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Determinants of Rural Land Values in Texas

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Introduction

Land is a primary input of agricultural production. The value of rural agricultural land is often based upon its agricultural productivity. However, the market value of rural agricultural land often significantly exceeds its estimated agricultural productive value. For example, Adkins and Graeber estimated that the rate of return to land in Texas from agricultural production on the average equals about two percent and that the market value of agricultural land in Texas is about four times its agricultural use value. Why is the market value of rural land in Texas so much higher than its agricultural use value? Benefits relating to the tax advantages associated with owning agricultural land, the potential for future income from oil or other minerals, the use of land as a store of wealth, and other such factors are important.

Another explanation for the high prices of rural land in Texas is that expected capital gains from the land are capitalized into land values. However, the question remains: Why does the price of rural land in Texas continue to rise or remain high when it is already higher than its productive value? The investor who buys land at a higher price than the use value of that land either recognizes an additional value of that land in some other form or subscribes to the "Bigger Fool Theory," i.e., a bigger fool will pay more for it later.

It is becoming increasingly apparent that motivations centered on the

purchasing of rural land as a consumptive good also play an important role in determining land prices and farm structure. These motivations may be related to individuals' innate desires to own land, live in a rural environment, have a place to engage in various outdoor recreational activities, "get back to nature," or be associated, at least peripherally, with agriculture. For the purposes of this report, it is hypothesized that these types of motivations play a significant role in determining the market value of rural land in Texas. Because the rural land market is a relatively thin market, i.e. a relatively small percentage of the land is actually bought and sold each year, buyers that purchase rural land primarily for consumptive uses have a large impact on the market price of land. Two studies using different methodologies that evaluate this hypothesis are reported and discussed. The results of a statistical evaluation of rural land values using cross-sectional data are first reported. Then the results of a survey of Texas rural land brokers are reported and compared with the results of the statistical evaluation.

Two Components of Land Values

Although land can go in and out of different uses, the actual total quantity or supply of land for all uses is fixed. Therefore, the value of land is determined by the demand for land from all uses. It is proposed that there are two primary components to the value of the surface rights to rural land that is well removed from urban fringes. These are the agricultural productive and the consumptive use components.

The agricultural productive value of land is commonly described as being the present discounted value of expected returns to the land. A mathematical representation of this relationship is given as follows:

$$AV = \Sigma_{t=1}^{\infty} R_t/(1 + k)^t \quad (1)$$

where AV is the agricultural productive value of land, R_t is the expected net returns to the land in time t, and k is the discount rate.

If R_t is expected to increase over time at a constant rate g as a result of technological progress, increasingly favorable prices, or a combination of such factors, the formulation can be rewritten as follows:

$$AV = \Sigma_{t=1}^{\infty} [R_o (1 + g)^t]/(1 + k)^t \quad (2)$$

If $k > g$, then this expression can be simplified as follows:

$$AV = R_1/(k - g) \quad (3)$$

As can be seen from equation (3), the agricultural productive value of land can be simply expressed as a function of current net returns to the land, the discount rate, and expected growth in net returns to land.

The determinants of the consumptive value of rural land are considerably more complex. There are many consumptive uses of land. They are highly interrelated and differ greatly in importance across individuals according to their tastes, needs and desires. One of the more obvious consumptive uses of rural land is as a place of residence. Many people view living on a farm or ranch in a rural area as being preferable to living on small lots in urban areas and are willing to pay to do so directly or through a loss in income. Some people perceive that rural property provides a good place to "raise a family", others save money throughout much of their lives to "buy a place in the country." For example, Goodwin asked rural land owners in Okmulgee County, Oklahoma to identify factors that most affected their decision where to live. The desire for a rural

environment and a rural atmosphere were identified as being the most important factors.

Rural land also serves as a display of wealth and may give the owner a certain sense of ownership pride unique to owning land. Embedded in American culture is the inherent desire to own land. The desire to not only own agricultural land but also to be associated with farming or ranching also is a motivating factor to own rural agricultural land. Gale points out that "millions of young men and women are acclimated by environment and education to farming as a way of life as well as a business . . . and they are likely to be quite competitive in their efforts to obtain title to a farm." (p. 17). Kliebenstein, *et. al.* asked Missouri grain farmers to rank various benefits from farming. The benefits receiving the highest rankings were 1) "Doing something worthwhile," 2) "Be my own boss" and 3) "Provides good income." It was concluded that income was only one of the important benefits motivating farmers.

Recreation is another important consumptive use of rural land. The land may provide a place to hunt, fish, observe nature, camp, picnic, ride horses, etc. In fact, as early as 1968, Uvacek and Schmedemann questioned whether or not the cattle business in Texas is primarily agricultural production or outdoor recreation. They pointed out that many people buy ranches and farms with recreation as a prime motive. The degree of recreational appeal certainly influences the consumptive value of land. Land with positive aesthetic qualities such as hills, mountains, rivers, streams, trees, wildlife, scenic views, access to the ocean, or other such amenities have higher consumptive values than land without such amenities *ceteris paribus.* The aesthetic and recreational aspect of rural land is often inversely related to the agricultural productivity of the land.

As with most consumptive goods, the consumptive demand for rural land depends greatly on the income, taste, and size of the population, along with its availability and the availability of substitutes. Between 1970 and 1980, the population of Texas grew at a rate of 27 percent (11 percent more than the nation as a whole). Per capita income in Texas also grew rapidly and is currently well above the national average (Texas Almanac). Also, with almost all available Texas land in private ownership, most hunting, hiking, camping, horseback riding, and other such outdoor activities must take place on privately owned land.

Because of the large consumptive demand for rural land in Texas, it is proposed that the market value of the surface rights of rural land in Texas can be formulated as follows:

$$MV = R_1/(k - g) + CV(D,P,A,H,\bar{X}) \qquad (4)$$

where k, g, and R_1 are as previously defined, MV is the market value of rural land in Texas, and CV is the consumptive value of rural land expressed as a function of population density (D), proximity to major population centers (P), the aesthetic and recreational appeal of the land (A) and (H), and other factors ($\bar{X}$) such as taste, incomes, availability of credit, etc.

Statistical Evaluation

To empirically evaluate the impacts that both the agricultural use and consumptive use components of land values have on rural land prices, the relationship expressed in equation 4 is assumed. Data pertaining to the average market value of rural agricultural land and estimated average net returns to the land are obtained for all school districts in Texas from the State Property Tax Board. The average market value per acre of rural land is estimated using sales data and market comparables. Data pertaining to quality of hunting, population density, and proximity to major metropolitan areas are also collected. The school districts that are within one of the 26 metropolitan statistical areas of Texas and other school districts that are primarily urban or urban fringe districts are deleted. Also, 15 regions of aesthetic appeal are identified based on differences in topography, vegetation cover, access to the ocean, type of dominant agricultural activity and other factors The following two Models are statistically estimated using least-squares regression:

Model I

$$AMV = \underset{(23.74***)}{424.52} + \underset{(10.07***)}{13.87}\ ANR$$

$R^2 = .147 \quad MSE = 53,389 \quad N = 592$

Model II

$$AMV = 33.53 + 11.84\ ANR + 18.31\ DRH + 295.47\ APP^{-0.5} + 18.02\ PD^{0.5}$$
$$(1.02) \quad (14.54^{***}) \quad (3.96^{***}) \quad (3.35^{***}) \quad (4.05^{***})$$

$$- 0.426\ [(APP)(.PD)]^{0.5} + 16893\ (1/DD) + 24026\ (1/DH)$$
$$(2.78^{***}) \quad (9.17^{***}) \quad (7.42^{***})$$

$$+ 9263\ (1/DSA) - 38.69\ (D2) - 26.99\ (D3)$$
$$(6.50^{***}) \quad (1.06) \quad (0.90)$$

$$+ 237.61\ (D4) + 104.11\ (D5) + 120.53\ (D6) + 51.64\ (D7)$$
$$(4.44^{***}) \quad (2.01^{**}) \quad (6.89^{***}) \quad (1.69^{*})$$

$$+ 8.10\ (D8) - 11.66\ (D9) + 33.89\ (D10) + 260.05\ (D11)$$
$$(0.27) \quad (0.47) \quad (0.87) \quad (4.20^{***})$$

$$- 95.70\ (D12) + 205.97\ (D13) - 57.01\ (D14) + 106.26\ (D15)$$
$$(2.83^{***}) \quad (7.48^{***}) \quad (2.73) \quad (3.82^{***})$$

$R^2 = .858 \quad MSE = 9366 \quad N = 592$

where:

AMV = average market value per acre of rural land in 1981 (State Property Tax Board),

ANR = estimated average annual net returns per acre to land from agriculture in 1981 dollars including government payments and income received from hunting leases (State Property Tax Board),

DRH = number of white-tailed deer harvested per square mile in the county in 1981 when total deer harvest for the county was more than 92, otherwise DRH = 0 (Texas Sportsman),

APP = estimated acres devoted to agriculture per person in 1980 based on the number of students in the school districts (Texas Education Agency),

PD = total population per square mile in the county in 1980 (Texas Almanac),

DD, DH, DSA = the highway mileage from Dallas, Houston, and San Antonio respectively (Statistical Research Service),

D1, D2, ... D15 = dummy variables that identify the region of aesthetic appeal. The variable equals 1 when the school district is with the region identified with the dummy variable, otherwise it equals 0.

The absolute t- values are given in parenthesis beneath the estimated regression coefficients and ***, ** and * refer to their statistical significance at 1, 5, and 10 percent respectively. An F test for the significance of the dummies as a group is significant at the one percent probability level ($F_{14,569} = 10.58$) (see Figure 1).

The functional form of Model II is based on *a priori* observations and assumptions on how the variables affect land values. The average market value of land is a linear function of average net returns plus a function of various factors that affect the consumptive value of land. The relationship between the number of deer harvested per square mile is linear. The relationship between acres devoted to agriculture per person in each school district and the population per square mile in the county are interactive and the marginal value of land with respect to its availability per person is diminishing. The function reflects an inverse relationship between distances to major metropolitan areas. Also a dummy variable for each aesthetic region is included in Model II.

The coefficients that correspond with the dummy variables estimate the differences in the residuals in each region. These differences are ascribed to aesthetic and other subjective differences of the regions. Although the regions differ in their average agricultural productivity, a wide range of agricultural productivity exists within most of the indivi-

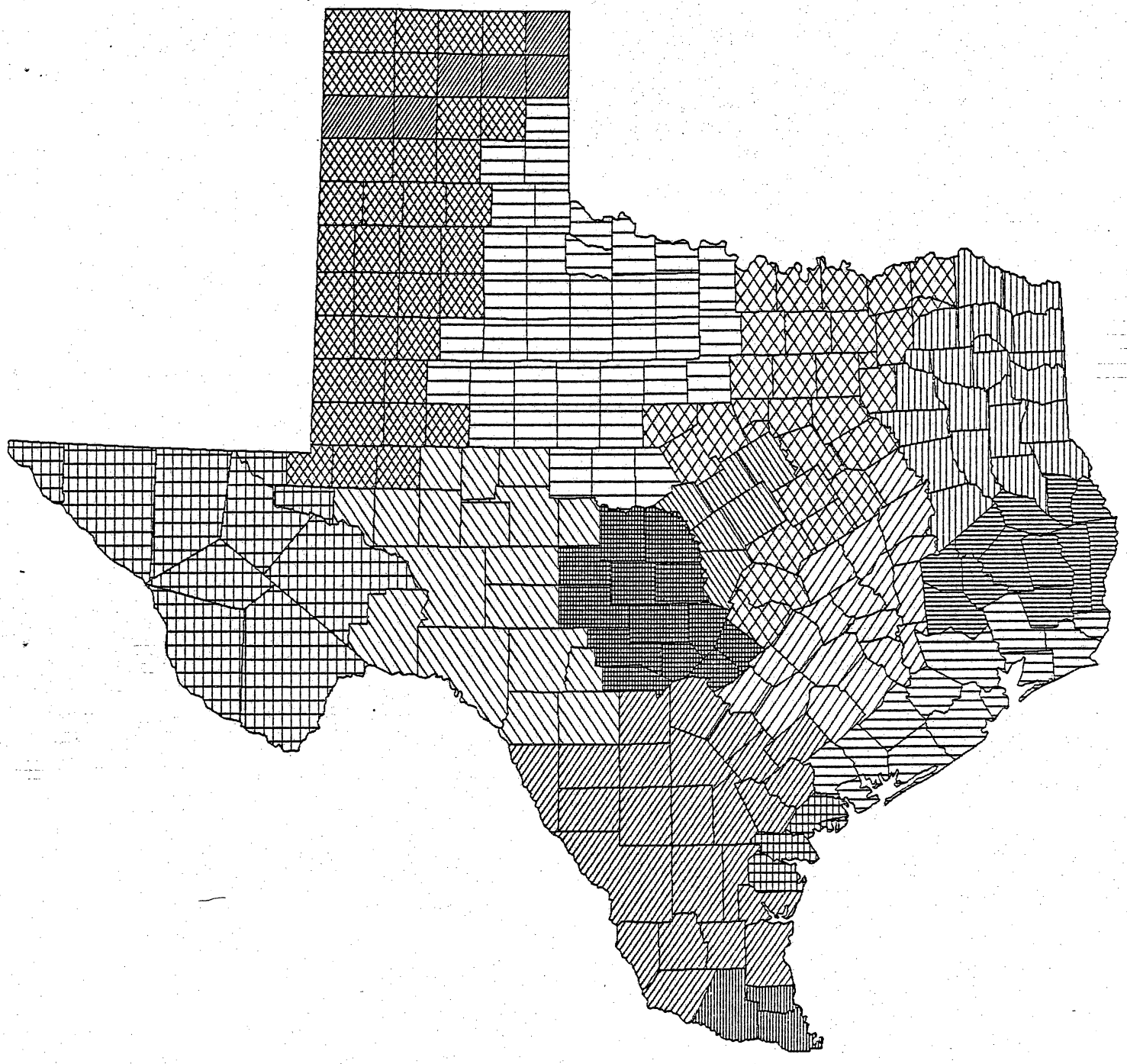

Figure 1

dual regions. The estimated relationship between the market value of the land and the average annual returns from the land from agricultural production is not highly sensitive to a respecification of the model that includes adding variables such as the dummy variables that identify various regions across the state. For example, in Model I versus Model II, the estimated net capitalization rate or (k-g) is 1/(13.87) versus 1/(11.84) or 7.2 versus 8.4 percent. The differences between the two does not seem pronounced. A discount rate of around 11 percent and an expected growth rate of agricultural returns to the land of 2.5 percent would result in a similar capitalization rate.

As can be seen in both models, average net returns to land is a significant and important determinant of rural land values in Texas. However, net returns to land explain only a relatively small portion of the total market value of land in Texas. For example, the average market value of rural agricultural land used in this study is $441.19. Average net returns to the land is $8.33. Based on and the estimated coefficient on ANR in Model II, the average agricultural use value of this land is $98.62. This equals less than a fourth of the average market value of the land.

Factors relating to population density and proximity to the three major metropolitan areas in Texas collectively explain the largest portion of the variance in rural land values. These factors have a major role in determining the demand for and thus the value of rural land as a place of residence, as a store of and display of wealth, as a place for outdoor recreation and other such uses. Even if agricultural returns to land remain low over time, as population growth continues, the increasing demand for agricultural land for consumptive uses will continue to apply

strong upward pressures on rural land values.

Although income from hunting leases is included in net returns to the land, the value of owning the rights of ingress to the land for hunting by the landowner, family, and friends is not included. The quality of hunting significantly contributes to the value of this consumptive or recreational use of the land. With so little public hunting in Texas, land with good hunting is sought after for private hunting purposes. For example, in 1981 there were approximately 10 deer harvested per square mile in several counties in the Texas Hill Country. Based on Model II, this good hunting potential contributes approximately $180 per acre to land prices in these counties.

By identifying various regions based on various non-quantifiable aesthetic qualities, the differences in land prices that can be attributed to these regions are approximated. For example, based on Model II, regions 1, 2, 8, 9, and 14 have relatively low inherent aesthetic appeal. These regions make up the High and Rolling plains of North-West Texas and the North-Central, Grand, and Blackland prairies of North-Central Texas. Regions 3 and 12 also have relatively low aesthetic appeal. They make up the dry arid regions of West Texas. Region 12, which is the most arid and desolate Region in Texas has the lowest aesthetic appeal as measured by Model II.

Regions 4, 5, 6, 7, 11, and 13 have relatively high aesthetic appeal. These regions include the East Texas Timber areas, the Coastal Bend and Coastal prairies, the lower Rio Grande valley and the Post Oak Savana regions. These regions receive relatively high amounts of rainfall, are wooded, and/or have relatively easy access to the Gulf Coast. Regions 10 and 15 also have relatively high aesthetic appeal. They include the Hill

Country and the South Texas plain areas respectively. Both are primarily ranching, have reputations of having great deer hunting, are generally covered with trees or big brush, and have a romantically western appeal to many.

Based on the estimated capitalization rate in Model II, and data obtained from the State Property Tax Board, estimated average market value, productive value, and numbers of acres of rural agricultural land in the 15 regions of Texas are reported in Tables 1 and 2. In Table 1 urban districts are excluded; in Table 2 they are included.

Table 1. Estimated average values of rural land in Texas in 1981 (excluding urban districts).

Region Name	Region Number	Market Value ($)	Productive Value ($)	Productive Value (% of Market)	Total Acres (1000)
High Plains	9	380	174	46	18,935
Canadian Breaks	2	221	78	35	2,715
Rolling Plains	14	318	101	32	18,769
Trans-Pecos	12	98	15	15	16,068
West Edwards Plateau	3	270	39	14	15,036
Hill Country	10	542	63	12	5,463
South Texas Plains	15	613	86	14	15,095
Blacklands-West Coast Timbers	1	619	121	20	6,253
Grand Prairie	8	599	78	13	2,582
Post Oak Savana	13	888	116	13	5,203
East Texas (North)	6	756	124	16	7,789
East Texas (South)	7	847	237	28	3,929
Coast Prairie	5	1041	287	28	1,304
Coastal Bend	4	757	79	10	661
Lower Rio Grande Valley	11	887	323	36	339
Whole State	—	441	99	22	120,142

Table 2. Estimated average values of rural land in Texas in 1981 (including urban districts).

Region Name	Region Number	Market Value ($)	Productive Value ($)	Productive Value (% of Market)	Total Acres (1000)
High Plains	9	397	166	44	21,119
Canadian Breaks	2	238	76	32	3,278
Rolling Plains	14	343	101	29	21,825
Trans-Pecos	12	118	18	15	16,413
West Edwards Plateau	3	278	43	15	15,994
Hill Country	10	700	65	9	7,077
South Texas Plains	15	646	83	13	17,981
Blacklands-West Coast Timbers	1	1369	122	9	13,815
Grand Prairie	8	624	78	13	3,325
Post Oak Savana	13	1110	122	11	8,948
East Texas (North)	6	823	127	15	9,984
East Texas (South)	7	1187	260	22	5,235
Coast Prairie	5	2590	220	9	5,912
Coastal Bend	4	1123	215	19	1,598
Lower Rio Grande Valley	11	1596	360	23	1,763
Whole State	—	677	109	16	154,266

Survey of Land Brokers

The statistical results reported above indicate that net returns to the land from agricultural production on the average explain less than 25 percent of the market value of rural land in Texas. Factors relating to population density, proximity to major metropolitan centers, quality of hunting, and aesthetic differences across the State explained the majority of the variance in rural land values. In an attempt to partially verify these results, a survey of Texas land brokers was conducted. Questionnaires were sent by mail to 384 farm and ranch brokers of the Texas Realtors Association. A copy of the questionnaire is given in Appendix A. Responses that were mostly or fully complete were obtained from 156 brokers (a response rate of about 41 percent).

Texas was divided into the following seven regions: 1) High and Rolling Plains, 2) West Texas, 3) South Texas, 4) Coastal Bend and Prairies, 5) East Texas, 6) Blacklands and Post Oak Savannah, and 7) Hill Country. These regions were developed by combining the regions of aesthetic appeal illustrated in Figure 1. These regions are illustrated in Figure 2. The brokers were asked to identify the counties that they work in primarily and the region that each broker worked in primarily was identified. All of the responses used in this survey came from experienced land brokers. The respondents averaged over 12 years experience as rural land realtors or brokers in Texas.

The brokers were asked to estimate the percentage of land in their area being bought primarily for agricultural purposes. In Table 3 it can be seen that averages of these estimates ranged from 13.8 percent in the Hill County to 68.12 percent in the High and Rolling Plains. The average across the state was less than 30 percent.

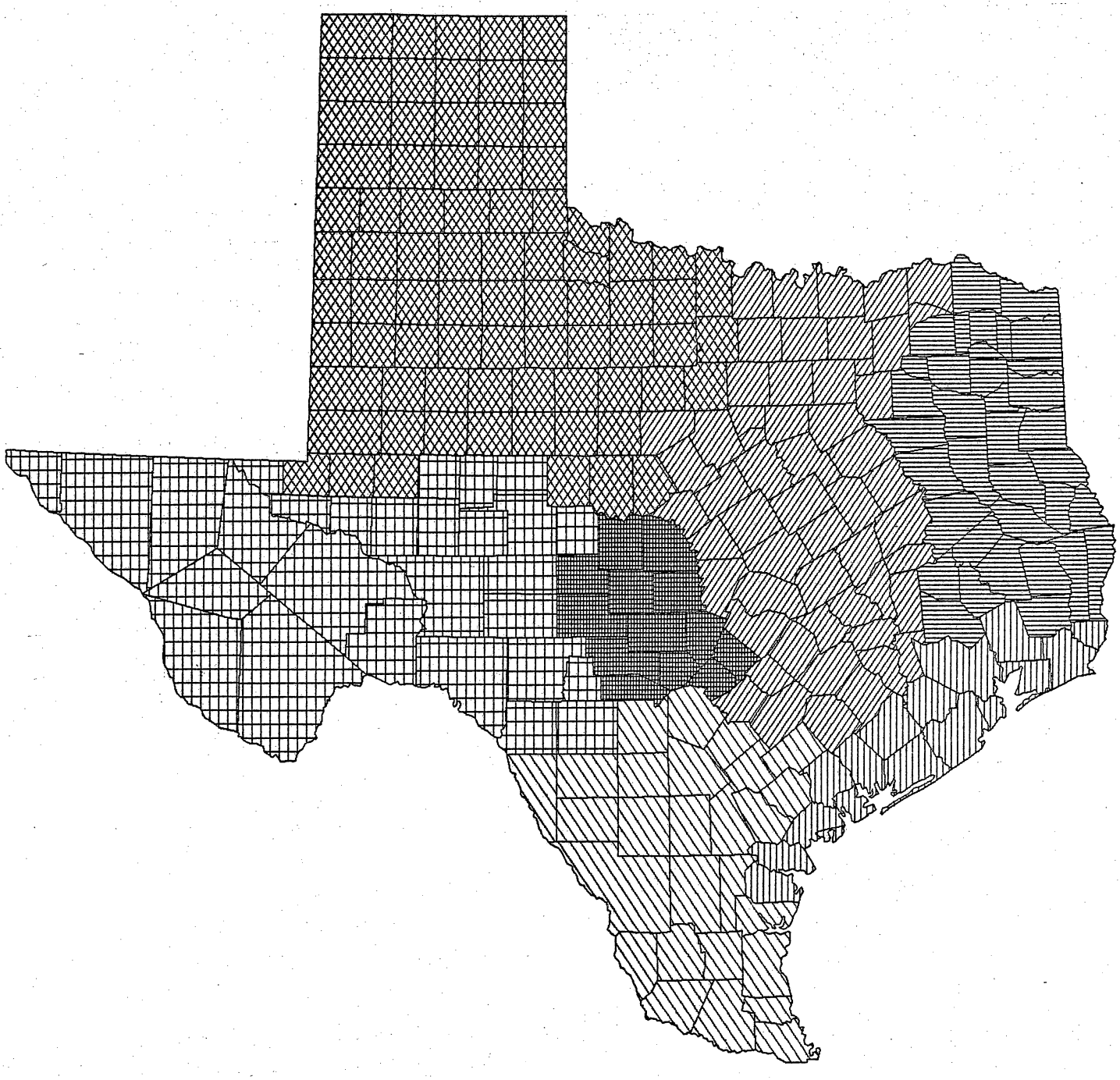

Figure 2

Table 3. Average number of years as a land realtor or broker and percent of rural land bought for various primary purposes in seven regions across Texas[a]

	(1) High and Rolling Plains	(2) West Texas	(3) South Texas	(4) Coastal Bend and Prairies	(5) East Texas	(6) Blacklands and Post Oak Savannah	(7) Hill Country	State Average
Total number of responses	20	4	22	12	17	66	15	156
Number of years as land realtor or broker	12.80 (2.35)	16.75 (6.10)	10.50 (1.20)	11.67 (2.20)	14.37 (1.51)	11.15 (1.06)	17.20 (3.01)	12.37 (0.70)
Percent of land bought primarily for agricultural purposes	68.21 (7.55)	45.00 (18.93)	28.52 (5.83)	30.17 (8.04)	20.76 (5.68)	24.02 (3.29)	13.80 (3.79)	29.81 (2.46)
Percent of buyers that buy rural land primarily as an investment	24.00 (5.54)	62.50 (13.92)	45.91 (7.16)	43.17 (7.73)	29.12 (4.91)	35.86 (3.14)	35.47 (6.54)	36.23 (2.16)
Percent of buyers that buy rural land primarily as a homesite	21.84 (5.54)	10.50 (5.11)	17.71 (3.42)	28.58 (6.28)	43.82 (4.84)	31.31 (2.90)	32.29 (6.61)	29.81 (1.87)
Percent of buyers that buy rural land primarily for outdoor recreation	13.70 (4.40)	27.50 (20.87)	39.15 (6.83)	10.25 (2.67)	27.69 (5.52)	30.45 (3.37)	44.07 (5.93)	28.76 (2.17)
Percent of buyers that buy rural land primarily for agricultural purposes	65.00 (8.30)	31.25 (10.87)	20.82 (4.17)	19.75 (5.74)	16.24 (5.11)	18.51 (2.72)	10.33 (3.36)	24.22 (2.24)

[a] Values in parenthesis are the standard errors of the mean values.

The brokers were also asked to estimate the percent of buyers who buy rural land primarily for agricultural purposes; as a homesite; for hunting, fishing, or other outdoor recreation; and as an investment but not intending to personally farm, ranch, or live on the land. As can be seen in Table 3, except in the High and Rolling Plains, the average estimate is that only about 25 percent of the buyers buy land primarily for agricultural purposes. Outside of the High and Rolling Plains, the brokers generally agreed that more people buy land primarily for an investment, a homesite, or outdoor recreation, rather than for agricultural production.

The brokers were asked to identify the three most important reasons why people acquire rural land and why people sell rural land in their area. They were also asked to rank various reasons as to their importance to buyers of rural property. As can be seen in Tables 4 and 5, in general across the state, the brokers identified the primary reasons for purchasing rural land in Texas as being an investment or hedge against inflation, a country retreat, a rural homesite, and/or a place for hunting, fishing or other outdoor recreation. Only in the High and Rolling Plains was the desire to farm or ranch generally identified as being the primary reason for purchasing rural land. The reasons why people sell rural land are summarized in Table 6. In combination, to settle estates and retiring from farming were most often identified. Also, to sell for profit or profit taking were identified by over half of the respondents. One broker stated that farmers and ranchers "can't believe the money rich city folks will pay for their land."

The three most important characteristics that prospective buyers of rural land consider were identified by the brokers. Their responses are summarized in Table 7. Location or accessability were most often listed.

Table 4. Reasons why people acquire rural land in Texas

Reasons	Number of times listed
1. Investment (tax advantages, hedge against inflation, and speculation)	126
2. Hunting, fishing or other outdoor recreation	92
3. The desire to live in the country, or own a rural retreat	86
4. Farm and/or ranch	56
5. Subdivide or develop	31
6. Pride of ownership, prestige	21
7. Increase present land ownership	10
8. Oil and minerals	5
9. Use as a non-ag. commercial location	3

Table 5. Average ratings of various reasons for buying rural land in seven regions across Texas[a]

Reason	(1) High and Rolling Plains	(2) West Texas	(3) South Texas	(4) Coastal Bend and Prairies	(5) East Texas	(6) Blacklands and Post Oak Savannah	(7) Hill Country	State Average
Wants a good investment or hedge against inflation	58.95 (7.43)	78.75 (4.27)	58.81 (6.10)	56.67 (7.03)	56.25 (5.03)	60.85 (3.32)	66.60 (6.71)	60.54 (2.15)
Wants a country retreat	29.89 (6.88)	30.75 (6.75)	47.00 (6.00)	41.17 (9.61)	60.27 (5.43)	59.32 (2.81)	66.67 (5.45)	52.57 (2.20)
Wants to live in a rural environment	36.37 (5.72)	22.00 (10.40)	35.48 (5.51)	37.75 (7.05)	65.50 (5.95)	51.20 (3.29)	45.00 (7.67)	46.24 (2.22)
Wants a place to hunt and/or fish	28.16 (6.25)	33.75 (11.25)	50.75 (7.37)	21.00 (5.71)	39.73 (7.35)	43.62 (3.44)	55.33 (6.04)	41.32 (2.33)
Wants to farm or ranch	67.37 (6.52)	39.50 (16.57)	35.76 (6.26)	25.83 (5.21)	27.00 (5.91)	31.48 (2.86)	24.40 (6.07)	35.21 (2.22)
Wants a place for outdoor recreation (not including hunting and fishing)	22.32 (4.94)	25.50 (14.05)	27.10 (4.42)	19.82 (7.26)	40.33 (6.20)	40.41 (3.03)	48.00 (5.62)	35.09 (2.01)
Wants land as a display of wealth	20.63 (6.23)	21.25 (7.18)	23.70 (4.43)	37.92 (6.50)	32.07 (6.35)	34.09 (3.34)	33.47 (6.76)	30.70 (2.08)
Wants future income from oil or other minerals	19.58 (5.65)	60.00 (18.14)	33.90 (6.66)	21.18 (7.87)	16.69 (3.83)	17.92 (2.39)	27.64 (5.90)	22.46 (1.94)

[a] Values in parenthesis are the standard errors of the mean values.

Table 6. Reasons why people sell rural land in Texas

Reasons	Number of times listed
Sell for profit, or profit taking	86
Settle estates	64
Retiring from farming or ranching	64
Need to generate cash	49
Not profitable to farm or ranch	37
Moving to new location	35
Want to invest in something else	29
Want to buy a different tract of land	16
Taxes are too high	11
Change in interest	10
Debt relief	9
Tired of farming, ranching, or rural life	7
Urban encroachment	5
Can't hire suitable help	3

Table 7. Characteristics that prospective buyers of rural land in Texas consider

Characteristics	Number of times listed
Location and accessibility	111
Trees, brush, topography, scenery and/or attractiveness	83
Availability of water	65
Price, financing, and terms	59
Agricultural productivity and/or soil type	42
Investment potential	21
Improvements and availability of utilities	20
Oil, gas, or mineral potential	20
Abundance of wildlife	18
Recreational potential	10
Flood plain or drainage	7
Size of property	4

Trees, brush, topography, scenery, and/or attractiveness, as a group, were also regularly listed, followed by price, financing, and terms. Agricultural productivity and/or soil type was the fifth most commonly listed characteristic.

The desire for trees, brush, scenery, and wildlife was often expounded on in spaces provided for additional comments. For example, one broker wrote that, "at the present time, it is quite difficult to sell land that has been cleared; either be farm land or improved grass country. It seems that if the property does not have some brush with game, there are very few prospective buyers." Another broker wrote that, "people will come to the country and buy any old sorry land as long as it has plenty of trees, especially 'Live Oaks' with rolling hills and they will pay more for it than good agricultural bottom land."

A predetermined set of characteristics were given to the brokers to rank as to the level of their importance in determining the per acre price of rural land. As can be seen in Table 8, good access roads, size of the property, availability of subsurface water, and scenery and view were ranked relatively high. Except in the High and Rolling plains, agricultural productivity had relatively low rankings.

The brokers were also asked to rank various improvements in terms of their importance in determining the per acre price of rural land. As can be seen in Table 9, electrical lines to the property, and a water system were generally the highest ranked improvements.

The brokers were asked what they saw as being the reason for the trend toward a greater dispersion in size between large and small farms in Texas and if they thought this trend would continue. Sixteen percent did not respond to the question; 82 percent thought the trend would continue;

Table 8. Average ratings of various characteristics in terms of their importance in determining per acre prices of rural land in seven regions across Texas[a]

Characteristics	(1) High and Rolling Plains	(2) West Texas	(3) South Texas	(4) Coastal Bend and Prairies	(5) East Texas	(6) Blacklands and Post Oak Savannah	(7) Hill Country	State Average
Good access roads	68.37 (6.10)	54.00 (11.48)	63.05 (6.04)	65.42 (8.38)	70.25 (3.96)	71.18 (3.01)	65.31 (6.65)	68.06 (2.01)
Size of property	64.89 (6.65)	66.75 (12.34)	65.65 (5.31)	53.75 (8.37)	68.69 (5.31)	63.90 (3.32)	55.38 (7.63)	63.28 (2.14)
Availability of subsurface water	74.95 (5.58)	59.00 (18.12)	57.95 (7.62)	50.91 (8.84)	37.73 (6.92)	55.90 (3.51)	53.46 (9.80)	56.29 (2.50)
Scenery and view	36.00 (8.41)	58.25 (9.90)	56.48 (6.32)	45.50 (9.29)	56.60 (6.36)	64.06 (3.11)	57.31 (7.11)	56.27 (2.38)
Elevation and topography	66.05 (6.78)	44.25 (7.28)	53.67 (5.79)	48.73 (8.95)	47.44 (6.58)	58.24 (3.21)	54.92 (5.94)	55.97 (2.16)
Distance from nearest towns, schools, etc.	62.26 (6.85)	25.75 (8.64)	48.33 (5.19)	40.83 (7.81)	64.94 (6.01)	57.81 (3.43)	52.31 (6.99)	55.06 (2.23)
Distance from major metropolitan areas (Dallas, Houston, etc.)	19.32 (5.53)	28.50 (16.02)	43.24 (6.92)	69.00 (6.73)	50.07 (7.52)	63.26 (3.34)	56.46 (7.63)	52.12 (2.57)
Direct access to surface water	37.68 (8.56)	40.50 (15.04)	54.33 (6.52)	34.67 (9.13)	36.73 (6.78)	52.24 (3.62)	68.00 (8.99)	50.39 (2.61
Type of vegetation cover	27.68 (6.30)	33.50 (5.89)	53.20 (7.29)	35.25 (8.72)	42.00 (6.67)	50.41 (3.25)	42.69 (7.71)	44.49 (2.34)
Abundance of wildlife	27.53 (7.07)	47.50 (13.15)	58.10 (6.77)	26.00 (6.48)	35.67 (6.05)	44.92 (3.45)	48.46 (7.60)	42.32 (2.38)
Agricultural Productivity	69.05 (6.68)	43.25 (17.50)	40.38 (5.06)	37.17 (9.05)	26.94 (5.45)	32.47 (2.83)	22.38 (5.90)	37.51 (2.25)

[a] Values in parenthesis are the standard errors of the mean values.

Table 9. Average ratings of various improvements in terms of their importance in determining per acre price of rural land in seven regions across Texas[a]

Improvement	(1) High and Rolling Plains	(2) West Texas	(3) South Texas	(4) Coastal Bend and Prairies	(5) East Texas	(6) Blacklands and Post Oak Savannah	(7) Hill Country	State Average
Electrical lines to the property	69.32 (6.37)	45.50 (16.41)	72.85 (5.75)	57.50 (10.14)	63.94 (7.52)	72.94 (3.25)	62.85 (7.54)	68.55 (2.30)
Water system	70.11 (7.67)	67.75 (8.17)	77.05 (5.06)	51.92 (8.13)	53.69 (6.76)	67.21 (3.11)	60.38 (10.26)	65.68 (2.29)
Livable house	37.42 (6.27)	23.00 (7.23)	43.55 (4.71)	45.00 (8.35)	37.60 (5.20)	53.13 (3.49)	50.31 (7.88)	46.39 (2.20)
Stock tanks	27.42 (6.70)	39.25 (18.23)	48.80 (6.91)	27.27 (7.43)	29.73 (5.65)	50.92 (3.29)	48.46 (7.48)	42.97 (2.35)
Ponds	23.79 (6.00)	23.50 (12.61)	45.35 (6.83)	32.50 (7.19)	31.67 (5.11)	52.27 (3.13)	48.46 (6.71)	42.68 (2.25)
Fences	21.47 (4.79)	46.75 (13.98)	34.35 (5.05)	29.58 (7.16)	33.07 (6.86)	41.13 (3.03)	37.69 (7.50)	35.68 (2.04)
Outbuildings	31.84 (4.99)	22.75 (10.92)	23.00 (3.82)	20.83 (5.67)	28.07 (4.44)	35.85 (3.22)	34.23 (7.14)	31.00 (1.90)
Sewage system	20.26 (6.13)	8.25 (4.40)	18.00 (4.32)	29.67 (9.66)	21.87 (6.90)	29.19 (3.86)	28.77 (8.28)	25.14 (2.33)
Natural gas lines to the property	49.84 (8.14)	13.00 (9.25)	7.05 (1.64)	25.00 (9.66)	20.27 (6.42)	22.56 (2.97)	19.85 (7.89)	23.46 (2.28)

[a] Values in parenthesis are the standard errors of the mean values.

and only 2 percent thought the trend would not continue. Only two brokers stated that they did not see the trend.

When giving their reasons for the trend toward a greater dispersion in farm size between large and small farms in Texas, many brokers simply stated that the price of land was too high. Examples of other reasons are given below:

> "Economies of scale - larger farms can be worked more efficiently, smaller tracts are in demand by city folks who will pay a premium per acre ...."
>
> "Many people coming from cities to rural areas want 20-50 acres and have money to pay a high price if they find what they're looking for."
>
> There is a "need for larger operating units to be economically feasible and [there is a] strong market for small acreage tracts for homesites - recreation - investment."
>
> "The 'Ranchette' 5 to 25 acres has happened to many thousand of acres."
>
> "The full time farmer has to handle a larger acreage .... your 40 hr/ week worker wants a smaller acreage for recreational farming."
>
> "Farming is not economically feasible except on a large scale operation. Middle sized operations must sell. Small farms still exist because they are essentially hobbies."
>
> "It is no longer cut and dried as to whether you are a farmer-rancher or not. People that prefer a rural setting buy as much land as they can afford and use it to raise animals and a garden - then still keep their jobs in the city."
>
> "The amount of acres it takes for a full time farmer to survive - against the small acreage the hobby farmers needs or wants."
>
> "The city dwellers moving back to the country with incomes from non agricultural sources. No intention of farming for profit."
>
> "Pride of ownership is one reason for smaller acres. A ranch can be a few acres."
>
> "The agribusiness unit must be larger - the 2nd home, recreational or investment for inflation protection can be smaller."
>
> "You cannot pay for land today at current prices through farming, and the price is reducing the amount of land a person can afford."

"Two reasons - (1) large units needed for agricultural operation to be profitable. (2) Many people just want a tract of rural land (tract being defined as 2-200 acres in this case)."

"Small farms are for recreation - and country living, working in town."

"You seem to have two types of buyers primarily. The wealthy who can and do buy large tracts. The other is the average wage earner who wants land but cannot afford anything other than a small place."

"Getting away from farming as primary use."

The brokers were asked to identify the trends that will have the greatest impact on rural land prices in Texas. As reported in Table 10, population growth in Texas was most often listed followed by increased desires to move to the country or own a rural retreat. One respondent, with over 40 years experience as a realtor and broker dealing with rural land in Texas identified the factors affecting land prices as being "migration impact - sunbelt population explosion - energy cost imbalances - economic instability - urban stress escape - leisure time increase - societal attitudinal changes - alteration of traditional urban/suburban/exurban lifestyle - communication and transportation developments."

The brokers were also asked to indicate their thoughts concerning future changes in the prices of land across various types of rural properties. As can be seen in Table 11, the brokers generally thought that the prices of ranches will rise faster than farms, and that smaller properties will rise faster than larger properties.

Table 10. Trends that are and will have the greatest impacts on rural land values in Texas

Trends	Number of times listed
Population growth in the state	74
Desires to move to the country or own a country retreat	44
Profitability of agricultural production	38
Interest rates	24
Oil and mineral prices and exploration	24
Overall economic conditions	20
Changes in tax structures	18
Urban encroachment	17
Income growth	15
Availability of water	15
Desires to own rural land for recreational and other reasons	14
Inflation	13
Government programs	8
Purchasing of land by corporations and conglomerates	4
Purchasing of land buy foreign and out-of-state investors	4
Horse farming	3

Table 11. Summary of Texas land brokers thoughts concerning future change in prices of rural land over various types of rural properties

Property type	Percent of respondents who think that land prices will:						
	Fall	Rise much slower than inflation	Rise slightly slower than inflation	Rise almost equal to inflation	Rise slightly faster than inflation	Rise much faster than inflation	Didn't answer
Large commercial farms	9	24	14	24	19	4	6
Large commercial ranches	9	16	19	28	18	4	7
Medium sized farms	3	20	13	24	27	7	6
Medium sized ranches	1	11	13	30	30	8	7
Small or "hobby" farms (where primary employment is off the farm)	1	6	4	19	35	29	7
Small or "hobby" ranches where primary employment is off the ranch	1	2	3	12	39	33	9
Large acreages used primarily for homesite and/or hunting or other outdoor recreation	4	8	7	28	35	10	7
Small acreages used primarily for homesites	0	4	2	11	22	54	7

Summary and Conclusions

It was hypothesized that motivations centered on purchasing rural land as a consumptive good play an important role in determining the market value of rural land in Texas. These motivations relate to individuals' innate desires to own land, live in a rural environment, have a place to engage in various outdoor recreational activities, "get back to nature", or be associated, at least peripherally, with agricultural production. The results of two studies, using different methodologies, were reported and basically supported the hypothesis.

Simple statistical models were estimated using least-squares regression and cross sectional data on values of rural land, average net returns to land from agriculture and other variables in Texas. The results indicated that factors relating to population density, proximity to major metropolitan centers, quality of hunting, and aesthetic differences across the State explain most of the variance in these rural land values.

A survey of Texas land brokers was also conducted. The results of this survey illustrated that purchasers of rural land in Texas are influenced by a large number of socio-economic motivations. Many investors who purchase rural land want an investment that they can "touch, feel, experience, and enjoy". Many purchasers desire a place in the country for a permanent homesite, a rural retreat, or a place to hunt, fish, and enjoy other forms of outdoor recreation. Purchasers who want to farm and ranch are willing to pay more for rural land than it is worth strickly for agricultural purposes because of other motivating factors. As one broker stated "many buyers love the land and enjoy farming or ranching even though they are aware that they will not make an operating profit."

In conclusion, the entire complex set of socio-economic motivations

for purchasing rural land should be recognized and better understood when examining rural land values; exploring policies relating to farm and ranch structure, property and income taxes, income and/or price supports, rural and urban development, and the distribution and utilization of public lands; or when considering purchasing or selling rural lands.

Motivations for purchasing rural land that are not directly related to agricultural production will continue to have a profound and growing influence on the structure and nature of farm and ranch enterprises and rural land prices.

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Appendix A

TEXAS A&M UNIVERSITY

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE STATION, TEXAS 77843-2124

SURVEY OF TEXAS LAND BROKERS

1. In what county are you located? _____

2. What county(ies) do you work in primarily? _____
_____

3. How long have you been a realtor or broker dealing with rural land in Texas? _____

4. Please list the three most important reasons why people acquire rural land in your area.

   a. _____
   b. _____
   c. _____

5. Please list the three most important reasons why people sell rural land in your area.

   a. _____
   b. _____
   c. _____

6. What are the three most important characteristics that prospective buyers of rural land in your area consider?

   a. _____
   b. _____
   c. _____

7. What percent of the buyers buy rural land in your area primarily for agricultural purposes? _____%

8. What percent of the total acreage of the rural land bought in your area is being purchased primarily for agricultural purposes? _____%

9. What percent of the buyers buy rural land in your area primarily as a homesite? _____%

10. What percent of the buyers buy rural land in your area primarily for hunting, fishing and other outdoor recreation? _____%

11. What percent of the buyers buy rural land primarily as an investment, but do not intend to personally farm, ranch, or live on the land? _____%

12. Recently, there has been a trend toward a greater dispersion in size between large and small farms in Texas. What do you see as being the primary reason for this trend? _____

_____

_____

_____

_____

Do you think this trend will continue? yes___ no___

13. What trends in Texas are having and will have the greatest impacts on rural land prices in Texas?

a. _____
b. _____
c. _____

14. There are many reasons why people buy rural land. Please rate the following reasons as to the level of their importance to buyers of rural property in your area. Ratings can range from 1 to 99. The higher the score, the more important the reason. The lower the score, the less important the reason. Please add any other reasons that you think are important.

LEVEL OF IMPORTANCE

1 10 20 30 40 50 60 70 80 90 99

Not important at all — Extremely important

a.	Wants a country retreat	_____
b.	Wants to farm or ranch	_____
c.	Wants land as a display of wealth	_____
d.	Wants to live in a rural environment	_____
e.	Wants a place to hunt and/or fish	_____
f.	Wants a place for outdoor recreation (not including hunting and fishing)	_____
g.	Wants a good investment or hedge against inflation	_____
h.	Wants future income from oil or other minerals	_____
i.	Other _____	_____
j.	Other _____	_____

15. Please rate the following characteristics as to the level of their importance in determining the per acre price of rural land in your area. Ratings can range from 1 to 99. The higher the score, the more important the characteristic, the lower the score, the less important the characteristic. Please add any other characteristics that you think are important.

LEVEL OF IMPORTANCE

1 10 20 30 40 50 60 70 80 90 99

Not important at all — Extremely important

a. Good access roads _____
b. Distance from nearest towns, schools, etc. _____
c. Distance from major metropolitan areas (Dallas, Houston, etc.) _____
d. Size of property _____
e. Scenery and view _____
f. Agricultural productivity _____
g. Direct access to surface water _____
h. Availability of subsurface water _____
i. Abundance of wildlife _____
j. Type of vegetation cover _____
k. Elevation and topography _____
l. Other _____ _____
m. Other _____ _____

16. Please rate the following improvements as to the level of their importance in determining the price of a parcel of rural land in your area. Ratings can range from 1 to 99. The higher the score, the more important the improvement is in determining the price. The lower the score, the less important the important the improvement is in determining the price. Please add any other improvements that you think are important.

a. Water system _____
b. Sewage system _____
c. Fences _____
d. Livable house _____
e. Outbuildings _____
f. Ponds _____
g. Stock tanks _____
h. Electrical lines to the property _____
i. Natural gas lines to the property _____
j. Other _____ _____
k. Other _____ _____

17. Listed below are eight different types of rural properties. Do you think that over the next 10 years, the per acre price of these types of properties will:

a. fall
b. rise much slower than inflation
c. rise slightly slower than inflation
d. rise almost equal to inflation
e. rise slightly faster than inflation
f. rise much faster than inflation

Please indicate what you think will happen to per acre rural land prices for the following types of properties by putting the letter of the appropriate answer in the blank provided below:

1. large commercial farms ____
2. large commercial ranches ____
3. medium sized farms ____
4. medium sized ranches ____
5. small or "hobby" farms (where primary employment is off the farm) ____
6. small or "hobby" ranches (where primary employment is off the ranch) ____
7. large acreages used primarily for homesite and/or hunting or other outdoor recreation ____
8. small acreages used primarily for homesites ____

Additional Comments: