



Evaluating the costs of meat and poultry recalls to food firms using stock returns[☆]



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ARTICLE INFO

Article history:

Received 10 March 2015

Received in revised form 10 September 2015

Accepted 13 December 2015

Keywords:

Food recalls
Food safety
Food industry
Stock prices
Abnormal returns
Event study

ABSTRACT

Food recalls have been an issue of great concern in the food industry. Stakeholder responses to food safety scares can cause significant economic losses for food firms. Assessing the overall impact that may result from a food recall requires a thorough understanding of the costs incurred by firms. However, a direct measurement of a firm's total private costs and losses of revenue associated with a food recall requires firm-level data that is not available. The method utilized in this study overcomes this limitation. Using an event study, the impact of meat and poultry recalls is quantified by analyzing price reactions in financial markets. A unique contribution of this study is evaluating whether recall and firm specific characteristics are economic drivers of the magnitude of impact of recalls on stock prices. On average, shareholders' wealth is reduced by 1.15 percent, equivalently to \$109 million, within 5 days after a firm is implicated in a recall involving a serious food safety hazard. However, when recalls involve less severe hazards, stock markets do not react negatively. Firm size, firm's experience handling a recall, media information and recall size are drivers of the economic impact of meat and poultry recalls. Findings from this study provide essential information to the meat industry. In particular, understanding the likely impact of food recall events is critical for firms investing in food safety technologies and protocols.

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Introduction

Food recalls are a major concern for the food industry. In recent years, the number of identified and reported incidents of contaminated food products has dramatically increased (Ades et al., 2012), posing serious health and economic consequences. The Centers for Disease Control and Prevention (2011) report that each year about 48 million people get sick, 128,000 are hospitalized, and 3000 die of foodborne diseases. On the supply side, food recalls can cause significant economic losses for food production, processing, and marketing firms. In addition to the economic repercussions related to recovering, disposing of, or reconditioning contaminated food products already in the market pipeline, firms might incur reductions in product demand, triggered by a decline in consumer or

[☆] This project was supported by Agriculture and Food Research Initiative Grant No. 2012-68003-30155 from the USDA National Institute of Food and Agriculture, Prevention, Detection and Control of Shiga Toxin Producing *Escherichia coli* (STEC) from Pre-Harvest through Consumption of Beef Products Program - A4101. This project was also supported by the Utah Agricultural Experiment Station, Utah State University, and approved as journal paper number 8837.

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customer confidence, as well as higher insurance premiums (Thomsen and McKenzie, 2001). Depending on the severity of the threat and its potential effect on the wellbeing of consumers, firms might also face product liability costs which can permanently damage a firm's reputation and even force the firm to cease operations. For example, in 1997, Hudson Foods Co. recalled 25 million pounds of ground beef, one of the largest food recalls in the U.S., due to foodborne contamination that caused several illnesses. This particular event resulted in the company's acquisition by Tyson Foods, after losing its largest customer, Burger King (Belluck, 1997).

Assessing the economic impact that may result from a food recall requires a thorough understanding of the costs incurred by firms. However, quantifying these costs is daunting. A direct measurement of a firm's total private costs requires firm-level data that are not available or too difficult to collect. To overcome this limitation, previous work has measured the impact of product recalls by analyzing price reactions in financial markets during periods surrounding the recall announcement (Davidson and Worrell, 1992; Jarrell and Peltzman, 1985; Thomsen and McKenzie, 2001). Because stock prices immediately reflect the impact of an event on firm profitability, a measure of the economic impact of product recalls can be constructed using stock prices observed over a

relatively short period of time, instead of using direct productivity related measures that may require much longer periods of observation (MacKinlay, 1997). This implies that the magnitude of stock market reactions reflect or can be compared to the total private costs incurred by implicated firms (Freedman et al., 2012; Pruitt and Peterson, 1986; Salin and Hooker, 2001).¹

The impact of food recalls on firm value likely depends on several factors. For example, Thomsen and McKenzie (2001) found significant shareholder losses when publicly traded food companies were implicated in a recall involving serious food safety hazards (e.g., foodborne illness outbreaks), indicating that reductions in company valuations are contingent on the seriousness of the human health risk associated with the recall event. Besides Kong (2012), who focused on the effects of corporate social responsibility, previous work has not assessed how the magnitude of stock market reactions to food safety incidents are influenced by a broader set of recall and firm related characteristics. This information is helpful in determining the sources of economic impact of food recalls. This study is intended to directly address this important gap in information.

The objectives of this study are twofold. The first is to quantify the overall economic impact of food contamination incidents on the value of firms. In particular, we focus on meat and poultry products that have been recalled from the market for food safety reasons. The second objective is to determine what factors represent economic drivers of the magnitude of impact of meat and poultry recalls on the value of firms. Besides recall severity, there are other factors that can potentially influence this impact. For example, firms recalling a large volume of product would be expected to experience more serious economic consequences than those involved in a small-volume recall. Firm size and the level of market segmentation would likely influence how firm valuation changes in the midst of a food safety breach. Larger, more diversified firms are expected to be more able to weather a meat recall than small companies. A firm's past experience managing recalls can also influence the outcome from contamination incidents its market value (Salin and Hooker, 2001; Wang et al., 2002). Here, it is possible that firms undertaking an effective food safety crisis management strategy have the potential to minimize stock market reactions. Finally, the extent of media information accompanying a food safety incident might influence consumer demand for implicated products (Piggott and Marsh, 2004; Schlenker and Villas-Boas, 2009), as well as investor decisions.

Results from this study provide essential information to the food industry about private costs associated with meat and poultry recalls. In particular, understanding the sources of impact of recalls on firm value is necessary for managers as they evaluate strategies for adopting and investing in new, often expensive, food safety technology and protocols. This information may also aid policy makers in conducting more accurate cost–benefit analyses of alternative, voluntary or mandatory, food safety policies impacting the probabilities of food recalls.

Meat and poultry recalls

Recalls of meat, poultry and processed egg food products are carried out under the supervision of the United States Department of Agriculture's Food Safety and Inspection Service (FSIS). Typically, meat and poultry products that have already been shipped and distributed into the market and are suspected of being potentially

hazardous to public health, are voluntarily recalled by firms either by their own initiative or by the request of FSIS. A recall can occur for many different reasons. Among these are products contaminated with foodborne bacteria such as *Escherichia coli* O157:H7 (*E. coli*), *Listeria monocytogenes* or *Salmonella*; undeclared allergens; contamination with foreign materials such as plastic, glass, and metals; mislabeling; and under-processing or undercooking.

The recall process works as follows. Once FSIS becomes aware of the potential need of a recall, it conducts a preliminary inquiry. Then, a recall committee determines whether to recommend a recall based on information provided by the firm (e.g., reason for the recall, recall classification, estimated amount of contaminated product). When the committee determines that a recall is necessary, the recommendation is subject to FSIS's approval. Following approval of the recall, FSIS contacts the firm to report its recommendation. Then, FSIS issues a recall release to the public containing information about the product being recalled and the firm issuing the recall, and instructions on how to properly handle the contaminated product (FSIS Directive, 2013).

Despite their efforts to adopt preventive measures and invest in food safety enhancing technologies, firms may continue encountering food safety threats during production, processing or packaging of food products. Human errors and limitations of food safety technologies make zero tolerance for food safety violations impossible. In the last two decades, FSIS has reported almost 1300 meat and poultry recalls, representing nearly 638 million pounds of product, from January 1, 1994, through December 31, 2013. Of the total, almost three-fourths correspond to the most severe class of recalls (FSIS, 2014).² These recalls come at the expense of the firm directly involved and can create substantial losses.

Related literature

There have been many recent studies focusing on consumer reactions to food safety issues. For example, Thomsen et al. (2006) estimated sales losses experienced by food processing companies following a recall caused by *Listeria*. Product sales of affected brands decreased by 22–23 percent after the outbreak. Conversely, non-recalled brands experienced an increase of sales when a competing brand was involved in a recall. In a similar study, Bakhtavoryan et al. (2012) evaluated spillover effects among peanut butter brands, initiated by the 2007 Peter Pan recall, using Nielsen Homescan data. Results suggested that the recall caused a structural change in the demand for peanut butter. However, after 27 weeks Peter Pan recovered from this food safety crisis.

Arnade et al. (2009) investigated the impact of an *E. coli* O157:H7 outbreak linked to spinach. Consumers substituted spinach with lettuce, and moved away from bagged salads that did not contain spinach, indicating a negative spillover effect on other leafy greens. However, retail expenditure for all leafy greens only declined 1 percent after 68 weeks, whereas for bagged spinach it decreased 20 percent. Peake et al. (2014) examined what factors drive consumer purchasing decisions during food recalls using a survey instrument. Recall concerns, propensity to reduce consumption beyond the recall parameters, and media reliance had a strong effect on broad consumption changes.

¹ Total private costs of a product recalls include: costs of retrieving and disposing contaminated product already in the market, inventory and sales losses, refunds, higher insurance premiums, and liability costs. Public costs, those that do not resonate back to the firm and are paid by someone else, are not expected to be reflected in stock prices.

² The most severe class of recalls are Class I and involve a "situation where there is a reasonable probability that the use of the product will cause serious, adverse health consequences or death" (e.g., foodborne pathogens, allergens). Class II recalls involve a "situation where there is a remote probability of adverse health consequences from the use of the product." For example, a Class II recall is issued when products contain small amounts of undeclared allergens typically associated with milder human reactions. The least severe class of recalls are Class III. These involve a "situation where the use of the product will not cause adverse health consequences." For example, a Class III recall may involve products that contain excess water.

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