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URBANIZATION AND CALIFORNIA FARMLAND VALUES

by

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Introduction

There has been a great deal of interest in recent years concerning the impact of urbanization, productivity, and taxes on U.S. farmland values per acre [e.g., Morris, Pasour, Herdt, and Cochrane]. Generally, these studies conclude that (1) urbanization has a major impact on farmland values; (2) real estate taxes dampen farmland prices; (3) productivity is positively related to farmland values; and (4) size of farm (which may or may not be strictly related to productivity) has an estimated negative coefficient when regressed against farmland per acre values.

Previously published studies have generally either focused on aggregate state or U.S. data, or have focused on only a portion of the above impacts.[1/] The purpose of the study reported here is to examine these propositions utilizing cross-sectional data on county farmland values in California. Since California has very large average farm size and has experienced phenomenal population growth accompanied by rapid urban encroachment on lands used for agriculture, it appears to be well suited for a less aggregative analysis.

In this study, an attempt was made to verify conclusions (1) - (4) above for California. Cross-sectional data for 56 California counties were examined: average farmland value per acre was regressed against variables representing population pressures, land productivity, and tax rates.

Though earlier studies have not investigated statistically the validity of pooling urban and rural regressions (e.g., Morris), our findings indicate major structural differences between regressions for predominantly urban and rural counties in California. We find that land values in predominantly urban counties are strongly influenced by population pressures and taxation, whereas variables used as proxies for productivity are insignificantly different from zero. In contrast, land values in rural counties appear to be strongly influenced by productivity and population pressures. However, the tax rate appears to have little detectable effect on rural farmland values.

SELECTIVE REVIEW OF PREVIOUS STUDIES

In a recent study utilizing data on 2,952 counties of the 48 contiguous states, Morris presented the following regression results[2/]

TABLE 1

Regression Coefficients[a/]

County Classification	Constant	D_{70}	D_{Δ}	S	A	R^2
All	FV=108.00	0.41 (0.01)	2.36 (0.14)	1.95 (0.05)	- .004 (-0.0008)	.68
SMSA	FV= 55.45	0.34 (0.02)	6.24 (0.58)	2.28 (0.16)	- .03 (0.02)	.69
Non-SMSA	FV=100.84	1.00 (0.03)	0.64 (0.11)	1.65 (0.04)	- .003 (0.0006)	.62

a/ Numbers in parentheses are standard errors.

where FV ≡ average farmland value/acre in 1969, D_{70} ≡ population density in 1970, D_{Δ} ≡ percentage change in population density 1960-1970, S ≡ average gross farm sales/acre in 1969, and A ≡ average farm size (acres) in 1969.

These results support propositions 1, 3, and 4 described above illustrating the influence of population pressures, farm productivity, and farm size on land values. Note that real estate taxes were not included in the study.

In another recent article, Pasour estimates a similar regression model including real estate tax rates as one of the independent variables, with the following results:

TABLE 2

Regression Coefficients[a/]

Constant	D_{70}	D_{Δ}	S	A	C	T	R^2
104.82	0.34 (5.38)	4.33 (4.69)	3.81 (8.42)	-0.01 (1.24)	3.33 (5.65)	-63.67 (4.49)	0.95

a/ Numbers in parentheses are t-values.

where D_{70}, D_{Δ}, S, A are as before,

C ≡ cropland harvested as a percent of total farmland, and

T ≡ property taxes per $100 of farm value.

The variable C is included to distinguish cropland from generally less valuable rangeland and grazing land, on which no crops are harvested. The model was estimated using statewide data from the 48 contiguous states. Pasour's results support the four conclusions previously outlined, although the influence of average farm size on farmland value is not shown to be significantly different from zero at the .01 level of confidence.

ECONOMETRIC ANALYSIS OF CALIFORNIA FARMLAND VALUES

California Farmland Values

The objectives of the study reported here are to determine the extent to which the four conclusions drawn from studies of U.S. farmland values apply to an explanation of variation in farmland values among California counties. The dependent variable chosen for the model is the average value per acre of farmland and buildings by county in California. Of the 58 counties in California, two have been omitted from the analysis because less than five percent of the total land area is devoted to farmland. Values are taken from the 1974 U.S. Census of Agriculture and pertain only to "commercial farms" with annual sales of $2,500 or more.[3/]

Table 3 lists the 56 counties and the corresponding average farmland values grouped into SMSA and non-SMSA counties. Although values in SMSA counties are generally higher, other sources of variation are obviously present. The relatively high values for Imperial, Butte, and Sutter counties, all sparsely populated, and relatively low values for Santa Barbara and Marin counties, both of which include urbanized areas, would appear to relate to some measure of farm productivity per acre.

The mean value for all 56 counties is $718/acre, while the means for SMSA and non-SMSA counties are $1,086 and $442 respectively.

Between 1969 and 1974, estimated average farmland values increased in all but five of the 56 counties studied, and by more than 30 percent in a majority (31) of these counties. Although average values continue to be generally higher in SMSA counties than in non-SMSA counties, percentage increases, and in some cases absolute increases in per acre values,

TABLE 3

California Farmland Values, 1969, 1974, and Percentage Change 1969-1974

County	Value per acre of farmland 1974	Value per acre of farmland 1969	Percent change (1969-1974)
56 California Counties	$ 718	$ 575	19.9
24 SMSA Counties	1,086	947	12.8
Alameda	715	740	(3.5)[a/]
Contra Costa	961	845	12.1
Fresno	861	574	33.3
Kern	503	237	52.9
Los Angeles	944	978	(3.6)
Marin	627	799	(27.4)
Monterey	524	352	32.8
Napa	1,186	698	41.1
Orange	4,477	4,346	2.9
Placer	573	384	33.0
Riverside	1,457	1,301	10.7
Sacramento	722	548	24.1
San Bernardino	233	181	22.3
San Diego	1,301	977	24.9
San Joaquin	1,179	840	28.7
San Mateo	1,117	950	14.9
Santa Barbara	626	408	34.8
Santa Clara	1,096	1,376	(25.5)
Santa Cruz	1,957	1,689	13.7
Solano	671	565	15.8
Sonoma	868	600	30.9
Stanislaus	1,120	800	28.6
Ventura	2,154	1,946	9.6
Yolo	794	598	24.7

(Table continued)

Table 3 continued

County	Value per acre of farmland 1974	Value per acre of farmland 1969	Percent change (1969-1974)
32 Non-SMSA Counties	$ 442	$297	32.8
Amador	215	182	15.3
Butte	836	539	35.5
Calaveras	298	200	32.9
Colusa	623	398	36.1
Del Norte	658	336	48.9
El Dorado	283	323	(14.1)
Glenn	551	379	31.2
Humbolt	224	126	43.7
Imperial	1,092	659	39.6
Inyo	112	59	47.3
Kings	600	382	36.3
Lake	713	474	33.5
Lassen	145	89	38.6
Madera	667	450	32.5
Mariposa	200	146	27.0
Mendocino	271	151	44.2
Merced	704	460	34.6
Modoc	232	118	49.1
Mono	373	151	59.5
Nevada	289	349	(20.8)
Plumas	221	152	31.2
San Benito	335	241	28.1
San Luis Obispo	330	210	36.4
Shasta	258	156	39.5
Sierra	237	176	25.7
Siskyou	237	149	37.1
Sutter	967	736	23.9
Tehama	276	158	42.7

(Table continued)

Table 3 continued

County	Value $/acre 1974	Value $/acre 1969	Change (percent)
Trinity	138	84	39.1
Tulare	970	722	25.6
Tuolumne	271	222	18.1
Yuba	817	522	36.1

a/ Parentheses denote decrease.

were greater in the non-SMSA counties. The dynamics of rising farmland values seem to be most active in rural California counties.

The Model

The regression model estimated for California farmland values was as follows:

$$FV = B_0 + B_1 D_{70} + B_2 D_\Delta + B_3 S + B_4 A + B_5 T + B_6 C$$

where $FV \equiv$ average value per acre of farmland and building in 1974,

$D_{70} \equiv$ county average population density in 1975,

$D_\Delta \equiv$ percentage change in population density, 1965-1975,

$S \equiv$ value of all farm sales per acre in 1974,

$A \equiv$ average farm size in acres in 1974,

$T \equiv$ average 1974-75 real estate taxes per $100 assessed valuation, and

$C \equiv$ percentage of county farmland on which crops were harvested in 1974.

Values for FV, S, A, and C are taken from the 1974 U.S. Census of Agriculture. Variables D_{70}, D_Δ, and T are taken from or calculated from data from the California Statistical Abstract.[4/]

Regression Results

The regression results are given in Table 4. These results of the regression for the 24 SMSA counties differ from those for the 32 non-SMSA counties in the values and significance of the five dependent variables. The following Chow Test compares the residual sums of squares for the SMSA and non-SMSA regressions with that of the pooled regression to test for the statistical significance of structural differences between regressions.

TABLE 4

Regression Coefficients[a/]

Model	Constant	D_{75}	D_{Δ}	S	A	T	C	R^2
Pooled	905.0	0.93 (0.15)	2.07 (1.50)	1.14 (0.30)	- .06 (0.05)	- 77.70 (36.18)	3.30 (3.74)	.70
SMSA	198.2	1.16 (0.18)	30.37 (9.15)	0.31 (0.46)	0.17 (0.21)	-244.34 (86.92)	12.79 (6.32)	.83
Non-SMSA	287.8	3.68 (1.31)	0.62 (0.43)	0.47 (0.18)	- .03 (0.015)	- 8.08 (16.34)	4.63 (1.80)	.87

a/ Numbers in parentheses are standard errors.

$$F = \frac{\dfrac{SS_P - SS_U - SS_R}{K}}{\dfrac{SS_U + SS_R}{N_U + N_R - 2K}} = 9.44.$$

The critical F value is F (7,49) at .01 ≈ 3.03

where SS_P = sum of squares-pooled regression $N_U = 24$

SS_R = sum of squares-rural regression $N_R = 32$

SS_U = sum of squares-urban regression $K = 7$.

The results of the test lead to rejection of the pooled model at .01 level of confidence, and to the conclusion that major structural differences exist between the regressions for the SMSA and non-SMSA counties. These results suggest that not only are the values of the coefficients different for urban and rural counties, but also that the set of explanatory variables may be different for the two regressions as well.

In the SMSA, or urban regression, the explanatory variables found to significantly affect farmland values were:

a) population density

b) changes in population density

c) real estate tax rate

d) percent of farmland on which crops were harvested.

All were found to be significant at the .05 level or above. Of these four variables, only the latter is related to the productive capacity of the farmland for agricultural purposes. This variable distinguishes cropland from generally less productive rangeland. The other productivity-related variables, value of farm sales per acre and average farm size, were not found to be statistically significant (t-values of less one). These results directly support propositions 1 and 2 only. Proposition 3 which relates farmland value to productivity per acre is not directly supported, in that none of the significant variables relate to differences in the productive capacity between, for instance, dry farmland used for barley production and irrigated land used for higher value vegetable crops.

Clearly, population pressures have exerted a significant effect on farmland values. These results indicate that, for example, in Sacramento County an increase in population density of one person per square mile will increase expected farmland values by $5.91 per acre. In percentage terms, a one percent increase in density would, on average, lead to a 5.8 percent rise in farmland values in SMSA counties.

Finally, in accordance with the classical theory of economic rents, if the supply elasticity of land is not infinity then increases in taxes result in increased production costs, lower producer's surplus, and lower land values. This analysis suggests that a decrease in the tax rate of one dollar per one hundred dollars assessed valuation will lead to a $244 per acre increase in farmland values.

The set of statistically significant variables in the rural regression proved to be somewhat different. The following three variables were found to be significant at the .05 level or above:

a) population density

b) percent of farmland on which crops were harvested

c) value of farm sales per acre.

A fourth variable, average farm size, was found to be significant at the .10 level. A fifth, change in population density, was significant at the .20 level, while the remaining variable, the real estate tax rate, was not significant even at the .50 level. As expected, both population and productivity measures are significant variables explaining inter-county variations in land values. That is, the signs and statistical significance of the estimated coefficients support propositions 1, 3, and possibly 4.

Surprisingly, the effects of the tax rate (ceteris paribus) on farmland values was not significantly different from zero. To the extent that conditions conform to the classic Ricardian case of property taxes simply reducing land rents on a perfectly inelastic supply of farmland, differences in property tax rates should directly affect farmland values. By reducing the annual stream of rents, a tax reduces the capitalized value of the farmland. While not perfectly inelastic, the supply of farmland in rural counties would seem relatively inelastic due to the absence of alternative uses in most cases. In order to be consistent with Pasour's hypothesis, a large proportion of reductions in the tax rate should be capitalized into higher land values, but this does not appear to be the case (Pasour).

It may be that the tax rate and land values are both positively related to a third variable, such as population density. To the extent that average tax rates increase as the result of demand for municipal services, the positive effect of increased population pressure on both tax rates and farmland values may overshadow the negative effect of taxes on land values.

A second possible explanation relates to the preferential property tax treatment available to some California farmland under the California Land Conservation Act of 1965 (Williamson Act). The preferential treatment of farmland in some counties through reduction in assessed values for tax purposes may sufficiently distort the average tax rate variable used, which averages farm with nonfarm property, to overshadow the tax effects on land values.

Summary and Implications

The most important implication of the above findings is that farmland values in SMSA counties within California are determined by factors largely unrelated to the productivity of the land for agriculture. The determining factors are population density, population growth, the property tax rate, and the proportion of farmland used for harvested crops. The effects of cropland productivity differences were not found to significantly influence county farmland values.

The "insignificance" of the value of farm production in the urban regression is surprising in that these SMSA counties include some the most highly productive agricultural areas in the state, including Fresno, Kern, Monterey, Riverside, San Joaquin, and Stanislaus counties, all of which ranked in the top 11 counties nationally in the total value of agricultural products sold in 1974. Together, the 24 SMSA counties accounted for 64.5 percent of the total value of 1974 California agricultural production. The regression results suggest that the value of this production is overshadowed by population pressures and tax rates as determinants farmland values in these areas.

The traditional concept of farmland value as the capitalization of an income stream from agricultural production may no longer be valid if the value of the land is in fact not related to the value of agricultural production. If this is actually the case, future farmland values become a function of future urbanization and population growth patterns and may continue to deviate from the capitalized value of future agricultural production.

jma 8/7/78

FOOTNOTES

1/ Exceptions are various site or appraisal regression models (e.g., Craig and Mapp). These studies, are, however, incapable of studying proposition 1.

2/ Counties with less than five percent of total land area in farmland were omitted from the sample.

3/ Census estimates of farmland value reflect respondent estimates of market value for each farm studied, whether or not the property has recently changed hands.

4/ Two additional variables thought to be of specific importance in determining land values in California were added to the model. These variables were (1) the percent of total county farmland irrigated; and (2) percent of the total county area devoted to farmland. Neither proved to be statistically significant in the regression nor did they increase the value of $\bar{R}^2$.

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