A Logit Analysis of Right-to-Farm Conflicts

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ABSTRACT

This paper analyzes survey data on farmer *worry* and actual *effects* for right-to-farm conflicts in New Jersey via logit models. Findings reveal that farm operation characteristics are more strongly linked to land use conflicts than either farmer characteristics or urban pressure.

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Introduction

Population growth in nonmetropolitan areas since the late 1960s has significantly altered many formerly rural communities. Two interrelated concerns linked to this process are loss of farmland and increased agricultural land use conflicts. Public policies designed to counteract the loss of farmland are well known and are usually referred to as farmland preservation. However, the right-to-farm statutes or programs that have been developed to help mitigate the impact of land use conflicts on agriculture have received relatively scant attention even though such laws have been adopted by 47 states since 1978 (Hand, Lapping et al.).

The land use conflicts addressed by right-to-farm policies include spillover effects supposedly generated by newcomers to rural areas. For example, nonfarmers (including rural and suburban residents and industrial establishments) may attempt to restrict or eliminate certain agricultural practices because they find them offensive (e.g. livestock odors), consider them nuisances (e.g. irrigation machinery noise), think they are dangerous (e.g. aerial pesticide spraying), or because they plan other uses for local land (e.g. zoning for residential development) (Lapping et al.; Lisansky, 1986a; Thompson). Restrictive local ordinances are often adopted which limit or prohibit certain types of agricultural activities, such as livestock raising or roadside marketing. In addition, trespass and vandalism of farms is a conflict of growing proportions (Lisansky and Clark). Most right-to-farm statutes try to mitigate these conflicts. Some statutes try to alter nuisance law to minimize law suits against farms while others recommend negotiation

of the disputes by a third party (Lisansky and Clark).

Although frequently mentioned, there is relatively little reliable empirical evidence on the determinants of those agricultural land use conflicts associated with the right-to-farm issue or the most effective ways of mitigating them. The purpose of this paper is to examine the occurrence of these conflicts, the characteristics of the farmers, farms, or communities involved, and the extent to which these indirect effects are correlated with urbanization.

Determinants of Right-to-Farm Conflicts

The types of land use conflicts considered here are generally portrayed in the literature as a byproduct of urban pressure (Berry; Coughlin et al.; Thompson, Jr.). The most direct and final consequence of urban pressure on agriculture is the conversion of land from rural to urban uses. Prior to land conversion, however, there are a number of transitional consequences usually referred to as "the indirect effects of urbanization" (Berry, Coughlin et al.). Indirect effects include the declining political status of farmers, loss of critical mass, spillover effects, and various forms of land speculation.

This literature clearly indicates that the characteristics of the community where the farm is located are relevant in determining right-to-farm conflicts. Specifically, it is suggested that fewer conflicts occur in either rural or urban communities whereas rural communities experiencing growth and development can be expected to have more right-to-farm disputes. That is, more indirect effects of urbanization occur in locations in transition from rural to urban.

Apart from community characteristics, two other types of factors ap-

pear relevant to conflicts: characteristics of the farmer and farm enterprise characteristics. A great deal of research supports the proposition that certain farmer traits such as age, experience, and educational level affect farmer perceptions, decision-making and productivity. The literature also supports the proposition that certain agricultural enterprises are less compatible with urbanization. The majority of legal precedents discussed in Hand's legal review of right-to-farm statutes refers to litigation involving livestock producers. Lopez, Adelaja, and Andrews found that the effects of urbanization vary a great deal across enterprise types, with vegetable producers benefiting the most and livestock producers being the most adversely affected.

Size can also be expected to have an impact on land use conflicts. While smaller farms might be expected to experience less conflict in general, they might also lack investment in some kinds of technology which specifically control externalities, such as odor or run-off. Preliminary research also suggests that larger more commercial operations are more concerned with the possibility of adverse effects of land use conflicts and less willing to compromise once involved.

Data and Analysis

The data used in this analysis were collected via a mail survey for a study of the regulatory environment of New Jersey agriculture (see Lisansky, 1986b for details). The survey data were merged with secondary data on community characteristics. The survey questionnaire included questions relevant to agricultural land use conflicts. Three issues were selected for this analysis to represent the most commonly discussed right-to-farm issues:

(1) conflicts about agricultural nuisances, (2) restrictive local ordinances, and (3) trespass and vandalism. Two types of questions pertaining to the conflicts were utilized. The first asked only if the issue worried or concerned the farmer the farmer (yes/no). The second asked for information on specific negative impact of the issue on the operation.

For nuisances, the respondents were asked whether or not they had ever received a complaint, warning, citation, or fine for livestock nuisances or agricultural noise, odors, dust or blowing debris. For local ordinances and trespass and vandalism they were asked if the problems had resulted in any financial costs for their farm operation. These two types of questions provide a perceptual dimension related to worry and an empirical dimension associated with self-reported estimates of actual effects.

The survey questionnaire was mailed to a randomly selected sample of approximately one-fourth (2,000) of the state's farmers. The response rate was 66 percent (1,327), with 860 usable for this analysis.

Twelve explanatory variables were selected to represent farmer characteristics, farm operation characteristics, and community characteristics. The farmer characteristics analyzed were age, percent of household income from farming, and farm family background. Education data proved inadequate for use. Two dimensions of the farm operation were analyzed: enterprise type and farm size. Community characteristics most relevant to this analysis were those related to urban pressure and the changing nature of urban fringe communities. The three variables used were population density, population growth, and state designated community-type descriptors for municipalities.

Location codes from the survey were used to merge survey data with

municipal level demographic data from the New Jersey Legislative District Data Book published by the Bureau of Government Research at Rutgers University. Population density was measured as municipal population density in 1980 and population change was the percentage change in municipal population between 1980 and 1984. A categorical variable classification for suburban community (Suburban) from the municipal data set was used to characterize the community type of respondents based on municipal codes from the survey.

The survey responses regarding worry and effect about nuisance complaints, ordinances, or trespass and vandalism can be coded as binary (0-1) variables. For example, a variable describing worry about nuisance complaints can be denoted as Y_i and Y_i will equal 1 if the i^{th} farmer responded positively to the survey question asking whether a nuisance complaint had been received and 0 otherwise. The determinants of any dependent variable, Y_i, can be analyzed by means of logit analysis using the following relationship:

$$Y_i = \sum_j X_{ij}\beta_j + U_i$$

where X_{ij} is a set of m variables (j=1,$\cdots$,m) describing community, farmer, or farm enterprise characteristics associated with the i^{th} farmer and β_j is the j^{th} coefficient to be estimated. β_j shows the effect of the j^{th} determining factor on the dependent variable, Y_i. The error term, U_i, is assumed to be distributed according to a logistic cummulative distribution (Maddala). The β_j coefficients were estimated via maximizing the likelihood function for Y_i, utilizing a SAS language algorithm. The estimated coefficients reflect the effect of a change in a given independent variable on $ln[P_i/(1-P_i)]$

where P_i is the probability that the i^{th} respondent will respond affirmatively. The coefficients thus measure the effect of a given change on the natural logarithm of the observed odds ratio for $Y_i = 1$.

Results

The estimated coefficients for the logit models explaining *worry* and actual *effect* for the nuisance, local ordinance, and trespass and vandalism categories are reported in Table 1. The results for the three farmer characteristics indicate that older farmers are *less* likely to be bothered by right-to-farm conflicts. This pattern was most evident with respect to the relationship between age and overall worry about right-to-farm conflicts. The age variable was significant in the model explaining actual effects of vandalism. Thus, it appears that not only are younger farmers more concerned about right-to-farm issues, but their operations are more vulnerable to financial losses due to trespass and vandalism. The results also suggest (although the relationships have a low level of statistical significance) that coming from a farm background predisposes a farmer to be more concerned about all right-to-farm issues while it simultaneously reduces the probability that the operation will actually be affected by vandalism and ordinance related issues.

Unexpectedly, the farm operation characteristics demonstrated the strongest relationships of any of the three categories of determinants for both worry and actual effect of right-to-farm conflicts. Size is significant at the 5-percent level as a factor determining worry and actual effect for the nuisance and vandalism categories. Thus, larger farms are more worried and report more actual effects of nuisance conflicts and trespassing and van-

dalism than smaller farms. Furthermore, the impact of size on worry is larger in absolute value than the impact of size on actual effect. The more commercialized sector (i.e., the larger farms) of the agricultural community appears to be the most concerned and affected by right-to-farm issues.

Enterprise type, as predicted by the literature, also plays an important role in determining worry and negative effects of right-to-farm issues. The nursery categorical variable was deleted from the empirical model to avoid perfect multicollinearity. Thus, as can be seen in Table 1, vegetable, field crop and livestock producers are significantly more likely to worry the about nuisance complaints as compared to nursey owners. Fruit and field crop producers are significantly more likely to be worried about trespass and vandalism, and as expected, livestock operations with their odors, dust and noise, and field crop producers are significantly more likely to receive a nuisance complaint than a nursery operation.

The most interesting finding is that, overall, the assumption that right-to-farm issues are strongly linked to by urban pressure is largely not supported by this analysis. Both municipal population density and the percentage change in population between 1980 and 1984 were *not* significantly related to the probability that a farmer is worried or affected by a right-to-farm issue. Residing in a "suburban" municipality also does *not* appear to be a significant factor determining worry or actual effect except in the nuisance category where it is significantly related (at the 5 percent level) to actual effect but not to concern.

These results show that some of the commonly used measures of the degree of urbanization at the municipal level failed to explain whether or not a given farmer is more likely to be worried or actually affected by three kinds

of right-to-farm issues. Only in the case of nuisance complaints against farms did any of the community characteristics appear to play a role. Even in this case, it was the more qualitatively derived characterization of the communities as "suburban" rather than their population density or growth rate which determined whether or not their farmers would be more likely to receive a nuisance complaint or action. In other words, farmers located in municipalities designated as "suburban" were no more likely than farmers located in other areas to worry about receiving a nuisance complaint even though they were significantly more likely to receive a complaint.

Concluding Comments

Previous studies indicated that right-to-farm conflicts were determined primarily by urban pressure, but the findings suggest that the issue is more complicated. The results only provide partial support for the link between conflicts and community characteristics. Farmers located in suburban communities *are* significantly more likely to experience adverse effects of nuisance actions. Interestingly, the suburban farmers were no more likely to worry about nuisance issues than farmers in other types of communities.

While reverse migration into rural areas does appear to contribute to nuisance issues, other previously ignored factors also play a role in the broader set of right-to-farm conflicts. Some farmer and enterprise characteristics determined the likelihood that a farmer would worry or be affected. Among the most interesting was the finding that larger farmers were more likely to be concerned and affected by nuisance actions and more likely to report effects of trespass and vandalism. Therefore, it can tentatively be concluded that right-to-farm issues differentially impact commercial agri-

culture independent of locational factors.

The question still remains as to why right-to-farm issues are on local and state policy agendas throughout the nation when most of the academic debate about them has been cast in terms of urban pressure. A more complex explanation is needed which includes national, political and ideological factors. The findings are consistent with Lisansky's (1986a) proposal that right-to-farm must also be viewed as a symbolic attempt to revitalize the historical concept of agriculture's special role in, and relationship to, the larger society. Right-to-farm laws were created partly to help allay a variety of anxieties generated by the changing structure of agriculture and the general public perception of what Paarlberg, and Stockdale have labeled as farming losing its uniqueness in American society. Therefore, the popularity of right-to-farm laws must be understood in the context of a more general transformation of American agriculture which includes but is not confined to, the effects of urbanization. More research is needed both to better comprehend the deynamics of right-to-farm conflicts and to improve the effectiveness of these programs.

Table 1: Estimated Coefficients for Logit Models Explaining Concern and Actual Effect of Right to Farm Conflicts

Independent	Nuisance		Ordinances		Vandalism	
Variables	Worry	Effect	Worry	Effect	Worry	Effect
Intercept	-0.531*	-1.926**	0.906**	-1.223**	0.566*	-0.598*
	(.303)	(.395)	(.303)	(.398)	(.325)	(.323)
Age	-0.009**	-0.007	-0.010**	-0.005	-0.010**	-0.010**
	(.004)	(.005)	(.003)	(.005)	(.004)	(.004)
Parttime	-0.241	-0.335	-0.012	-0.175	-0.183	-0.120
	(.168)	(.208)	(.172)	(.224)	(.190)	(.181)
Farm Background	0.060	0.209	0.218	-0.778	0.415**	-0.041
	(.168)	(.220)	(.167)	(.224)	(.173)	(.179)
Fruit	0.360	0.179	0.496	0.583*	0.818**	0.558*
	(.303)	(.407)	(.318)	(.347)	(.359)	(.307)
Vegetables	0.617**	0.253	0.203	-0.752**	0.101	-0.195
	(.240)	(.325)	(.239)	(.369)	(.247)	(.268)
Field Crops	0.445**	0.545*	0.191	-0.203	0.484**	0.226
	(.215)	(.285)	(.210)	(.278)	(.225)	(.225)
Livestock	0.442**	0.806**	0.161	0.019	0.345	0.103
	(.214)	(.280)	(.208)	(.271)	(.217)	(.226)
Size	$6.9(10^{-4})$**	$5.6(10^{-4})$**	$3.5(10^{-4})$	$5.1(10^{-4})$	$1.6(10^{-3})$	$8.9(10^{-4})$**
	$(2.8(10^{-4}))$	$(2.7(10^{-4}))$	$(2.9(10^{-4}))$	$2.9(10^{-4}))$	$(5.2(10^{-4}))$	$(2.8(10^{-4}))$
Population Density	$8.1(10^{-5})$	$8.7(10^{-5})$	$-1.1(10^{-4})$	$1.2(10^{-4})$	$-1.5(10-5)$	$1.5(10^{-4})$
	$(9.1(10^{-5}))$	$(10.9(10^{-5}))$	$(9.2(10^{-5}))$	$(1.0(10^{-4}))$	$(9.6(10^{-5}))$	$(.9(10^{-4}))$
Population Change	0.011	0.014	-0.004	-0.028	0.018	0.006
	(.013)	(.016)	(.013)	(.019)	(.014)	(.013)
Suburban	0.166	0.479**	-0.109	0.036	0.244	0.006
	(.161)	(.198)	(.162)	(.215)	(.175)	(.172)
Chi Square (model)	30.75	29.96	18.44	22.90	54.76	30.16

Note: Standard errors are in parentheses below estimated coefficients. Single and double asterisks indicate significance at the $\alpha = .10$ and 0.05 levels, respectively.

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