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Examining the Effect of Food Recalls on Demand: The Case of Ground Beef in the U.S.

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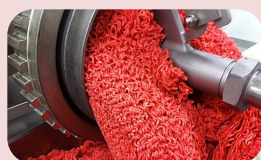
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BACKGROUND

Approximately 71 food recalls occurred every year in the last decade (USDA 2005-2015). The annual healthcare costs and other losses of foodborne illness are over \$150 billion in the U.S. (Scharff 2010). Recalls can cause a significant financial loss to manufacturers which can exceed 30 million dollars on average (Grocery Manufacturers Association 2011). Moreover, 35% of food recalls are associated with beef products, and during 2006-2014, over 225 million tons of beef products were recalled (USDA 2005-2015).

On August 6, 2009, the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) announced more than 0.8 million pounds of potentially Salmonella-tainted ground beef products to retail distribution centers in Arizona, California, Colorado and Utah.



OBJECTIVE

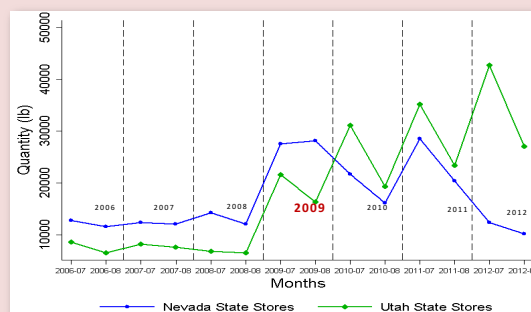
Investigate Consumers' reaction to the 2009 Possible Salmonella ground beef Contamination in Utah. In fact, by comparing purchases in a "treated" state, Utah, and a "control" state, Nevada, we test whether consumers reduced ground beef purchases.

DATA

- The USDA Food Safety and Inspection Service (FSIS): recalls data such as date, geographic distribution area, and pathogens.
- Nielsen scan-track market level UPC level data on prices and quantity of sale by year, months, weeks, state and store.

Descriptive Statistics

State		Obs.	Mean	Std. Dev.	Min	Max
Utah Stores	Log Quantity	26,972	3.58	0.70	2.36	7.46
	Log Price	26,972	1.24	0.31	0.004	1.79
Nevada Stores	Log Quantity	6,111	3.47	0.64	2.40	7.03
	Log Price	6,111	1.39	0.27	0.03	1.79



Notes: Figure shows the evolution of total monthly sales (lb) by state for ground beef with no controls. Months denotes one pre-event month and one post-event month for each year (2006, 2007, 2008, 2009, 2010, 2011, and 2012). Months across years are not continuous in time.

MODEL

The difference-in-differences (DID) approach:

$$Y_{asnt} = \alpha_{ast} + \beta_1 I_n + \beta_2 I_U + \beta_3 I_n I_U + \beta_4 P_{asnt} + \varepsilon_{asnt}$$

Y_{asnt} is the log of sales by aggregation level a in store s , in week n of year t , α_{ast} is an aggregation level by store by year fixed effect, I_n is a dummy variable equal to one if the purchase occurred in a post-event weeks, I_U is a dummy equal to one if the purchase happened in Utah, P_{asnt} is the average price of all products in aggregation level a in store s in week n of year t , and ε_{asnt} is error term.

The fixed effects α_{ast} allow for shifts of the average purchases by stores s , aggregation levels a and period t due to, for example, trends in buying habits by products between stores and years. The coefficient β_1 , shows the seasonal effects in week n , coefficient β_2 captures the additional effect in Utah, and the coefficient β_3 indicates the treatment effect.

RESULTS and CONCLUSION

Abnormal Monthly Changes for Ground Beef Demand Following the 2009 Salmonella Ground Beef Recall

	coefficient	Robust Standard Error
Event	-0.141***	0.026
Utah	-0.034	0.025
Event*Utah	-0.064**	0.027
Log Price	-1.03***	0.011
constant	4.773***	0.028

***and ** denote 1% and 5% significance levels respectively.
R-squared: 0.342

- "Event*Utah" shows the treatment effect. Ground beef purchases decreased by 6.4 percent in the six months following the recall.
- Price elasticity for ground beef is -1.03.
- Considering the result of treatment effect and price elasticity, the sale reduction from the recall is comparable to 6.2% increase in price.
- Consumers' reactions to recalls motivate firms to invest in risk reduction and to satisfy food safety.

SELECTED REFERENCES

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