Consumer Meat Safety Concerns: Impacts of Beef *E. coli* O157: H7 Recalls on Meat Consumption

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Several studies have indicated that meat demand is driven by a number of factors, including traditional economic determinants such as consumer income and relative prices, as well as nontraditional determinants such as nutrition and food safety information (Tonsor et al., 2010).

In addition to food safety information, meat safety issues have dramatically concerned livestock producers, consumers, and governments in recent years. Foodborne contaminants directly impact producers and may also influence consumer food demand adversely. Unsafe contaminants on food lead to human illness which causes the loss of billions of US dollars to the society annually (Marsh et al., 2004).

Within meat safety issues, E. coli O157: H7 is a deadly toxin which can cause severe public health threat. As a result, the outbreaks of E. coli O157: H7 is an obvious risk factor for the consumption of meat. The USDA Food Safety Inspection Service (FSIS) is responsible for inspecting meat safety and releasing safety recall information to the public.

The previous researches examined the impacts of FSIS recall on meat demand (Marsh, 2004). However, they did not mention what the magnitude of own- and cross-effects to the meat demand due to E. coli O157: H7 based recalls of beef. Thus, the effects of beef E. coli O157: H7 is analyzed in the current paper.

Methodology

For the empirical model of previous studies, two common approaches have been widely used: the Rotterdam model and the Almost Ideal Demand System (AIDS).

Rotterdam model:  
\[ w_i(\ln x_i) = \alpha_0 + \sum \alpha_{ik} \ln y_{i,k} + \beta \ln p_i + \sum \gamma_{i,k} \ln q_{i,k} + \sum \delta_{i,k} \ln R_k + \epsilon_i \]

where \( w_i \) is the quantity demanded for good \( i \); \( \ln x_i \) is the natural log of the quantity demanded for good \( i \); \( \ln y_{i,k} \) is the natural log of per capita income; \( \ln p_i \) is the natural log of the price of good \( i \); \( \ln q_{i,k} \) is the natural log of the price of good \( k \); \( \ln R_k \) is the natural log of the price of other goods; and \( \epsilon_i \) is the error term.

Our findings from the Rotterdam model indicate that pork is the most elastic and poultry is the most inelastic demand of the meat goods. These are consistent with Tonsor and Marsh (2007) and Tonsor et al. (2010).

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The meat industry may need to make great efforts to estimate meat consumption using both Rotterdam model and 1st difference LA/AIDS model. We will make further test to compare the two models.

Estimated Results

Following the suggestion of Tonsor et al. (2010), we assume that the right-hand-side variables are endogenous, and the models are estimated using ITSLS (iterative three-stage least squares). The ITSLS has the same results as ITSUR (iterative seemingly unrelated regression) in this case.

References


Conclusions and Implications

Our findings from the Rotterdam model indicate that pork is the most elastic and poultry is the most inelastic demand of the meat goods. These are consistent with Tonsor and Marsh (2007) and Tonsor et al. (2010).

The elasticities of 1st difference LA/AIDS model represent unexpected results. The absolute values of price elasticities are larger than the values of Rotterdam model.

The meat industry may need to make great efforts to reduce risk of foodborne contaminants in production, distribution, and transportation.