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Food Safety Innovation in the United States

Evidence from the Meat Industry

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Innovations in food safety help lower the cost of safe food. While market incentives for food safety innovation are relatively weak, some restaurant chains and large retailers are encouraging processors to overcome these challenges. These large, savvy meat and poultry buyers are setting and enforcing safety standards and creating markets for food safety. As a result, food safety investments are increasing throughout the meat supply chain. *Food Safety Innovation: Evidence from the U. S. Meat Industry,* is ERS' first report on food safety innovation.

What Is the Issue?

The ability to control and exploit the benefits drives the private market for innovation, according to economic theory. Unfortunately, improved food safety is a difficult attribute to sell to consumers; and companies have been reluctant to invest in food safety innovations. Food safety is largely a credence attribute, meaning that consumers cannot evaluate the existence or quality of the attribute before purchase, or even after they have consumed the food. Consumers cannot usually determine whether a food was produced with the best or worst safety procedures, or whether a food poses a health risk. For example, consumers cannot detect by sight, smell, or price whether raw chicken is contaminated with *Salmonella.*

Despite these market hurdles, food safety innovations have occurred in the last decade. Industry has developed new pathogen tests, high-tech equipment, and supply-chain management systems to control foodborne pathogens.

How Was the Study Conducted?

To investigate the drivers for food safety innovations, ERS researchers examined the theoretical literature, surveyed the meat industry, and conducted two case studies of successful food safety innovations in the beef industry. Three research methods were used. The theoretical literature of innovation was explored to discover the drivers for innovation in the private marketplace.

The case study method was used to collect detailed data to understand the steps in the innovation process, the collaborations that made it possible, and the market and food safety impact of the two innovations. One innovation was a high-tech piece of equipment, the Beef Steam Pasteurization System. The second innovation was a management system for producing safer hamburger patties, the Bacterial Pathogen Sampling and Testing Program.

ERS' survey of meat and poultry plants was the first national survey to ask explicitly about changes in food safety investments. In five broad categories, 40 questions asked about changes in investments in food safety technologies and practices

What Are the Major Findings?

Food safety innovations have increased, largely because of the stringent standards for pathogen control demanded by large meat and poultry buyers like Jack in the Box and many foreign buyers. These companies are referred to as "channel captains"—savvy buyers who monitor food safety up and down their supply chain. These channel captains offer meat and poultry processors contracts that allow payment of their investments in new food safety technologies.

ERS' national survey confirmed that in the beef industry, domestic buyer specifications and exports correlate with higher levels of investment in food safety technologies and practices. Thus channel captains were significant motivators of food safety investment in the beef industry.

In the first case study, Jack in the Box cancelled all its contracts with hamburger patty suppliers after an outbreak in 1993 of *E. coli* O157:H7. One of the two companies that agreed to meet the more stringent testing and other food safety requirements was Texas American Food Service Corporation. Texas American worked with Jack in the Box to develop a superior food safety control program with strict temperature control and rigorous product testing. Texas American, in fact, collaborated with Qualicon, a food safety business of the DuPont company, to fine-tune a more sensitive and accurate test for *E. coli* O157:H7 in hamburger. Texas American benefited from its food safety investments by moving from the spot market to contracts for their hamburger patties, permitting better capacity utilization and reduced product spoilage.

In the second case study, the invention and commercialization of Frigoscandia Equipment's beef carcass steam pasteurization system illustrates the ripple effect that the emergence of food safety markets can have on the entire supply chain—-all the way down to equipment manufacturers. Frigoscandia Equipment partnered with Excel, the second largest U.S. beef packing company to assure commercial viability. When microbiologists at Kansas State University studied various interventions to reduce pathogens on the surface of freshly slaughtered beef, they found Frigoscandia Equipment's innovation to be superior to the other methods tested. By 1997, both the largest and second largest beef packing companies had ordered the equipment for all their beef slaughter plants.