

An Analysis of the First-Order Economic Costs of the 2008 FDA Tomato Warning

Andrew Meyerson

The Leonard N. Stern School of Business
Glucksman Institute for Research in Securities Markets
Faculty Advisor: William Greene
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I. Introduction

On June 7, 2008, the FDA issued a nationwide warning to consumers not to eat certain types of raw red tomatoes.¹ This warning followed a June 3 warning that was localized to New Mexico and Texas.² The reason for the warning was a sudden outbreak of salmonellosis, a form of food poisoning caused by the bacterium *Salmonella enteritidis*.³ Even more alarming was that it was *Salmonella* Saintpaul, a particularly uncommon strain of salmonella.⁴ At the time of the warning letter, since mid-April there had been a total of 145 cases of salmonellosis caused by *Salmonella* Saintpaul nationwide, including 23 hospitalizations.⁵ States affected included Arizona, California, Colorado, Connecticut, Idaho, Illinois, Indiana, Kansas, New Mexico, Oklahoma, Oregon, Texas, Utah, Virginia, Washington, and Wisconsin.⁶ Within a week, over 200 people had been sickened in almost half the country.⁷

The warnings covered all red Roma, red plum and red round tomatoes and any other products containing these raw, red tomatoes. The consumer reaction was swift as people began avoiding not only the tomatoes included in the warning, but also all other varieties of tomatoes even though the FDA explicitly stated that some varieties were safe. Stores removed them from their shelves and restaurant customers began ordering their customary dishes without tomatoes.⁸

¹ Press Release, FDA, FDA Warns Consumers Nationwide Not to Eat Certain Types of Raw Red Tomatoes (June 7, 2008) [hereinafter FDA Recall June 7].

² Press Release, FDA, FDA Warns Consumers Nationwide Not to Eat Certain Types of Raw Red Tomatoes (June 3, 2008).

³ FDA Recall June 7, *supra* note 1.

⁴ *Id.*

⁵ *Id.*

⁶ *Id.*

⁷ Jerry Hirsch, *Tainted Tomato Mystery*, L.A. TIMES, June 13, 2008, at C2.

⁸ *McDonald's Pulls Tomatoes: Recall Spreads After Salmonella Cases Reported*, THE CHARLESTON GAZETTE (W. Va.), June 10, 2008, at A1.

On July 17, 2008, the FDA updated its warning to lift the ban on tomatoes.⁹ For more than a month, the tomato industry suffered tremendous crop and profit loss, with the main tomato trade unions estimating the ban costing tomato farmers hundreds of millions of dollars.¹⁰ While the FDA declared tomatoes safe to eat, it also acknowledged that the actual source of the salmonella outbreak was still not determined. This means that tomatoes were not the actual cause of the outbreak and the warning was unnecessary. Moreover, the FDA went on to issue a warning against raw jalapeno and raw serrano peppers from Mexico, which currently remains in effect indefinitely.

The FDA has an obligation to protect the health of United States citizens, which includes warning the public about the sources of potential food-borne illnesses. However, there are also significant financial and economic consequences to food producers, manufacturers, and retailers that are subject to a FDA warning. Although the FDA recognizes crops spoil and can only be sold during a certain period of time, it still issues warnings regularly that may cause significant harm throughout the supply chain.

This paper seeks to determine the nature of the economic costs caused by a FDA produce warning such as the tomato warning this past summer. Through analysis and anecdotes, it will be determined who along the supply chain bears the costs, the nature of the costs, the hypothesized amount of the costs, and suggestions going forward to further explore the issue.

II. Food Processing, Retail, and Large Restaurants: Public Company Analysis

The downstream portions of the tomato supply chain are comprised mostly of companies that engage in food processing, food retail, and restaurants. Food processing includes companies that manufacture canned and jarred goods that contain tomatoes. This would include, for

⁹ Press Release, FDA, FDA Lifts Warning About Eating Certain Types of Tomatoes (July 17, 2008).

¹⁰ Dean Best, *FDA Faces Rotten Tomatoes Amid Salmonella Scare*, JUST-FOOD, June 12, 2008.

instance, companies such as Campbell Soup and Heinz, two companies that consistently use tomatoes in the processed products they sell. Retail companies include grocery stores such as Kroger and other forms of food retail such as SYSCO. Restaurants include both fast food restaurants like McDonalds as well as sit-down restaurants like Olive Garden (owned by Darden Restaurants).

These companies are all relatively large and the vast majority of them are public. It would be expected that any economic costs borne by these companies would be reflected in their stock prices, especially in the short term. Thus, by looking at a broad set of companies within these three verticals, it should be possible to assess whether they were significantly affected by the FDA warning. The companies included in the analysis are listed in Table 1. For consistency, only companies listed on the New York Stock Exchange were included. To test for an effect in the stock price from the warning, the change in stock price of each company was regressed against the change in the value of the NYSE from the period of May 12, 2008 through August 1, 2008 with additional variables surrounding the issuance and repeal of the warning. By analyzing the p-value of the coefficients of these variables, it can be determined whether it is statistically probable that the movement in the company's stock price was due to the news of the tomato warning. The results of the regression analysis are in Table 2.

Using a 0.05 significance level, the results strongly suggest that the stock prices of these companies at the time of the warning issuance and retraction were unaffected by these events. Of the 25 companies, only two, Safeway and Ruddick Corporation, exhibited a statistically significant connection between the stock prices and the two periods. Since both of these companies are in the Food Retail vertical, perhaps this indicates that there was an effect for these companies. However, while the significant period for Ruddick was when the warning was

issued, for Safeway it was when the warning was rescinded. The extremely high p-values for the other companies coupled with the fact that ultimately there was only one company with a statistically significant result in each period strongly suggests that a factor other than the FDA tomato warning is influencing the results for these two companies. In fact, Safeway both released its earnings and trimmed its sales projections date as the FDA rescinded its warning.¹¹ Similarly, Ruddick announced a joint venture for its industrial yarn spinning business within days of the FDA issuing its warning.¹² In both instances, this alternative company-specific news is more likely the reason why there was a reaction in their stock prices than the tomato warning.

A lack of significant effect among the downstream supply chain makes sense. Each of these firms is large and is well-diversified. Although all of these companies removed tomatoes due to the warning, they have so many other products available for sale that the overall effect on their earnings is not significant.¹³ A restaurant could, for instance, serve the same sandwich but leave off the tomatoes. Further, because not all tomatoes were subject to the warning, several of these companies were able to find substitutes.¹⁴ Thus, if one were to examine only the downstream public-company supply chain, a FDA produce warning seemingly has little economic impact.

III. Small Restaurants, Distributors, Farmers, and Migrants: Private Stakeholders

The main force protecting the public-company downstream supply chain is diversification. However, diversification is increasingly more difficult the smaller the company and the further upstream the supply chain a company is. For this reason, small restaurants, the tomato distributors, farmers, and field workers were all significantly affected by the tomato

¹¹ David Kesmodel, *Safeway Shares Tumble As Co Trims Sales Projections*, WALL ST. J., July 17, 2008.

¹² *Vardham Textiles in Joint Venture with US Company*, BUS. OF FASHION, May 31, 2008, at 47.

¹³ Interview with Reggie Brown, Executive Vice President, Fla. Tomato Growers Exch., on phone (Feb. 27, 2009).

¹⁴ David Hutton, *Demand Rises for Canadian Tomatoes*, THE GLOBE AND MAIL (Can.), June 10, 2008.

warning. Since virtually all of these stakeholders are private, though, precisely quantifying the economic cost of the tomato recall is problematic. As a result, the magnitude of the effect on these stakeholders will be determined through personal interviews and the public information they have made available in the press. Further complicating matters is that the geographic diversity in the source of tomatoes and the multiple varieties of tomatoes that can be grown in each location prevent generalizations about the industry as a whole. For this reason, this analysis will focus predominantly on the Florida tomato industry because it was the part of the overall tomato industry most affected by the warning.

Florida is the United States' largest producer of tomatoes, producing an annual crop that is valued between \$500 million and \$700 million.¹⁵ In 2006-2007, Florida's tomato industry had an estimated total direct and indirect economic impact of \$1.1 billion, providing over 15,700 jobs and contributing \$58 million indirectly to local and state tax revenue streams.¹⁶ Florida is responsible for roughly 50% of all fresh tomatoes consumed in the United States each year and for 95% of the domestically produced tomatoes consumed in the country between October and June.¹⁷ Since this includes the time of the outbreak, a large focus of the FDA's investigation was on Florida. What the FDA warning created was a perfect storm that caused harm to the tomato industry on many fronts.

III.1 The Immediate Disintegration of the Market

Once the FDA officially released its warning, there was a quick reaction from restaurants and grocery stores as all removed tomatoes from sale. Although they were not required to do so, they all did out of a concern for both litigation and the bad reputational hit that would result from

¹⁵ Julie Jargon, *Grocers and Restaurants Toss Out Tomatoes – Salmonella Scare Delivers a Blow to Crop's Growers*, WALL ST. J., June 10, 2008.

¹⁶ *Commissioner Charles Bronson Announces Florida Tomatoes Deemed Safe by the FDA*, US FED NEWS, June 10, 2008 [hereinafter Commissioner Bronson].

¹⁷ Florida Tomato Bits and Pieces, Florida Tomatoes, <http://www.floridatomatoes.org/bitsandpieces.html>.

one of their customers getting sickened from a tainted tomato they sold.¹⁸ In several instances, the stores were able to return the tomatoes to their distributors for a refund but in most cases the tomatoes had to be thrown out. While large corporations can handle these losses, smaller restaurants could not. The National Restaurant Association claimed that its members lost more than \$100 million due to the warning.¹⁹ Further, while some companies were able to return their tomatoes, the loss was pushed back upstream towards the distributors and growers. Without anyone to sell their produce to, the tomato industry, especially in Florida, was completely halted.²⁰ It is estimated that Florida alone had \$40 million worth of tomatoes in the distribution system at the time which could not be sold.²¹

Further, with no market for their products but fruit ready to be picked, several farmers chose to let the tomatoes rot on the vines rather than pay the cost to pick them.²² Because of the gentle handling required for tomatoes, tomatoes have to be harvested by hand. At the peak of Florida's tomato season, over 33,000 workers are employed to pick and process the fruit.²³ However, most of these workers are paid by the day and if there are no crops to pick then they do not get paid. With no alternatives, these migrant workers are effectively unemployed and unable to make a living.²⁴ Their loss of income cannot be replaced and are a true economic loss.²⁵

III.2 Unclear Communication from the FDA and Guilt by Association

¹⁸ Mike Stobbe and Seth Borenstein, *Why did food sellers treat tomatoes like hot potatoes?*, ASSOCIATED PRESS NEWSWIRE, June 10, 2008.

¹⁹ Editorial, *FDA's Ineffective Tomato Probe is Economic Hurricane for State*, TAMPA TRIB., July 2, 2008.

²⁰ Julie Jargon, *supra* note 15.

²¹ *Id.*

²² Interview with Reggie Brown, *supra* note 13.

²³ Facts and Sizes, Florida Tomatoes, <http://www.floridatomatoes.org/facts.html>.

²⁴ Alejandro Lazo, *Virginia Tomato Farmers Fear Backlash*, WASH. POST, June 14, 2008, at D01.

²⁵ *Id.*

When the FDA released its nationwide warning letter, it included a list of states and countries that were not subject to the warning.²⁶ The FDA did this in an attempt to be more communicative with the public, but instead it only created confusion.²⁷ As a result, while both certain varieties and certain growing states were safe, consumers avoided all tomatoes as a precaution.²⁸ For instance, farmers in California, the nation's second largest tomato producer and a state on the original safe-list, initially had their produce returned to them despite the FDA saying it was safe to eat.²⁹ The public eventually received more clarity as to which tomatoes were safe, but millions of dollars were unnecessarily lost in the meantime.

III.3 Unstable Prices

Beyond “guilt by association,” the FDA safe-list had other consequences the FDA likely did not intend that greatly affected the tomato industry. Since states were only slowly being added to the safe-list, the states that were on the list were able to enjoy premium prices for their tomatoes³⁰ while those left off were either not able to sell their tomatoes at all or only at a severe discount.³¹ This is because the largest tomato-producing state, Florida, was left off the original list, severely decreasing the available supply of tomatoes.³² Since only field-grown tomatoes were included, hot house tomatoes and the other safe varieties witnessed significant increases in their price as retailers and consumers scrambled for alternatives from the varieties included in the warning.³³ Also of note is that the vast majority of the “safe” varieties came from Canada and

²⁶ FDA Recall June 7, *supra* note 1.

²⁷ Editorial, *Rotten Tomato Response*, ALBANY TIMES UNION (N.Y.), June 12, 2008.

²⁸ *Id.*

²⁹ Joseph Ascenzi, *Tomato Crisis Endures*, BUS. PRESS, June 12, 2008.

³⁰ Nancy Luna, *California Tomatoes Become a Hot Ticket*, ORANGE COUNTY REGISTER (Cal.), June 11, 2008.

³¹ Kyle Arnold, *Left to Rot: Tomato-Salmonella Scare Spoils Season's Sale for Local Importers*, THE MONITOR (Tex.), June 12, 2008.

³² Interview with Reggie Brown, *supra* note 13.

³³ David Hutton, *supra* note 14.

Mexico meaning that the beneficiaries were not domestic farmers.³⁴ Further, as more and more states were added to the list, the premiums that could be paid disappeared as more supply was allowed to come to the market. As a result, there was a strong competitive advantage to being included on the safe-list as quickly as possible. For instance, from the beginning, Florida farmers insisted that their tomatoes were safe, but because they did not get FDA approval until three days after the initial warning, trucks carrying Florida tomatoes were consistently turned away.³⁵

Because of problems with the information flow from the FDA, states also spent significant sums on advertising their state's inclusion on the safe-list.³⁶ However, even the advertising was not enough to recoup the losses. As a result, Florida witnessed a significant reduction in both the amount and price of tomatoes it normally sells.³⁷ Before the issuance of the warning, Florida tomatoes were selling for around \$15-\$17 per crate with an upward trend in the price.³⁸ At the issuance of the warning, they could not be sold at any price and currently, 10 months after the warning, they only sell for \$7-\$8 a crate.³⁹ Because tomatoes are a commodity, recuperation of the losses cannot be passed on to consumers, meaning the farmers have to shoulder the burden. The rapid price fluctuations have created a lot of uncertainty for the farmers and it has affected their decisions about how many tomatoes to plant for the coming season.⁴⁰ While some farmers were able to take advantage of the warning by either selling a

³⁴ Interview with Reggie Brown, *supra* note 13.

³⁵ Russel Ray, *Florida Tomatoes Rejected Over Scare*, TAMPA TRIB., June 10, 2008.

³⁶ *Agriculture & Industries Commissioner Sparks: Alabama Grown Tomatoes on FDA "Safe to Eat" List*, US FED NEWS, June 9, 2008; Stephanie Hoops, *Tomato Ban Raises Concerns; California Crop Not Ties to Salmonella*, VENTURA COUNTY STAR (Cal.), June 10, 2008; Commissioner Bronson, *supra* note 16.

³⁷ Interview with Reggie Brown, *supra* note 13.

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

different variety or being from a “safe” state, there is an overall net loss to the industry as a whole.

III.4 No Insurance Reimbursement

Farmers are able to obtain crop insurance to protect themselves against crop loss due to inclement weather and other factors.⁴¹ Included in these factors is reimbursement for a FDA recall. However, since the FDA never issued a recall in this instance, the farmers’ crop insurance will not reimburse them for any of the losses they sustained as a result of the warning.⁴² This means that the farmers would have been better off with a hurricane destroying their fields than the FDA warning.

III.5 Long-term Consumer Reaction

The most significant cost farmers anticipate from the whole episode is the damage to the tomato’s image in the eyes of consumers.⁴³ The tomato industry had already witnessed the effect of a salmonella scare on the spinach industry a year earlier and knew that demand for spinach was still much lower than the pre-recall levels.⁴⁴ The extreme media coverage of the incident created tremendous apprehension among consumers about the safety of tomatoes. A poll commissioned by Deloitte Consulting found that 57% of respondents have stopped eating a particular food, either temporarily or permanently, following a recall.⁴⁵ It is precisely these kinds of statistics that worry the tomato industry.⁴⁶ It has recognized it is in a battle to win back consumers’ trust in order to ensure future demand for tomatoes grows. Still, once the loss of future demand is factored in, the losses due to the FDA warning increase significantly.

⁴¹ Interview with Dr. Mervin Kramer, President, EHA Consulting Group, on phone (Nov. 20, 2008).

⁴² Kris Hundley and Jessica Vander Velde, *Tomato Growers Predict Pasting*, ST. PETERSBURG TIMES (Fla.), June 12, 2008.

⁴³ Interview with Reggie Brown, *supra* note 13.

⁴⁴ *Id.*

⁴⁵ Syantani Chatterjee and Enn Zureick, *New U.S. Food Safety Scare Takes Toll on Consumers*, REUTERS NEWS, June 10, 2008.

⁴⁶ Interview with Reggie Brown, *supra* note 13.

IV. Conclusion and Next Steps

Overall, the FDA tomato warning is an episode both the tomato industry and the FDA wish never happened. The FDA came out poorly for being unable to identify the source of the outbreak and causing a public panic at the expense of the tomato industry. The agency faced tough criticism and renewed calls for change.⁴⁷ Future work should include an investigation of the most cost-effective ways for the FDA to ensure public health while doing as little harm as possible to particular industries.

The full extent of the damage is hard to quantify. Current estimates from the Florida Tomato Growers Exchange put the total losses due to the FDA's actions at \$500 million, the value of a full year's crop;⁴⁸ Georgia estimated its losses at around \$8 million;⁴⁹ a single distributor in Texas estimated its own individual loss at half a million dollars;⁵⁰ and the National Restaurant Association estimated its members' losses at \$100 million.⁵¹ Going forward, it would be beneficial to be able to accurately quantify the true costs to the industry. Regardless, the tomato industry suffered tremendous economic harm and its effects will likely be felt for years to come.

⁴⁷ Dean Best, *supra* note 10.

⁴⁸ Tom Bayles, *Tomato Growers Fault FDA for Losses*, SARASOTA HERALD-TRIB. (Fla.), July 1, 2008, at D1.

⁴⁹ Elizabeth Lee, *Financial Losses Add Up as Tomato-Related Outbreak Lingers*, ATLANTA J.-CONST., June 27, 2008, at E1.

⁵⁰ Kyle Arnold, *supra* note 29.

⁵¹ Editorial, *supra* note 19.

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Vardham Textiles in Joint Venture with US Company, BUS. OF FASHION, May 31, 2008, at 47.

VIII. Tables

Table 1: Primary NYSE-listed Public Companies involved in the Tomato Industry

Food Processing

Campbell Soup Company (CPB)
B&G Foods (BGS)
Archer Daniels Midland (ADM)
Kraft Foods (KFT)
H. J. Heinz Company (HNZ)
Unilever (UN)
ConAgra Foods (CAG)
Smithfield Foods (SFD)
Fresh Del Monte Produce (FDP)
Del Monte Foods Company (DLM)
Hormel Foods Corporation (HRL)

Food Retail

SYSCO Corporation (SYY)
Supervalu (SVU)
Safeway (SWY)
Weis Markets (WMK)
Ruddick Corporation (RDK)
Kroger (KR)
Wal-Mart (WMT)
Target (TGT)
BJ's Wholesale (BJ)

Restaurants

McDonald's (MCD)
Burger King Holdings (BKC)
Yum! Brands (YUM)
CKE Restaurants (CKR)
Wendy's Arby's Group (WEN)
Ruby Tuesday (RT)
Dominos (DPZ)
Darden Restaurants (DRI)

Table 2: Results of Statistical Analysis

Company	Constant	T-Value	P-Value	NYSE	T-Value	P-Value	Recall Issued	T-Value	P-Value	Recall Repealed	T-Value	P-Value
CPB	0.1325	0.59	0.56	0.6232	3.56	0.001	0.1778	0.31	0.755	-0.199	-0.31	0.76
BGS	0.0193	0.06	0.955	0.1742	0.67	0.508	0.2996	0.35	0.725	-0.0831	-0.09	0.932
ADM	-0.6101	-1.86	0.068	0.637	2.51	0.015	0.1051	0.13	0.899	0.032	0.03	0.973
KFT	0.2457	1.33	0.188	0.407	2.85	0.006	-0.6915	-1.49	0.141	-0.3628	-0.69	0.496
HNZ	0.1576	1.06	0.293	0.5125	4.46	0	0.3491	0.94	0.353	-0.4383	-1.03	0.308
UN	-0.3913	-1.45	0.153	0.7492	3.58	0.001	0.2489	0.37	0.715	0.6899	0.89	0.377
HRL	-0.1622	-1.08	0.284	0.2928	2.52	0.015	-0.1474	-0.39	0.697	0.2285	0.53	0.598
DLM	0.067	0.14	0.887	0.3494	0.96	0.342	-1.047	-0.89	0.38	0.18	0.13	0.894
CAG	-0.094	-0.33	0.741	0.4222	1.92	0.06	0.5266	0.74	0.462	-0.1599	-0.2	0.845
SFD	-0.5276	-0.83	0.413	0.4793	0.97	0.338	-1.647	-1.03	0.31	2.676	1.46	0.151
FDP	-0.8713	-1.46	0.151	0.2925	0.63	0.531	2.563	1.71	0.094	1.29	0.75	0.456
SYU	-0.0048	-0.03	0.976	0.8093	6.44	0	0.0566	0.14	0.89	0.168	0.36	0.72
SVU	-0.0203	-0.05	0.958	1.3203	4.46	0	0.2692	0.28	0.78	-1.87	-1.7	0.094
SWY	0.1911	0.57	0.571	0.8876	3.42	0.001	-0.0313	-0.04	0.97	-2.3698	-2.46	0.017
WMK	0.7475	2.67	0.01	0.8481	3.9	0	-0.6728	-0.95	0.344	-1.5322	-1.9	0.062
RDK	-0.3635	-1.49	0.143	0.841	4.43	0	1.262	2.05	0.045	0.1315	0.19	0.852
KR	0.3195	1.06	0.293	0.8855	3.79	0	-0.0549	-0.07	0.942	-0.8989	-1.04	0.303
WMT	0.0499	0.28	0.779	0.9424	6.88	0	0.7377	1.66	0.103	-0.0382	-0.08	0.94
TGT	-0.1431	-0.52	0.602	1.212	5.73	0	0.5261	0.77	0.446	0.1518	0.19	0.847
BJ	0.0835	0.22	0.829	0.7528	2.52	0.015	0.4483	0.46	0.645	-0.308	-0.28	0.781
MCD	0.0276	0.15	0.879	0.6807	4.85	0	0.3247	0.71	0.479	0.4632	0.89	0.377
BKC	-0.0316	-0.11	0.913	1.0616	4.74	0	0.5637	0.78	0.441	0.8866	1.07	0.29
YUM	0.1321	0.56	0.58	1.034	5.61	0	-0.4469	-0.75	0.457	-0.7089	-1.04	0.303
CKR	0.6045	1.25	0.215	1.4365	3.84	0	0.187	0.15	0.878	-0.754	-0.54	0.588
WEN	0.1765	0.46	0.649	1.3131	4.39	0	-0.6778	-0.7	0.487	0.037	0.03	0.974
RT	0.1495	0.24	0.808	2.4998	5.28	0	0.137	0.09	0.929	0.237	0.13	0.893
DPZ	0.5644	1.01	0.316	1.8209	4.21	0	-0.264	-0.19	0.852	-1.383	-0.86	0.392
DRI	0.1968	0.53	0.597	1.7137	5.98	0	-0.4084	-0.44	0.662	0.047	0.04	0.964
NYSE	-0.2275	-1.33	0.189				-0.1768	-0.41	0.687	0.5368	1.09	0.282

