**Consumer Preferences Before and After a Food Safety Scare:**

**An Experimental Analysis of the 2010 Egg Recall**

Tongzhe Li
University of Delaware
tongzhe@udel.edu

John C. Bernard
University of Delaware
jbernard@udel.edu

Zachary A. Johnston
University of Delaware
zjohnston@udel.edu

Kent D. Messer
University of Delaware
messer@udel.edu

Harry M. Kaiser
Cornell University
hmk2@cornell.edu

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

# Consumer Preferences Before and After a Food Safety Scare: An Experimental Analysis of the 2010 Egg Recall

Tongzhe Li[1], John C. Bernard[1], Zachary A. Johnston[1], Kent D. Messer[1] and Harry M. Kaiser[2]

[1] University of Delaware

[2] Cornell University

## Overview

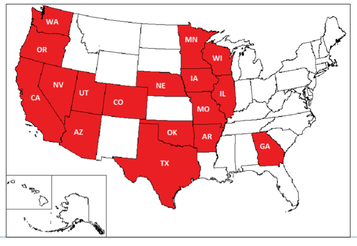
This study examines the effect of a food recall with a unique pair of auction experiments investigating willingness to pay (WTP) for conventional and organic eggs, one conducted shortly before and one after the 2010 egg recall with the same participants.


## Background

- Each year, approximately 48 million Americans contract a foodborne illness, resulting in 128,000 related hospitalizations and 3,000 deaths (Centers for Disease Control and Prevention, 2016).
- Recalls are important as they attempt to remove the source of the problem to prevent further illnesses. However, recalls can also inflict serious damage on an industry through stigmatizing all like-products, including ones that are safe.


- On August 13, 2010, Wright County Egg Farms of Iowa initiated a voluntary recall of eggs, which expanded on August 18, 2010. Two days later, the recall was again expanded to include Hillandale Farms of Iowa. In total, more than 550 million eggs distributed throughout the United States were identified as presenting a potential risk of Salmonella contamination.

Figure 1. Map of States Affected by the 2010 Shell Egg Recall




## Objective

The purpose of this research is to examine how food recalls impact consumer demand for both the product being recalled and a closely related version of the product.

## Experimental Design

- This study uses data from experimental sessions conducted shortly before and after the egg recall in August 2010. The first sessions were conducted in July 2010 to examine consumer WTP for conventional and organic food products.
- To avoid biasing the responses, the experimental sessions conducted after the recall were presented solely as follow-up studies. The experiment lasted about 45 minutes, and participants earned approximately $45 in cash or a combination of cash and food products of equal value.
- In both studies a Vickrey fourth-price auction was used to collect the WTP on conventional and organic eggs.

## Model

We use a random effects Tobit model to estimate whether the egg recall shifted consumer WTP.

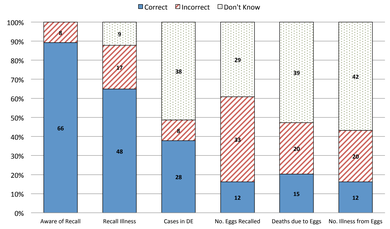
$$bid_{ij} = \begin{cases} 0 & \text{if } bid^*_{ij} \le 0 \\ bid^*_{ij} = \mathbf{X}'_{ij}\boldsymbol{\beta} + u_i + \varepsilon_{ij} & \text{if } 0 < bid^*_{ij} < 10 \\ 10 & \text{if } bid^*_{ij} \ge 10, \end{cases}$$

where $i$ represents the subject and $j$ represents the bidding rounds. $\mathbf{X}_{ij}$ represents relevant independent variables, which include the demographic and recall-attitude variables; a dummy variable for observations after the recall, and a variable for the egg attributes. $\boldsymbol{\beta}$ is a vector of coefficients, $u_i$ is the between-entity error and $\varepsilon_{ij}$ is the within-entity error.

In addition, we use standard Tobit models to estimate factors that contribute to the difference in WTP before and after the recall and the difference in WTP before and after the information treatment, respectively.

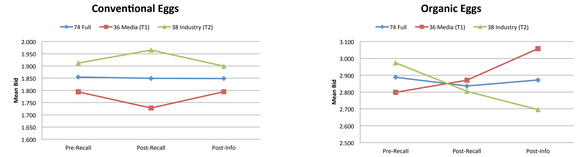
## Results

Figure 2. August 2010 Egg Recall Quiz Results




Ninety percent of the subjects in the follow-up experiment were aware of the recall and 65% could identify its source, an outbreak of Salmonella.

Figure 3. Bid Change Summary




Surprisingly, there was little difference in the number of participants who reported relatively high and relatively low WTP both before and after the recall.

Table 1. Random Effects Tobit Regression Results for Conventional and Organic Eggs

| Variables | Coefficient Estimates | |
|---|---|---|
| | Conventional | Organic |
| After No Info | -0.01 | -0.05 |
| After Media Info | 0.07 | 0.27* |
| After Industry Info | -0.01 | -0.21 |
| Male | 0.33* | 0.58** |
| Children | 0.01 | 0.10 |
| Age | 0.01 | 0.02 |
| White | -0.30 | -0.41 |
| Income | 0.01* | 0.00 |
| College | 0.12 | 0.57* |
| Conventional Eggs Changed | 0.14** | 0.16 |
| Organic Safer | – | 0.18* |
| Had Foodborne Illness | -0.44*** | 0.37 |
| Constant | 1.10 | 0.42 |

Note: *10% significance level, **5% significance level, ***1% significance level.

Table 2. Tobit Regression Results on WTP Difference After-Before Information

| Variables | Coefficients Estimates | |
|---|---|---|
| | Conventional Eggs | Organic Eggs |
| Balanced Info | 0.47* | – |
| Age | 0.12* | – |
| White | 0.28* | – |
| College | 0.44** | – |
| Children | 0.44*** | – |
| Worry Food Safety | – | -0.44** |
| Recall Risk | – | 0.42* |
| Institution Risk | -0.15** | -0.31* |
| Had Foodborne Illness | -0.28* | – |
| Conventional Eggs Changed | 0.19*** | – |
| Balanced*Worry Food Safety | 0.05*** | – |

Note: *10% significance level, **5% significance level, ***1% significance level.
Only variables that are significant at the 10% level are reported.

- There were no significant differences between any of the bidding rounds.
- The balanced information treatment had a positive effect on WTP only for conventional eggs, which is expected since the recall was only on conventional eggs.
- We observe an interesting heterogeneity among different groups of participants.

## Conclusions

- The vast majority of subjects in the follow-up experiment were aware of the recall and the majority could identify its source, an outbreak of Salmonella.
- The recall had opposite effects on different consumers' WTP, and in aggregate, the recall did not lead to a statistically significant change in consumer preferences for organic or conventional shell eggs.
- Balanced information only had a positive effect on WTP for conventional eggs.