Evaluating Spillover Effects of Red Meat and Poultry Recalls across Firms

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Introduction

- In the last two decades, about 1,300 red meat and poultry recalls have been issued in the U.S. representing nearly 638 million pounds of product recalled.
- Previous studies have found significant reductions in company valuations occurring right after the recall event (Salin and Hooker, 2001; Thomsen and MacKenzie, 2001). However, there is little evidence indicating how other firms in the industry, not directly involved in the recall, are affected by such food scares.
- A recall issued due to food safety reasons may either benefit or harm competing firms.
- This issue has direct implications for how meat and poultry firms and industries may be affected by industry-wide food safety enhancement investments.

Objectives

- The objective of this study is to evaluate spillover effects of red meat and poultry recalls across related firms.
- More specifically:
  - To quantify the magnitude of impact of individual recalls on competitor firms.
  - To examine whether the magnitude and direction of spillover effects are driven by selected factors.

Research Methods

- Assessing the economic impact that may result from a food recall requires firm-level data that are not generally available.
- To overcome this limitation, price reactions in financial markets are analyzed using an event study approach.

Event Study

The impact of a meat recall on rival firms is quantified by obtaining a measure of abnormal returns:

$$AR_{it} = R_{it} - E[R_{it}]$$

where R_{it} is the actual stock return of rival firm i at day t, observed during the recall event, and $E[R_{it}]$ is the normal return, expected had the recall event not occurred. Here, the market model is used as benchmark to predict normal returns.

Hypothesis Testing:

Negative Effects

H_o: $CAAR(\tau_1, \tau_2) = 0$
H_a: $CAAR(\tau_1, \tau_2) < 0$

Positive Effects

H_o: $CAAR(\tau_1, \tau_2) = 0$
H_a: $CAAR(\tau_1, \tau_2) > 0$

where $CAAR(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N} CAR_i(\tau_1, \tau_2)$ is the cumulative average abnormal return across N recalls, and $CAR_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{it}$ is the cumulative abnormal return for competitor firm i, aggregated over interval (τ_1, τ_2) surrounding the recall event. Under the null hypothesis, recall events do not have a significant impact on stock returns of competitor firms.

Data

Meat and poultry recalls are carried out under the supervision of the USDA's Food Safety and Inspection Service (FSIS). FSIS issued a total of 1,365 recalls from January 1994 to December 2014. Among these, 170 recalls from 31 different publicly traded firms were identified. Table 1 shows a description of these recalls by selected attributes. Daily stock price data from the 31 firms were collected using Bloomberg.

Table 1. Description of FSIS recalls by publicly traded firms (1994 – 2014)

Attribute	Description	No.	% Freq
Class			
Class I	Most severe	120	70.59
Class II	Remotely severe	41	24.12
Class III	Least severe	9	5.29
Firm Size	Market Equity		
Small	< $1.4 billion	51	30.00
Medium	$1.4 – $5.3 billion	83	48.82
Large	> $5.3 billion	36	21.17
Recall Size	No. of Pounds		
Very Small	< 10,000	46	27.06
Small	10,000 – 50,000	43	25.29
Medium	50,001 – 400,000	49	28.82
Large	> 400,000	28	16.47

Results

- Tables 2-4 report cumulative stock price reactions following a recall, as a measure of CAAR. Results are presented for the day after the recall announcement and up to 25 trading days.
- Results from the "All Recalls" column in table 2 indicate competitor firms are harmed by meat recalls. On average, the value of firms is reduced by 0.076% the day after the recall announcement.
- Table 3 indicates that when a recall is issued by a medium size firm, competitor firms are negatively affected. However, they benefit when the recall is issued by a larger firm.
- Sizable volume recalls negatively affect competitor firms. Table 4 shows that, on average, the value of firms decreases 0.377% three days after the recall announcement.
- Figures 1-3 illustrate these findings.

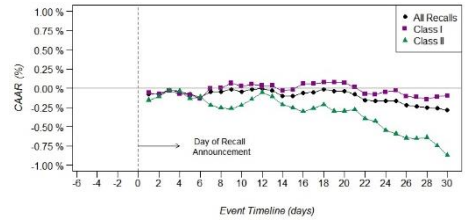

Figure 1. CAAR for All Recalls and by Recall Class

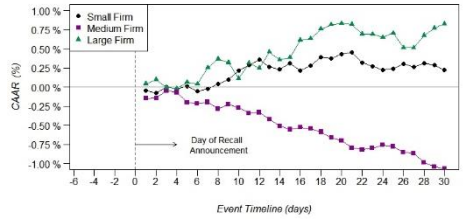

Figure 2. CAAR by Firm Size

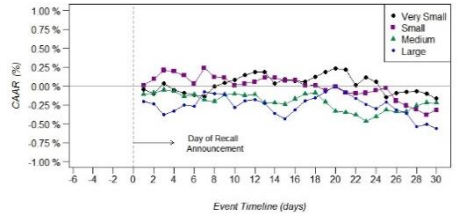

Figure 3. CAAR by Recall Size

Table 2. CAAR for All Recalls and by Recall Class

Day	All Recalls	Class I	Class II
1	-0.076 **	-0.059 *	-0.155 *
2	-0.072 *	-0.074 *	-0.109
3	-0.022	-0.035	-0.025
4	-0.044	-0.071	-0.036
5	-0.080	-0.086	-0.131
6	-0.113	-0.136	-0.117
7	-0.048	0.000	-0.222
8	-0.049	0.005	-0.256
9	-0.012	0.066	-0.264
10	-0.045	0.026	-0.222
15	-0.098	-0.016	-0.253
20	-0.038	0.071	-0.299
25	-0.161	-0.028	-0.592

Table 3. CAAR by Firm Size

Day	Small Firm	Medium Firm	Large Firm
1	-0.049	-0.145 **	0.044
2	-0.074	-0.144 **	0.098
3	0.004	-0.045	-0.005
4	-0.024	-0.070	-0.015
5	0.012	-0.198	0.062
6	-0.050	-0.218	0.041
7	-0.018	-0.196	0.252
8	0.039	-0.283	0.368 *
9	0.102	-0.226	0.322 *
10	0.216	-0.271	0.113
15	0.310	-0.554 **	0.386
20	0.434	-0.700 **	0.833
25	0.237	-0.775 **	0.705

Table 4. CAAR by Recall Size

Day	Small Recall	Medium Recall	Large Recall
1	0.009	-0.113	-0.206 **
2	0.093	-0.091	-0.235 **
3	0.209 **	-0.053	-0.377 **
4	0.194 **	-0.072	-0.333 **
5	0.140	-0.141	-0.250 *
6	0.026	-0.116	-0.266 **
7	0.240 *	-0.186	-0.077
8	0.119	-0.202	-0.105
9	0.107	-0.117	-0.108
10	0.008	-0.102	-0.281
15	0.074	-0.241	-0.431 **
20	-0.011	-0.333	0.000
25	-0.024	-0.317	-0.216

Note: ** and * denotes statistical significance at the 5% and 10% level, respectively

Conclusions

- Findings provide evidence of spillover effects of meat recalls across firms. However, whether competitor firms benefit or are harmed by recall events depends on several factors.
- Large volume recalls or recalls issued by a medium size firm cause negative effects to competitor firms. Conversely, recalls issued by small firms benefit rival firms.

References

Salin, V. and N. H. Hooker. (2001). "Stock Market Reaction to Food Recalls." *Review of Agricultural Economics*, 23 (1): 33–46.

Thomsen, M. R. and A. M. McKenzie. (2001). "Market Incentives for Safe Foods: An Examination of Shareholder Losses from Meat and Poultry Recalls." *American Journal of Agricultural Economics*, 82: 526–538.