

## CONTRIBUTIONS OF ECONOMICS TO NIFA PRIORITIES

### FOOD SAFETY AND NUTRITION<sup>1</sup>

Over the last century and today, economists have been involved in multidisciplinary efforts to address critical problems of food demand, food safety and nutrition. The issues addressed include problems of food sufficiency in times of economic recession; developing effective public programs to address dietary needs; determining the economic and non-economic consequences of policies dealing with the food sector and with individuals or households. Many of these issues are best studied with models of human responses and reactions to incentives—factors that are often treated as exogenous by physical scientists.

Economists conduct cost-benefit analysis of new products, technologies and policies. Other lines of research contribute to understanding factors that affect consumer acceptance and purchase of products, including items that have undergone various post-harvest or processing measures to reduce contamination risks or to enhance the functional properties of food products. In studies of markets, economists calculate market impacts of food safety scares, policies, nutritional information and new technologies. A better understanding of incentives can help address key questions related to food choice, nutrition and food policies. Without question, the food system has become increasingly complex. The challenges today, and those of interest to many economists, involve the optimal design of institutions, markets and policies to enhance health and safety as well as ways research can address critical public health needs.

#### What Economists Can Contribute

The study of food safety and human nutrition requires multi- and trans-disciplinary approaches that integrate knowledge from basic science and social sciences in order to yield insight into individual and social behavioral perspectives. Some key economic questions include:

- **How important is food safety and nutrition to consumers? What are they willing to give up for improved food safety and nutrition?** Consumer acceptance plays a key role in determining the efficacy of scientific developments aimed at reducing microbial contamination and improving nutrition. For example, consumer acceptance has hindered the adoption of irradiation, fumigation, chlorine treatments and, in some cases, biotechnology. Research on the value consumers place on the technologies and their responses to education provides industry and public policy analysts with a wider range of acceptable technologies to improve nutritional attributes and prevent food safety problems. Consumer research is also key to establishing the benefits of new technologies, which can then be compared with the costs.
  - Hammit and Haninger (2007) provide a comparison and alternative methods for eliciting estimates of the value of reducing risk of foodborne illness, focusing on short-term morbidity.
  - Lusk and Briggeman (2009) find that safety and nutrition were among the most important attributes of new food products.

---

<sup>1</sup> Prepared by Helen Jensen (Iowa State University), Oral Capps, Jr (Texas A&M University), Jayson Lusk (Oklahoma State University) and Victoria Salin (Texas A&M University). February, 2010

- Yuan, Nayga and Capps (2009) find that the introduction of a functional food in the orange juice sector did not lead to consumer shifts away from purchases of the traditional product. Instead, consumers added separate purchases of the phytosterol-enriched juice product.
- **How can institutions and policies be optimally designed to improve food safety or nutritional outcomes at minimum cost? Are the benefits of proposed changes to policies or methods greater than the costs?** Benefits from the reduction in illness are important for determining appropriate public policies that seek to reduce sickness or disease with regulation and at the firm level in determining optimal investments in nutritional technology, food safety and hazard control.
  - Economists have been on the forefront of determining the economic benefits resulting from reductions in disease (e.g., the Foodborne Illness Cost Calculator developed by the Economic Research Service, USDA. <http://ers.usda.gov/Data/Foodbornellness/>).
  - The challenges of how firms respond to improving food safety or quality are addressed, for example, by Starbird and by Hennessy.
- **What is the economic impact of a food safety outbreak on producers and consumers?** In considering public and private options to improve food safety control, a key question relates to the economic impact of food safety outbreaks. What is the cost in terms of public health? What is the loss in profitability to processors and the industry? Answers to these questions have guided firms and governments in the optimal response to meat food safety and recalls and other food safety outbreaks.
  - Economists have determined the economic impact of recent food safety scares in leafy greens and spinach, for example. Studies by Arnade, Calvin and Kuchler (2009) and by Fahs, Mittlehammer and McCluskey (2009) determine changes in the market and demand for spinach and leafy greens before and after the 2006 E.coli O157:H7 outbreak and related recall. Similar studies have focused on meat recalls.
- **How can we address the complexities in our food and agricultural system to improve food safety and nutrition?** The food system consists of participants holding differing objectives and interests in the delivery of safe and nutritious food. Moreover, these parties are regulated by various authorities at the local, state and Federal level, resulting in gaps and confusion about food safety law. Achieving safe food and good nutrition requires a concerted effort to coordinate and align various interests.
  - Economic research considers incentives and institutional arrangements that affect behavioral responses to policies for addressing food safety and nutrition problems. Starbird (2005) and Hennessy, Roosen, and Miranowski (2001) represent studies that focus on the role of institutional settings in the efficacy of food safety policies.
  - Golan, Mancino and Unnevehr address the efficacy of policies and market incentives to improve the nutritional composition of the food supply.
- **How do consumers respond to information—including nutritional labeling claims on food—and what are the costs and benefits of nutritional labeling policies?** Nutritional information and labeling often are used to provide information consumers needed to make food choices. But, adding labeling information is costly. Economic research is needed to determine whether the benefits of better informed consumers outweigh the cost.
  - Teisl, Bockstael and Levy (2001) find that although nutrient labeling affects purchase behavior, it may not increase consumption of healthy foods. Hence, although the labeling improves consumer welfare, health risks may not change.

- Kim, Nayga, and Capps (2001) find that food labels provide measurable benefits by improving diet quality. The use of health claims on food labels provided the highest level of improvement in diet quality.

- **What are the effects of agricultural policies, food prices, “fat taxes,” and subsidies on food consumption, nutritional intake, and health of consumers?** Recently, policy makers have considered how to provide incentives to decrease consumption of energy-dense foods and to increase consumption of foods associated with improved health. In addition, some have argued that some agricultural policies designed to help the agricultural sector may encourage over-consumption of foods, thus increasing instances of obesity. Economists have contributed to the research through studies to examine the effect of agricultural policies and taxes.

- A recent study of French consumers finds a “fat tax” has only a small effect of nutrient intake and body weight in the short run. It had a greater effect in the long run but the tax burden is borne disproportionately by lower-income consumers. Schroeter, Lusk and Tyner (2008) find that a tax on food away from home could lead to an increase in body weight. Their findings emphasize the need to employ careful modeling when developing public policies and evaluations.
- Beghin and Jensen’s (2008) study of agricultural policies related to sugar and corn sweeteners examines the effect on the relative price of the commodity-based ingredients and shows that current policies and sweetener ingredient prices have had little effect on US sweetener consumption. Other recent studies (Brownell *et al.*, 2009) have looked at the effectiveness of a tax on sugar-sweetened beverages to reduce consumption of the beverages and to generate revenue.

- **Are food assistance programs, including school meals, effective at improving dietary intakes and health? What factors contribute to designing programs to address the nutritional concerns of today’s children and other targeted groups?** Although addressing dietary inadequacies has been the hallmark of nutrition assistance programs in the past, new Dietary Guidelines highlight the importance of changing diets to address new scientific knowledge and current nutritional situations, including the high prevalence of obesity. Redesign of the food programs benefits from improved understanding of the program funding mechanisms, as well as participant behaviors.

- A series of recent papers by economists and colleagues (<http://www.choicesmagazine.org/magazine/block.php?block=39>) summarize recent results on the design of school meal programs that help to identify opportunities to improve the quality, funding and dietary outcomes of school meals programs.

## Needs and Opportunities

Food safety and nutrition science continue to progress and evolve. At the same time, an increased awareness of the role of producer and consumer behaviors as well as the complexity of the food system requires an integration of the physical and social-behavioral sciences to design and carry out research and educational programs aimed at improving public health.

Economics contributes to the underlying research through its focus on social and market factors that affect consumer and firm behaviors. As a result of economic studies, decision-makers have a better understanding of the system-wide interrelationships that occur in the marketing channel linking producers to consumers. Future concerns include:

- How can food safety regulations and policies be designed to be effective in the context of global markets and multiple sources of foods?
- What are effective ways to work with both the public and private sectors in achieving improved food safety and nutrition? What are the consequences, both intended and unintended, of public policy actions toward health and nutrition concerns (e.g., proposed taxes on, or subsidies to, specific foods or food groups)?
- Do food safety and nutritional policies and programs address the greatest risks to public health?
- What factors are important in changing food-related behaviors? How effective is the provision of information through nutrition education or food labels and labeling at changing behaviors?
- Can food and nutrition programs and efforts be better integrated to achieve improved health outcomes?
- How will consumers respond to new technologies and products? These include foods with enhanced functional product attributes (e.g., fortification and health promoting ingredients) as well as new production and processing technologies.

Addressing these questions requires good knowledge of food markets and the food system as well as an understanding of economic behaviors. New and improved data sources and the use of analytic/empirical techniques are fundamental preconditions for these efforts.

900 Second Street, NE  
Suite 205  
Washington, DC 20002  
Phone: 202-408-8522  
[www.cfare.org](http://www.cfare.org)



## References and Additional Reading

- Allai, Ol, Bertail, P., Nichèle. 2010. The Effects of a Fat Tax on French Households' Purchases: A Nutritional Approach. 92(1).  
<http://ajae.oxfordjournals.org/content/early/2010/01/20/ajae.aap004.abstract> ; Schroeter, C., Lusk, J., Tyner, W. (2008). *Journal of Health Economics* 27(1):45–68.  
<http://dx.doi.org/10.1016/j.jhealeco.2007.04.001>.
- Arnade, C., L. Calvin and F. Kuchler. 2009. Consumer Response to a Food Safety Shock: The 2006 Food-Borne Illness Outbreak of E. Coli O157:H7 Linked to Spinach. *Review of Agricultural Economics*, (Winter) Vol. 31 (4): 734–750. Fahs, F., R.C.Mittelhammer, and J.J. McCluskey, 2009. E.coli Outbreaks Affect Demand for Salad Vegetables. *Choices*.  
<http://www.choicesmagazine.org/magazine/article.php?article=72>.  
Beghin, J., Jensen, H.H. (2008) *Food Policy*, 33(6):480–488).
- Brownell, K.D., Farley, T., Willett, W.C., Popkin, B.M., Chaloupka, F.J., Thompson, J.W., Ludwig, D.S. (2009), The Public Health and Economic Benefits of Taxing Sugar-Sweetened Beverages, *The New England Journal of Medicine*, Health Policy Report, 1–7.
- Golan, E., L. Mancino and L. Unnevehr (2009). Food Policy: Check the List of Ingredients. *Amber Waves*. USDA, Economic Research Service.  
<http://www.ers.usda.gov/amberwaves/june09/features/foodpolicy.htm>
- Hammit, J.K., Haninger, K. (2007). Willingness to Pay for Food Safety: Sensitivity to Duration and Severity of Illness. *American Journal of Agricultural Economics*, 89(5):1170-1175.  
<http://ajae.oxfordjournals.org/content/89/5/1170.full?sid=db0ae320-ca7f-4263-9c0d-baceee21152a>.
- Hennessy, David A., Jutta Roosen, and John A. Miranowski. Leadership and the Provision of Safe Food. *American Journal of Agricultural Economics* 83, no. 4 (November 2001): 862–874.
- Kim, S.Y., Nayga, Jr., R.M., Capps, Jr. O. 2001. Food Label Use, Self-Selectivity, and Diet Quality, *Journal of Consumer Affairs*, 35(2): 346–363.
- Lusk, J.L., Briggeman, B.C. 2009. Food Values. *American Journal of Agricultural Economics*, 91(1):184–196. <http://ajae.oxfordjournals.org/content/91/1/184.abstract?sid=394f66a2-709c-46d7-95d8-8e747e2529a2>.
- Starbird (2005) and Hennessy, D. (2005) Slaughterhouse Rules: Animal Uniformity and Regulating for Food Safety in Meat Packing. <http://ajae.oxfordjournals.org/content/87/3/600.abstract?sid=12b68bd7-b5e4-4154-8337-7cdce6fd3f74>.
- Teisl, M.F., Bockstael, N.E., Levy, A. 2001. Measuring the Welfare Effects of Nutrition Information, 83(1):133–149. See <http://www.jstor.org/stable/1244305>.
- Yuan, Y., Nayga, Jr., R.M., Capps, Jr., O. (2009). Assessing the Demand for a Functional Food Product: Is There Cannibalization in the Orange Juice Category? *Agricultural and Resource Economics Review*, 38 (2): 153–165.

