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## **Value-Based Pricing of Fed Cattle: Challenges and Research Agenda**

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## **Value-Based Pricing of Fed Cattle: Challenges and Research Agenda**

### **Abstract**

Beef has lost considerable market share because it does not offer adequate value to consumers. An important component of value is quality problems related to pricing cattle on averages. This study summarizes results of industry surveys solicited to investigate this problem. A research agenda to resolve the problem is proposed.

## **Value-Based Pricing of Fed Cattle: Challenges and Research Agenda**

Beef's share of total meat consumption declined precipitously over the last four decades (Purcell). Although much of this decline has been attributed to changes in relative prices (Schroeder, Mintert, and Brester), there is evidence, especially the past decade, that losses of market share are also related to problems with beef quality (Smith et al. 1992, 1995). Improving beef product quality relies critically upon the market relaying consumer demands to producers. Jones et al. concluded that wholesale beef value differentials were not fully reflected in live cattle prices, confirming what has been called pricing cattle on averages. Pricing cattle on averages inhibits communication of consumer demand to producers.

Price is the most important signal to encourage production of beef products demanded by consumers. Price incentives must be present for producers and processors to target production and marketing management decisions. In order for the pricing system to provide appropriate signals, accurate measurement of beef quality attributes is necessary. Inability to accurately measure beef quality and pricing cattle in a manner that does not fully reflect value differences across animals are two problems the beef sector needs to resolve if the industry is going to reverse its market share loss in meat consumption.

This paper documents problems associated with measuring fed cattle value and identifies ways to improve cattle pricing to more closely match beef product value differences. Research is needed to solve this problem. Therefore, the paper culminates by identifying a research agenda needed to improve beef industry market coordination.

## **Procedure**

This research synthesizes information primarily from two sources: 1) interviews with beef industry participants, and 2) previous research. To discern industry perspectives regarding problems in fed cattle pricing, a series of intensive in-person and telephone interviews were conducted. Firms interviewed were from a targeted group of operations located primarily in major cattle feeding and packing regions of the central U.S. Interviewees included upper management and/or owner-managers of selected cattle feeding firms, beef packing firms, beef product retailers, and industry organizations. Interview participants were selected so as to have representation from major cattle feeding regions, a diversity of firm sizes (with emphasis on firms with large market shares), and from operations likely to be significant forces in the beef industry over the next decade. As such, the interviews do not represent a random, scientific sample.

Firms interviewed included 5 of the largest beef packers representing an approximate annual kill capacity of 25.5 million head. Packers interviewed were the largest multi-plant firms and single-plant firms. Also in the interview sample were 8 of the 25 largest cattle feeding operations plus a few smaller cattle feedlots representing a combined total of approximately 3.4 million head of annual fed cattle marketings. Information collected from interviews was combined with previous research to discern problems associated with value-based pricing in the beef industry and to identify future research needs.

## **Identifying Beef Quality**

Surveys of beef purveyors, packers, restaurateurs, and retailers in the 1995 National Beef Quality Audit (Smith et al. 1995), revealed the top 5 quality concerns were: (1) low

uniformity and consistency; (2) inadequate tenderness; (3) low palatability; (4) excessive external fat; and (5) beef's price is too high relative to value. These problems are related to determining and paying for fed cattle value.

Federal beef quality grades are the primary source of categorizing beef quality differences. Since their inception in the 1920s, concern has existed about whether federal beef quality grades accurately measure quality and, therefore, value. The USDA's quality grades categorize carcasses based primarily upon a visual assessment of degree of marbling. Beef quality grades are correlated with consumer meat palatability ratings (Smith et al. 1987). However, Wheeler, Cundiff, and Koch (p. 3150) concluded that beef “.. marbling explained at most 5% of the variation in palatability traits.” They suggested that “USDA quality grade does not sufficiently segregate carcasses for palatability differences, and thus a direct measure of meat tenderness is needed to supplement USDA quality grade,” (p. 3150).

Most industry participants surveyed indicated the current federal beef quality grading system is too subjective. USDA quality grades are determined by graders based upon subjective visual appraisal. Several industry participants felt that USDA beef quality graders located at packing plants in the Southern Plains had upward biased grades because of generally lower average quality cattle in the region. Others felt grading inaccuracy occurred randomly, but was subject to excessive judgement errors.

USDA quality grades do not adequately categorize beef carcasses according to characteristics of most concern to consumers. Although quality grade is related to palatability, variance among eating experiences is great enough within each grade that

consumers have a significant probability of an unsatisfactory eating experience, even if they purchase beef of the highest quality grades. This is because of grading subjectivity and because marbling has not been a good predictor of beef tenderness or palatability.

Many cattle feeders felt their role in influencing beef quality was limited to sorting for weight and color or breed, finishing for projected Choice quality grade, and proper cattle handling. Koohmaraie et al. (1996) cautioned that although breed is related to tenderness, breed alone does not ensure tenderness. In fact, variation of tenderness and palatability *within* breeds is as great as variability *across* breeds. Given heterogeneity of the beef herd, there will always be a distribution of beef product quality. The crucial issue is accurate quality categorization and sorting of beef in this distribution. This is important because producer alliances with the goal of targeting beef to specific markets will find success elusive if they rely on current beef quality grades, cattle breeds, and genetics to ensure product tenderness and consistency.

One alternative to current USDA quality grades to determine beef quality is to use mechanical tenderness measurements. Koohmaraie et al. (1993) recommended using mechanical tenderness testing to sort beef carcasses using Warner-Bratzler shear force meat tenderness scores. This would eliminate concerns regarding grading subjectivity and would also ensure meat of the highest quality is tender. They further suggested chemically treating tough beef products to increase tenderness. This quality assurance would allow meat products to be better targeted to the end consumers. Targeting meat products to specific consumers requires careful meat sorting and identification in beef packing plants. Increased costs of measuring tenderness and sorting would need to be offset by higher

prices for higher quality meat products. In particular, “guaranteed tender” beef cuts may be more expensive than current beef.

In addition to problems measuring beef quality, difficulty in predicting red meat yields from live cattle or carcasses also presents a significant obstacle. Projecting primal weights using carcass information is essential if producers are going to be paid for value differences (Dolezal). If red meat yields cannot be accurately predicted on a carcass-by-carcass basis, packers face risks of primal yield variability which increases their costs and leads to lower fed cattle prices. To solve this problem, meat yields either need to be projected from carcass traits by development of technologies such as video imaging, or identity preserving technology needs to be developed that can track primal cuts from carcasses through fabrication.

### **Pricing to Value**

#### **Pricing on Averages**

Cattle feeders have long voiced concerns that fed cattle are bought based upon averages. They assert that higher quality cattle receive the same price as lower quality cattle. Research indicates that, in a strict sense, this is not correct (Ward 1981 and 1992; Jones et al.; Ward, Koontz, and Schroeder). Packers pay higher prices for pens of cattle with a higher percentage of Choice or Prime quality grade and a higher percentage of yield grade 1-3 cattle. However, Jones et al. found that differences in live weight transaction prices paid for fed cattle in western Kansas reflected only about 25 % of estimated wholesale value differences.



Fed cattle have been priced predominantly on a live weight basis, though Packers and Stockyards Administration data (GIPSA) indicate carcass or dressed weight pricing has increased, reaching 45% of slaughter in 1994 compared to 27% in 1980. The percentage of fed cattle priced on a carcass basis varies considerably among the major cattle feeding states, ranging from 65.9 % in Nebraska to just 14.1 % in Texas (TAMRC). Fed cattle prices more closely reflect actual wholesale values as cattle pricing moves from live weight, to dressed weight, to dressed weight and grade (Stout and Thomas; Feuz, Fausti, and Wagner).

Value based marketing is a stated goal of the beef industry (Value Based Marketing Task Force), but achieving it is difficult. Value based marketing and pricing are concepts meant to link price and value and more accurately communicate consumer demands to producers. However, there are economic incentives to trade cattle on averages. Many feedyards sell a large number of cattle with a quality distribution roughly equal to the distribution of all cattle in the region offered for sale that day. The typical packer buys large numbers of cattle in a region on a given day. Both packer and feeder gain by grouping cattle into one transaction and pricing them at the average price for the day. The feedlot benefits by not having to search for buyers and not having to separately determine asking prices and negotiate price for each pen of cattle. The packer benefits by getting a large number of cattle from one location in a short period of time at lower transactions cost than if prices were individually negotiated.

If cattle in a feedlot are not all owned by the same individual, pricing on averages creates significant welfare losses to owners of high quality cattle who subsidize owners of

poor quality cattle when they are combined in the same transaction. But even in this case, the feedlot manager has incentives to sell a large group of cattle on the average and the packer still has incentive to buy them in this manner. Such economic incentives help explain why carcass-based cattle pricing is more popular in areas with smaller feedyards such as Nebraska, which often market their own cattle or cattle in retained ownership.

### **Marketing Agreements and Alliances**

Several efforts have been made to move toward value based marketing and pricing. Among them are exclusive marketing agreements, strategic alliances, formula pricing, and grid pricing. One of the first and largest exclusive marketing agreements was formed in the late 1980s by Cactus Feeders and IBP. The Cactus-IBP agreement deviated from the common practice of negotiating with packers for each pen or show list of cattle and all sales were on carcass-merit. Several similar arrangements followed over the next few years. Essentially these exclusive marketing agreements are long-term, full-supply contracts. They are long-term in the sense they are on-going, revolving contracts, rather than a contract for each pen or show list of cattle traded each week. Cattle feeders agree to provide cattle to a packer with price based on some formula arrangement which may specify an acceptable quality of cattle (yield, quality grade, yield grade, and carcass weight), with provisions for cattle not fitting specifications.

Several incentives exist for forming or participating in exclusive marketing agreements or alliances. Nearly all relate to moving toward value based pricing; improving price signals between stages in the vertical production, processing, and distribution channel; overcoming problems associated with and related to pricing on averages; and reducing the

adversarial relationship between feeders and packers. However, these agreements also alter the role of agents involved in the agreement in that cattle feeders and buyers spend less time discovering cash prices and more time negotiating terms of the agreement. This suggests a need for different information and skills in development of marketing agreements than common cash cattle trade.

### **Formula Pricing and Price Grids**

Most marketing agreements and alliances involve formula pricing and pricing cattle on a carcass weight basis using grid pricing. The pricing formula in most marketing agreements consists of a base price with premiums and discounts for carcasses above and below the base quality specifications. Base prices and grids can be established in many different ways. How base prices and quality premiums and discounts are established has significant implications regarding price discovery in fed cattle markets.

Several base price sources were mentioned in our interviews. One was the average price of cattle purchased by the plant where the marketing agreement cattle were slaughtered. Other base prices were specific market reports, e.g., highest reported price for a specific market. One base price was tied to a reported price for the live cattle futures market price. In some cases the base price was negotiated. Some base prices were stated on a carcass weight basis. Others were on a live weight basis, but based on yields of the cattle slaughtered. Some expressed the need to tie the base price to boxed beef prices, if a means could be identified to accurately measure red meat yield for each primal cut.

Which of these base pricing methods is most widely adopted influences where price discovery originates in the beef industry. For example, base prices tied to wholesale

boxed beef prices increase the need for better pricing information at the wholesale level and increase incentives to develop a carcass or boxed beef futures contract. Alternatively, base prices formulated from plant average live prices or from external cash markets, rely on what could be thin cash trade to establish base prices. This increases the burden of price discovery on those trading cattle in the cash market suggesting continued need for more information in this market regarding expected supply and demand conditions especially relative to cattle tied up in marketing agreements.

Our surveys revealed that premiums and discounts in grids or formulas also varied. Some were based on plant averages. Others were negotiated. Some feeders indicated they considered premiums and discounts estimated from software developed by Dolezal and negotiated based on those estimates.

Several potential base prices can be identified and used and premiums and discounts can vary widely. Thus, any given pen of cattle could be sold using various formulas or grids and its computed price vary greatly. Consequently, it is important that cattle feeders understand the options for choosing base prices, premiums, and discounts, and that they understand the trade-offs within the grids, especially regarding cattle quality.

With improved public information about pricing grids, cattle feeders are in a better position than ever to sell cattle on a carcass basis. Improved market information allows them to know more about market discounts and premiums so they can target their sales to the most advantageous market outlet. Consumers have indicated a willingness to pay more for consistent high quality beef (Boleman et al.). Therefore, processors that can efficiently identify beef quality more accurately than current USDA quality standards may

be able to develop branded beef products and capture brand premiums. Being able to identify and guarantee consistent high quality beef products would allow packers to better target and segment their markets. Long term agreements with retailers and food service firms may be a necessary component of vertical alliances and these agreements may need to include improved monitoring of product quality.

### **Research Agenda**

The challenges facing the beef industry in better measuring beef quality and move away from average live-weight pricing are significant. Improved price discovery and vertical coordination are essential for beef to maintain future market share. One theme that pervades the beef sector is that the industry desperately needs to produce products possessing greater value to consumers. Value means the product must be priced competitively, it must be convenient, and it must provide a consistently desirable eating experience for consumers. These attributes have proven immensely difficult for the beef industry to manage. A myriad of beef products and product qualities are produced from cattle, and the target markets represent such a diverse set of consumer demands, that there is no simple solution to the industry's struggle for market share. Assurance of beef tenderness would go a long way towards solving quality problems in the beef industry. Consumers have demonstrated a willingness to pay for tender steaks (Boleman et al.), therefore, if feasible quality identification processes can be developed, there may be opportunity to recover these costs. However, much of the change taking place desperately needs more information and research by agricultural economists. The following is a list the types of research needs agricultural economists can contribute to this

industry:

- Research is needed on the economic feasibility of adopting improved beef quality identification and measurement. Technologies to be evaluated include mechanical quality grading of beef, video imaging of beef carcasses, mechanical tenderness evaluation, and meat product identification tracking systems. These technologies are in early development stages and economic feasibility will determine which approaches are adopted.
- Information is needed regarding how much consumers are willing to pay for beef products that more specifically match their demands. For example, how much will consumers pay for guaranteed tender steaks compared to current quality graded cuts? Costs associated with this change are substantial and probable returns must be known with more certainty before the industry can afford to make large capital investments in new technology.
- All segments of the beef industry, from cow/calf through retail, need more information regarding risks, costs, and expected returns associated with developing longer-term contractual agreements. Many of these agreements or alliances could substantially alter both the risks and expected returns for the parties involved, yet little is known about how these agreements alter risks and returns.
- As increasing numbers of cattle are marketed through alliances and marketing agreements, research is needed on how to ensure competitive pricing when publicly reported prices represent progressively less of the total market trade for fed cattle.
- Consideration needs to be given to non-price means of coordinating beef markets.

The pricing system may not always coordinate markets with such a complex nature as the beef industry. Inherent biological lags together with the broad diversity of underlying genetics produced in a decentralized fashion make beef industry adjustments to price signals at the consumer level problematic. This increases search and transaction costs together with risk associated with procuring cattle having particular specifications, encouraging nonprice means to coordinate the market. Research examining other means of efficiently transmitting market signals would be beneficial to this industry.

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