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BRIEFING

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Livestock Marketing Issues: Impacts on Feed Grain Producers

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Objective

Analysis

for Informed

Decision Making

Introduction

Supplies and prices of feed grains, particularly corn, are important determinants of livestock demands and supplies. For the beef industry, changes in corn prices affect feedlot cost of gain and, subsequently, prices of feeder cattle. Likewise, changes in feedlot cost of gain affect average slaughter weights, hence, prices of fed cattle (Anderson and Trapp). Cow-calf producers and feedlot operators pay close attention to corn market developments including corn production, ethanol demand, exports, etc. since these impact corn prices.

The purpose of this briefing is to evaluate the effects of economic changes in the beef industry on prices, production, and revenues in the corn feed grains sector. Corn constitutes about 92 percent of total feed grain production and about 94 percent of feed grains consumed by livestock and poultry. The briefing analysis focuses on contemporary issues in the beef industry that likely impact corn growers. These include: (1) changes in consumer demand for beef, (2) public health information linking cholesterol levels with red meat consumption; and (3) food

safety issues and animal disease concerns such as the 2003 cases of *Bovine Spongiform Encephalopathy* (BSE or mad cow disease) in Canada and the United States.

Demand Changes

From 1970 to 2003 domestic demand for beef in the United States declined by nearly 52 percent. Demand changes are based on an estimated annual beef demand index by the Livestock Marketing Information Center and Marsh (2003). The long term decline in beef demand has been attributed to changes in consumer preferences for beef (health, food safety, and quality consistency problems), demographic changes (population age distribution and ethnic population growth), and relative prices of competing meats (Marsh 2003). But since 1998 consumer beef demand has been increasing; this recent increase in beef demand has been attributed to positive effects of beef advertising and promotion, popularity of low-carbohydrate diets (i.e., Atkins diet), and increasing consumer incomes.

Health Effects

One persistent issue facing the beef industry has been public health information correlating blood serum cholesterol levels and heart disease to red meat consumption. This information is primarily based on studies published in medical journals and on food nutrition recommendations made by medical professionals and nutritionists. A recent study of health effects and the U.S. beef industry used an annual cholesterol information index to quantify public information about levels of cholesterol and beef consumption. This cholesterol index increased nearly four fold from 1970 to 2001, which has been interpreted to mean the public was exposed to more negative information about the health effects of red meats. The recent study concluded that negative cholesterol information associating heart disease with red meat consumption decreased consumer beef demand and prices, supplies, and incomes in the slaughter cattle and feeder cattle sectors of the marketing channel (Holzer). Cholesterol effects decreased revenues in these sectors, on average, by about one percent annually.

BSE Effects

Single cases of BSE (mad cow disease) were confirmed in May 2003 in Canada and in December 2003 in the United States. These two BSE cases resulted in noticeable short-run impacts on U.S. beef producers, but more noticeable longer-term impacts on Canadian beef producers. [In January 2005 two other BSE cases were announced in Canada,

and in June 2005 a BSE case involving a Texas cow slaughtered in November 2004 was confirmed. The price effects in these later cases were negligible.] Canadian beef producers lost critical export markets of live cattle to the United States from May 2003 to July 2005, and also important beef export markets to non-NAFTA countries, particularly Japan. The United States also lost critical beef export markets to non-NAFTA countries, the most important being Japan and South Korea.

Because of greatly reduced access to foreign markets for beef, Canadian and U.S. cattle prices substantially declined from the dates of their initial BSE announcements. By the fourth quarter of 2004 these price declines had moderated, but at different levels, with U.S. fed steer price having declined by about \$7 per hundred weight and Canadian fed steer price having declined by about \$26 per hundred weight. Canadian beef producers were more adversely impacted due to loss of export markets. About 40 percent of their domestic beef production is exported compared to the United States exporting about 8 percent of its domestic beef production. Marsh, Brester, and Smith (2005) estimated the net price impact from the 2003 North American BSE occurrences was a 7 percent reduction in U.S. fed steer price in 2004.

Model

The impacts of beef industry factors on the corn sector were quantified by developing an economic model of farm-level demands and supplies in the corn and livestock sectors. Feedback effects are accounted for between

the corn, beef, and pork sectors. From the estimated model, equilibrium multipliers and comparative statics were used to measure the effects of long term changes in beef demand, increased information about cholesterol, and BSE occurrences on corn prices, production, and revenues. Data for the model included the years 1970 to 2003. Analysis of any one market impact assumes all other market factors in the economic model constant.

Results

Table 1 presents the price, production, and revenue effects in the corn sector from long term declines in consumer beef demand, negative health information concerning cholesterol, and the 2003 occurrences of BSE in Canada and the United States. Estimates presented in the table are the result of multiplying the model equilibrium multipliers by percent changes in the demand, health information, and BSE variables, and then multiplying these results by average (1970-2003) corn prices and quantities. Prices and revenues presented in Table 1 are real, 1982-84 constant dollar values converted to 2003 nominal dollars. In the far left column of the table, demand change is the 52 percent decline in the beef demand index from 1970 to 2003, health change is the 132 percent increase in the cholesterol information index from 1970 to 2001, and the 2003 BSE change is represented by the 7 percent decline in fed steer price.

The revenue changes given in Table 1 are expressed in billions of dollars and as percentages of average corn revenues, 1970 through 2003. For example, the 52 percent decline in retail beef demand reduced corn price by \$0.21 per bushel, corn production by 0.43 billion bushels (430 million bushels), and corn revenue by \$2.93 billion (first row of Table 1). The revenue decrease was about 13 percent of average corn revenues.

The three beef factors of interest (demand, cholesterol, and BSE) would initially impact prices received and feeder calves produced by cow-calf producers. Thus, expected revenue changes in the corn sector are compared with expected revenue changes in the primary feeder calf sector. For example, the 52 percent decline in beef demand resulted in decreasing feeder calf revenue by 9.46 billion, which was 51.7 percent of average feeder calf revenues (Beef Revenue

column of Table 1). As expected, the beef demand decline was more important in the beef (feeder calf) sector.

The revenue estimates in Table 1 indicate the effects of beef demand, cholesterol information, and BSE occurrences on the corn sector were not trivial. Specifically, changes in these variables reduced corn revenues by \$2.93 billion (13.2 percent), \$1.30 billion (5.8 percent), and \$0.67 billion (3.0 percent), respectively (Corn Revenue column of Table 1). Their total effect amounted to \$4.90 billion, or 22 percent of average corn revenue. These revenue reductions were a result of economic forces decreasing corn prices and corn production. For example, the large increase in negative cholesterol health information resulted in reducing corn price by \$0.17/bushel (second row of Table 1). This reduction occurs as a result of decreased demand for feed corn by cattle

finishers. Moreover, the health issue caused a reduction in corn production by 260 million bushels due to decreased profit incentives from the reduced corn price. Note the cholesterol impact was relatively greater in the beef industry, decreasing feeder calf revenue by \$6.37 billion, or about 35 percent of average feeder calf revenue.

The least impact on the corn sector occurred from the 2003 BSE cases. Results indicated corn revenues were reduced by \$670 million, or 3.0 percent of average corn revenue (third row of Table 1). BSE also displayed the least impact in the beef sector, reducing feeder calf revenue by \$2.04 billion, or about 11 percent of average feeder calf revenue.

Table 1: Effects of Beef Market Variables on Corn Producers

Beef Variables Changing	Corn Variables Responding			Beef Variables Responding
	Corn Price (\$/bu)	Corn Production (bil. Bu)	Corn Revenue (bil \$)	Beef Revenue (bil \$)
Beef Demand	-0.21	-0.43	-2.93	-9.46
(52% decrease)			(13.2%)	(51.7%)
Cholesterol Index	-0.17	-0.26	-1.30	-6.37
(132% increase)			(5.8%)	(34.8%)
BSE (Mad Cow)	-0.05	-0.10	-0.67	-2.04
(7% decrease in steer price)			(3.0%)	(11.2%)
TOTAL	-0.43	-0.79	-4.90 (22.0%)	-17.87 (97.7%)

Note: Average (1970-2003) prices in nominal dollars are: corn price = \$2.96 per bushel and feeder calf price = \$75.35 per hundred weight. Average production for corn is 7.53 billion bushels and average calf crop is 42.24 million head. Feeder calves are assumed to weigh an average of 575 pounds. Average revenues for the corn and feeder calf sectors are \$22.28 billion dollars and \$18.30 billion dollars, respectively.

The BSE impacts in the corn and feeder calf sectors are based on a 7 percent reduction in fed steer price. According to Marsh, Brester, and Smith (2005), this steer price decline was primarily due to reduced access of U.S. beef to foreign markets. However, the steer price decline was mitigated by the U.S. moratorium on imports of Canadian live cattle (beginning in May 2003) and by relatively strong domestic beef demand. Consumer confidence in the safety of U.S. beef supplies was maintained with enactment of numerous USDA safeguards.

Conclusions

Declining consumer beef demand, negative cholesterol health information, and BSE (mad cow disease) in the beef industry not only affect beef producers, but corn growers as well. Added together, changes in these three factors reduced corn price by \$0.43/bushel, corn production by 0.79 billion bushels, and corn revenues by \$4.90 billion (Total row of Table 1). About 60 percent of the \$4.90 billion corn revenue reduction was due to the general decline in consumer beef demand, 27 percent was attributed to negative publicity of cholesterol information, and 13 percent due to the 2003 North American BSE cases.

Other factors such as weather, farm commodity programs, and international grain trade may overshadow the effects of livestock markets on corn producers. However, the study results emphasize that corn producers have a vested interest in current issues affecting livestock producers such as health and food safety, agribusiness concentration, international livestock and meat trade, and livestock marketing alternatives.

References

Anderson, J.D., and J.N. Trapp. "An Analysis of the Effect of Corn Prices on Feeder Cattle Prices." In Proceedings of NCR-134 Conference: *Applied Commodity Price Analysis, Forecasting and Market Risk Management*, ed., B. Wade Brorsen, pp. 240-54. Department of Agricultural Economics, Oklahoma State University, Stillwater, 1997.

Holzer, B.M., "Health (Cholesterol) Information and Economic Effects on the U.S. Beef Industry." Master's Thesis, Montana State University, Bozeman, MT, April 2005.

Livestock Marketing Information Center. "Miscellaneous: Annual Beef Demand Index." LMIC, Lakewood, CO, March 2005. Available at www.lmic.info/tac/graphs/graphframe.html.

Marsh, J.M. "Impacts of Declining U.S. Retail Beef Prices and Production." *American Journal of Agricultural Economics* 85 (November 2003): 902-13.

Marsh, J., G. Brester, and V. Smith. "Re-opening the U.S.-Canadian Border to Live Cattle and Beef Trade: Estimated Impacts on U.S. Beef Producers." Montana State University Agricultural Marketing Policy Trade Center. Forthcoming (Fall 2005).

United States Department of Agriculture. National Agricultural Statistics Service. *Agricultural Statistics*. Washington, D.C., 2004.

