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**A Valuation of Public Demand for the Participation of Nongovernmental Agencies in
Monitoring and Enforcing Food Safety Regulations**

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Abstract:

Lack of consumer trust in governmental food safety regulators hinders the promotion of consumer confidence in the safety of their food supply. One possible way to boost consumer trust is to allow nongovernmental agencies to participate in monitoring and enforcing food safety regulations. This study identifies factors affecting consumer desire for the participation of nongovernmental agencies. The information obtained from this study can be used in further valuation of the feasibility of the participation of nongovernmental agencies.

Key Words: nongovernmental agencies, food safety regulations.

I. Introduction

Food safety regulations, as an imposition of public interests on food commercial systems, are formulated to protect consumer health against food-borne risks and hence promote consumer confidence in the safety of their food supply (Henson). For food safety regulations to effectively promote consumer confidence in their food markets, it is essential for consumers to trust the agencies formulating and enforcing the regulations.

In the United States, food safety regulations are formulated and enforced by governmental administrative agencies. Unfortunately, public trust in the food safety regulators seems to be weak (Henson; Macfarlane; Mitchell and Scott; Schutz, Bruhn, and Diaz-Knauf). In the past decade, a series of well-publicized incidents of food poisoning has aroused public concerns about the safety of their food supply, and food safety has become the number one concern of American consumers (Adams). The food poisoning incidents may have shaken consumers' confidence in the adequacy and enforcement effectiveness of food safety regulations and heightened public distrust in food safety regulators. In addition to food poisoning incidents, consumers can recount examples of perceived cover-ups by governmental administrative agencies (Henson). Such perceived cover-ups can damage consumer trust in food safety regulations and lead to consumer suspicions over the intent and motives of food safety regulators.

Trust takes time and efforts to build but can be easily lost (Slovic). Further, once distrust has arisen, it tends to persist for a long time and reinforce new distrust (Henson). This has a serious consequence because lack of trust is a block to good risk communication (Covello; Frewer et al.) In the United States, the profound impact of distrust in governmental administrative agencies is evidenced

by consumers' reaction to the FDA's approval of food irradiation, when some consumers indicated that the approval would increase their concerns over food irradiation (Henson; Schutz, Bruhn, and Diaz-Knauf). Such effects of distrust may cause market failure and efforts should be made to boost consumer confidence. A logical argument is that if consumers have lost their trust in governmental agencies in formulating and enforcing food safety regulations, then, participation of nongovernmental agencies may help to boost their confidence. This study explores factors affecting consumer desire for the participation of nongovernmental agencies in the monitoring and enforcement of food safety regulations, aiming to gain information useful in boosting consumer confidence.

II. Econometric Model

Consumer desire for the participation of nongovernmental agencies is elicited using a dichotomous choice question, asking respondents whether it is necessary for nongovernmental agencies to participate in the monitoring and enforcement of food safety regulations. Assuming the probability that a respondent gives a "yes" or "no" answer is determined by a vector of observed variables, then, we can form a probability model. Further, the binary nature of the data warrants the use of a binary choice model and probit regression analysis is applied in this study. Following standard practice, the probit regression is specified as:

$$\begin{aligned} \text{prob}(y_i = 1) &= \Phi(\mathbf{a} + \mathbf{b}'x_i) \\ \text{prob}(y_i = 0) &= 1 - \Phi(\mathbf{a} + \mathbf{b}'x_i) \end{aligned} \quad (1)$$

where y_i is an indicator variable which is assigned a value of one if the i^{th} respondent thinks it is necessary for nongovernmental agencies to participate, zero otherwise; $\Phi(\cdot)$ is the cumulative

distribution function (cdf) of the standard normal distribution; \mathbf{x} is a vector of explanatory variables and \mathbf{b} is a vector of parameters to be estimated; and \mathbf{a} is the coefficient on a constant variable.

Probit models are frequently estimated using the maximum likelihood method. The log-likelihood function can be expressed as:

$$\ln L = \sum_{i=1}^N \{y_i \ln \Phi(\mathbf{a} + \mathbf{b}x_i) + (1 - y_i) \ln[1 - \Phi(\mathbf{a} + \mathbf{b}x_i)]\} \quad (2)$$

where N is the total number of observations of the sample. The parameter estimates can be obtained by maximizing the log-likelihood function with respect to \mathbf{a} and \mathbf{b} .

III. Data and Empirical Model

The data used in this study are collected from a nationwide telephone survey of US consumers. The survey was primarily designed to assess consumers' perceptions of, attitudes toward, and WTP for beef irradiation. The survey instrument was designed by a group of agricultural economists and survey design experts. The survey was conducted by the University of Georgia Survey Research Center between December 1999 and January 2000. Following a pretest of the survey instrument, telephone interviews were conducted with 740 respondents selected from a random digit-dialed sample. In order to enhance the reliability of the information gained from the survey, primary grocery shoppers of the households were requested to answer the survey questions.

A set of questions was included in the survey to obtain information on consumer perceptions of the adequacy and enforcement effectiveness of food safety regulations and their desire for the participation of nongovernmental agencies in monitoring and enforcing food safety regulations. The

survey results show that public confidence in the adequacy and the enforcement effectiveness of the food safety regulations is very weak. Only 15% of the respondents think that the current food regulations are both adequate and effectively enforced. About 24% think that the food safety regulations are neither adequate nor effectively enforced. More than 46% believe the regulations are adequate, but not effectively enforced. Less than 6% think the regulations are not adequate, but are effectively enforced.

Demand for the participation of nongovernmental agencies in monitoring and enforcing food safety regulations are surprisingly strong. About 75% of the respondents indicate that it is necessary for nongovernmental agencies to get involved in the task, while only 19% think it is unnecessary.

A probit model is specified to explore factors affecting demand for the participation of nongovernmental agencies. Table 1 presents definitions and means of the explanatory variables. Older consumers in the United States tend to trust authorities more than younger consumers do (Hunter). We therefore included the variable “age” in the model as an explanatory variable and expected it to be inversely related to the probability of demanding the participation of nongovernmental agencies.

Education is commonly considered to be able to increase people’s ability to gain knowledge and acquire information. Consumer knowledge about food safety regulations and their enforcement may affect consumer trust in food safety regulators and hence their desire for the participation of nongovernmental agencies. Based on this concept, respondents’ education level is assumed to be a factor affecting consumer demand for the participation of nongovernmental agencies. We assign a dummy variable to white respondents because it has been reported that there is an information acquisition difference between white and nonwhite people (United States Department of Health and

Human Services). In the United States, women are typically more concerned about food safety than men because they are often responsible for food and health issues within the household (Steger and Witte). To capture the impact of task assignment within the household, we assign a dummy variable to female respondents. Household income may seem to be unrelated to a person's desire for the participation of nongovernmental agencies in monitoring and enforcing food safety regulations. But, apart from its monetary value, income may be an indicator of personal ability and other characteristics and thus is included in the model. Together with a set of demographic variables, food consumption experience and confidence in current food safety regulations are included in the model as explanatory variables. A dummy variable is assigned to those who had been sick from meat consumption. Respondents who consider the current food safety regulations to be both adequate and effectively enforced are assigned a dummy variable. To capture the effect of lack of confidence in the current food safety regulations, we also assign a dummy to those who think the current regulations are neither adequate nor effectively enforced.

IV. Results

Because some respondents did not provide useful answers to several questions, only 704 observations were used in the estimation. The model was estimated using the maximum likelihood method and the estimation results are presented in table 2. The results show that age has a negative effect on consumer demand for the participation of nongovernmental agencies in monitoring and enforcing food safety regulations. In the United States, older people are believed to be more trustful in authorities (Hunter). It could be that older people are more trustful in the willingness and ability of government to ensure that the food safety regulations are adequate and effectively enforced, and hence

they are less likely to consider the participation of nongovernmental agencies necessary.

Female respondents tend to consider the participation of nongovernmental agencies necessary. Females are more concerned about food safety (Steger and Witte) and are more likely to emphasize the importance of food safety in grocery shopping (Lin). Being concerned with current food safety implies lack of confidence in the current food safety regulations, which are set and enforced by governmental administration agencies. Hence, females are more likely to desire the involvement of nongovernmental agencies to ensure that the food safety regulations are adequate and effectively enforced.

Those with an annual income of more than \$75,000 are less likely to consider it necessary to have nongovernmental agencies get involved. Some researchers think that income means more than capacity to pay or ability to earn money, and it may indicate human capital beyond that given by formal education (Ippolito and Mathios). High income may in a way implies confidence, self confidence and confidence in others, possibly including government's intent and ability to set and effectively enforce food safety regulations. Being more confident in current food safety regulations implies less desire for the involvement of nongovernmental agencies.

Consistent with our expectation, the positive perception that the current food safety regulations are both adequate and effectively enforced is inversely related to desire for the participation of nongovernment agencies. On the other hand, the negative perception that the current food safety regulations are neither adequate nor effectively enforced heightens the desire for the involvement of nongovernmental agencies.

The results indicate white people are less likely to demand the participation of nongovernmental

agencies. The effect of ethnic status may be due the difference in media exposure between white and nonwhite people. White people in the United States are reported to have a higher newspaper and magazine readership than nonwhites (United States Department of Health and Human Services). They may be more knowledgeable about the content of food safety regulations and the efforts made to effectively enforce the regulations, and thus are more trustful in the intent and ability of governmental agencies to ensure the safety of their food supply.

Two variables were not found to have the expected effects. Education was expected to reduce consumer demand for the participation of nongovernmental agencies. More educated people may be more knowledgeable about food safety regulations and the efforts governmental agencies made to ensure the regulations are adequate and effectively enforced, and they are less likely to believe in such rumors as government and corporate conspiracy regarding food safety. However, education was not found to have a statistically significant effect. Another variable not found to have the expected effect is consumption experience. We expected the negative consumption experience of getting sick from eating meat to increase consumer desire for the participation of nongovernmental agencies because such experience may hurt consumer trust in or even cause prejudice against food safety regulators. Although the estimated coefficient on the variable “sick” bears the expected sign, it is not statistically significant at commonly accepted level.

V: Concluding Remarks

Consumer distrust in food safety authority has reached such an extent that the approval of food irradiation by the FDA even increased consumer concerns about the food processing technology (Henson; Schutz, Bruhn, and Diaz-Knauf). Lack of trust in government authority is a big obstacle for

the mechanism of food safety regulation to function well and realize its goals, especially a serious obstacle to the promotion of consumer confidence in the safety of their food supply. To overcome the obstacle, efforts should be made to boost consumer trust in food safety regulators.

Building up consumer trust is a challenging task requiring time, efforts, and a good strategy. Conceptually, since consumers do not trust responsible government agencies, allowing nongovernmental agencies to take part in the monitoring and enforcement of food safety regulations may be an effective way to boost their trust. This is surely a big issue entailing a careful feasibility valuation. But the valuation of the feasibility of the participation of nongovernmental agencies requires careful consideration of many factors. To begin with, we need information on consumer perception of the desirability of the participation of nongovernmental agencies. After all, if consumers do not consider it necessary, then, involvement of nongovernmental agencies may not boost their trust.

This study has found that consumer desire for the participation of nongovernmental agencies is strong. Strong consumer desire means the public trusts nongovernmental agencies and implies that involvement of nongovernmental agencies in the monitoring and enforcement of food safety regulations may effectively increase consumer confidence in the mechanism of food safety regulation.

This study has also identified some important factors affecting consumer desire for the participation of nongovernmental agencies. Such information can be used in further valuation of the feasibility of the participation of nongovernmental agencies.

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Table 1. Definitions and means of explanatory variables.

Variable	Definition	Mean
Age	Actual age of respondents.	47.5
Education	1 = less than high school, 2 = high school, 3 = some college education, 4 = college degree, 5 = post-graduation or professional.	2.97
Female	= 1 if a respondent is female, 0 otherwise.	0.71
White	= 1 if a respondent is white, 0 otherwise.	0.82
Income	= 1 if the household annual income is \$ 75,000 or more, 0 otherwise.	0.15
Safe	= 1 if a respondent considers the food safety regulations both adequate and effectively enforced, 0 otherwise.	0.16
Notsafe	= 1 if a respondent considers the food safety regulations both inadequate and not effectively enforced, 0 otherwise.	0.23
Sick	= 1 if a respondent had the experience of becoming sick due to consumption of meat, 0 otherwise.	0.07

Table 2. Parameter estimates using the maximum likelihood method.

Variable	Coefficient	t-value
Constant	1.7301	6.46***
Age	-0.0142	-4.29***
Education	-0.0120	-0.24
Female	0.2059	1.74*
White	-0.4407	2.70***
Income	-0.3692	-2.42**
Safe	-0.4854	-3.41***
Notsafe	0.3045	2.16**
Sick	0.2750	1.18
McFadden R ²	0.0771	
N	704	

Note: * denotes significant at 0.1 level, ** denotes significant at 0.05 level, *** denotes significant at 0.01 level.