ANALYSIS OF VARIATIONS IN FARM REAL ESTATE PRICES OVER HOMOGENEOUS MARKET AREAS IN THE SOUTHEAST

Ivery D. Clifton and Stan B. Spurlock

This article presents an analysis of factors influencing farm real eatate prices in the southeastern United States. The first step in the analysis is the use of a multivariate criterion to segment the regional market into homogeneous land resource components. Segmentation of the regional market reflects the view long held by land economists that the aggregate farm real estate market really comprises a conglomerate of smaller, differentiated submarkets (Barlowe; Crowley; Scofield). These economists use regression analysis to examine the importance of various factors on land prices within each homogeneous market identified in the initial phase of the research.[1] It is hypothesized that the magnitude of and relationships between determinants of land prices are uniform across market areas subject to different levels of urban influence. Identification of the magnitude of these factors influencing land prices in homogeneous areas and the relationships between them may provide an improved understanding of the functioning of the farm real estate market.

Previous studies have statistically explored the importance of various factors in determining land values (Castle and Hoch; Herdt and Cochrane; Klinefelter; Maier, Hedrick and Gibson; Reynolds and Timmons; Tweeten and Martin). These include net farm income, government transfer payments, farm enlargement, population density, capital gains, expectations, and technological change. However, most previous empirical studies and existing theoretical analyses have dealt primarily with macrodata or aggregate market analysis.

Structural variables in an aggregate market context may undergo periodic change and specific coefficients may vary in magnitude and direction among submarkets. Earlier studies conducted by Christensen and Raup in Minnesota and Johnston in California provide support for this hypothesis. Regional analysis of land prices must therefore identify relatively homogeneous land market areas while at the same time ensuring that the size of the submarket areas are large enough for reliable statistical analysis.

Several classification systems have been proposed to identify conglomerates of smaller homogeneous markets, but no universally accepted method or system has emerged.[2] Population density and topographic and climatic factors are commonly used to provide some homogeneity of agronomic conditions (Harrell and Hoover; Spurlock and Adrian; Herr; Vallink). Schuh and Scharlach used regression residuals to classify counties in Indiana into 4 submarket areas. Corty used population density to group the 48 contiguous states into 11 markets. Clifton used a multivariate criterion to classify U.S. counties into a set of homogeneous farm real estate submarkets. The latter study employed county data from the 1969 *Census of Agriculture* and the 1970 *Census of Population* to analyze factors affecting land values within each submarket.

CONCEPTUAL FRAMEWORK

Though we speak of the land market in a spatial sense (states and regions), the market as a unit of inquiry is not easily delineated. Land viewed either as a productive or consumptive good does not conform to the Marshallian definition of an economic good. Parcels of land are heterogeneous and fixed in location with relatively few buyers and sellers in local areas. Each parcel of land constitutes its own unique market. Therefore, the conceptual focus of this analysis is more properly directed toward "market area classification" than "market classification" per se.

Assuming the local economic supply of farmland to be perfectly inelastic, market areas can be defined on the basis of demand relationships. Areas which exhibit similar demand characteristic effects on land should experience similar land values, given the absence of supply effects. For example, farmland adjacent to urban areas, which often provides needed space for urban and industrial activities, should be expected to experience high land prices relative to similar land situated in a predominately rural area. In the urban area, nonagricultural demands such as accessibility, timing of development, and intensity of use combine with farm factors to influence the earning expectations of land owners. Generally, in the rural area expected net ag-

Ivery D. Clifton is an Associate Professor of Agricultural Economics, University of Georgia. Stan B. Spurlock is as Assistant Professor of Agricultural Economics and an Assistant Economist, Mississippi State University.

The authors acknowledge the constructive suggestions and criticisms of John E. Reynolds and *Journal* reviewers.

[1] The terms "land value" and "land price" are often used interchangeably. Here, however, value denotes the subjective worth of land. The term is used synonymously with land value as reported in the *Census of Agriculture*. The term "price" reflects the actual monetary consideration provided in a bonafide sales transaction.

[2] Two different data sets are used in the analysis. Secondary data from the *Census of Agriculture* and *Census of Population* were used to achieve the market classification system. Primary data from the Federal Land Bank of Columbia, South Carolina were used to estimate the rural real estate regression models.

ricultural land earnings, appreciation, and demand for farm expansion provide a ceiling above which land prices will seldom rise. As the distance between urban centers and agricultural areas increases, a hierarchy of markets, variously influenced by farm and nonfarm factors, emerges. The theoretical basis for this argument can be traced to the writings of land economists in the early 1920s (Salter). A classification model was used in Phase I of this study to identify farm and nonfarm factors useful in classifying land markets.

EMPIRICAL STUDY

Study Area and Data

The study area includes Florida, Georgia, South Carolina, and North Carolina. Counties within this region form the farm real estate submarkets. Three counties (see Figure 1) contained relatively few acres of farmland and were deleted from the analysis. Data from the *Census of Agriculture* and *Census of Population* are used to classify markets (Table 1). Farmland values and other socioeconomic characteristics are averages for counties; therefore, the average figures in classifying land markets apply only to the county and not to individual farm properties in a county. Observations of bona fide farmland transactions of 10 acres or more occurring between 1971 and 1979 were obtained from the Federal Land Bank (FLB) of Columbia, South Carolina. The FLB data were used in the regression analysis only.

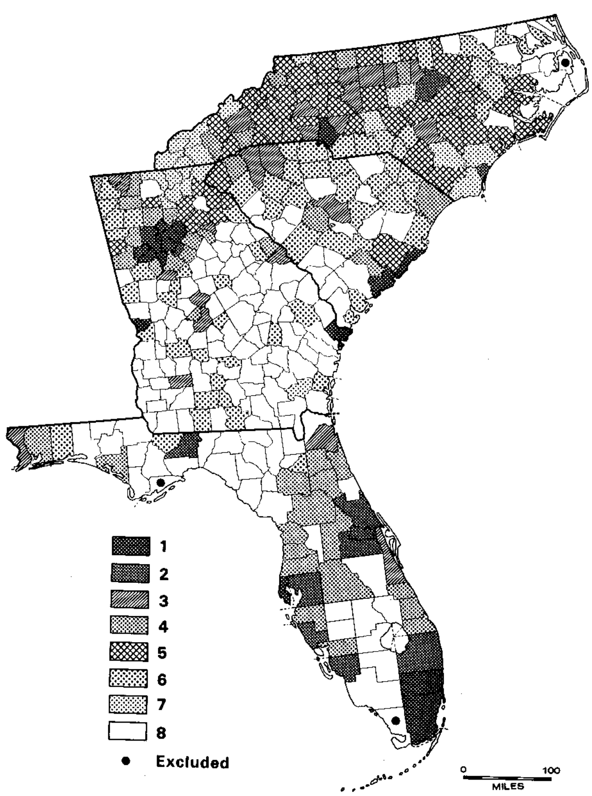

Figure 1. Homogeneous Classification of Farm Real Estate Markets in the Southeast.

Table 1. Symbols and Definitions for Variables Used in the AID Classification Model.

Symbol	Variable (Unit; time period)
X1	Population density (people/square mile; 1975)
X2	Urban population (% of total population; 1970)
X3	Change in population due to migration (%; 1970-75)
X4	Property taxes ($/capita; 1972)
X5	Crime rate (#/100,000; 1975)[a]
X6	Land in farms (% of all land; 1974)
X7	Average size of farms (acres; 1974)
X8	Occupied housing density (units/square mile; 1970)
X9	Farm population (% of total population; 1970)
X10	Cropland acreage (% of farmland; 1974)
X11	Net farm income ($/farmland acres: 1974)
X12	Median family income ($, 1969)
X13	Media house price ($/unit, 1970)
X14	Change in number of farms (%; 1969-74)
X15	Change in farmland acreage (%; 1969--74)
X16	Average value of farmland ($/acre)

[a] Includes robbery, aggravated assault, burglary, and motor vehicle theft.

Analytical Procedure and Model Specifications

The analytical procedures employed in the analysis are described by Sonquist, Baker and Morgan. The Automatic Interaction Detector (AID) was used to partition counties in the study into a series of homogeneous land segments. AID divides the sample, through a series of binary splits, into a mutually exclusive series of subgroups. The algorithm examines the total sample and chooses the explanatory variable (Table 1) that, when used as the splitting variable, results in a maximum reduction in the unexplained sum of squared (TSS_i) for the dependent variable, per acre value of farmland. This decision is satisfied by equation

$$(1) \qquad TSS_i = \sum_{j=i}^{N_i} X_j^2 - \left[\frac{\sum_{i=1}^{N_i} X_j}{N}\right]^2$$

where TSS_i = error sum of squares for the dependent variable,

X_j = independent variables,
N_i = size of the submarket sample, and
N = size of total sample.

The aggregate sample is then split into two nonoverlapping submarkets. This search procedure is repeated across each submarket formed with the between sums of squares (BSS) of the resulting submarkets computed using equation

$$(2) \qquad BSS_i = (n_1\bar{x}_1^2 + n_2\bar{x}_2^2) - N_i\bar{X}_j^2$$

where

n_i = size of split of submarket,
N_i = size of total ($N_i = n_i + n_2$),
$\bar{x}_1$ = mean of the explanatory variable for the split market, and
$\bar{X}_j^2$ = mean value of the explanatory variable for the total sample.

The BSS of each explanatory variable is computed and divided by the TSS of the market to be split. The explanatory variable with the largest ratio (BSS_i/TSS_i) is chosen to split the market into additional submarkets. The final subgroups have characteristics that quantitatively distinguish one group from another. Furthermore, each group can be considered a market since the average per acre values for counties within a group are composites of similar characteristic values. The prime reason for splitting a region into different submarkets is to identify how select variables affect land prices in different homogeneous areas. Grouping all markets together and obtaining estimators for this set of observations would restrict the parameters in each market to be identical (Maddala). If differences across markets exist, then it is important to identify these differences to obtain a better understanding of the relationship between land prices and certain explanatory variables. Magnitudes of the ordinary least squares (OLS) estimators should be larger in the urban markets since nonfarm factors normally exhibit greater influence on the demand for farmland than do farm factors.

OLS was used to obtain linear regression estimates for each submarket and for the aggregate region. Symbolically, the structural form of the model can be stated as

$$(3) \qquad SP = f(BV, ST, PT, PC, FC, RPE, RPNF, DUI, Y)$$

where

SP = sales price of farm real estate (\$/acre),
BV = Farm building value (\$/acre),
ST = Size of tract (acres),
PT = Percent of tract in timberland,
FC = Farm class rating, assigned by FLB,
PC = Percent of tract in cropland,
RPE = Reason for purchase is farm expansion (0-1 dummy variable),
RPNF = Reason for purchase is nonfarm purpose (0-1 dummy variable),
DUI = Degree in urban influence in the county in which the transaction occurred, and
Y = Yearly time trend.

The error terms for each equation were assumed normally distributed, with a mean of zero and a constant variance. The conventional t − ratio was used to test the hypothesis that a single parameter is equal to zero. In addition, an F-ratio was computed to test the hypothesis of no differences in parameters across equations.

The hypothesized relationships between the price of farm real estate (SP) and the explanatory variables are also considered. The size (acres) of the tract (ST) sold is expected to vary inversely with SP per acre. However, as the number of acres in the sale increases, the price response should also increase, but at a decreasing rate (Hushak and Sadr). The reciprocal of acres was used to account for the nonlinear relationship. The sign of the estimator 1/ST is expected to be positive. Properties having relatively more timberland than cropland are expected to have lower prices, primarily because such lands generate less expected income. Conversely, the expected income potential for properties having relatively more cropland should result in a positive effect on SP. The farm class variable (as defined by the FLB) is given a large value when the income-generating capacity and stability of the property is low. The sign of the farm-class estimator is expected to be negative. Generally, the signs of the estimators discussed above should be consistent across market areas. However, the magnitude of each estimator may vary with the urban orientation of the market in question.

The reason for purchasing farmland should influence SP, since land use is a principal determinant of value as well as expected earnings. Farm expansion causes the per acre returns for the total farm to increase as the fixed costs of machinery are spread over more acres. Land purchased for nonfarm uses normally has higher expected returns and thus a higher price. The two dummy variables, RPE and RPNF, should have positive effects on SP when compared to a purchase for farm establishment. The farm establishment variable is the dummy omitted from the model.

Land prices are hypothesized to increase as the degree of urban influence increases. The yearly trend variable included in this analysis should account for the effects of inflation and other dynamic factors of the local economic structure.

EMPIRICAL RESULTS

Results of the AID submarket classification for the Southeast are shown in Figure 1. A quantitative description of each submarket, the mean values of select characteristics, and a geographic distribution of counties by submarkets and states appear in Table 2. Since data in the study represents the population and not a sample, F-test and other statistical measures are not appropriate.

Eight exclusive but not necessarily contiguous submarkets are identified in the Southeast. One-way analysis of variance over these markets accounts for 51 percent of the variation in the average per acre value of farmland in 1974. Of the hypothesized discrimina-

Table 2. Market Classification Criteria, Mean Characteristics Values, and Number of Counties in Each State by Land Markets.

Item	Land Market 1	2	3	4	5	6	7	8
Market Classification Criteria:								
Population Density (per sq. mi.)	>180	>180	>180	45-180	45-180	45-180	<45	<45
Land in Farms (Ac.)	<15	≥15	≥15	-	-	-	-	-
Population Migration (%)	-	≥10	<10	≥10	<10	<10	-	-
Average Size of Farms (Ac.)	-	-	-	-	<140	≥140	<140	≥140
Mean Values of Characteristics:								
Farm Real Estate Values ($/per Ac.)	1572	954	694	737	617	488	622	414
Population Density	1333	324	347	95	91	83	31	26
Land in Farms	9.7	35.1	35.2	37.1	36.0	41.0	18.1	40.9
Population Migration	15.6	28.2	1.5	26.4	3.7	0.2	7.4	4.8
Average Size of Farms	137	392	205	280	109	240	101	423
Number of Counties in:								
Florida	3	8	3	17	0	3	0	31
Georgia	8	1	8	14	10	26	8	84
North Carolina	1	2	10	5	42	15	12	12
South Carolina	1	0	3	4	2	20	0	16
Total	13	11	24	40	54	64	20	143

tors of local market areas, only four were important[3]: population density, percent of land in farms, percent net migration, and average size of farm in the county. The density-land value relationship is quite evident in developing the market hierarchy. Density was the most important criteria in defining each submarket. However, this is not surprising since density is a composite variable of many theoretical dimensions. It obviously measures location, accessibility and many other factors influencing land values. The characteristic of average size of farms in the county is an important determinant of land value. The size of the farm purchased has been shown by Vallink and others to vary inversely with sale price.

The resulting submarkets are not necessarily comprised of contiguous counties. Only those counties possessing similar characteristic values for specific variables constitute a land market. Counties with large metropolitan cities are classified as Land Market 1 (LM1). The Florida peninsula accounts for the majority of counties in Land Markets 2 and 4. Most of the counties in Land Markets 3 and 5 are found in North Carolina. Counties in Land Market 6 (LM6) are scattered throughout Georgia, South Carolina, and North Carolina. The mountainous areas of Georgia and North Carolina are primarily classified to as Land Market 7 (LM7), while counties in southern Georgia and sections of Florida comprise Land Market 8 (LM8).

The first submarket (LM1) is comprised of 13 counties having a population density greater than 180 people per square mile and few (less than 25 percent) acres of land currently devoted to agriculture. In 1974, the mean value of farmland per acre in LM1 was $1572 compared to $954 per acre in the slightly less urban-oriented LM2. Population density is high in LM1, LM2, and LM3; medium in LM4, LM5, and LM6; and low is LM7 and LM8. In LM2 through LM6, higher land values are observed in those counties experiencing larger increases in population due to net migration. Counties having a mean farm size of less than 140 acres appear to have higher land values than counties with average farm sizes equal to or greater than 140 acres. Only LM6 and LM8 have lower average land values than the Southeast regional average of $578 per acre. Generally, however, a divergence in land values is seen as markets decline in urban orientation.

Confidence in the classification would be strengthened if a statistical measure could be derived to test the hypothesis that the submarkets are significantly different. However, these data represent the population and not a sample. More importantly, it is possible for two markets to share a common mean value of land and yet represent substantially different markets. The one-way analysis of variance over the data does indicate the possibility of some overlap in the classification system. The classification would seem more meaningful, in an aggregate sense, if LM2 and LM3, and LM4 and LM5 were collapsed into two groups. The criteria used to define these particular market areas appear quite similar. Collapsing groups with similar characteristic values is common in AID, though the practice is not followed in this study.

Characteristics of Market Transactions

The mean values of actual market transactions financed by the FLB are arranged according to the AID classification system in Table 3. LM1 transactions exhibit the highest average price per tract, followed by LM2, LM4, LM3, LM5, LM7, LM6, and LM8. Thus, when comparing land prices, the FLB data is very similar to the census land-value data used in the AID model classifications.

Mean building values are larger in LM2, LM4, LM5, and LM7 than for the aggregate market. Average size of tracts sold in LM5, LM6, LM7, and LM8 exhibit the same relationships as in the AID model, which uses the average size of farms as a variable to define these markets. High percentages of timberland occur in LM5, LM6, and LM7, and high percentages of cropland are observed in LM1, LM2, LM6, and LM8. Pastureland is predominant in LM2 and LM4. Farms in LM1, LM2, LM3, and LM4 are given slightly better farm class ratings by the FLB than in other markets. A rating of 1 means the farm has an excellent income-generating potential, while a rating of 5 implies a very poor potential.

The percentage of land in farms in LM1, LM2, and LM3 reveals the same relationships as given in the AID model. Net farm income is higher in LM1, LM2, LM5, and LM6 than for the aggregate market. The reasons for purchasing the farm are different across markets.

[3] Only those variables capable of reducing the unexplained sum of squares (TSS) by at least one-percent were allowed to enter the analysis.

Table 3. Mean Characteristics of Selected FLB Variables for Land Markets in the Southeast, 1971–1979.

Variables	Land Market 1	2	3	4	5	6	7	8	Aggregate
Number of Sales	293	872	1475	3615	4268	4885	1132	7618	24158
Farm Real Estate Price ($)	4807.20	2705.85	1118.94	1774.94	901.96	771.16	888.97	754.99	1084.91
Building Value ($/AC)	11.94	110.57	29.25	49.65	50.56	25.11	66.89	13.83	34.86
Acres Sold	87.64	167.52	84.34	127.16	76.80	128.31	103.29	198.29	138.17
% Timberland	39.83	18.32	44.97	30.01	48.79	47.82	58.16	41.56	42.50
% Cropland	40.52	38.78	31.30	33.22	34.53	37.89	22.65	39.41	36.03
% Pastureland	18.50	41.58	23.09	36.21	16.28	13.87	18.87	18.66	21.00
Farm Class Rating	2.68	2.82	2.83	2.83	2.94	2.92	3.04	2.92	2.90
% of Land in Farms in County	10.03	43.87	34.09	45.92	40.78	44.80	21.82	49.26	43.48
Net Farm Income in County ($)	90.73	51.37	23.31	21.49	50.82	32.86	27.38	25.06	32.40
Reason for Purchase:									
% Establish Farm	32.76	33.14	51.39	36.52	44.89	38.75	45.32	33.83	38.75
% Expand Farm	22.87	33.14	25.83	32.39	38.73	40.20	26.94	46.59	38.83
% Nonfarm Purpose	44.37	33.72	22.78	31.09	16.38	21.05	27.74	19.58	22.42
Urban Influence	2.15	1.62	1.22	1.11	0.47	0.55	0.37	0.32	0.64
Per Capita Income in County ($)	4901.13	4665.75	4201.68	3809.45	3400.86	3306.32	2943.12	2941.49	3389.33
% Net Migration in County	11.90	21.24	2.08	28.89	3.49	1.23	7.16	5.68	8.36

Establishing a farm as reason for purchase is predominant in LM3, LM5, and LM7, while farm expansion occurs more often in LM6 and LM8. As expected, purchases for nonfarm purposes are more prevalent in LM1, LM2, and LM4.

The degree of urban influence is another rating given to the tract by the FLB. A value of 0 indicates no influence, 1 is slight influence, 2 is moderate influence, and 3 is greater influence. Average values of this variable generally decrease from LM2 to LM8. Per capita income and the degree of urban influence exhibit this same decreasing relationship. Changes in county population due to migration in LM2 through LM6 have the same relationship as in the AID model, since this variable is used to define those markets. In general, analysis of average characteristics shows LM1 to be the highest priced and most urban-oriented market. The higher-numbered markets tend to become more rural in nature.

Regression Results of Farm Real Estate Price Models

Ordinary least squares estimators for the eight submarkets and the aggregate market appear in Table 4. Each equation produced highly significant F-ratios. A separate F-ratio was calculated to test the hypothesis of no difference in parameters across the eight markets (Maddala, p. 323). The resulting F-ratio of 115.6 led to rejection to the hypothesis. All variables except size of tract (ST) were entered in the models in linear form. Inspection of the simple correlation matrix revealed no evidence of multicollinearity among the independent variables. All variables in the aggregate model are theoretically consistent in sign and highly significant.

The data indicate that local phenomena affect and condition the structure of agricultural land markets in the southeastern United States. The level of microparameters across markets is highly influenced by the varied mix of urban and rural activity present or expected to be present. Though not focused upon in this study, public investments, primarily at the federal level in highways, airports, and water projects, have all served to influence spatial variations in farmland prices. Farmland prices in urban areas benefit from direct competition between farm and nonfarm uses, as well as from accessibility and location. The relative influence of nonfarm factors tends to moderate with distance from the urban center, leaving predominately

Table 4. Regression Results for Farm Real Estate Price Model for Land Markets in the Southeast, 1971–1979.

Explanatory Variables[a]	Land Market 1	2	3	4	5	6	7	8	Aggregate
Intercept	-26464.38* (-3.47)	-11795.56* (-6.72)	-7622.29* (-14.91)	-8608.62* (-15.74)	-4854.75* (-18.94)	-4610.26* (-21.70)	-3530.80* (-6.49)	-5394.67* (-23.08)	-6740.83* (-33.31)
Building Value (BV)	0.04 (0.01)	1.09* (15.18)	1.12* (12.01)	1.18* (23.21)	1.06* (39.09)	1.02* (39.46)	1.20* (24.56)	.83* (10.76)	1.08* (47.39)
1/Acres (ST)	39821.10* (5.91)	16680.00* (9.97)	7147.97* (11.46)	10834.00* (19.09)	5707.31* (15.67)	5998.69* (18.31)	7732.49* (10.99)	9718.68* (27.28)	11809.73* (44.71)
% Timberland (PT)	-16.08** (-2.24)	-9.93** (-5.58)	-3.72* (-6.35)	-4.54* (-8.82)	-3.61* (-10.90)	-1.95* (-6.85)	-2.89* (-4.52)	-4.36* (-16.42)	-5.28* (-23.65)
% Cropland (PC)	31.77* (4.68)	6.51* (4.96)	0.10 (0.19)	9.29* (19.64)	1.81* (5.90)	2.58* (9.85)	-0.70 (-1.03)	2.45* (9.80)	4.36* (20.70)
Farm Class (FC)	-468.78 (-1.20)	-491.34* (-3.73)	-268.69* (-7.04)	-475.97* (-12.88)	-123.80* (-5.83)	-234.16* (-11.94)	-61.03 (-1.51)	-271.13* (-13.30)	-306.73* (-18.80)
Farm Expansion (RPE)	1349.43** (2.31)	290.50** (2.08)	-37.87 (-0.96)	138.13* (3.22)	43.08* (2.48)	48.81* (3.25)	-49.84 (-1.23)	60.57* (3.61)	111.23* (7.61)
Nonfarm Purpose (RPNF)	2253.55* (4.32)	983.42* (7.15)	195.45* (4.79)	417.90* (9.88)	227.12* (9.96)	153.70* (8.62)	190.14* (4.32)	110.22* (5.19)	329.18* (19.32)
Urban Influence (DUI)	947.45* (3.84)	570.55* (9.08)	230.03* (13.74)	358.00* (19.55)	117.90* (11.42)	186.67* (23.02)	166.95* (7.12)	232.90* (20.04)	399.85* (53.34)
Year (y)	355.77* (3.60)	182.39* (8.02)	121.05* (18.44)	140.38* (20.10)	78.56* (24.56)	76.31* (28.46)	58.37* (8.44)	89.15* (29.88)	107.28* (41.73)
R^2	.48	.47	.45	.48	.47	.50	.51	.34	.40
F	28.55	84.78	133.48	362.77	425.61	547.23	131.13	443.98	1807.29
Number of Observations	293	872	1475	3615	4268	4885	1132	7618	24158

Dependent Variable: Farm Real Estate Price ($/acre)
[a] ratios are shown in parentheses
* significantly different from zero, $\alpha = .01$
** significantly different from zero, $\alpha = .05$

rural land prices to be influenced primarily by expected farm earnings. The positive sign on building value (BV) is consistent with most land value theories. Improvement values had a significant effect on sale price (SP) in all markets except LM1. The significant coefficient on BV probably reflects the presence of the supersession costs frequently associated with farmland purchased for immediate development.[4] Supersession costs occur more frequently in urban than rural market areas. The average size (ST) tract sold evidenced a highly significant nonlinear impact on SP in all market areas. As expected, the inverse price-equality relationship was stronger in LM1 and LM2 than in the more rural-oriented market areas. The relative amount of timberland in the tract (PT) exhibited a significant negative impact on SP in all markets. Again, the strongest impact occurred in LM1 and LM2, reflecting the combination of time and supersession cost incurred in developing farm properties.

The quantity (percentage) of cropland (PC) in the tract is a significant positive determinant of SP in all markets except LM3 and LM7. No reasonable explanation can be given for the insignificant coefficient on PC in these two markets. Possibly the classification model did not group counties in LM3 and LM7 as well as in other markets. The farm class (FC) variable is negative, as expected, for all markets but insignificant in LM1 and LM7. One explanation for the result in LM7 is that a high percentage of tracts sold were small and idle before sale. Thus, these tracts were assigned a low farm productivity rating by the FLB. The sale price of these tracts reflects primarily their nonfarm use potential. In addition, land of good quality brings a higher price in urban than rural areas. Location and urban-industrial development theories support this finding. Purchases for farm expansion (RPE) have significantly lower mean prices than purchases for nonfarm purposes (RPNE). RPE was of the expected sign in all markets except LM3 and LM7. The larger impacts from RPNE occurred in LM1 and LM2, suggesting that those who purchase for nonfarm reasons are located in urban areas.

Urban influence (DUI) exhibits a significant positive effect on SP in all markets. The yearly trend variable (y) demonstrates that mean land prices increased substantially faster in LM1 and LM2 than in LM3 and LM4 during 1971–79. Even slower growth in value increases occurred in the remaining markets.

[4] Supersession costs are those costs incurred in removing structures in order that development can proceed. Oftentimes, supersession costs involve opportunity costs associated with the removal of structure with a positive salvage value.

SUMMARY AND CONCLUSIONS

Models explaining variations in land prices have often specified market areas on the basis of a single characteristic. However, markets are better conceptualized if defined on the basis of a multivariable criterion. Moreover, explanatory variables exert different influences on real estate prices in some local markets. Support for this finding is confirmed by Danielson in his study of farm real estate prices in North Carolina. Applying a model to each submarket within a region makes it possible to discover differences in relationship between explanatory variables and land prices. In this study, a method allowing for interactions between explanatory variables is used to define homogeneous land markets in the Southeast. Regression analysis is then applied to a land price model for each market.

The empirical evidence presented supports the hypothesis that a number of independently functioning land markets exist within the southeastern region. Farm real estate submarket areas can be defined on a quantitative basis to reflect the dynamic nature of economic phenomena over time. One critical shortcoming of the classification model used in this study is the inability to validate the resulting membership in each submarket. Thus, some counties may have been assigned to the wrong submarket. Discriminant or cluster analyses could be used to access the probability of correctly assigned counties, but a new data set would be needed. No such data set was available for use in this study. If the researcher is interested in explaining the variation in land prices within homogeneous areas, an additional burden arises. Partitioning markets into homogeneous segments substantially reduces the amount of variation to be explained. Thus, the OLS procedure must be specified with rigor. Detailed attention must be given to the choice of variables selected, as well as the functional form of the estimating procedure. Several problems arise when arithmetic functions are fitted to microdata (see Clouts; Downing; and Hushak). Microdata pertaining to expectations, capital gains, location, accessibility, and property taxes are needed to fully explain local variations in farmland prices.

The results of any single empirical investigation should not be overgeneralized. Yet, the results of this study seem sufficiently positive to encourage incorporating the market classification developed here to other regions of the country.

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