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AN ANALYSIS OF FACTORS AFFECTING PARTICIPATION IN THE WISCONSIN FARMLAND PRESERVATION PROGRAM

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I. Introduction

In the last two decades most states have adopted programs designed to deter conversion of farmland to developed uses and to provide property tax relief to owners of agricultural land. Forty-five states employ use-value taxation which stipulates that eligible land be assessed according to its current use value rather than its highest market value. Under use-value taxation schemes, the potential tax savings are greatest at the urban fringe where the land's development value is often significantly higher than its use value. Yet, use-value programs are perceived to be least effective at the urban fringe.[1] In California, Carman reports that "use-value assessment has limited potential for preserving agricultural land in the face of significant development expectations" (1977, p. 278). Others (Barrows, 1974, Keene et al., 1976) conclude that use-value taxation--if used without restrictive land use controls--does not have a great impact on land preservation around urban areas.

The Wisconsin Farmland Preservation Program (WFPP) was established in 1977 to assist local governments in preserving farmland and to provide property tax relief to farmers enrolled in the program. Unlike other states' programs which employ use-value assessments as their primary policy instrument, the WFPP combines circuitbreaker tax relief, local planning, and exclusive agricultural zoning.

In the four years since the program's inception, local governments have rapidly developed agricultural preservation plans and adopted agricultural zoning ordinances. Also, in contrast to use-value programs, the WFPP has elicited a favorable response from farmers and local governments

in rural as well as urban counties. The success of the Wisconsin program raises three interesting policy issues. First, what factors influence local government's adoption of the program? Second, what program modifications might enhance overall as well as urban fringe participation rates? Third, is the Wisconsin experience with circuitbreaker tax relief, planning and zoning unique or could these tools be implemented in other states which want to control urban fringe land conversion?

In this paper, the analysis focuses on the identification and assessment of factors which influence towns' adoption of exclusive agricultural zoning in Wisconsin. Policy instruments and participation rates associated with planning and zoning options are discussed in the next section. In subsequent sections, a discrete choice model of towns' adoption of zoning is developed and estimated using a Probit maximum likelihood estimation technique. In the concluding section, the policy questions are addressed.

II. The WFPP: Policy Instruments and Participation

The design of the Wisconsin program reflects the criticisms levied on present use-value programs by Barrows and Keene in that eligibility for tax credits is tied to the adoption of restrictive controls and the use of contracts. In addition, eligibility requirements for program benefits are more restrictive in urban counties--where land conversion is perceived to proceed at a more rapid rate--than in rural counties. For the purpose of the WFPP, an urban (rural) county is defined as a county with population density greater (less) than 100 persons per square miles.

In urban counties, farmers can qualify for tax credits only if their land is subject to exclusive agricultural zoning by October 1, 1982.[2] Exclusive Agricultural Zoning (EAZ) ordinances are adopted and administered

in the same manner as regular zoning with two notable exceptions. The initial adoption of an EAZ in an urban county can be rejected for all towns if a majority of towns within the county reject the ordinance. In all counties in which an existing county zoning ordinance is amended to incorporate the exclusive agricultural use designation, the amendment automatically takes effect in each town unless the town board rejects it. Under certain conditions, towns may adopt zoning ordinances even if the county takes no action.

These zoning ordinances must meet specific minimum standards contained in the Wisconsin Farmland Preservation Act. Most importantly, ordinances must be consistent with the county plan. The EAZ must also restrict special exceptions and conditional uses to those specified in the Act (Section 91.75 (5)) and establish a minimum parcel size of 35 acres (Section 91.75 (1, 2, 6)).

Farmers in rural counties may qualify for tax credits if their town adopts exclusive agricultural zoning or if their county prepares a plan, their land is located in a designated preservation area, and they satisfy other requirements discussed below. Agricultural Preservation Plans outline county policies regarding farmland preservation and residential development and include maps identifying special environmental and farm preservation areas. To encourage county mapping efforts, the Act designates the Wisconsin Department of Agriculture, Trade and Consumer Protection to provide financial and technical assistance. The plans are not binding on landowners or the county. However, to qualify for tax credits under the planning option, landowners must sign a 10 to 25 year agreement not to develop their land. If urban counties prepare plans, farmers qualifying under the zoning option are entitled to larger tax credits.

In the WFPP, eligible farmers receive credits against their state income taxes which are based on the concept of circuitbreaker tax relief. If the property tax levy exceeds a specified percentage of income (i.e., "overloads" the farmer's income), the excess payment is refunded. The tax credit increases as property tax increases and decreases as household income increases.

The receipt of tax credits by landowners does not directly affect local property tax revenues and the direct costs of the program are shared by all residents of Wisconsin. However, if agricultural land assessments are based on market values, local property tax revenues may be reduced because of the program. When a Wisconsin landowner enrolls in the program, an argument can be made for assessing the land according to its agricultural use value since the land is not zoned for developed uses or is tied up in agricultural uses by a long term contract. This result suggests that the program provides benefits to participating landowners over and above use-value programs in other states.

In the first four years, the maximum tax credit schedule has been revised several times. Initially, the maximum tax credit was $2,600 for zero household income and $4,000 (or more) in property taxes. In 1978 the maximum tax credit increased to $4,200 for zero household income and $6,000 (or more) in property taxes. Also, the income factor was modified so that participants would receive greater tax credits for given levels of income and property taxes. In 1979, the income factor was again modified to increase the credit for most income and property tax levels. However, the maximum credit ($4,200) remained unchanged.

Through 1981, household income is defined as net farm income plus non-farm income, wages, and tips in excess of $7,500. On December 4, 1981, the Wisconsin legislature revised the income definition and the tax credit schedule. The budget bill eliminated the $7,500 non-farm earning deduction and added a deduction for farm business losses and depreciation in excess of $20,000. A 10 percent minimum tax credit is now available for farmers who are subject to agricultural zoning. To control the expected increase in total costs of the program, the structure of the tax credit schedule was also altered. The maximum tax credit schedule applicable for 1981 tax returns is presented in Table 1.

Farmers are eligible for 100 percent of the maximum credit if participation is based on zoning and planning, 70 percent for zoning in rural or urban counties, and 70 percent for planning in rural counties. In 1978, 633 thousand dollars was paid to participants in the Wisconsin program. In 1979, total payments increased to 3.4 million dollars. The average per farm credit payment in 1979 was 1,112 dollars (Johnson).

Through 1981, 60 of 71 Wisconsin counties had initiated planning projects or had certified preservation plans in effect. Ninety percent of Wisconsin farmland is situated in these sixty counties. In addition, 155 towns (12.2%) have implemented exclusive agricultural zoning ordinances and 14 counties have adopted exclusive agricultural zoning ordinances.

In contrast to use-value programs, farmers and local governments in urban Wisconsin counties have shown considerable interest in the WFPP. Fifteen of eighteen urban counties have certified preservation plans or expect to complete planning projects in 1982. Ninety-nine (36.3%) towns in urban counties have adopted agricultural zoning and eight urban counties

TABLE 1

MAXIMUM TAX CREDIT SCHEDULE

Household Income	Property Tax					
	$1,000	$2,000	$3,000	$4,000	$5,000	$6,000+
0 - $5,000	$ 900	$1,800	$2,500	$3,200	$3,700	$4,200
$10,000	$ 675	$1,575	$2,325	$3,025	$3,575	$4,075
$15,000	$ 360	$1,260	$2,080	$2,780	$3,400	$3,900
$20,000	0	$ 855	$1,755	$2,465	$3,165	$3,675
$25,000	0	$ 180	$1,080	$1,940	$2,640	$3,300
$30,000	0	0	0	$ 855	$1,755	$2,465
$35,000	0	0	0	0	$ 180	$1,080
$40,000	0	0	0	0	0	0

Source: Barrows (1981)

have approved exclusive agricultural zoning. The significantly higher adoption rate of agricultural zoning by towns in urban counties is a surprising development. The motivation to adopt agricultural zoning is discussed and evaluated in the next two sections.

III. A Discrete Choice Model of Participation

In the Wisconsin Farmland Preservation Program, the decision to adopt agricultural zoning is resolved by the town board. It is assumed that town board zoning decisions are generally reflective of the views of town residents. Hence, the ultimate decision to adopt EAZ will be largely influenced by the benefits and costs accruing to landowners as a result of zoning. The town's attitude toward and expertise with zoning will also influence the decision to adopt EAZ.

It is hypothesized that the town's adoption of zoning can be explained by the following relationship:

$$TZ = f(FARM, DEVELOPMENT, TAX\ CREDITS, ZONING) \quad (1)$$

whre TZ = 1 if zoning is adopted by the town (zero otherwise) and FARM, DEVELOPMENT, TAX CREDIT, AND ZONING refer to general categories of explanatory variables described below.

The dependent variable TZ corresponds to the status of exclusive agricultural zoning in the town as of December 31, 1981. It is probable that additional towns will subsequently adopt zoning after this date. Consequently, the specification of the participation model explicitly ignores the importance of lags in the adoption of a new innovation (the WFPP). This simplication -- which could be addressed in a model relating TZ_{ij} (i=town, J-year) to time series as well as cross sectional variables -- is justified by the limited duration of the WFPP.

The choice of specific variables in Equation 1 is suggested by landowner behavioral models developed elsewhere (Rose, Anderson). A brief description of these variables and a discussion of each variable's relation to TZ are provided below.

FARM FACTORS

PLF is the percentage land in the county in farm uses. When PLF is large, the town is more likely to pursue policies which provide benefits to the farm community. RPA is farm revenue per acre for the county. RPA is expected to reflect the intensity of support for and importance of farming in the local economy. Together, PLF and RPA represent proxies for the breadth and intensity of local government's commitment to the farm sector.

SQ is a dummy variable for soil quality which takes on values of 1, 2, 3, and 4. If SQ equals 1, at least 75 percent of the land in the town is classified as prime agricultural land. If SQ = 2, 50 to 75 percent of the land is prime, SQ = 3 implies 25 to 50 percent of land is prime and less than 25 percent is prime for SQ = 4. SQ provides additional differentiation between towns for a given county value of revenue per acre and percentage land in farms.

VAJR is the percentage of county residents which supported Assembly Joint Resolution number one (AJR-1) in 1974. This resolution allows differential tax treatment for farmers and its passage smoothed the way for the WFPP. Strong support of AJR-1 is expected to have a positive effect on the adoption of town zoning. However, there may be some difficulties with this variable. First, the resolution only approved a change in the uniform tax codes and didn't imply a specific program

instrument such as preferential taxation or agricultural zoning. A second problem with this variable is that many voters may not have understood the implications of the resolution (Beaupre).

DEVELOPMENT FACTORS

DEVT is one of three variables in the model which is a proxy for development pressure. From agricultural land sales between 1975 and 1979, the per acre value of land diverted to non-farm uses (VD) and the per acre value of land continuing in agriculture (VC) were calculated for each county if Wisconsin. The difference between VD and VC is the observed margin between market and use-value and represents the opportunity cost of WFPP participation. However, this measure overstates the expected value of the development option. Every landowner who decides to sell his land has only some probability of selling to development interests. A proxy for this probability is the percentage of agricultural land which is diverted to developed uses. DEVT is equal to the difference between VD and VC weighted by the percentage of land which is diverted. As DEVT increases in magnitude, the opportunity costs of program participation increases, and towns are less likely to adopt exclusive agricultural zoning.

ECD is the expected change in county density between 1980 and 2000. ECD should complement DEVT. Where DEVT reflects present development pressure, ECD is a proxy for future urban and rural demand for housing. For example, if ECD is equal to 50 persons per square mile, each additional person requires .0004 square miles (1/4 acre) for housing and public services and there are 500 square miles in the county, then an additional ten square miles of land will be required to meet increased

housing demand. If ECD is large, towns are less likely to tie up land in agricultural zones.

DIST is constructed to reflect the effect of distance from a town to a Standard Metropolitan Statistical Area (SMSA) on town zoning. One possible specification of DIST is the actual distance from the town to the SMSA. However, there is a major limitation to this specification. We would expect that if a town is very close to the nearest SMSA, it would be unlikely to adopt town zoning because the town would be a prime location for development. As the distance from the town increases, agricultural zoning is more desirable to protect farmland from urban encroachment. Beyond commuting distance from the SMSA, there is probably less need for restrictive controls because the cost of commuting tends to reduce the development value of farmland. Consequently the DIST variable is constructed to capture both of these effects. The actual distance between the town and the SMSA is substracted from 30 miles and the difference squared. As DIST increases, the motivation for zoning should decrease.

TAX CREDIT

TB is the average per acre property tax burden for farmland in each county. It is calculated as the net property tax payment per acre divided by average per acre farm income for each county. Because of the circuit-breaker formula, an increase in TB implies higher tax credits for farmers participating in the WFPP. Hence, as TB increases, landowners are more likely to favor zoning.

ZONING FACTORS

CA is a dummy variable which equals 1 if the county has approved exclusive agricultural zoning and equals zero otherwise. If the county ordinance is approved by the state, the town does not need to incur

additional costs to prepare a town ordinance. Once the county approves zoning, towns may be more likely to approve zoning if the town people rely on the county board to provide direction in the area of land use planning. There may also be ramifications if a town fails to adopt zoning and adjacent towns do: the town may experience more rapid growth because of reduced supply of development property in adjacent towns.

CZ is the percentage of towns in each county which have adopted comprehensive zoning ordinances. This variable reflects knowledge of and experience with zoning and planning techniques and procedures. A town with no prior experience with zoning may be reluctant to become involved with this new instrument. In addition, low values of CZ may reflect political opposition to land use controls.

Estimation Procedure and Results

The participation model to be estimated is summarized below by Equation 2. The "+" and "-" superscripts refer to the hypothesized sign on the coefficient associated with each explanatory variable.

$$TZ = f(\overset{+}{PLF}, \overset{+}{RPA}, \overset{-}{SQ}, \overset{+}{VAJR}, \overset{+}{TB}, \overset{-}{DEVT}, \overset{-}{ECD}\ \overset{-}{DIST}, \overset{+}{CA}, \overset{+}{CZ}) \qquad (2)$$

For purposes of estimation, the decision to adopt town zoning can be expressed as a linear function of the independent variables in Equation 2:

$$TZ = a + \underline{b}\,\underline{X} \qquad (3)$$

where a = constant

$\underline{b}$ = vector of coefficients (1×10)

$\underline{X}$ = vector of indepencent variables (10×1)

However, to ensure that all predicted values of TZ fall within the interval (0,1), the linear model can be transformed so that the dependent variable

is the probability that a town adopts zoning. Using the Probit specification (see Pindyck and Rubinfeld), Equation 37 can be transformed as follows:

$$P_i(TZ=1) = F(a + \underline{b}\ \underline{X_i}) \tag{4}$$

where P_i = probability that town i adopts zoning

$\underline{X_i}$ = independent variables associated with the $i^{\underline{th}}$ town

F = cumulative probability function for the standard normal distribution

As noted in the previous section, most of the explanatory variables (CZ, PLF, RPA, VAJR, TB, DEVT, ECD) are county averages which cannot be readily disaggregated for individual towns. Hence, the equation to be estimated is characterized by an errors-in-variables problem in that the true value of the explanatory variable (X_i^*) differs from the county average (X_i) by an error term (u_i). As a consequence, the estimated regression coefficients will be biased and inconsistent. The degree of bias and inconsistency will depend on the variance in measurement error (Pindyck and Rubinfeld). Although the errors-in-variables problem can be avoided by using a county-level model,[3] the present specification was retained to preserve the town-level character of the model.

A maximum likelihood routine was used to determine estimates of a and $\underline{b}$. The equation was estimated for a subset of Wisconsin towns because the WFPP prohibits towns from adopting zoning unless the county has prepared an agricultural preservation plan.[4] Hence, the appropriate equation is given by:

$$P_i(TZ=1)\Big|_{PP=1} = F(a + \underline{b}\ \underline{X_i}) \tag{5}$$

where $\Big|_{PP = 1}$ implies that the probability that a town adopts zoning is conditional on the county's preparation of a preservation plan. The maximum likelihood estimation coefficients and standard errors for Equation 5 are presented in Table 2.

As the number of observations increases, the ratio of the maximum likelihood estimate to the asymptotic standard error can be interpreted as a t-value. All estimate coefficients except $\hat{\hat{b}}_{VAJR}$, $\hat{b}_{DEVT}$, and $\hat{b}_{CZ}$ are significantly different from zero at the 5 percent significance level. Of the explanatory variables, only CZ and VAJR are not of the hypothesized sign. Both variables have coefficients which are not statistically different from zero.

The estimated coefficients can be more easily interpreted if we analyze the impacts of changes in the explanatory variables on the probability of town zoning. Since the marginal impact (ΔTZ) of a change in the explanatory variable (ΔX) depends on the probability before the change, values for the explanatory variables must first be specified in order to determine P_i. One possibility is to use sample means for the X's. However, if sample means are used, the value of P_i will be very close to zero. This result can be attributed to substantial differences between the mean values of CA, DIST, and SQ for towns which have and have not adopted zoning. Hence, we substitute alternative values for DIST and SQ and assume CA equals one. Except for changes in CA, all marginal impacts are calculated as follows:

$$\Delta P(TZ=1)\Big|_{PP=1,\ \underset{\sim}{X}} = f(a + \underline{b}\,\underline{\tilde{X}}) \cdot b_j \cdot X_j$$

where ΔP = change in probability of zoning from a baseline probability of 47.8%

TABLE 2

MAXIMUM LIKELIHOOD ESTIMATES OF THE COEFFICIENTS

VARIABLE NAME (DESCRIPTION)	ESTIMATED COEFFICIENT	STANDARD ERROR
Constant	- 8.5308	1.2472
PLF (Percentage Land in Farms)	.0227	.0105
RPA (Revenue Per Acre)	.0096	.0028
SQ (Soil Quality)	- .2308	.1144
VAJR (Vote on AJR-1)	- .0011	.0107
TB (Tax Burden)	.2477	.0303
DEVT (Development Variable)	- .0048	.0028
ECD (Expected Change in Density)	- .0153	.0026
DIST (Distance Variable)	- .0007	.0003
CA (County Adoption of Zoning)	1.9668	.2426
CZ (Comprehensive Zoning)	- .0017	.0039

TZ = 1 for 155 towns

Number of observations = 666

Log of the likelihood ratio = -177.05

f = marginal probability density function for a standard normal

$\underline{\tilde{X}}$ = sample means (or other values) for the explanatory variables

$\hat{b}_j$ = estimated coefficient of the $j^{\underline{th}}$ variable

ΔX_j = change in the $j^{\underline{th}}$ explanatory variable

The marginal impact on P(TZ=1) when CA=1 is equal to:

$$\Delta P(TZ=1)\Big|_{PP=1} = F(\hat{a} + \underline{\hat{b}}\,\underline{\tilde{X}}\Big|_{CA=1}) - F(\hat{a} + \underline{\hat{b}}\,\underline{\tilde{X}}\Big|_{CA=0})$$

The marginal change in town participation, specified values for the explanatory variables, and values for X_i are presented in Table 3.

V. Conclusions and Implications

From Table 3, we can draw several conclusions concerning the factors influencing town's adoption of exclusive agricultural zoning. Except for VAJR, the farm factors (PLF, RPA, and SQ) have a positive effect or the probability of zoning. A combined 10 percent increase in PLF and RPA increases the probability of zoning from 47.8 percent to 61.6 percent. Also, an increase in the percentage of prime land from 50-75% (SQ=2) to 75% or more (SQ=1) results in a 9.2% increase in the probability of town zoning.

The three development pressure variables are all negatively correlated with the adoption of town zoning. A combined 10 percent increase in DEVT, ECD, and DIST implies a reduction in the probability of zoning from 47.8 percent to 45.7 percent. At first glance, the effect of the development factors on town zoning appears to be negligible for the changes specified in Table 3. However, small changes in these variables do not adequately reflect more intense development pressure. For example, the

TABLE 3

CHANGES IN THE PROBABILITY OF TOWN ZONING

EXPLANATORY VARIABLE	SAMPLE MEAN or OTHER VALUE	$(+\Delta X_i)$	Change in P(TZ = 1)
PLF (Percentage Land in Farms)	68.4%	6.8%	+.061
RPA (Revenue Per Acre)	$202.32/Acre	$20.23/Acre	+.077
SQ (Soil Quality)	2.0	1	-.092
VAJR (Vote on AJR-1)	55.4%	5.5%	-.002
TB (Tax Burden)	16.9%	1.7%	+.168
DEVT (Devt. Variable)	$35.6/Acre	$3.56/Acre	-.007
ECD (Exp. Change in Density)	15.2 person/sq mi	1.52 person/sq mi	-.010
DIST (Distance Variable)	150 (42 or 18 mi)	15 ($\approx$ 4 mi)	-.004
CA (County EAZ)	1	1	+.456
CZ (Comprehensive Zoning)	65.2%	6.5%	-.004

mean values of DEVT and ECD are $50.76 per acre and 19.7 persons per square mile but range as high as $2,500 per acre and 344 persons per square mile. Hence, in areas with intense development pressure, the probability of zoning is likely to be significantly attenuated. Agricultural zoning appears to be most effective just beyond the urban fringe where the local farm economy is strong and where development pressure is present but less intense than in areas nearer to urban settlements.

The variable TB is an important factor in explaining the adoption of zoning. A 10 percent increase in TB is associated with an increase in the probability of zoning of 16.8%. Since the tax credit increases as TB increases, changes in the tax credit formula might be expected to have a similar effect on the probability of zoning as changes in the tax burden. Changes in the tax credit schedule which increase landowner benefits are likely to encourage towns to adopt zoning. Yet the costs of doing so will not severely impact taxpayers; currently the annual cost of the WFPP is less than one dollar per capita.

The most important factor in explaining town's adoption of zoning is the adoption of a county EAZ. County action limits the town's costs associated with adoption of a zoning ordinance and conveys greater benefits to landowners (assuming the Preservation Plan has been approved). The involvement of county government is an important development in farmland preservation legislation.

The WFPP and its associated policy instruments, while effective in Wisconsin, is not necessarily the appropriate approach for other states to pursue. Other states and local governments may want to examine their own agriculture-development milieu more thoroughly and consider the following issues.

First, what levels of government are familiar with traditional planning and zoning tools. Are local governments likely to have the resources neccessary to inventory critical farm areas or will state financial or technical assistance be required. Are landowners likely to be ideologically opposed to the implementation of zoning.

Second, what is the nature of development pressure in the state. Wisconsin is not a state which is experiencing rapid growth. In places such as the Sun Belt and California there is likely to be opposition to mandatory controls which limit development options. However, local governments may see agricultural zoning as a way to manage growth in public services and limit property tax increases.

Third, who are the owners of the farmland. In Wisconsin, over 70 percent of the farmland is owned by owner-operators. Most farmland is employed in agricultural activities, and most of the farms are under 200 acres. The design of the tax credit (or other incentive) structure should be consistent with ownership characteristics.

Finally, local and state governments should have a sense for the willingness of urban and commercial taxpayers to share the burden of farmland preservation efforts. Under use-value taxation, the burden is limited to property owners in the local tax jurisdiction. However, the fiscal burden under alternative tax credit approaches will be distributed more widely. Even though the WFPP has realized high participation rates at low annual per capita costs, many people are unwilling to shoulder any additional public expenditures, however small.

DATA SOURCES

TZ and CA were obtained from the Farmland Preservation Unit in Madison. These variables are updated to December 31, 1981.

PLF is based on estimated land in farms and total land area for each county. The farmland estimate is from 1978 Census of Agriculture (preliminary data), Wisconsin Agricultural Reporting Service, Madison (1980). County land area is from 1977 Wisconsin Blue Book, Wisconsin Department of Administration, Madison.

RPA is based on preliminary census data on gross revenue from agricultural activities and estimated land in farms, 1978 Census of Agriculture.

VAJR is from 1975 Wisconsin Blue Book, Wisconsin Department of Administration.

CZ is based on the results of a telephone survey conducted by Joe King of the Wisconsin Department of Natural Resources in 1976.

DEVT is from Agricultural Land Sales by Counties, Wisconsin, Wisconsin Statitistical Reporting Service, 1977 - 1980.

ECD is based on population projections to the year 2000 for Wisconsin counties contained in Wisconsin Population Projection, Document No. BPM-IS-75-6, Wisconsin Department of Administration, Madison (1975) and 1980 Population census estimates (preliminary).

SQ is determined by superimposing a unique farmland map from Wisconsin's Farmland Preservation Program, ADFP-59, Wisconsin Department of Agriculture, Trade and Consumper Protection, Madison (1980) on a state map.

TB is composed of average property tax payment/acre on agricultural land in each county and farm income/acre. The tax data is from Property Tax-1978, Bulletin No. 478, Wisconsin Department of Revenue (1979). Farm income/acre is estimated from the preliminary 1978 Census of Agriculture. For each county, total production costs were subtracted from the value of agricultural products sold and divided by farm acreage. Total production costs include livestock and poultry purchases, purchased feeds, animal health, seed and plants, commercial fertilizer, agricultural chemicals, hired, contract and custom labor, energy costs, depreciation on machinery and equipment (20%) and estimated interest payments (1% of per acre full value property values).

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FOOTNOTES

1. In general, it is difficult to isolate the impact of public policies on the outcome of landowner decisions. Most researchers are hesitant to draw conclusions about the number of acres saved from development because of the problem of Instead, inferences of the effect of preservation programs are drawn from observed program participation rates.

2. There is also a voluntary contract program which expires in September, 1982.

3. The county-level share of towns adopting zoning can be used as the dependent variable. Town-specific explanatory variables are then averaged or omitted. The county equation can then be estimated using Probit or Logit. Approaches to correct the errors-in-variables problem while retaining the town-level character of the model did not prove to be superior to the present specification.

4. In some instances, only a county EAZ is required before towns can adopt agricultural zoning. However, the Act states that all EAZs should conform to county plans. In addition, all counties which have approved EAZ have also prepared plans.