Impacts of Food Safety Events on Consumer Awareness and U.S. Meat Demand

Aaron M. Ates
Oklahoma State University
aaron.ates@okstate.edu

Jayson L. Lusk
Oklahoma State University
jayson.lusk@okstate.edu

Selected Poster prepared for presentation at the 2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31- Aug. 2

Agricultural Economics

FooDS FOOD DEMAND SURVEY

Introduction

The United States Department of Agriculture (USDA) issued over 150 food product recalls and public health alerts in 2015. Although it may not always be the case, researchers studying impacts of food safety on demand assume consumers are aware of USDA issued recalls and alerts. This research seeks to determine, first and foremost, if and to what extent consumers are aware of meat recalls and food safety events.

Previous research such as that by Marsh, Schroeder, and Mintert (2004) and Piggot and Marsh (2004) have studied impacts of meat recalls and food safety information on U.S. meat demand. In these studies, recall and media indices are considered demand shifters; however, it would seem that a **direct measurement** of **consumer awareness** and **concern** about food safety would be the more appropriate variable affecting demand. Moreover, due to the nature of the data used in prior studies, authors were unable to identify heterogeneity in response to food safety events – i.e., which type of consumers' demand is most impacted by food safety events.

Objectives

1) Determine the relationship between meat recalls, media coverage of meat recalls, and consumer awareness and concern for meat safety.
2) Determine the impact of the aforementioned variables on demand for meat products.
3) Identify consumer characteristics associated with greater awareness and concern stemming from meat recalls.

Data

The Oklahoma State University Food Demand Survey (FooDS) is a unique monthly, online survey completed by at least 1,000 consumers each month. The FooDS survey was first administered in May of 2013 and it has since been issued consistently each month. The survey is sent to a sample of consumers in a panel maintained by Survey Sampling Incorporated (SSI). We make use of survey data through January 2016, meaning we have 33 months of survey responses, or at least 33,000 observations.

Among other questions in the survey, respondents are asked questions pertaining to their (1) overall awareness and (2) concern for 16 food and animal related issues (see FooDS technical document). We will primarily focus on awareness and concern for two issues on the survey: **E. Coli** and **Salmonella**.

The **FooDS data** will be merged with types of data conventionally used to study the impacts of food safety and health on meat demand. Following previous research (Tonsor, Olynk, Wolf 2009, Piggot and Marsh 2004), **Lexis-Nexis** databases and **Food Safety Inspection Service's** meat recall events (Marsh, Schroeder, Mintert 2004) will be used to construct media and recall indices, respectively, capturing public information relating to meat recalls related to bacterial contamination.
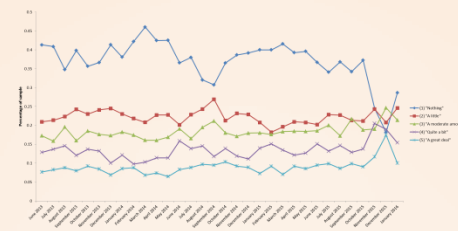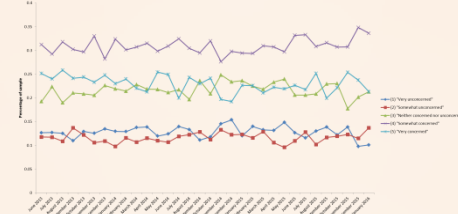

Figure 1. Monthly E. Coli consumer awareness levels
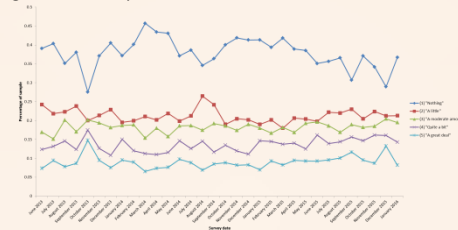

Figure 2. Monthly E. Coli consumer concern levels

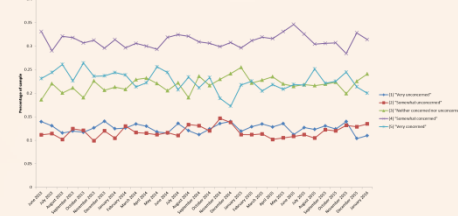**Figure 3.** Monthly Salmonella consumer awareness levels

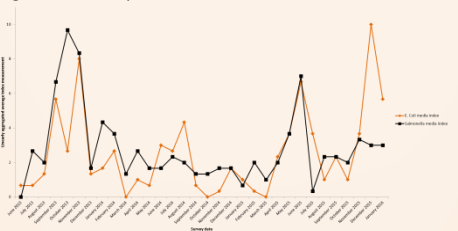**Figure 4.** Monthly consumer Salmonella concern levels

Figure 5. Monthly E. coli and Salmonella media index measurements

Methodology

Ordered logit model:

$$(1) \; V_{i,j,t} = \beta_5 + \beta_4 + \beta_3 + \beta_2 + \beta_1 + \beta_{1i} Media_{j,t}$$

where $V_{i,j,t}$ represents the probability individual i is more/less aware/concerned of foodborne illness j in time period t. $Media_{j,t}$ represents media index measurements created from LexisNexis Academic searches for foodborne illness j in time period t. Intercept values, β_k (k=5,4,3,2,1), represent threshold parameters used to determine the probability consumer i will indicate a level of k awareness/concern for foodborne illness j.

Equation (1) is expanded by including dummy demographic and behavior variables (linearly and interacted with $media_j$): (1) gender, (2) primary shopper, (3) foodborne illness in last 2 weeks, (4) kids, (5) college degree, (6) middle class tax bracket, (7) high income tax bracket, (8) 25-34 years of age, (9) 35-44 years of age, (10) 45-54 years of age, (11) 55-64 years of age, (12) 65+ years of age to determine characteristics of individuals influenced by the media.

Results

Table 1. E. Coli and salmonella awareness and media relationships

Parameter	E. Coli	Salmonella
Intercept 5	-2.46***	-2.42***
	(0.02)	(0.02)
Intercept 4	-1.39***	-1.34***
	(0.02)	(0.02)
Intercept 3	-0.51***	-0.47***
	(0.02)	(0.02)
Intercept 2	0.40***	0.39***
	(0.02)	(0.02)
Media index	0.06***	0.04***
	(0.004)	(0.004)

Note: Standard errors are in parenthesis. One asterisk represents significance at the 0.10 level, two asterisks represent significance at the 0.05 level, and three asterisks represent significance at the 0.01 level.

Table 2. E. Coli and salmonella concern and media relationships

Parameter	E. Coli	Salmonella
Intercept 5	-1.24***	-1.27***
	(0.02)	(0.02)
Intercept 4	0.12***	0.11***
	(0.02)	(0.02)
Intercept 3	1.10***	1.10***
	(0.02)	(0.02)
Intercept 2	1.89***	1.90***
	(0.02)	(0.02)
Media index	0.01***	0.01***
	(0.004)	(0.004)

Note: Standard errors are in parenthesis. One asterisk represents significance at the 0.10 level, two asterisks represent significance at the 0.05 level, and three asterisks represent significance at the 0.01 level.

Conclusions

- Statistically significant, positive relationship between newspaper articles mentioning E. Coli or Salmonella and beef or hamburger, pork or ham, or chicken or poultry.

- Statistically significant, positive marginal effect of media on consumer awareness of E. Coli for females, households with kids, middle tax bracket, and upper tax bracket.

- Statistically significant, positive marginal effect of media on consumer awareness of Salmonella for females, households with kids, middle tax bracket, 45-54 year olds, 55-64 year olds, and individuals 65+ years of age.

References:

Marsh, T.L., Schroeder, T.C. and J. Mintert. 2004. "Impacts of meat product recalls on demand in the USA." *Applied Economics* 3699):897-909.

Piggot, N.E. and T.L. Marsh. 2004. "Does food safety information impact U.S. meat demand?" *American Journal of Agricultural Economics* 86(1):154-174.

Tonsor, G.T., Olynk, N. and C. Wolf. 2009. "Media coverage of animal handling and welfare: influence on meat demand." American Agricultural Economics Association Annual Meetings, Milwaukee, WI, July 2009.