Agricultural Marketing Policy Center

BRIEFING

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Distribution of Cost Efficiencies in the Beef Marketing Channel

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Objective

Analysis

For Informed

Decision Making

Cost efficiencies are an important factor in the red meat industry. These efficiencies refer to technological changes, resource configurations, and management strategies that result in firms reducing per unit costs of output (including risk). Cost efficiencies in livestock and meat marketing are critical for the economic survival of firms that compete in domestic and global markets. The adoption of computer information technology has particularly improved the cost efficiencies of firms in the marketing chain including auction barns, input suppliers (i.e., feed, energy, and transportation), livestock finishers, meat packers and processors, and wholesalers and retailers of meat products.

Improved cost efficiencies have been associated with structural changes in the food and agricultural commodity markets. In the red meat industry, cost efficiencies due to technological change and economies of scale have resulted in increased consolidation in grocery retailing, meat packing and processing, and to a lesser extent in animal finishing and production. For example, in 1975 the four-firm concentration ratios for retail grocers and beef packers (steers and heifers) were 54 percent and 25 percent, respectively. In the same year, about 17 percent of fed cattle marketed were sold from feedlots with more than 32,000 head capacities. By 2001, retail grocery concentration and meat packer concentration had increased to about 75 percent and 80 percent, respectively, while fed cattle marketing from feedlots with greater than 32,000 head capacities increased to about 45 percent.

Commensurate with cost economies and market concentration in the red meat industry have been concerns of increasing market power and inefficient price discovery. For example, some producers allege that large meat packer concentration has enabled packers to exercise market power by suppressing live cattle prices below competitive equilibriums. Some also allege that meat packers exploit captive supplies and value based (grid) pricing by respectively manipulating live cattle open market prices and base prices of beef carcasses. However, research studying these potential impacts has found very little evidence of market power abuse by meat packers. Some studies have even found that an adequate amount of competition exists in the meat packing industry as the positive effects of cost economies outweigh any negative effects of market power (Azzam and Anderson; Brester and Marsh; Ward).

Potential Cost Efficiency Effects

The livestock-meat marketing channel is complex due to the number of firms, products and services, exchange functions, transactions, and degrees of horizontal and vertical competition that exist. Livestock producers generally perceive the potential to capture marketing cost efficiencies in this channel to be limited. However, producer involvement in programs of forward integration such as retained ownership and marketing alliances has increased marketing flexibility and allowed cow-calf producers to extract benefits beyond the farm gate. But such benefits are often accompanied with additional risks.

Output prices relative to input costs are key to economic viability whether or not farm producers are involved in integrated systems. Economic theory states that prices received by producers at the farm level (or by marketing firms) depend upon relevant demand, supply, and marketing cost conditions. For example, prices received for steers and heifers by feedlot managers depend upon packer demand for fed cattle which depends upon retail demand for meat products, supplies of fed cattle which depends upon production of stocker and feeder cattle, and the magnitude of farm-retail marketing costs which depends upon the efficiencies of firms in the livestock-meat marketing chain. Other factors are also important in determining steer and heifer prices such as weather conditions, international trade, competition in the marketing channel, and government policies.

Producer interest in marketing cost efficiencies is based upon potential impacts of changes in marketing costs on cattle prices and revenues. Generally, two areas of concern expressed by cattle producers are: (1) the extent to which livestock producers receive price and revenue benefits from cost efficiencies that occur upstream at the meat packer, processor, and retail grocery levels, and (2) the distribution of price and revenue effects from cost efficiencies across farm producers and marketing-level firms.

Theoretically, if little competition exists in the red meat marketing channel, firms that realize cost efficiencies have little incentive to pass increased profits down the marketing channel in the form of livestock price increases. Thus, the farm producer may realize little price benefit from any marketing efficiencies. However, if competition exists in the red meat channel, farm producers should benefit from marketing cost efficiencies as upstream firms bid competitively for livestock inputs.

The expected price benefits and distribution effects of cost efficiencies among livestock producers and marketing firms depends upon several factors: (1) the point in the marketing chain at which cost changes occur and the magnitude of the cost changes; (2) the extent of competition and market power among firms in the marketing chain; and (3) demand and supply elasticities at each level of the marketing chain, i.e., the responses of buyers and sellers to relevant price changes. For example, if livestock producers respond less to a cattle price change then consumers do to a meat price change, producers would receive a proportionately greater price benefit (than would consumers) for an increase in marketing cost efficiency.

Cow-calf producers would more likely receive a higher price benefit if feedlot technology substantially reduces finishing cost of gain compared to grocery retailers reducing unit labor costs. Also, producers would receive higher farm prices if buyer-seller competition between feedlots and meat packers was strong compared to monopoly power in these sectors, or if the elasticity of feeder cattle supply was less than the elasticity of consumer demand for meat products. The latter implies, for any reduction in marketing costs, that producers would receive a relatively greater price increase than consumers would receive a price decrease since feeder cattle producers have fewer alternatives.

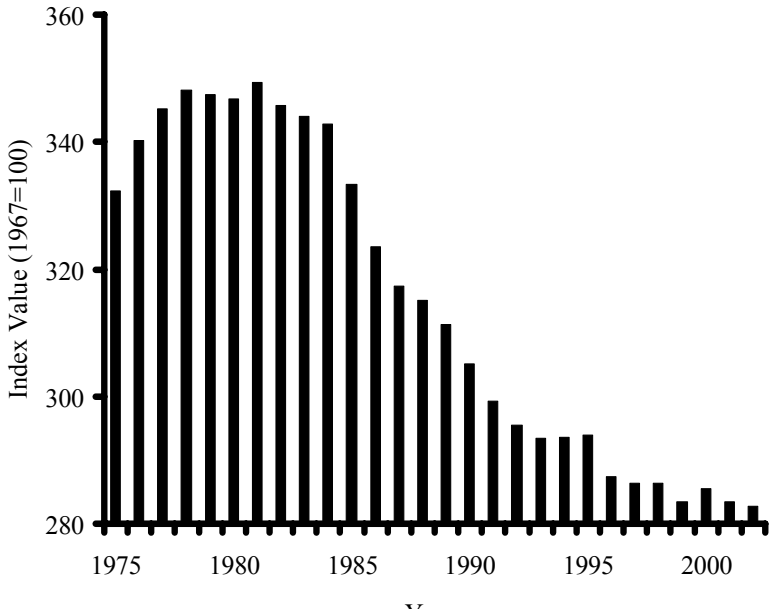
Measuring Cost Efficiencies

Because of diverse technology and resource use by firms in the livestock-meat marketing channel, defining cost efficiencies as a *specific measure* is difficult.

However, the USDA does provide marketing cost information with a *food marketing cost index*.

This price index is comprised of weighted food cost components including labor wages (processing, wholesaling, and retailing), packaging, transportation, energy, advertising and communications, interest, taxes, and other services. Conceptually, adoption of new technologies or changes in resource use by firms can increase marketing efficiencies by reducing these marketing costs. Efficiency examples include improved animal genetics, computer information technology, new processing and handling methods, capital substitution for labor, and investment in human capital (training and education). Generally, improvements in cost efficiencies are reflected by increasing factor productivity.

Figure 1: Inflation Adjusted (1982-1984 Constant Dollar) Marketing Costs, 1975-2002.



For example, from 1975 to 2001 productivity in cattle finishing (proxied by average live cattle weights) and productivity in beef processing (proxied by meat output per employee hour) increased by about 21 percent and 44 percent, respectively.

Figure 1 shows food marketing costs adjusted for inflation (1982-84 constant dollars) from 1975 to 2002. The data indicate real marketing costs increased by about 4 percent from 1975 to 1980, but from 1980 to 2002 real marketing costs declined by about 18.5 percent. This declining trend suggests increasing cost efficiencies in the food marketing system, which raises the question of potential price and revenue impacts on livestock producers and upstream marketing firms.

Marketing Cost Impacts

A statistical model that estimates market demands and supplies in the feeder cattle, fed cattle (steers and heifers), nonfed cattle (cull cows) and boxed beef (wholesale) sectors was used to evaluate the effects of cost efficiencies on prices and revenues. Total elasticities were developed to measure the effects of changes in real marketing costs on each of these cattle and beef sectors in the beef marketing channel. Specifically, the statistical model and elasticities were used to measure: (1) the long-run effects of changes in food cost efficiencies on cattle and meat prices and production at the feeder, slaughter (fed and nonfed), and wholesale marketing levels, and (2) the distributional effects of changes in food cost efficiencies on prices and revenues among the live cattle and meat sectors.

Table 1 presents the estimated price and revenue impacts in the beef sectors (in 2002 dollars) from increased food cost efficiency. The increase in food cost efficiency is represented by the 18.5 percent decline in real food marketing costs between 1980-2002. Based upon USDA's composition of this index, most of the real cost declines occurred at the food processing, wholesale, and retail levels. The estimates in Table 1 reflect two major findings: (1) the price and revenue effects of increased marketing cost efficiencies are not confined to the meat packer-to-retail level, but are also passed down to the slaughter cattle and feeder cattle levels, and (2) the reduction in marketing costs were not entirely allocated throughout the marketing system, but what was allocated resulted in an uneven distribution of price and revenue effects among the different beef sectors.

Results indicate that the boxed beef sector benefited most from the 18.5 percent decline in real food marketing costs. For example, the decrease in food marketing costs increased boxed beef price by $16.10/cwt, slaughter prices (fed and nonfed) by $5.62/cwt, and feeder price by $3.09/cwt. This indicates that food retailers paid higher prices for wholesale meat products with reduced marketing costs. Thus, 65 percent of the total price increase was allocated to the wholesale beef market with 23 percent and 12 percent allocated to the slaughter and feeder cattle markets, respectively.

When marketing chain prices increase (as in this case) relevant supplies also increase because producers at each market level perceive an increase in expected profits. Thus, the estimated revenues in Table 1 reflect both price and quantity increases from the reduction in real marketing costs. As with prices, the greatest revenue increase occurred at the wholesale level ($4.67 bil.), followed by revenue increases at the slaughter ($3.59 bil.) and feeder ($1.84 bil.) levels. The bottom row in Table 1 shows the revenue distribution among the sectors to be 46 percent, 36 percent, and 18 percent, respectively. Because of the supply responses, the revenue distribution is less skewed towards the wholesale sector compared to that of the price distribution.

Table 1: Distributional Effects of a Reduction in Real Food Marketing Costs (18.5 percent) on Prices and Revenues in Livestock and Meat Sector

	Market Level			
Price/Revenue	Wholesale	Fed	Nonfed	Feeder
Boxed price	+ $16.10 cwt			
Boxed revenue	+ $ 4.67 bil.			
Fed price		+ $5.22 cwt		
Fed revenue		+ $2.73 bil.		
Nonfed price			+ $0.49 cwt	
Nonfed revenue			+ $0.85 bil.	
Feeder price				+ $3.09 cwt
Feeder revenue				+ $1.84 bil.
Percent distribution	46%	27%	9%	18%

Note: Wholesale level refers to boxed beef sector. Fed level refers to the fed cattle sector. Nonfed level refers to the cull cow sector, and the Feeder level refers to the feeder cattle sector. Percent distribution (bottom row) is the percentage allocation of *revenue* changes among the sectors.

Conclusions

Cost efficiencies in the agricultural and food marketing system, particularly those pertaining to the processor-to-retailer level, are passed back in terms of higher prices in the live cattle markets. This suggests a certain degree of competition in the livestock-meat marketing channel as food retailers, meat processors, and livestock finishers bid up the value of meat products and livestock commodity inputs as marketing costs decline. But the distribution of price and revenue benefits are skewed towards the processor-retailer level of the marketing chain. The study does not address reasons for the skewness, but they can range from differing demand and supply elasticities to unequal market power in the vertical marketing channel. Several studies have indicated meat packers demonstrate little market power over sale prices of boxed (wholesale) beef; however, they have shown retailers to exercise buying power over prices of wholesale meat products. In addition, other studies have indicated meat packer buying power over live cattle prices could exist at certain times and in certain regions, but any depressing effects on prices were shown to be minimal.

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