 acres and a multipurpose pool of 5,300 acres. The announcement is assumed to already be exerting speculative pressure on the land market and the proposed lake is expected to attract further non-farm developments as well as reducing the supply of available farmland in that area of Kansas.

To summarize, the non-farm developments existing and proposed, that are expected to influence the rural land market include:

1. Tuttle Creek Reservoir
2. Manhattan, Kansas

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[2]The Kansas Power and Light Company, A New Electric Energy Center For The Kansas Power and Light Company, (Topeka, Kansas, 1973).

[3]Mercury News Service, "Largest Hog Slaughtering Facility in State," Manhattan Mercury, February 23, 1972, (Manhattan, Kansas) p. A1.

[4]Mercury News Service, "Onaga Lake One Step Nearer a Reality," Manhattan Mercury, July 31, 1973, (Manhattan, Kansas) p. A8.

3. Increased residential building
4. Kansas State University
5. State Highway 24
6. Proposed pork processing facility
7. Proposed electrical generating plant
8. Proposed reservoir

These developments are expected to attract further non-farm development in this area and exert added pressure on the real estate market.

Sources of Data

The Register of Deeds located in the county courthouses of the two counties sampled, served as a source of information on land transactions. January 1, 1972 to July 1, 1973 was selected as the period to cover, primarily because this period included the announcements of the proposed non-farm developments, but also because questions from the public indicated a lot of interest in real estate activity during this time period. It was decided that all tracts 10 acres or larger would be considered as rural land, assuming that tracts smaller than 10 acres were not transferred for use in agricultural activities. The legal descriptions recorded at the Register of Deeds indicating the size and location of the tract were used to determine what tracts were suitable for the study. When it was determinable from the names of the grantor and grantee, family transfers were not taken from the records. Those family transfers that were undetected were later eliminated when the questionnaires were returned.

General county highway maps were used to determine if any tract of land selected for the study was located inside the city limits of any city or town.

If there were any, they were eliminated from the study. Gifts, trades, etc. were not considered in this study because these transfers were not expected to affect land values.

Therefore, an observation was excluded from the study if it had one or more of the following attributes:

1. The tract was transferred before January 1, 1972 or after July 1, 1973.
2. The tract size was less than 10 acres.
3. The sale was a transfer between relatives.
4. Any portion of the tract was within the city limits of any city or town.
5. The transfer did not involve monetary consideration.

As was indicated earlier, a questionnaire was used to gather a large portion of the data. Initially, a questionnaire was developed for a personal interview (see appendix, Figure 5) with each of the new landowners selected as a sample. A cover letter (see appendix, Figure 4), introducing the interviewer and briefly describing the study, accompanied each questionnaire. This questionnaire asked for general information about the tract itself as well as the buyer and seller. Questions were also asked about reasons for buying the particular tract and factors affecting the decision to buy the land and the price paid. The six non-farm factors were to be checked if they affected the decision to buy the land and then ranked in their order of importance. The price paid for the land was asked as well as what the landowner considered the tract he purchased to be worth for farming and/or grazing. Information was requested from the landowner concerning the agricultural productivity of the land. This information was to help the interviewer establish a farming worth, therefore not having to rely solely on the landowners judgement.

For pasture, the cash rent value and number of acres that would support a cow and spring calf were sought as being indicative of the land value. For cropland, the type of crop, annual per acre yield, and landlord's share were asked for. In this personal questionnaire some variable costs were asked for to help individualize the various tracts of land.

The personal interview approach was not very successful and was abandoned after numerous attempts to keep the interviews going. One reason was that the time and expense involved in a personal interview survey were inhibitive to the study. A major problem was finding the interviewee at home and willing to spend the time for an interview. Several of the landowners lived so far away that it was impractical to consider a personal interview. The interviewer detected a strong reluctance to tell the price paid for the land in a face to face interview. This information was crucial to the study. The mail questionnaire (discussed below) was more successful in gathering this information.

After considering the above problems with the personal interview questionnaire, it was decided to switch to a mailing questionnaire. Basically the same information was sought, although the questions were altered to read more clearly and some explanations of procedures were added. The questionnaire was pretested by sending out questionnaires to 10 randomly selected observations. From the results of the pretest, problems were detected and corrected on the questionnaire.

The questionnaire consisted of a cover letter explaining the study and the questionnaire, the questionnaire itself with the appropriate legal description filled in, and a return envelope with postage affixed. The first cover letter and mailing questionnaire are presented in Figures 6 and 7 (see

appendix). Two weeks after the initial mailing a second identical questionnaire and appropriate cover letter were mailed to the non-respondents. The second cover letter is presented in Figure 8 (see appendix).

Accompanying many of the returned questionnaires were requests from the landowners seeking the results of the survey. To prevent impatience and misunderstandings of the people participating, a letter was sent out shortly after receiving most of the questionnaires, informing the participants of some preliminary results of the survey. This letter is presented in Figure 2.

The 32 responses from the first mailing of 95 questionnaires was slightly over 30 percent. A second mailing yielded another 29 responses, for a total of 61 respondents or 64 percent return.

However, not all of the 61 responses were useful to the study. Several did not include crucial information; and if this information could not be obtained from other sources, the observation had to be eliminated from the sample. Of the 61 responses, 44 contained adequate information to conduct the study. Nine more observations were obtained from the initial personal interviews, bringing the observations to a total of 53 that were used in the complete study.

Methods of Analysis

Observation and Tabulation. The analyses performed under this method were designed to bring out relationships in the data that would illustrate the kinds of activities occurring in the land market. This type of analysis include those simple relationships that can be analyzed with graphs, tables, scatter diagrams, etc., and without the use of statistical or computer analysis. This type of analysis would not be practical with a large number of

March 21, 1974

Dear Land Owners,

We wish to thank you for cooperating in our effort to become more informed about rural land markets and prices. This letter also is to inform you of some preliminary results from our real estate survey. We may be calling a few persons to provide additional information.

We received 61 responses to the questionnaire and felt that that was quite good. The survey included the recorded deeds on rural land between January 1972 and July 1973 from Pottawatomie and the north half of Wabaunsee counties. Reasons given for purchasing were:

Reason	Response	Average acreage	Range
To farm yourself	34	230	20 - 1363
To rent to farmer	8	168	100 - 240
For non-farm use	5	55	13 - 87
To sell later: for farm use	5	83	27 - 160
for non-farm use	1	40	40

The average price paid for pasture land in the survey area was $146 per acre with a range from $80 to $225 per acre. The average price for cropland only was $432 per acre with a range from $190 to $627 per acre. Combinations of pasture and cropland had an average price of $264, ranging from $84 to $1230 per acre.

Eighteen landowners paid more than they thought the land was worth for farming and/or grazing while 8 thought they had received a bargain and paid less than what it was worth. Thirteen parties paid exactly what they thought it was worth and 5 were non-committal.

Several factors were listed in the questionnaire to determine if they influenced the purchase of the particular land:

Factors	Response
Scenic and recreational features	13
Location with respect to towns	15
Location with respect to non-farm developments	6
Location with respect to roads	24
Expected increase in value (capital gain)	22
Improvements	7
None of the above	14

Figure 2. Letter of preliminary results sent to respondents of survey to obtain information on land transfers in two Northeast Kansas counties between January 1, 1972 and July 1, 1973.

Although the above results may not provide precise and complete answers they and other information will help in answering some of the questions being raised by the public about real estate markets.

Sincerely,

(Signed) Wilfred H. Pine

Wilfred H. Pine, Economist

(Signed) Everett K. Everson, Jr.

Everett K. Everson, Jr.
Graduate Research Assistant

Figure 2 (Continued)

observations; however, in the present study with a relatively small number of observations several important relationships were brought out.

Present Value for Determination of Land Value. This procedure was not used to detect any relationships in the data, but was used to determine a value of land for farming purposes given the productivity information for a tract of land. It was indicated previously that the landowner was asked in the questionnaire to indicate what he thought the land he purchased was worth for farming and/or grazing purposes. To avoid relying solely on the landowners judgement, he was also asked to divulge productivity figures which could be used to calculate an average annual income from the tract of land and in turn determine a value for the tract of land based on its income producing capabilities.

The present value formula used was:

$$V = \frac{A}{i}$$

where:

V = present value

A = future annual income

i = discount (or capitalization) rate

assuming the annual income is constant and continues in perpetuity.

The discounted value of future net returns is based on the idea that people prefer present returns to future returns. Most people are aware of the income generating capacity of a dollar and would prefer $100 today to $100 one year from now if they can earn a positive rate of return on it during the year.

Whether it is the potential buyer or the potential seller considering the value of a tract of land, the value will represent the discounted value

of his expected future net returns. The potential buyer determines a value of land based on his anticipated future net returns. Theoretically he'll offer the amount that represents the discounted value of his expected future net returns, independent of whether they are farm or non-farm in nature.

Freidman Two Way Analysis of Variance by Ranks. This statistical analysis was used to determine if there was a significant difference in the preference of any one of the non-farm factors over any of the others. It was previously indicated that in the questionnaire the landowner was asked to check if any of the non-farm factors including scenic and recreational influence, location with respect to non-farm development, location with respect to town, location with respect to roads, expected capital gains, and improvements affected his decision to buy the land and the price he paid. He was then asked to rank the factors in order of their importance. The ranks from each questionnaire were then combined into a table (see appendix, Table 17) appropriate for the Freidman test.

The Freidman test is utilized by calculating the expression:[5]

$$\chi^2 = \frac{12}{Nk(k+1)} \sum_{j=1}^{k} (R_j)^2 - 3N(k+1)$$

where: N = number of rows

k = number of columns

R_j = sum of ranks in jth column

$\sum_{j=1}^{k}$ directs one to sum the squares of the sums of ranks over all k conditions

χ^2 is distributed approximately as chi square with d.f. (degrees of freedom) = k-1.

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[5]Sidney Sigel, Nonparametric Statistics for the Behavioral Sciences, (New York, N. Y.: McGraw-Hill, 1956) p. 166-173.

If the value of χ^2 is equal to or larger than a tabular value for a particular level of significance and a particular value of d.f. = k-1, the implication is that the sums of the ranks for the various columns differ significantly. In the present study this would mean that the sum of the ranks given for the various non-farm factors differ significantly.

Multiple Regression Analysis. This analysis had a three fold purpose in the present study: (1) to determine the effect of each factor on the value of rural land, (2) to develop estimating equations for the price per acre of rural land, and (3) to identify the non-farm factors affecting rural land values.

A multiple regression expresses the functional relationship between a dependent variable and several independent variables. The functional relationship may be written as $Y = f(X_1, X_2, \ldots, X_n)$ or in specific form as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots \beta_n X_n + E$$

where:

Y = dependent variable

β_0 = constant (or intercept)

X's = independent variables

$\beta_1 \ldots \beta_n$ = population regression coefficients

E = unexplained error

In this expression the term β_0 represents the intercept value of Y or the value of Y when all the X's are zero. The observed value for Y deviates from the predicted Y by either a positive or negative finite term. To estimate from a given set of observations, an error term (E) must be added to the model.

Input data for a multiple regression expression appear as the following matrix:

$$\begin{matrix} Y_1 & X_{11} & X_{21} & \cdots & X_{k1} \\ Y_2 & X_{12} & X_{22} & \cdots & X_{k2} \\ \vdots & & & & \vdots \\ Y_n & X_{1n} & X_{2n} & \cdots & X_{kn} \end{matrix}$$

where $Y_j (j=1, 2, \ldots, n)$ is level of Y attained when i+n of the k inputs is at level X_{ij}. (k = number of independent variables)

"The coefficient of multiple determination, R^2, indicates the percentage of the variation in the n observed Y values that is explained by the fitted regression equation. Thus it is a measure of the goodness of fit of the estimated regression equation."[6]

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[6]This discussion and much of the preceeding was based on Earl O. Heady and John L. Dillion, Agricultural Production Functions, (Ames, Iowa: Iowa State University Press, 1961) p. 109-110 and George W. Snedecor, Statistical Methods (Ames, Iowa: Iowa State College Press, 1948) p. 340-346.

CHAPTER V

ANALYSIS OF THE DATA

Results from Observation and Tabulation

To understand the real estate market it is necessary to become acquainted with the activity that stimulates it. Various questions were asked in the questionnaire that were designed to help determine who was dealing in the land market and why. Much of these data are summarized and presented in Tables 4 through 10.

The reason for purchasing land only is presented in Table 4[1] because this emphasizes the number of land buyers that bought land for non-farm reasons which is of major interest in this study. The majority of land

TABLE 4. Summary of reason for purchasing rural land in Pottawatomie and north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Reason for Purchase	Response
To farm yourself	41
To rent to farmer	11
For non-farm use(s) by you	11
To sell later: for farm use	4
for non-farm use	3

[1]The total response is larger than the sample size (53) because some respondents gave more than one reason for purchasing the land.

buyers purchased land for the purpose of farming; however, a significant number of people purchased land for non-farm purposes. Some indication as to the speculative activity during the period is that only seven out of 70 reasons given indicated a purchase for the specific reason of selling later. To consider speculation as a non-farm reason for purchase, it can be generalized from this table that 18 land buyers indicated a non-farm reason for purchase.

Table 5 breaks down the reason for purchasing land by occupation.[2] This table gives an indication of who is involved in the land market relative to why they are involved. As could be anticipated, almost the only reason given by farmers for buying land was to farm themselves. However, not so likely to be anticipated was that 15 buyers that reported their major occupation as other than farming purchased land to farm themselves. The results also indicate that almost as many non-farmers (25) purchased land to either farm themselves or rent to a farmer as did the farmers (27). The majority of

TABLE 5. Reason for purchasing land relative to the occupation of the buyer, for land purchases in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Reason for Purchase	Occupation	
	Farmer	Non-farmer
To farm yourself	26	15
To rent to farmer	1	10
For non-farm use(s) by you	1	10
To sell later: for farm use	1	3
for non-farm use	0	3

[2]Occupation is classified into only two categories, farmer and non-farmer, because further classification would not be useful to this study.

activity for non-farm reasons, however, is by people employed in a non-farm occupation.

Occupation can be related to other aspects of the real estate market. Summaries of those relationships are presented in Tables 6 through 8.

The category in Table 7 with the largest response (0) shows that 21 buyers felt they paid exactly what they felt the land was worth for farming purposes. Of the 53 observations, 24 or nearly one-half indicated they paid more than the land was worth for farming purposes, while eight land buyers purchased their land at what they felt was a bargain.

There was almost an even breakdown in occupation of the 53 land buyers sampled with 27 indicating non-farm occupations and 26 indicating farming as their major occupation. However, farmers purchased by far the greatest quantity of land, buying 5745.3 acres during the sample period versus 3701.6 acres bought by non-farmers.

The average price paid by the non-farm buyer was $315.15 per acre, while the average price paid by the farmer buyer was $222.81. Table 8 indicates that the major interest of non-farm buyers was in the smaller tracts of land,

TABLE 6. Kind of land purchased relative to the occupation of the buyer for land purchased in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Kind of land	Occupation		Total
	Farmer	Non-farm	
Cropland	5	5	10
Pasture	9	13	22
Combination	13	8	21
Total	27	26	53

TABLE 7. Percentage difference between purchase price and farming value[a] relative to the occupation of the land buyer for land purchases in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Percentage Difference[b]	Occupation		Total
	Farmer	Non-farmer	
-40 to -31	0	2	2
-30 to -21	0	1	1
-20 to -11	1	1	2
-10 to -1	2	1	3
0	14	7	21
1 to 9	3	0	3
10 to 19	2	3	5
20 to 29	3	1	4
30 to 39	1	1	2
40 to 49	0	0	0
50 to 100	1	7	8
101 and above	0	2	2
Total	27	26	53

[a]Farming value refers to what the new landowner considered his land to be worth for farming and/or grazing.

[b]Negative percentages indicate less was paid for the land than the present owner feels it was worth for farming. Zero indicates the price paid was equal to the farming value, and positive percentages mean more was paid than the land was worth for farming.

TABLE 8. Size of tract purchased relative to the occupation of the land buyer for land purchases in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Acres	Occupation		Total
	Farmer	Non-farmer	
0 - 49	1	8	9
50 - 99	6	6	12
100 - 149	3	3	6
150 - 199	8	4	12
200 - 249	3	2	5
250 - 299	1	0	1
300 - 399	2	2	4
400 - 499	2	0	2
500 and above	1	1	2
Total	27	26	53

with the largest concentration between zero and 100 acres. The farmers showed the most purchases in the range from 150 to 199 acres. From this table it can be anticipated that the largest effect from non-farm influences are felt by the relatively smaller tracts of land.

A subject closely related to the above discussion is the size of a tract of land relative to the price paid. It has been shown in previous studies that a negative relationship exists between the price per acre and the size of tract.[3] Table 9 shows the same relationship in the data for the present study.

As the size of tract purchased increases, the purchase price per acre tends to become smaller. Relating this to the previous results that the non-farm buyer buys the relatively smaller tracts of land would indicate that the non-farm buyer will generally pay a higher price per acre than the farmer buyer.

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[3]Pine and Sutton, p. 9.

TABLE 9. Size of tract purchased relative to the purchase price for land purchased in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Purchase Price/Acre	Acres Purchased									
	0 to 49	50 to 99	100 to 149	150 to 199	200 to 249	250 to 299	300 to 349	350 to 399	400 and above	Total
$50 - $99			1	1			1			3
100 - 149	1	2	1	6			1		2	13
150 - 199	1	1	2	4	4		1		2	15
200 - 249		4		1						5
250 - 299										0
300 - 349	2	1				1	1			5
350 - 399	1	1			1					3
400 - 449	1									1
450 - 499			1							1
500 and above	3	3	1							7
Total	9	12	6	12	5	1	4	0	4	53

A similar relationship shows up between price per acre and distance to the nearest town of a population greater than 1,000. As the distance to town decreases, the price per acre increases. Figure 3 is a scatter diagram illustrating the relationship between the price per acre and distance to town. This relationship has been documented in several previous studies.[4]

A major indicator of who is participating in the real estate market is the ages of the land buyers. Table 10 summarizes the ages of the buyers of the 53 observations sampled for this study.

The largest number of buyers (24) fell in the age bracket of 45 to 54 years of age. The youngest real estate purchaser was 25 years of age and the oldest was 64 years old.

[4] Wise, Dover and Miller, p. 24-25. Edwards, Pine and Feyerherm, p. 25.

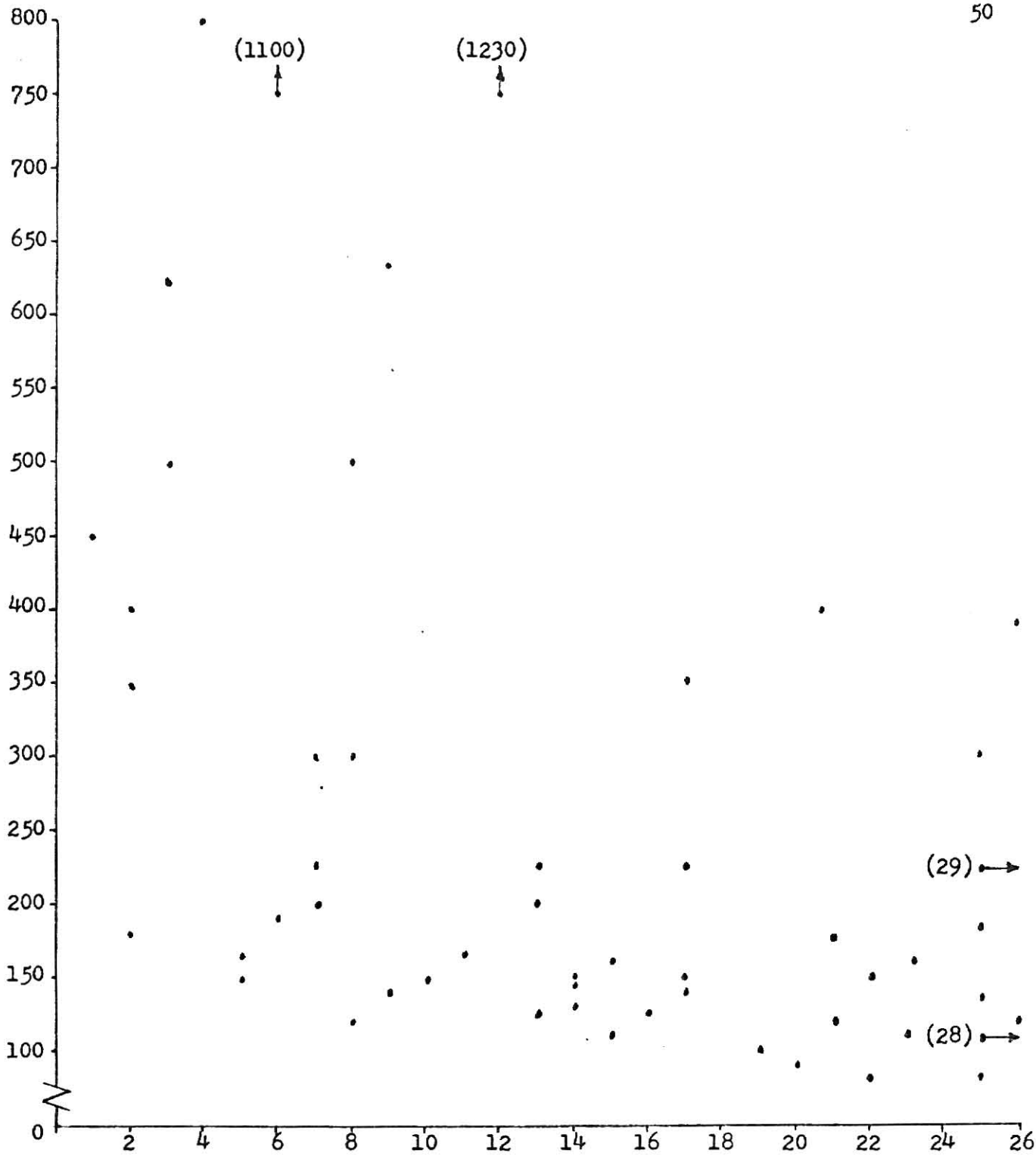

Figure 3. Price per acre in relation to the distance to nearest town with a population greater than 1000, for land purchased in Pottawatomie and the north half of Wabaunsee counties between January 1, 1972 and July 1, 1973.

TABLE 10. Age of land buyers in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Age	No. of Buyers
25 - 34	9
35 - 44	9
45 - 54	24
55 - 64	11
65 and above	0
Total	53

To summarize, some very general conclusions can be drawn from these observations. The primary reason people are buying rural land is to farm themselves. This holds true for both the farmer and non-farm occupations. The majority of land buyers pay what they feel the land is worth for farming purposes or they pay more than they feel it's worth for farming. The most common land buyer will fall in the age range from 45 to 54 years of age. If he is a farmer he will be primarily interested in tracts from 150 to 200 acres, or if he is a non-farmer he will be looking for tracts of less than 100 acres. Finally, the larger the tract is relative to other tracts on the market, and the farther it is located from a town of 1,000 population or greater, the smaller the purchase price will be.

Results from Present Value Calculations to Determine Worth of Land for Farming and/or Grazing Purposes

The purpose of this procedure was to qualify the reliability of the landowners' estimates as to the worth of the land for farming and/or grazing purposes. Because we were dealing largely with peoples attitudes and values when evaluating non-farm factors, the figure that the landowner put on the questionnaire as the farming value was used in the analyses to evaluate the non-farm factors affecting rural land prices.

Presented in Table 11 are the figures used in calculating the present value of the observations in the sample. Pasture returns and expenses were calculated on a landlord's return basis, while cropland figures represent an income calculated on an owner-operator's basis. This procedure was used because it is difficult to judge the productivity of pastureland, and a cash rent figure represents an income from the land. Average figures were used for the pastureland calculations because there were indications that the majority of the pastureland owners that were sampled were not aware of the rental rates in their area. (The reason for this was assumed to be that many pastureland owners use the pasture themselves.) Therefore, the result of the calculations of present value gave an average price per acre for pastureland in the sample area.

The results from the present value calculations compared to the landowner's estimate of the land's value for farming and/or grazing purposes are presented in Table 12. This table indicates there was a wide range of estimates with some landowners estimating very close to the present value determination, and some were a lot different. This wide range of difference could be attributed to the landowners expecting a higher capitalization rate than was used

TABLE 11. Discount rates and revenue and expense figures used in the present value formula to determine what the land was worth for farming and/or grazing for land purchases in Pottawatomie and the north half of Waubaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Discount Rates (Capitalization Rates)

Pasture	- 5%
Cropland	- 7%
Combination	- 6%

Revenue

Pasture[a]	- $45.00 cash rent (cow and spring calf) 6 acres per cow and spring calf	
Cropland	- Wheat	$ 2.05/bu.[b]
	Grain sorghum	2.34/cwt.[b]
	Corn	1.38/bu.[b]
	Soybeans	3.14/bu.
	Alfalfa	25.00/ton

Expenses

		Yield	Expense
Pasture[c]	- $2.00 per acre		
Cropland[d]	- Wheat[†]		56.50/acre
	Grain sorghum	60 bu.	52.00/acre
		80 bu.	66.20/acre
	Corn	60 bu.	62.75/acre
		85 bu.	79.00/acre
		120 bu.	85.15/acre
	Soybeans	20 bu.	54.40/acre
		25 bu.	58.40/acre
	Alfalfa[†]		15.75/ton

[a]Figures for pasture revenue were averages for 1972 and 1973 taken from "Bluestem Pasture Report," Kansas Crop and Livestock Reporting Service, U.S.D.A., Topeka, Kansas, April 1, 1974.

[b]Support prices given by the Agricultural Stabilization and Conservation Service.

[c]The tax portion of this estimate was taken from Department of Revenue, Statistical Report of Property Assessment and Taxation, State Office Building, Topeka, Kansas, 1973. The maintenance cost was approximated from questionnaire responses.

[d]Cropland cost figures were taken from Kansas Cooperative Extension Service, Farm Management Guides for the respective crops.

[†]Expenses did not vary according to yield.

NOTE: The figures not footnoted are estimates of Department of Agricultural Economics faculty at Kansas State University.

TABLE 12. Results from the present value method of determining the value of land for farming and/or grazing purposes on a price per acre basis for observations in Pottawatomie and Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Observation No.	Present Value Determination	Landowner's Estimate	Difference
1	$ 86	100	-14
2	110	214	-104
3	162	180	-18
4	110	125	-15
5	93	100	-7
6	110	100	10
7[a]		125	--
8	455	275	180
9[a]		85	--
10	110	150	-40
11	220	200	20
12	270	233	37
13	110	100	10
14	110	150	-40
15	110	230	-120
16	110	100	10
17	190	275	-85
18	251	200	51
19	321	150	171
20	110	120	-10
21	257	627	-370
22	157	175	-18
23	110	85	25
24	110	150	40
25	582	500	82
26	454	500	-46
27	1096	800	296
28	329	350	-21

TABLE 12 (Continued)

Observation No.	Present Value Determination	Landowner's Estimate	Difference
29	110	150	-40
30	222	300	-78
31	110	150	-40
32	492	200	292
33	110	150	-40
34[b]	--	--	--
35	189	200	-11
36	833	600	233
37	110	225	-115
38	110	628	-518
39	110	171	-61
40	110	171	-61
41	110	140	-30
42	110	110	0
43	110	156	-46
44	116	150	-34
45	110	120	-10
46	266	190	76
47	242	150	92
48	149	80	69
49	158	150	8
50	430	300	130
51	252	200	52
52	110	80	30
53	110	100	10
54	110	100	10

[a]Information from questionnaires 7 and 9 was not adequate to use the present value formula.

[b]Observation 34 was deleted from the sample because the questionnaire did not give adequate information.

in the present value calculations.[5] Uncertainty appears to exist in the land market, with many buyers being unaware of income producing capacity of their newly acquired land.

From general observation of the data as a whole, there seemed to be no explanation for the wide range of differences. However, when the differences were summed, the total was -58 indicating that the present value of the sample area as a whole was only $58 below the total of the landowners' estimates.

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[5]See Table 13, p. 57.

Results from the Freidman Two-Way Analysis of Variance by Ranks

The questionnaire used in this study contained a section where the landowner was asked to check those non-farm factors that affected his decision to buy the land and the price he paid. The landowner was then instructed to rank in order of importance the factors he had checked. These rankings were then compiled into Table 17 (see appendix). (Ranks as they appeared from the questionnaire are presented in Table 18 of the appendix.) Many of the landowners did not rank all of the factors in the section; therefore, for purposes of analysis, the remaining factors of each observation were averaged and given a tie rank. To illustrate, if only two of the factors had been ranked on the questionnaire, to determine the rank of the other four factors, 3, 4, 5 and 6 were summed and divided by 4. Therefore, the remaining factors received a tie rank of 4.5.

The six non-farm factors used in this study and their average ranks are listed in Table 13. This table is presented to show the observed importance of the non-farm factors to the landowners.

TABLE 13. Listing and average ranks of non-farm factors used in analyzing the non-farm factors that affected rural land prices in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Non-farm factors	Average rank
Location with respect to roads	2.82
Expected increase in value (capital gain)	2.90
Location with respect to towns	3.24
Scenic and recreational feature	3.64
Location with respect to non-farm developments	4.16
Improvements	4.25

It can be generally concluded from this table that location with respect to roads and expected capital gain exerted the most influence on rural land prices in the sample area. However, to arrive at a definite conclusion it is necessary to use a statistical test to test the significance of the above results.

The Freidman test[6] was used on the rankings to determine if there was a significant difference between the non-farm factors listed. That is to say, the test was used to determine if the landowners preferred any one of the non-farm factors over any of the others listed.

The chi-square from the first analysis with all six factors included was 28.88 with n-1 = 5 degrees of freedom. Comparing this value with the tabular value showed significance at the .001 level. This indicated that there was a 99.9 percent probability that a significant difference existed in the preference of one non-farm factor over the others by the landowners in the sample area.

To determine if a significant difference existed among the four non-farm factors with the highest average ranks, the Freidman test was used on these factors. This required that the ranks of these four factors be adjusted so that only the ranks of 1, 2, 3 or 4 were assigned to a factor (see Table 19 in the appendix). The chi-square from this analysis with only four non-farm factors included was 4.77 with n-1 = 3 degrees of freedom. The resulting significance level was only .20 indicating that with 80 percent probability, a significant difference exists between the four non-farm factors with the highest average ranks.

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[6]See "Freidman Two-Way Analysis of Variance by Ranks," in this paper.

Further analysis of variance was not conducted on the ranks because from observation, it was evident that if no significant difference existed among the four non-farm factors tested in the second analysis, no significant difference existed among the six factors except between the lowest and highest average ranks which was evident from the first analysis.

In summary, from the observed average ranks it can be generally concluded that land buyers in the sample area and period preferred some of the non-farm factors over the others, with location with respect to roads having the highest average rank and improvements showing the lowest average rank. The Freidman test shows that with 99.9 percent probability, it can be said that a statistically significant difference exists among the six factors as a whole. However, to say that a significant difference exists between the four highest ranked factors, one must be satisfied with only 80 percent probability that this statement is correct.

Results from Multiple Regression Analyses

Multiple regression analyses were run on the data, not only to help establish the importance of the non-farm factors studied, but primarily to attempt to measure the effect they exerted on the price of rural land. Along with the non-farm factors used in these analyses, several factors that had been established to affect rural land prices in previous studies were included as one basis for indicating the reliability of the results of this study. These factors included acres in tract, soil type, adjacent road type, and distance to the nearest town with a population greater than 1,000.

An inclusive list of the variables used in the regression analyses of this study is presented in Table 14. Also shown in this table are the mean and standard deviation of each variable. Variables 1 and 2 are dependent variables used in the regression analyses, while the remainder of the variables are independent variables.

It should be noted that in several variables the standard deviations are as large or larger than the means. This points out the wide variation in the data from the sample area.

The variables 3 through 8 were entered in the regression model in a reverse ranking with that which was given on the questionnaire. If scenic and recreational feature was ranked 1 on the questionnaire, it was given a value of 6 for the regression model. This gave the most weight to the higher ranked factors. One weakness of this method of evaluation is that it distorts the effect of the factors. For instance, if expected capital gain were given a value of 6 and improvements a value of 3, this is the same as saying expected capital gain had twice as much influence as improvements. This may not be

TABLE 14. Means and standard deviations of variables used in multiple regression analyses to develop estimating equations for the value of rural land using data from 53 cases of real estate transfers in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Variable No.	Variable	Mean	Standard Deviation
1	Price per acre	268.11	236.83
2	Percent increase in price	33.21	107.07
3	Scenic and recreational features (ranked)	1.49	2.25
4	Location with respect to town (ranked)	2.00	2.52
5	Location with respect to non-farm developments (ranked)	0.58	1.40
6	Expected capital gain (ranked)	2.84	2.65
7	Location with respect to roads (ranked)	2.88	2.53
8	Improvements (ranked)	0.45	1.33
9	Acres in tract	178.25	205.09
10	Percent of type 1 soil	19.91	33.88
11	Percent of type 2 soil	35.00	38.52
12	Percent of type 3 soil	44.62	42.21
13	Hard surface road	0.24	0.43
14	Gravel road	0.57	0.50
15	Dirt road	0.19	0.40
16	Distance from nearest town with a population greater than 1,000	14.06	8.19
17	Existence of improvements	0.47	0.50
18	Scenic and recreational features (0-1)	0.34	0.48
19	Location with respect to town (0-1)	0.42	0.50
20	Location with respect to non-farm developments (0-1)	0.17	0.38
21	Expected capital gain (0-1)	0.58	0.50
22	Location with respect to roads (0-1)	0.58	0.50
23	Improvements (0-1)	0.13	0.34
24	Non-farm factors (0-1)	0.66	0.48

the case, however, because these were simple rankings and not a value placed on the factor. Even though this method distorts the effect, it gives an indication of the direction of effect and is the only method available to evaluate the factors that have been ranked.

Variables 18 through 23 were given a zero value if they had not been ranked in the questionnaire, or a 1 if they had been ranked. This method of valuation was used to determine if the mere existence of a factor, regardless of its relationship to other factors, had an effect on the value of rural land.

Variables 10, 11, and 12 are the percent of soil type 1, 2, or 3, respectively, that make up the tract of land.[7] Table 20 in the appendix summarizes the soil types of the 53 observations. Soil type 1 corresponds to the Soil Conservation Service's (SCS) land use capability classes I and II, soil type 2 corresponds to the SCS land use capability classes III and IV, and soil type 3 corresponds to the SCS land use capability classes of VI and VII. The road variables 13, 14, and 15 were given a value of 1 if the tract was located on that type of road, or a zero if it was not.[8] Table 20 of the appendix also summarizes the road type of each of the 53 observations. Variable 17 indicates whether or not the tract of land had improvements on it. The non-farm factors variable (variable 24) was made up of the three "pure" factors: scenic and recreational features, location with respect to non-farm developments, and expected capital gain.[9] If one or more of these factors had been checked

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[7]Estimated from USDA Soil Conservation Service maps of "Classes of Land According to Use Capability" for Pottawatomie and Wabaunsee counties.

[8]Data taken from General Highway Maps of Pottawatomie and Wabaunsee counties, prepared by the Department of Planning and Development of the State Highway Commission of Kansas.

[9]See "Hypotheses" in this paper, p. 27.

on the questionnaire, then this variable was given a value of 1. If none had been checked, then its value was zero. Table 14 indicates that 66 percent of the respondents checked at least one of the pure non-farm factors.

Other data of interest revealed by Table 14 is that the average price per acre for the sample area was $268, while the average size of tract was 178 acres. The land considered in the study had 45 percent of soil type 3, 35 percent of soil type 2, and 20 percent of soil type 1. The majority of the tracts, or 57 percent, had gravel roads adjacent to them, while 24 percent had hard surfaced roads, and 19 percent had dirt roads. The average distance to a town of 1,000 population or greater was 14 miles.

Dirt roads and percent of soil type 3 were deleted from the regression analyses because of problems of multicollinearity. Multicollinearity ". . . is the name given to the general problem which arises when some or all of the explanatory variables in a relationship are so highly correlated, one with another, that it becomes very difficult, if not impossible, to disentangle their separate influences and obtain a reasonably precise estimate of their relative effects."[10] When there is an exact linear relationship between one or more of the "independent" variables, it is impossible to estimate the effects of the separate factors. This was why it was not feasible to use percentages of all three soil types in the same regression model. All three percentages would add to 100 percent. The same reasoning is used for road types because the three variables would always add to one.

In calculation of the correlation coefficients (r) which is a statistical procedure designed to test the association between two quantitative variables;[11]

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[10] J. Johnston, Econometric Methods, (New York: McGraw-Hill, 1963), p. 201.

[11] For a full discussion on this topic see J. Johnston, Econometric Methods (New York: McGraw-Hill, 1963), p. 33.

a number of relatively high correlations appeared, but were not high enough to cause concern of multicollinearity. Some of the variables which did show some correlation were hard surface roads and location with respect to non-farm developments, scenic and recreational features and location with respect to non-farm developments, and expected capital gain and location with respect to roads. Location with respect to town showed correlation to several variables including location with respect to non-farm developments, location with respect to roads, and expected capital gain. Most of these simple correlations were anticipated, but were unavoidable in evaluating the various factors. For instance if location with respect to town was an important factor to the land buyer, it would be expected that location with respect to roads would also be an important factor because of the use of the road in traveling to town.

Table 15 presents estimating equations derived from multiple regression analyses that utilize the price per acre as the dependent variable. The dependent variable for the equations in Table 16 is the percentage difference between the purchase price and the value the land has for farming and/or grazing purposes. It bears repeating that the purpose of this section is to determine the significant effects of the non-farm factors and not to derive estimating equations.

In the price per acre equations, the distance to town variable was consistently significant at the 5 percent level in the equations in which it was used. This factor was not used in the fourth equation because high multicollinearity would have occurred with location with respect to town. The other factors, besides the non-farm factors used, did not show significance at any reasonable level of confidence. For this study a confidence level of 10

TABLE 15. Estimating equations for price per acre, derived from data on rural land sales in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Variable	Coefficient	Standard Error	t-value
I.			
Distance from town	-9.9744	4.5527	-2.1908*
Hard surface road	81.3268	101.4198	0.8018
Acres in tract	-0.2046	0.1494	-1.3695
Existence of improvements	68.6711	66.7330	1.0290
Percent of soil type 2	1.0015	0.9332	1.0732
Percent of soil type 1	0.3744	1.1178	0.3349
Gravel road	-25.5004	87.9157	-0.2900
Constant = 364.3739			
Standard Error of the Estimate = 212.7658			
R^2 = 0.3015			
II.			
Distance from town	-9.4471	4.7920	-1.9714*
Hard surface road	75.8773	103.3440	.7342
Acres in tract	-0.1865	0.1578	-1.1820
Existence of improvements	70.4253	67.5221	1.0429
Percent of soil type 2	0.9993	0.9421	1.0607
Non-farm factors	27.9380	71.8269	0.3889
Percent of soil type 1	0.4675	1.1536	0.4052
Gravel road	-26.2053	88.7752	-0.2951
Constant = 334.4247			
Standard Error of the Estimate = 214.8010			
R^2 = 0.3039			
III.			
Distance from town	-8.3114	4.2413	-1.9596*
Hard surface road	123.6364	99.6089	1.2412
Location with respect to non-farm developments	-245.1468	83.3774	-2.9402**
Scenic and recreational features	188.1380	70.5185	2.6679**
Acres in tract	-0.1304	0.1444	-0.9031
Existence of improvements	38.6058	61.1359	0.6314
Percent of type 2 soil	1.2688	0.8942	1.4189
Percent of type 1 soil	1.3987	1.1280	1.2399
Gravel road	-28.6549	83.3708	-0.3437
Constant = 281.3497			
Standard Error of the Estimate = 192.9030			
R^2 = 0.4514			

TABLE 15 (Continued)

Variable	Coefficient	Standard Error	t-value
IV.			
Acres in tract	-0.1478	0.1609	-0.9186
Percent of soil type 2	1.9592	0.9374	2.0899*
Percent of soil type 1	2.2363	1.0402	2.1499*
Scenic and recreational features (ranked)	40.8228	15.4672	2.6393**
Location with respect to non-farm developments (ranked)	-42.5980	25.5708	-1.6658†
Location with respect to roads (ranked)	10.3501	14.0134	0.7385
Improvements (ranked)	-9.6920	23.7985	-0.4072
Location with respect to town (ranked)	4.1145	16.1473	0.2548
Capital gains (ranked)	-2.8442	12.6436	-0.2249
Constant = 119.8208			
Standard Error of the Estimate = 215.8238			
R^2 = 0.3133			

**Significant at 1 percent level
*Significant at 5 percent level
†Significant at 10 percent level

TABLE 16. Estimating equations for the percentage difference between the purchase price and the value the land has for farming and/or grazing purposes derived from data on rural land sales in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Variable	Coefficient	Standard Error	t-value
I. Equation with dummy variables assigned to non-farm factors			
Scenic and recreational features	140.7935	33.4791	4.2054**
Location with respect to town	-63.1482	39.3434	-1.6050†
Expected capital gain	-41.8388	30.4756	-1.3728
Location with respect to roads	50.9686	35.7575	1.4253
Location with respect to non-farm developments	-44.2074	42.5336	-1.0343
Improvements	-38.2554	43.5389	-0.8786
Constant = 18.8228			
Standard Error of the Estimate = 94.9893			
R^2 = 0.3037			
II. Equation with the non-farm factors ranked			
Scenic and recreational features	28.0105	6.2120	4.5090**
Location with respect to town	-8.0610	6.5079	-1.2386
Expected capital gain	-8.1727	5.1612	-1.5834
Location with respect to roads	7.7829	6.0450	1.2874
Location with respect to non-farm developments	-12.5352	10.9368	-1.1461
Improvements	-3.7406	9.9012	-0.3777
Constant = 17.4207			
Standard Error of the Estimate = 92.4455			
R^2 = 0.3283			

**Significant at 1 percent level or less
*Significant at 5 percent level
†Significant at 10 percent level

percent was arbitrarily set as a reasonable level. For purposes other than this study, significance at the 20 percent level could be found in some of the other factors listed (a calculated t-value greater than 1.301 was required to achieve significance at this level of confidence).

With the introduction of separate non-farm factors into equation III and IV of Table 15, the estimate of scenic and recreational features was consistently significant at the 1 percent level of confidence. Location with respect to non-farm developments also showed significance in each of these equations. Percentage of soil type 1 and 2 showed significance at the 5 percent level in equation IV.

Observation of these four estimation equations and their statistical tests indicate that the best estimating equation presented in equation IV. Although III shows the highest coefficient of multiple determination (R^2), some of the regression coefficients of this equation seem unreasonable (such as the value for location with respect to non-farm developments). On the basis of the t-test calculations, the estimates in equation IV show more significant coefficients than any of the other price per acre equations and it yielded the second highest R^2 of 0.3133.

The majority of the regression coefficients in equation IV seem to be reasonable indicators of the effects of the various factors on the price per acre of land. The negative value assigned to the acres in the tract indicates that the larger the tract of land the smaller the price per acre. It was also anticipated that soil type 1 would contribute more to the price per acre than soil type 2. Scenic and recreational features were expected to add value to the land, however the estimate was larger than anticipated. One regression coefficient that was contrary to the expected effect was the value for

location with respect to non-farm developments. It was anticipated that this coefficient would be positive indicating a desire for land purchasers to own land near a non-farm development. However, the coefficient was negative and yielded a relatively large estimate. This could be justified by people wanting to live away from non-farm developments. Another possible explanation for the negative value may be that when a non-farm development is proposed, the boundaries of land use are not clearly defined and until people are sure where the boundaries are, they will be reluctant to buy land in that area.

The two estimating equations presented in Table 16 show that the estimated regression coefficients for the scenic and recreational feature variable were highly significant. The confidence level for this variable was less than .1 percent (a t-value greater than 3.520 was required for that level of confidence). Location with respect to town was also significant in equation I of Table 16, but only at the 10 percent level of confidence. A 20 percent level of confidence would have to be satisfactory to accept expected capital gain and location with respect to roads as significant in either equation.

To summarize, the non-farm factor that showed the most consistent significance was scenic and recreational values. Location with respect to non-farm developments showed reasonable significance in several equations, but the regression coefficient was judged to be unreliable. To say that other non-farm factors exerted a significant influence on the price per acre, or the percent difference between the purchase price and the farming value, one would have to accept levels of confidence larger than 10 percent.

CHAPTER VI

SUMMARY

The primary objective of this study was to identify some of the major non-farm factors affecting rural land values and to estimate the effect of these factors on rural land prices. Major questions this study has attempted to answer were: do non-farm factors affect rural land prices, and if they do, how much do they affect the rural land prices? A set of hypotheses was formulated as a tentative explanation of the situation and to provide a basis for further investigation of these questions.

Pottawatomie and the north half of Wabaunsee counties of Kansas were chosen as the sample area because of the rapid non-farm development in these rural counties. To obtain the data necessary for the study, a mail questionnaire was used after attempts with a personal interview questionnaire failed. This questionnaire was mailed to land buyers in the sample area who had purchased their land between January 1, 1972 and July 1, 1973. Most of the information on land transfers during the sample period was obtained from the Register of Deeds of the two counties surveyed.

The non-farm factors analyzed in this paper are scenic and recreational features, expected capital gain, location with respect to non-farm developments, location with respect to towns, location with respect to roads, and improvements on the property. This study was not designed to include all possible non-farm factors, but to include the major non-farm factors affecting rural land values.

Observation and tabulation was used as a method of analysis to indicate the kind and amount of activity in the rural land market. It was observed that the primary reason people are buying land is to farm themselves, which was true for buyers in non-farm occupations as well as the farmer buyers. Pricing patterns indicated that the majority of land buyers pay what they feel the land is worth for farming purposes or an amount larger than that. The most common land buyer is from 45 to 55 years of age. Farmer buyers are primarily concerned in tracts of land from 150 to 200 acres; while if the land buyers occupation is non-farm in nature, he will be primarily interested in tracts less than 100 acres. The above observations were taken from the information gathered by the questionnaire. By observing the location of the land purchases on highway maps, it was noted that the farther the tract is located from a town of 1,000 population or greater, the smaller the price per acre will be. The same relationship existed between the size of tract and the price per acre.

Present value of the income generating capacity of agricultural activities was used as a basis for comparison to determine the reliability of land buyers' estimates of the farming values tracts of land. An estimate of the land's value for farming and/or grazing purposes was asked for on the questionnaire. Also sought were measures of productivity such as average crop yields and number of acres of pasture to graze a cow and spring calf for a season. These productivity figures were then used in computing a discounted present value for the tract of land.

The results from the present value calculations indicated a wide range of estimate variation; however, as a whole, the buyers' estimates averaged close to the present value of the land sampled.

Two methods of analysis were used on the data to determine the significance of the non-farm factors. The Freidman two way analysis of variance by ranks was used to determine if a significant difference existed among the non-farm factors. A multiple regression analysis was used to measure the effect of the non-farm factors on the price per acre of land as well as the percentage difference between purchase price and the farming value of the tract.

It was evident from the multiple regression analyses that non-farm factors do contribute significantly to the difference between the market value for a tract of land and the value it has for farming purposes. Scenic and recreational features and location with respect to non-farm developments each had significant t-values; therefore, the major hypothesis was proven true.

A sub-hypothesis that a significant difference exists among the effects of the various non-farm factors was tested with the use of the Freidman two way analysis of variance by ranks. This test showed that there is a significant difference (with a confidence level of .001) in the effects of non-farm factors. However, it could be shown with only a .20 confidence level that a significant difference existed among the four non-farm factors with the highest average rank. These were scenic and recreational features, location with respect to town, expected capital gain, and location with respect to roads.

After using the multiple regression analysis on the data, it was evident that the remaining two sub-hypotheses were true. Two out of the three "pure" non-farm factors registered significant t-values, while none of the "non-pure" factors were significant. The non-farm factors rated as pure were scenic and recreational features, location with respect to non-farm developments,

and expected capital gain. The last sub-hypothesis, which stated that scenic and recreational features exerted the strongest effect on land values of any of the "pure" non-farm factors, was true with a .001 level of confidence.

Estimating equations derived in this study were not entirely satisfactory. The majority of the estimates of the variables used in these estimating equations had theoretically correct signs; however, many did not show significant values. For these reasons the results from this study should be used with prudence and care. It has been concluded in this study that scenic and recreational features have a definite effect on rural land prices. However, guidelines to judge whether or not a tract of land has these features, and to what degree, have not been specified.

The primary problem encountered in this study was differentiating between farm and non-farm factors, and separating the non-farm effects of a factor that may also exert farm influences. It has been recognized in this paper that some of the factors labeled non-farm, in fact, had some farm aspects. It is suggested for further study that a precise definition of non-farm influence be formulated as a basis for judging a factor affecting land prices.

If more time had been available, more observations could have been gathered. This could be accomplished by either expanding the sample area or examining more sources of information on land sales or both. The information being sought for this study was more subjective than it was objective; therefore, if resources are available a personal interview survey is suggested for further study on this subject.

Some additional suggestions for further study would be to establish a method to evaluate non-farm factors other than by ranks. Also a more precise method of determining the value of a tract of land for farming and/or grazing purposes

should be formulated, especially for pasture. Pasture should be evaluated according to each individual tract rather than on an average basis.

The ultimate goal of studies of this nature is to develop a refined tool that can be of practical use to people concerned with the measurement of land values. This study was built upon the findings of previous studies and future studies possibly will build on this study in an attempt to reach a point of precision in land value estimation. Such professions as assessors, appraisers, real estate agents, and many more would find a tool of this nature a valuable asset to their work, but it will take the combined effort of all involved to reach this goal.

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APPENDIX

TABLE 17. Ranking of non-farm factors (with tie ranks inserted for purposes of analysis) considered in analyzing non-farm factors that affect rural land prices in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Observation Number	Scenic and Recreation	Towns	Non-Farm Developments	Capital Cain	Roads	Improve-ments
1	5	2	6	3	1	4
2	3	5	4	1	2	6
3	4.5	1	4.5	4.5	2	4.5
4	2	1	4	5	3	6
5	5	4	6	1	2	3
6	2	3	1	5.5	4	5.5
7	4.5	4.5	4.5	1	2	4.5
8	5	2	5	3	1	5
9	1	4.5	4.5	4.5	2	4.5
10	4.5	4.5	4.5	1	2	4.5
11	5.5	2	3	4	1	5.5
12	3	4	5.5	5.5	2	1
13	4	4	4	4	1	4
14	1	5	5	3	2	5
15	1	4.5	4.5	2	4.5	4.5
16	2	4.5	4.5	1	4.5	4.5
17	4.5	4.5	2	4.5	1	4.5
18	4	1	2	5	3	6
19	4.5	4.5	4.5	1	4.5	2
20	4	4	4	1	4	4
21	5	2	5	1	3	5
22	5	1	4	6	2	3
23	4	4	4	1	4	4
24	5	2	5	1	3	5
25	5	1	5	3	2	5
26	4	4	4	4	1	4
27	5	3	5	1	2	5
28	3	1	5.5	5.5	4	2

TABLE 17 (Continued)

Observation Number	Scenic and Recreation	Towns	Non-Farm Developments	Capital Gain	Roads	Improvements
29	4.5	4.5	4.5	2	1	4.5
30	5.5	1	4	2	3	5.5
31	4.5	4.5	4.5	2	1	4.5
32	5	1	5	3	2	5
33	4.5	4.5	4.5	1	2	4.5
34[a]						
35	1	3	5	2	4	6
36	4	4	4	1	4	4
37	2	4.5	4.5	1	4.5	4.5
38	4	3	5.5	1	2	5.5
39	1	4	5	2	3	6
40	2	1	4.5	4.5	4.5	4.5
41	3.5	3.5	3.5	3.5	3.5	3.5
42	3.5	3.5	3.5	3.5	3.5	3.5
43	3.5	3.5	3.5	3.5	3.5	3.5
44	3.5	3.5	3.5	3.5	3.5	3.5
45	3.5	3.5	3.5	3.5	3.5	3.5
46	3.5	3.5	3.5	3.5	3.5	3.5
47	3.5	3.5	3.5	3.5	3.5	3.5
48	3.5	3.5	3.5	3.5	3.5	3.5
49	3.5	3.5	3.5	3.5	3.5	3.5
50	3.5	3.5	3.5	3.5	3.5	3.5
51	3.5	3.5	3.5	3.5	3.5	3.5
52	3.5	3.5	3.5	3.5	3.5	3.5
53	3.5	3.5	3.5	3.5	3.5	3.5
54	3.5	3.5	3.5	3.5	3.5	3.5
Σ of Ranks	193.0	171.5	220.5	153.5	149.5	225.0
Average Rank	3.6415	3.2358	4.1603	2.8962	2.8207	4.2452

[a]Observation 34 was deleted from the sample because the questionnaire did not give adequate information.

TABLE 18. Ranking of non-farm factors (as they were ranked on the questionnaires) considered in analyzing non-farm factors that affect rural land prices in Pottawatomie and the north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973.

Observation Number	Scenic and Recreation	Towns	Non-Farm Developments	Capital Gain	Roads	Improvements
1	5	2		3	1	4
2	3	5	4	1	2	6
3		1			2	
4	2	1	4	5	3	
5	5	4		1	2	3
6	2	3	1		4	
7				1	2	
8		2		3	1	
9	1				2	
10				1	2	
11		2	3	4	1	
12	3	4			2	1
13					1	
14	1			3	2	
15	1			2		
16	2			1		
17			2		1	
18	4	1	2	5	3	
19				1		2
20				1		
21		2		1	3	
22	5	1	4	6	2	3
23				1		
24		2		1	3	
25		1		3	2	
26					1	
27		3		1	2	
28	3	1		4	2	

TABLE 18 (Continued)

Observation Number	Scenic and Recreation	Towns	Non-Farm Developments	Capital Gain	Roads	Improve-ments
29				2	1	
30		1	4	2	3	
31				2	1	
32		1		3	2	
33				1	2	
34[a]						
35	1	3	5	2	4	
36				1		
37	2			1		
38	4	3		1	2	
39	1	4	5	2	3	6
40	2	1				
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
No. of Ranks	18	22	10	31	31	7
Σ of Ranks	47	48	34	66	64	25
Average Rank	2.6111	2.1818	3.4000	2.1290	2.0645	3.5710

[a]Observation 34 was deleted from the sample because the questionnaire did not give adequate information.

TABLE 19. Ranking of 4 non-farm factors that yielded the highest average rank among the 6 non-farm factors considered in this study.

Observation Number	Scenic and Recreation	Towns	Capital Gain	Roads
1	4	2	3	1
2	3	4	1	2
3	3.5	1	3.5	2
4	2	1	4	3
5	4	3	1	2
6	1	2	4	3
7	3.5	3.5	1	2
8	4	2	3	1
9	1	3.5	3.5	2
10	3.5	3.5	1	2
11	4	2	3	1
12	2	3	4	1
13	3	3	3	1
14	1	4	3	2
15	1	3.5	2	3.5
16	2	3.5	1	3.5
17	3	3	3	1
18	3	1	4	2
19	3	3	1	3
20	3	3	1	3
21	4	2	1	3
22	3	1	4	2
23	3	3	1	3
24	4	2	1	3
25	4	1	3	2
26	3	3	3	1
27	4	3	1	2
28	2	1	4	3

TABLE 19 (Continued)

Observation Number	Scenic and Recreation	Towns	Capital Gain	Roads
29	3.5	3.5	2	1
30	4	1	2	3
31	3.5	3.5	2	1
32	4	1	3	2
33	3.5	3.5	1	2
35	1	3	2	4
36	3	3	1	3
37	2	3.5	1	3.5
38	4	3	1	2
39	1	4	2	3
40	2	1	3.5	3.5
41	2.5	2.5	2.5	2.5
42	2.5	2.5	2.5	2.5
43	2.5	2.5	2.5	2.5
44	2.5	2.5	2.5	2.5
45	2.5	2.5	2.5	2.5
46	2.5	2.5	2.5	2.5
47	2.5	2.5	2.5	2.5
48	2.5	2.5	2.5	2.5
49	2.5	2.5	2.5	2.5
50	2.5	2.5	2.5	2.5
51	2.5	2.5	2.5	2.5
52	2.5	2.5	2.5	2.5
53	2.5	2.5	2.5	2.5
54	2.5	2.5	2.5	2.5
Σ of Ranks	148.0	135.5	123.5	123.0
Average Rank	2.792	2.556	2.330	2.320

TABLE 20. Soil and road types for the 53 observations used in this study.

Observation Number	Soil Type			Road Type
	Percent of 1	Percent of 2	Percent of 3	H G or D[a]
1	0	90	5	G
2	0	100	0	H
3	40	40	20	G
4	0	0	100	G
5	0	0	100	G
6	0	0	100	H
7	0	80	20	G
8	5	95	0	G
9	0	0	100	D
10	30	40	30	G
11	50	50	0	H
12	0	0	100	H
13	10	0	90	D
14	0	5	95	G
15	0	100	0	G
16	70	10	20	G
17	70	30	0	G
18	0	50	50	H
19	0	60	40	G
20	0	10	90	D
21	100	0	0	H
22	0	10	90	H
23	0	100	0	H
24	10	60	30	D
25	0	100	0	G
26	100	0	0	H
27	100	0	0	H

TABLE 20 (Continued)

Observation Number	Soil Type Percent of 1	Percent of 2	Percent of 3	Road Type H G or D[a]
28	0	100	0	G
29	0	0	100	H
30	70	30	0	G
31	5	0	95	D
32	0	100	0	G
33	0	50	50	D
35	100	0	0	G
36	100	0	0	G
37	0	0	100	D
38	0	100	0	H
39	0	20	80	G
40	0	20	80	G
41	40	0	60	D
42	0	0	100	G
43	5	35	60	G
44	0	40	60	G
45	20	40	40	G
46	90	10	0	G
47	0	100	0	G
48	20	30	50	G
49	0	80	20	G
50	10	0	90	G
51	20	80	0	H
52	0	0	100	G
53	0	0	100	D
54	0	0	100	D

[a]H = Hard Surface Road
G = Gravel Road
D = Dirt Road

July 24, 1973

To: Participants in Farm Real Estate Survey

From: Wilfred H. Pine, Professor of Agricultural Economics,
Kansas State University

This is to introduce to you Everett Everson, Graduate Research Assistant, and to describe briefly a study of farm real estate markets and prices in your area.

From March, 1972 to March, 1973 land prices in Kansas increased 16 percent. In some areas prices have increased even more. A number of factors, some non-farm in nature, appear to be influencing prices for land. Our study is an attempt to identify and measure the influence of those factors.

Mr. Everson will take just a few minutes to obtain information from you as a recent buyer or seller of land. We will keep the information confidential or seek your permission to use it specifically. We will put together information from you and other buyers and sellers to permit us to determine the effects of various factors on land prices.

We appreciate your cooperation. It will help us to be informed about farm land markets and prices and to help farmers in making decisions in buying and selling land.

Sincerely,

(Signed) Wilfred H. Pine

Wilfred H. Pine
Economist

Figure 4. Cover letter that accompanied questionnaire used for the personal interview to obtain information about land transfers between January 1, 1972 and July 1, 1973.

Kansas Agricultural Experiment Station
Department of Agricultural Economics

FARM REAL ESTATE SURVEY - 1973

Date _____

I. General Information on Tract:

1. Legal Description _____

2. Total Acreage _____ Cropland _____ Pasture _____

Other _____

3. Improvements _____

_____

4. Quality _____

_____

5. Buyer: Name _____ Age _____ Occupation _____

Address _____

Relation to seller _____

Source of information on sale _____

Date of transfer _____

6. Seller: Name _____ Age _____ Occupation _____

Address _____

Other Prospective Buyers:

Name _____ Address _____

Name _____ Address _____

Reason for selling _____

Figure 5. Questionnaire used in personal interview survey with land buyers in two Northeast Kansas counties to obtain information about land transfers for the period January 1, 1972 to July 1, 1973.

II. Information to determine non-farm factors:

When did you buy this land? _____

_____

Why did you buy this land (go back to date of purchase)?

To farm yourself _____

To rent to a farmer _____

For non-farm use(s), part or whole, by you _____

To sell later for non-farm use(s) _____

Combination of farm and non-farm uses _____

Did any of the following affect your decision to buy this land and the price paid? (Rank in order of importance)

	Yes/No	Rank
Scenic and recreational features		
Location with respect to towns		
Location with respect to non-farm developments (KPL, Oscar Mayer, K.S.U., etc.)		
Expected increase in value (Capital gain)		
Location with respect to roads		
Improvements		

How much did those factors affect the price you paid? (Dollars or percent)

_____

What did you consider this land was worth for farming and/or grazing?

_____

What price did you pay? (optional)

_____

Have you changed your ideas and plans for this land since purchasing?

_____

Figure 5 (Continued)

III. Information to establish a base farm price:

A. Pasture: Return:

Acreage _____

Cash rent value (per cow/season) _____

Return/acre for own use (gain/acre X price/lb.) _____

Quality (no. of Acres/cow & calf) _____

Cost:

Water (Ponds, Wells, etc.) _____

Fencing _____

Spraying _____

Other Pasture Costs _____

B. Cropland: Return:

	A	B	C	D	E
Crop					
Acres: 1973					
Normal avg.					
Yield: 1973					
Normal avg.					
Landlords share					
Price/unit					

ASCS Program:
Allotment Payments: Wheat _____ Feed Grain _____

Landlord's share ($\frac{1}{2}$, $\frac{1}{4}$, etc.) _____

Comments:

Figure 5 (Continued)

Costs:

	A	B	C	D	E
Crop					
Fertilizer					
Herbicides					
Pesticides					
Other Crop Expenses					
_____					
_____					

Other Costs:

Property Taxes _____

Maintenance on Farmstead _____

_____

Other General Expenses:

Comments:

I give my permission for the information contained in this survey to be used in research and subsequent publications.

_____
Signature of Landlord

Figure 5 (Continued)

Kansas Agricultural Experiment Station
Department of Agricultural Economics

FARM REAL ESTATE SURVEY

Date _____

Dear:

From March, 1972 to March, 1973 land prices in Kansas increased 16 percent. In some areas prices have increased even more. A number of factors, some non-farm in nature, appear to be influencing prices for land. We at Kansas State University are involved in a study to attempt to identify and measure the influence of those factors.

We would like for you to complete this questionnaire, as a recent buyer or seller of land, and return it to us in the stamped self addressed envelope, at your earliest convenience. We will keep the information confidential or seek your permission to use it specifically. We will put together information from you and other buyers and sellers to permit us to determine the effects of various factors on land prices.

We appreciate your cooperation. It will help us to be informed about farm land markets and prices and to help farmers in making decisions in buying and selling land.

Sincerely yours,

(Signed) Wilfred H. Pine

Wilfred H. Pine
Economist

NOTE: Land transfers that do not involve monetary considerations (such as family transfers, inheritances, etc.) are of little value to the study. If the land in question was obtained without a transfer of money, please return the incompleted questionnaire with a brief statement below as to the nature of the transfer.

Figure 6. Cover letter that accompanied first mailing of questionnaire to land buyers in two Northeast Kansas counties to obtain information about transfers between January 1, 1972 and July 1, 1973.

I. General Information on Tract:

1. Legal Description of Land in Question:

2. Buyer: Name _____ Age _____

Occupation _____

Relation to seller _____

Source of information on sale _____

3. Seller: Name _____ Age _____

Occupation _____

Reason for selling _____

4. Total Acreage _____

Acres of Cropland _____

Acres of Pasture _____

Other _____

5. Improvements:

a) House: Yes___ No___. Condition: Good___ Fair___ Poor___

b) Bldgs.: Yes___ No___. Condition: Good___ Fair___ Poor___

II. Information to determine factors involved in purchase of land:

1. When did you buy this land? _____

2. Why did you buy this land (go back to date of purchase)?

(check those that apply)

To farm yourself _____

To rent to a farmer _____

For non-farm use(s) by you _____

To sell later: for farm use _____

for non-farm use _____

Figure 7. Questionnaire mailed to land buyers in two Northeast Kansas counties to obtain information about land transfers between January 1, 1972 and July 1, 1973.

3. Did any of the following affect your decision to buy this land and the price paid? (Check each factor that affected your decision then rank in order of importance. (i.e., 1, 2, 3, etc.)

NOTE: You may or may not have been very conscious of these factors at the time of purchase, but they may have indirectly influenced your decision to buy the land and the price paid.

	✓	Rank
Scenic and recreational features		
Location with respect to towns		
Location with respect to non-farm developments		
Expected increase in value (capital gain)		
Location with respect to roads		
Improvements		

4. How much did those factors affect the price you paid?

Percentage Affect	0-9%	10-19%	20-29%	30-39%	40-49%	50-100%
Check one						

5. What did you consider this land was worth for farming and/or grazing? _____

6. What price did you pay? _____

7. Do you own other land? Yes _____ No _____

How far is the newly acquired land from that originally owned? (express in road miles) _____

8. Have you changed your ideas and plans for this land since purchasing? Yes _____ No _____

If yes, how? _____

Figure 7 (Continued)

III. Information to aid in determining value of land for farming purposes:

A. Pasture: Acreage _____

NOTE: If pasture is for own use give estimates for comparable pasture in your area.

1. Cash rent value (for cow and spring calf for a season) _____

2. Quality (No. of acres per cow and calf) _____

3. Normal costs (kinds) that a landlord would be expected to pay to maintain a pasture.

_____

_____

B. Cropland: (If cash rented or owner-operated answer following questions as though land were share rented.)

	Wheat	Grain Sorghum	Corn	Soybeans	Alfalfa	Other: _____
Normal Acres						
Normal Yield						
Landlords Share						

What is usual Landlords share? (Indicate, 1/2, 2/5, 2/3, etc.)

Fertilizer _____ Harvesting _____

Herbicide _____ Other: _____

Pesticide _____ _____

Seed _____ _____

Figure 7 (Continued)

Kansas Agricultural Experiment Station
Department of Agricultural Economics

FARM REAL ESTATE SURVEY

January 18, 1974

Dear:

January 4 we mailed a questionnaire to you to obtain information concerning a tract of real estate you purchased recently. To date we have not received your completed questionnaire. We need yours to add to those received from other buyers. This will permit us to obtain a better understanding of the rural real estate market and be able to help farmers and others in making decisions to buy or sell. I repeat that we will keep your specific information confidential.

Another copy of the questionnaire and a return envelope are enclosed. We certainly would appreciate your completion of the questionnaire.

Sincerely yours,

(Signed) Wilfred H. Pine

Wilfred H. Pine
Economist

Figure 8. Cover letter that accompanied second mailing of questionnaire to land buyers in two Northeast Kansas Counties to obtain information about transfers between January 1, 1972 and July 1, 1973.

NON-FARM FACTORS AFFECTING RURAL LAND PRICES IN A SELECTED AREA OF KANSAS

by

EVERETT KAY EVERSON, JR.

B. S., Kansas State University, 1973

AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

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Manhattan, Kansas

1974

In this thesis an attempt was made to identify and measure the major non-farm factors that affect rural land prices. Many non-farm factors such as scenic and recreation value are subjective and difficult to measure.

Much of the information used in this study was obtained from land buyers. Rural land sales for Pottawatomie and north half of Wabaunsee counties of Kansas between January 1, 1972 and July 1, 1973 were analyzed. That area was selected because of non-farm developments in recent years.

The nature and level of activity in the land market of the selected area was observed and tabulated. An analysis of non-farm factors affecting rural land requires a knowledge of the value of the land for farm purposes. Therefore the potential future income from farming or pasturing was estimated and discounted to obtain a present value for farm use. The Freidman two-way analysis of variance by rank was employed to measure the level of significant difference that existed among the non-farm factors as ranked by the buyers.

A multiple regression analysis was used to measure the effect of each factor on the price of rural land. Price per acre was considered a function of several factors, farm and non-farm. Previous studies were used as one basis to evaluate the regression coefficients in this study.

The majority of land buyers, both farmers and non-farmers, were buying rural land to farm themselves. Nearly 40 percent of the land buyers paid exactly what they felt the land was worth for farming purposes. Buying patterns indicate the farmer is more interested in large tracts of land than the non-farmer.

The Freidman test showed a significant difference among the six non-farm factors as ranked by the buyers. Improvements and location with respect

to non-farm developments were ranked as least important, while scenic and recreational features, expected capital gain, location with respect to roads and location with respect to town were ranked higher. The Freidman test showed no significant difference among the four ranked highest.

Scenic and recreational features was established by the multiple regression analysis as being the non-farm factor with the most effect on rural land prices. It exerted the largest effect on the price per acre and was consistently significant at the .01 level of confidence in various estimating equations. Location with respect to non-farm development was also significant, but at a lower level and with a negative coefficient.

The estimating values of various equations were not particularly high (R^2 from .30 to .45). The regression coefficients were of primary importance in this study.