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An Economic Perspective on Food Safety In Fruit and Vegetable Production

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An Economic Perspective on Food Safety in Fruit and Vegetable Production

Executive Summary

- Food safety has risen to the forefront as an important policy matter affecting both public health and grower profits.

- Outbreaks of food borne illnesses are typically accompanied by numerous press accounts of the incident, a decrease in demand, and a falling market price. A single outbreak can also have a lasting impact on the market, as the reputation of the industry or product may be damaged in the mind of the consumer.

- A recent NFAPP analysis evaluated the impact of adverse and positive information delivered through print media on California strawberry grower profits over for the period 1994 through 1997. During this time, two food borne illness incidents were experienced in this industry-the cyclospora scare of 1996 and the hepatitis incident of 1997. The observed positive articles may have been the result of the ongoing promotional or defensive efforts of the California Strawberry Commission (CSC)-spin control.

- It was found that adverse information substantially reduces grower profits, but that positive information can partially offset their negative effects. The bad news stories released between 1994 and 1997 caused grower returns to fall by between 37 and 53 million dollars. However, positive news stories allowed growers to recoup between 24 and 32 million dollars. Combined, the net losses to growers over this period ranged between 12 and 21 million dollars.

- Measures to prevent food contamination are costly. Currently these costs are incurred by individuals on a voluntary basis. However, the benefits accrue to many when they help to protect the image of the industry. Thus, individuals have an incentive to under invest in these systems.

- Grower associations, like the CSC, may be well served to redirect funds used traditionally for promotion towards effective industry directed food safety initiatives.

National Food and Agricultural Policy Project
Arizona State University

The Economic Value of Spin Control: Food Safety and the Strawberry Case

Food-Borne Illness and Industry Losses

Growers and their commodity associations are fully aware of the nature of the damage that a food borne-illness incident can cause to their industry. However, little is known of the exact cost to producers of such incidents. For example, California strawberry growers, who experienced two such incidents in 1996 and again in 1997, estimated the cost of the latter at some $40.0 million, but this was admittedly only a rough estimate. Beyond the loss of product that is actually found to be contaminated, the true cost lies in the damage done to a product's reputation with consumers as part of a safe, healthy diet. Such changes in consumers' perceptions may be long lasting, widespread, and very difficult to reverse. Moreover, the damage is often caused by one grower or packer, while all growers are made to suffer.

As growers evaluate the costs and benefits of adopting new production methods and techniques, accurate measures of these costs must be developed in order to be able to quantify the benefit to increased attention to food safety. This information can also be used to quantify the benefits of any defensive action taken by a commodity board, such as the California Strawberry Commission (CSC), in the aftermath of a disease outbreak. To the extent that a product's "clean reputation" is a public good, an analysis of the costs and benefits of trying to fix the damage once it is inflicted provides a measure of the amount that a group of growers, through their association, should be willing to spend on an industry-wide system of contamination control irrespective of any new government regulation.

Procedures for Estimating Grower Losses

The experience of California strawberry growers was analyzed over the period 1994 through 1997. In each incident affecting this industry (the cyclospora scare of 1996 and hepatitis scare of 1997), the potential health hazards associated with consumption of the fruit were chronicled in numerous news articles. The publicity linked to these incidents were observed to cause a decline in market prices, as consumers reduced their consumption of the product (see figure 1). This pattern has been observed in other commodity markets and is consistent with economic theory.

To evaluate the economic impact of these food borne illnesses incidences on growers, the number of negative articles related to strawberries which were indexed in the Dow Jones News Retrieval Service was counted. The impact of positive information was also taken into account and these articles were counted, as well. These information indicators were then introduced into a model of consumer behavior. Other studies have used a similar approach to measure the relationship between egg consumption and information on health and blood cholesterol levels. Parameter estimates from the consumer model were then used to evaluate the independent impact of good and bad news on grower profits, under varying assumptions on the responsiveness of growers in adjusting supplies to prevailing market conditions. In some instances, such as in the short run, growers have little

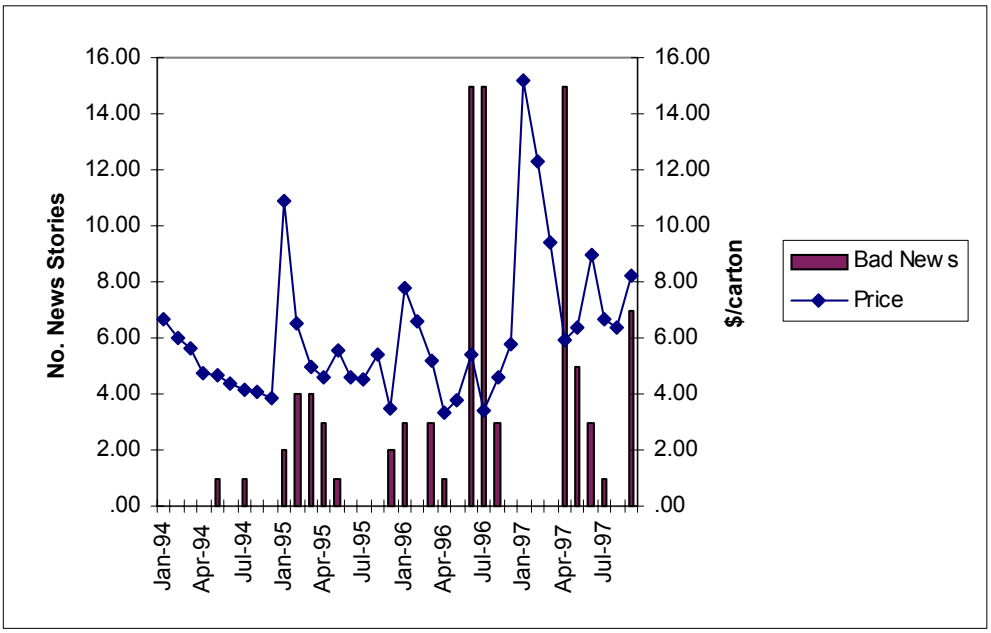

Figure 1. Negative News Stories and Strawberry Prices.

opportunity to adjust supplies delivered to the market. Over time, grower supply responsiveness (measured by the elasticity of supply) may increase. Their ability to respond, though, can have a substantial impact on grower profits. With few prior estimates on the supply responsiveness of strawberry growers available, the impacts of information on grower returns were evaluated under several plausible supply response scenarios. The change in grower returns were calculated for each month during the sample and expressed in November 1997 dollars through a future value calculation.

Findings

The consumer response model showed that bad news has a larger impact on market prices than good news. Over the long run, one additional bad news article causes market prices to decline by $0.60 per carton, while one additional good news article causes price to only increase by $0.36. These parameter estimates were next used to evaluate the impact of market information on grower returns.

Assuming that growers are not very responsive in adjusting market supply, the long run grower losses attributable to bad news over the sample period, is estimated at $53 million (see table 1). However, if they are indeed very responsive (particularly over the long term), then the losses sum to only $37 million. Under these same supply assumption, if the effects of good news (defensive actions or spin control) are also accounted for, then grower losses are limited to $21 million and $12 million, respectively. Thus, the estimated value of the spin control varies between $32 million and $24 million. Provided that the CSC spent less than $24 million in attempting to offset

misinformation or to change consumer perceptions, that money was well invested. However, could it have been better invested?

Table 1. Grower Losses Due to Unfavorable Media and the Value of Media Defense.

Grower Supply Responsiveness	Bad News	With Defense	Value of Defense
		$ Million	
None ($\eta = 0.01$)	-53.07	-21.38	31.69
Minimal ($\eta = 0.10$)	-52.06	-20.80	31.25
Some ($\eta = 0.50$)	-47.95	-18.49	29.46
Moderate ($\eta = 1.00$)	-43.56	-16.07	27.49
Very Responsive ($\eta = 2.00$)	-36.65	-12.41	24.24

All cases represent cumulative cost or benefit of all media exposure from January 1994 to October 1997. The elasticity of supply is denoted by η. Values are in millions of current dollars.

Although it sounds cliche, in this case an ounce of prevention may indeed be worth more than a pound of cure. Preventing a loss this large not just in revenue, but in *profit* provides ample justification for investing in an industry-wide safety-control program. The problem is that a disease-free reputation is a classic example of a public good. Because all growers benefit from this product-image, but none can be compelled to pay their individual benefit, the private market will fail to provide any protection at all. If it is rational for one grower to be a "free-rider," then it is rational for all to become free-riders. However, commodity organizations were initially established to provide another type of public good--generic commodity promotion. It seems natural, therefore, that commodity groups could treat contamination prevention as an equal and companion objective to promoting their products. Mandatory grower check-off fees would fund inspectors and industry-designed standards that would obviate the need for more government regulation of growers. In the strawberry industry, some of the largest, vertically-integrated grower-marketers have recognized the fundamental truth in this logic by investing in their own Hazard Analysis and Critical Control Point (HACCP) programs. To the extent that their strawberries are seen as close substitutes for all others, however, they are still subject to the risk that one culprit will again damage the buying public's image of strawberries as a safe and healthy food.

Recommendation

If a product's image among consumers as a safe and healthy alternative is considered a public good, then grower associations have an incentive to broaden their missions to include not only generic commodity promotion, but also to consider industry-wide efforts at preventing future disease outbreaks. Individual firms' efforts to develop HACCP programs or to adopt new production practices can be undermined by one individual that takes one risk too many.