Cornhusker Economics   Agricultural Economics Department

4-29-2009

Who Suffers Most when Disease Outbreaks and Food Recalls Happen? The Case of Mad Cow Disease in the United States

Sunil P. Dhoubhadel
University of Nebraska-Lincoln

Matt Stockton

Who Suffers Most when Disease Outbreaks and Food Recalls Happen? The Case of Mad Cow Disease in the United States

Market Report	Yr Ago	4 Wks Ago	4/24/09
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	$92.70	$83.49	$89.45
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.. . . .	123.56	111.58	116.51
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	105.64	93.21	99.48
Choice Boxed Beef, 600-750 lb. Carcass.	154.49	134.73	152.83
Western Corn Belt Base Hog Price Carcass, Negotiated.	71.34	57.22	60.63
Feeder Pigs, National Direct 50 lbs, FOB.	50.00	*	66.95
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean..	70.71	58.63	59.51
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.	83.50	89.75	93.50
National Carcass Lamb Cutout, FOB.	250.92	248.76	248.09
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	7.95	4.73	4.89
Corn, No. 2, Yellow Omaha, bu.	5.49	3.74	3.66
Soybeans, No. 1, Yellow Omaha, bu.	12.81	8.94	9.86
Grain Sorghum, No. 2, Yellow Dorchester, cwt.	9.32	5.70	5.43
Oats, No. 2, Heavy Minneapolis, MN , bu.	3.96	2.00	2.01
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	*	190.00	190.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	*	77.50	77.50
Grass Hay, Large Rounds, Premium Nebraska, ton.	*	85.00	85.00
Dried Distillers Grains, 10% Moisture, Nebraska Average.	177.00	128.00	132.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	67.00	49.25	48.50
*No Market			

It is generally observed that whenever there are cases of disease outbreaks and food recalls, such as the case of the 2003 Mad Cow Disease (Bovine Spongiform Encephalopathy or BSE) outbreak, cattle and beef prices fall. Given these incidents, there is the question of which part of the marketing chain is the most affected. For those who produce live cattle, such as feedlot operators, the question is 'what effect these events have on price and demand for beef and cattle?' Similarly, how do the Food Safety Inspection Service (FSIS) recalls and diseases such as Mad Cow Disease outbreaks affect the beef marketing margins at all levels in the U.S. beef marketing chain? Identifying these effects along the marketing chain provides insight into which level along that channel is the most vulnerable to these events. In addition, this information helps to assess the impact of such events on the industry, providing a basis for policy formulation.

Between the 2003-2006 period, three confirmed cases of BSE were reported in the United States (December 2003, Washington State; June 2005, Texas; and March 2006, Alabama). During this same time period six cases were reported in Canada (May 2003, January, April, July (two cases), and August 2006). The first confirmed cases of BSE in Canada and the United States had significant impact on trade and prices of both U.S. and Canadian cattle and beef (Coffey, et al. 2005; Almas, Collete and Amosson, 2005; Hanrahan and Becker, 2006; Mathews, et al. 2006). Moreover, following the BSE outbreaks, the United States announced a series of regulations which required slaughterhouses to remove certain tissue and bones from the market and find alternative disposal methods (Mathews, et al. 2006). These new regulations give rise to additional production costs, compounding the effects of any decrease in demand and price, resulting in reduced revenues for the beef sector.

The marketing margin is the difference or spread between prices at any two levels along a market chain or channel. For example, the price difference between the feedlot and the packer/processor (wholesaler) is the wholesale marketing margin or M_{fw}. Similarly, the retail margin (M_{wr}) is the price difference between the packer and retail stores. In this case, where only these three levels of the chain are considered, an inclusive margin being the price difference between feedlots and retail stores, is identified as the overall margin, or M_{fr}. Using these price margins in the Relative Price Spread (RPS) Model specified by Wohlgenant and Mullen (1987), wholesale (M_{fw}), retail (M_{wr}) and overall margins ($M_{fr} = M_{wr} + M_{fw}$) are estimated. These margins are scaled as dollars per pound, $/lb. The effects of BSE are incorporated as Polynomial Distributed Lag or PDL variable into the RPS model.

Monthly data from January 1982 to December 2006 are used, with the prices and quantities collected from the 2006 Red Meat Yearbook. The BSE and FSIS recalls are taken from official reports of several different federal agencies, which are available online. USDA reports were used to provide marketing cost index and market concentration information. All prices are adjusted to the 1982-84 base, using the consumer price index deflator.

The results of this study indicate that food recalls do not significantly affect marketing margins at any level of the beef marketing chain in the United States. BSE outbreaks however, significantly affect marketing margins. The BSE outbreaks in the United States are found to significantly increase the retail margin, while Canadian BSE incidences increase wholesale margins. The overall margin is significantly increased by BSE cases in both countries. The effect of BSE outbreaks on the marketing margins are passed from level to level over time. The model shows that it takes about two months to increase the marketing margins at both wholesale and retail levels. However, it takes about four months to affect the overall margin. It is estimated that for each additional case of BSE found in Canada the wholesale margin increases by $0.06 /lb, with the retail margin not statiscally altered. When a case of BSE is found in the United States no statistical difference in the wholesale margin is found, but a $0.18/lb increase in the retail margin is observed. The increase in overall margin is about $0.20/lb for an additional case of BSE in the United States, and $0.18/lb for an additional case of BSE in Canada.

Another way to measure the effects of BSE is through the use of a measure known as the Elasticity of Price Transmission or EPT. EPT is a measure of the percent change in one price relative to percent change in another. An EPT of one means that all the changes in price at one level are fully transmitted to

the next specified level. For example, a ten percent increase in feedlot prices will result in a ten percent increase in prices at the next specified level. An EPT close to zero indicates very little, if any price change is transmitted between those two levels in a market chain. From the producer's perspective it is desirable to have an EPT equaling one or more during any BSE outbreak. Estimated EPTs indicate that during normal periods (i.e., no BSE outbreaks), EPT is slightly above one for the wholesale level (EPT_{fw}), but it is less than one for the retail (EPT_{wr}) and overall (EPT_{fr}) levels. These measures indicate that changes in price at the feedlot are more than fully transferred to the processor, whereas processor's prices are not fully transmitted to the retailer, nor are prices between the feedlot and retailer fully transmitted. This indicates that the wholesaler bears a greater portion of any price shock. Even after the BSE outbreaks, EPT at the wholesale level remains above one while it is less than one at retail and overall levels (Figure 1 on next page). However, the magnitude of EPT decreases at all levels after these events.

These results are contrary to expectation. It seems natural to expect that during an event such as a BSE incidence, feedlots would have the highest percentage change in price, not the packer or wholesaler. While EPT measures percent price changes between levels in the marketing chain, it does not provide information on the impact on profitability. It is possible that equivalent percentage changes in prices result in different percentage changes in profit to the different level along the market chain. From these results we know the packer takes a higher percent change in prices than the feedlot producers, passing on less of the price impact. But what is not known is how this transmission alters profitably at the individual levels, making this an opportunity for further research. An EPT less than one may also be an indication that increases in retail price are not fully transmitted to producers by wholesalers, thus creating a cushion in prices and taking profits when available, but then reducing losses when they occur.

Sunil P. Dhoubhadel, (308) 696-6738
Research Analyst
West Central Research & Extension Center
University of Nebraska-Lincoln
Sdhoubhadel2@unl.edu

Matt Stockton, (308) 696-6713
Assistant Professor and Agricultural Economist
West Central Research & Extension Center
University of Nebraska-Lincoln
Mstockton2@unl.edu

References:

Almas, L. K., W. A. Colette and S. H. Amosson. 2005. "BSE, U.S. Beef Trade and Cattle Feeding Industry." Selected paper prepared for presentation at the Southern Agricultural Economics Association Annual Meetings, Little Rock, Arkansas, February 5-9, 2005.

Coffey B., J. Mintert, S. Fox, T. Schroeder and L. Valentin. 2005. "The Economic Impact of BSE on the U.S. Beef Industry: Product Value Losses, Regulatory Costs, and Consumer Reactions." Kansas State University, Kansas.

Hanrahan, C. E. and G. S. Becker. 2006. "Mad Cow Disease and U.S. Beef Trade." Congressional Research Service, the Library of Congress. Washington D.C.

Mathews, K. Jr., M. Vaneveer and R. A. Gustafson. 2006. "An Economic Chronology of Bovine Spongiform Encephalopathy in North America/LDP-M-143-01." Economic Research Service/ USDA. June 2006. Electronic outlook report from the economic research Service/USDA. Available at:
http://www.ers.usda.gov/publications/ldp/2006/06Jun/ldpm14301/ldpm14301.pdf

Wohlgenant, M.K. and J.D. Mullen. 1987. "Modeling the Farm-Retail Price Spread for Beef." *Western Journal of Agricultural Economics,* 12(2):19-25.

Figure 1: Elasticity of Price Transmission Four Months Before and After BSE Outbreaks