LOST OPPORTUNITIES IN BEEF PRODUCTION

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INTRODUCTION

U.S. beef producers must compete on a relative price and quality basis with U.S. producers of other meat as well as with foreign producers of beef. Compared to pork and poultry beef has become less competitive in the U.S. since the 1970's. In 1970 beef sold for about 1.3 times the price of pork and twice the price of broilers. During the first half of 1990 beef sold for 1.4 times the price of pork and 3.2 times the price of broilers.

These relative price increases for beef have contributed to declining demand and lost market shares. In 1970, beef enjoyed a 42 percent market share of 201 pounds per capita total meat consumption. By 1989, consumers purchased a record 220.5 pounds of total meat but the market share for beef had declined to 31.2 percent. Projected figures for 1990 indicate another drop to a 30.5 percent market share for beef.

Much of the changing price relationship between beef and the other meats can be explained by changing costs throughout the production/processing/marketing chain. Competing meats have been more aggressive in reducing production costs and processing/marketing margins than beef. Cost reductions, in part, relate to the natural biological advantages of other species. Shorter generation length and multiple births result in faster genetic change and accommodation of consumer preferences.

Other cost differences relate to the makeup or structure of the industries. Beef is produced and consumed in a dispersed and segmented industry consisting of seedstock, cow-calf, stocker/grover, feedlot, packer/fabricator, breaker/distributor, retailer and consumer segments. By comparison, poultry (and increasingly pork) is produced and consumed in a system with fewer steps -- integrator/grover, retailer and consumer. An integrated system costs less because fewer middlemen make a margin.

Imagine a beef system without stocker/grover operations, no auctions or order buyers, no purveyor/meat brokers, very few feed dealers, only a handful of genetic companies and possibly no futures market and you can see a lot of overhead currently being paid by someone in the beef industry is eliminated. That is basically the system the integrated poultry industry operates on today. It's efficient and low-cost, but not real popular with those segments or producers who perceive they may not have a role (or that their role might be significantly altered) in a functionally integrated beef production system.
The integrated system also allows a shorter response time to economic signals of changing consumer preferences. Decisions to change genetics, production practices, processing or packaging technologies, or marketing techniques can be made in response to market signals from the consumer by a board of directors of an integrated firm in a relatively short period of time. The dispersed segmented system relies on market signals from sector to sector (and there are nearly three times as many sectors). "Producer education" and "policy by democracy" are relied upon to evolve change by consensus over a period of years. Consumer preference continues to erode due to the slow response in developing new products and adjusting products to consumer market signals.

Even without embracing the integrated structure, many economic opportunities from excess costs in the current beef system could be corrected to reduce the overall cost of delivering beef to the end consumer. A brief description of the more visible opportunities and a brief summary analysis are presented followed by an annual summary total in Table 1: Economic Opportunities Lost to the Beef Industry Annually.

### BASELINE INFORMATION

Beef industry production stages prior to the packer earned an average 60 percent of the total retail value of beef and beef by-products during the 1984-1989 period -- the feedlot sector received about 19 percent of the value and segments prior to the feedlot earned about 41 percent. The packer segment received approximately 5.5 percent of the total retail value of beef and beef by-products (for slaughter and fabrication services to boxed primal). Segments between the packer and the final beef consumer received approximately 34.5 percent of the total value of beef sold at retail for cutting (from boxed primal to retail cuts) trimming, packaging, and merchandising the fresh beef product. Thus, of the total value of beef and beef by-products sold during 1984-89, producers pre-feedlot earned 41 percent, feedlots 19 percent, packers/fabricators 5.5 percent and breakers/distributors/retailers 34.5 percent.

Inefficiencies at every segment add to the total cost of delivering beef to the end consumer and ultimately contribute to beef's relatively less competitive price when compared to other meats. Some of these economic opportunities relate to traditional management practices stubbornly clinging to by industry sectors. Others trace to needs for new technology and changes in genetics or management/marketing systems.

Producers often say "we have reduced our cost-of-production as far as we possibly can." Costs, however, are only one factor in the profit equation. Producers who survive into the 21st Century will become very familiar with the following equation:

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Price X Quantity = Gross Returns
- Total Expenses = Net Returns

Net returns are often generically referred to as profits or technically they may be called returns to labor, management and equity. Net returns can be increased in one of three ways: 1) increase price of the output sold without a comparable increase in expenses, 2) increase output (the quantity produced) without raising expenses more than the value of the increased production, or 3) reduce expenses without reducing output in the process.

It would be an obvious false economy to eliminate a $10/head health program if death losses increase and total production declines. But producers will be forced to weigh tradeoffs between increasing output, and the expense of increasing that output coupled with the fact that heavier calves sell for less money per pound (but more total dollars). The following factors are presented for producer's consideration as ways to impact the bottom line of individual operations and the beef industry in total.

ECONOMIC OPPORTUNITIES

Reproductive Performance: On January 1, 1988 some 43.411 million beef and dairy cows were reported (33.112 million beef and 10.298 dairy). An additional 9.343 million replacement heifers were reported (5.227 million beef and 4.116 million dairy). In any given year, only two-thirds of the replacement heifers reported on January 1 will be exposed to a bull. The rest will go on feed as producers alter their original plans prior to the breeding season. Thus, approximately 6.260 million heifers were exposed to calve during 1989.

Total beef and dairy females eligible to calve during 1989 were approximately 49.671 million -- 43.411 million cows and 6.260 million replacement heifers [1]. The 1989 calf crop reported on January 1, 1990 totaled 40.142 million [2]. Based on these figures, only about 80 percent of the dairy and beef cows and heifers in the breeding herds produced a calf in 1989.

Intuitive reasons lead us to believe the percentage calving is better for dairy cows than for beef cows -- more intensive management, higher planes of nutrition, etc. But for simplicity, let's assume the same percentage for both beef and dairy. Thus, approximately 29.384 million beef calves were born to 36.614 million beef females in 1989.

Increasing the calving rate to 95 percent would add an additional 5.2 million beef calves and increase returns to the industry by approximately $2.6 billion (5.2 million more calves at $500 each).
**Death Losses**: USDA reported an average annual death loss of cattle prior to slaughter at 5 million head during the 1980-89 period [3]. With approximately 74 percent of all cattle being beef cattle (35.614 million out of a total 49.671 females eligible to calve) the death loss among beef cattle would be approximately 3.7 million. U.S. average cost per cow (not including returns to producer labor and management) totaled $468.31 in 1989 [4]. Death losses cost the beef industry $1.73 billion considering cow costs only.

USDA estimates that approximately 65 percent of death losses occur at birth. Based on that figure, we can assume that approximately 35 percent of the beef cattle that died received an additional $100 off feed and other costs prior to death. Therefore, an additional $130 million in losses would be tallied. The total cost of death loss to the beef industry comes to $1.86 billion or more.

**Hot Iron Branding**: Industry losses due to hot iron branding are estimated by some individuals at $25 per head per branded animal. These estimates include reduced growth performance and other losses due to stress. Hide discounts alone amount to $14 for multiple branded hides and $8 for butt brands. Total losses attributed to hot iron branding are approximately $180 million to the beef industry annually.

While hot iron branding provides permanent identification and may prevent loss due to theft, more than 180,000 cattle valued at $1,000/head would have to be permanently lost every year to justify hot iron branding's cost to the industry. That's also assuming that those cattle would not be recovered using another type of identification system. While other identification systems would have some cost involved, most tagging systems cost much less than $8 to $14/head.

**Increased Weaning Weight**: During the mid 1970's, nearly 69 percent of the total calf crop weighed less than 500 pounds at the time the report was issued on January 1. By 1989, 48 percent of the total calf crop weighed less than 500 pounds at report time. The change in number of calves weighing over 500 pounds reflects heavier weaning calves and, possibly, more calves born earlier in the year. Assume no change in dairy calf weaning weights since the mid-1970s and 29.584 million beef calves were born in 1989, and we still have approximately 14.2 million beef calves weighing less than 500 pounds at the time of the January inventory reports. Some of those are no doubt fall-born calves -- say 5 million for the sake of argument. That leaves 9.2 million spring-born beef calves weighing less than 500 pounds on January 1. Adding 50 pounds of weaning weight to 9.2 million calves would mean 460 million more pounds of calf to sell. At $65/cwt for the additional pounds (because the heavier calves sell for less per cwt), total beef herd revenues would increase by $299 million.
Increased weaning weights would also up the probability that calves could go directly to the feedlot (or to a relatively short intensive growing program). Either case would reduce the likelihood of multiple ownership or of entering the trader circuit. This, in turn, would reduce the probability of repeated handling, multiple vaccinations and increased death loss.

Multiple Processing: The 9.2 million lightweight beef calves would be expected to enter some type of extended growing program -- increasing the probability that they will be "processed" and vaccinated more frequently during their lifetimes. Assuming these calves are processed an additional 1.5 times at a cost of $5/processing increases the cost of these calves by nearly $61.5 million. A proportionately larger percentage death loss (analyzed earlier) would be expected to occur in these calves so the total cost of light-weight calves would probably exceed this amount.

Many of the 20.384 million calves weighing more than 500 pounds are multiple processed at several marketing stages following weaning. If half of these calves are unnecessarily processed the cost to the industry is nearly $51 million. Yes, in addition to stress and reduced performance, multiple processing costs the industry over $110 million.

Feed Efficiency: Approximately 400 pounds of gain on average are produced in the feedlot. Pounds of feed per pound of gain conservatively ranges from 7 pounds of feed/pound of gain to 9 pounds of feed/pound of gain, or a range of total feed consumed for 400 pounds of gain from 2,800 pounds to 3,600 pounds. Thus, feed consumption might vary by as much as 800 pounds for two individual animals gaining 400 pounds each.

In 1989, total fed slaughter in 1989 was approximately 26.2 million head. Using this figure, approximately 10.5 billion pounds of gain were produced in the feedlot (26.2 million cattle X 400 pounds). Improving average feed efficiency by 1 pound of feed/pound of gain would save nearly 5.25 million tons of feed worth over $650 million.

One of the more obvious ways to increase feedlot feed efficiency is to reduce fat production as discussed in a later section. Other factors such as maintenance costs could also be included in overall cost of feedlot gain. Assuming technology or factors other than reducing fat production could improve feed efficiency by .5 pound of feed/pound of gain, feed costs could be reduced by $325 million.

The total value of cattle entering the feedlot reflects both expected feedlot performance (feed efficiency and livability) and expected value for beef. At the end of the feeding period, the value of the animal primarily reflects its value as beef and beef by-products.
Outlier Cattle: As a point to start this analysis, it is assumed that carcasses from fed cattle weighing 550-900 pounds (approximately 875 pounds to 1,430 pounds live weight), Yield Grade 3 or better and USDA Select or better grades can be managed into some existing niche of the current system without being heavily discounted. As broad as this range is, some cattle are produced that lie outside the range: approximately 2 percent of all fed cattle carcasses produced will weigh less than 550 pounds and receive an average $10/cwt discount -- cost to the industry $26.2 million. Approximately 1.5 percent of all carcasses produced will weigh more than 900 pounds and receive an average $12/cwt discount -- cost to the industry $44.8 million.

Approximately 5 percent of all carcasses produced will grade less than USDA Select -- and receive an average $10/cwt discount. Some of these carcasses would also fall into the less than 550 pound category. To avoid double counting, we will assume a 50 percent cross-over. Total cost of carcasses grading less than Select that do not also weigh less than 550 pounds is $40 million. Another 1 percent of all carcasses will be dark cutters and will receive an average $12/cwt discount -- total cost of the industry about $22 million.

Reported incidence of Yield Grade 4 and 5 cattle varies by season, but averages is approximately 6 percent. Industry data place the percentage of Yield Grade 4 and over cattle as high as 12 percent if all Y4 cattle that are not rolled are included. Those same industry data indicate that approximately 37 percent of all carcasses grading Y4 or Y5 still grade Select or less -- and 4.2 percent of Y4 and Y5 carcasses grade Standard or less. Thus, over one-third all Y4 and Y5 cattle do not have the genetic potential to grade Choice regardless of days on feed or amount of fat. About 10 percent of all fed cattle carcasses are Select, Yield Grade 3, adding to the number of cattle without the genetic potential to grade Choice, regardless of days on feed. Even some Select, Yield Grade 2 cattle have been fed for a long period but haven't deposited marbling or outside fat.

As a compromise between industry and USDA reported figures, let's assume that 7.5 percent of all cattle grade (or would grade) Yield Grade 4 or 5. The discount for Y4 cattle compared to Y3 or better cattle averaged $12.42/cwt in 1989. Total discounts to the beef industry for cattle grading Y4 or Y5 are approximately $171 million. The total cost of outlier cattle is approximately $304 million: too light, $25.2 million; too heavy, $44.8 million; less than Select, but weighing over 550 pounds, $40 million; dark cutters, $22 million and too fat -- Y4 and Y5, $171 million.

Excess Fat Production: Excess fat production exists even among cattle falling within the "acceptable" weight and grade range. As quoted from the Value Based Marketing Task Force Report [5].
A conservative definition of excess fat would be "any fat in excess of that needed to guard against cold-shortening of muscle fibers, and to ensure palatability." This equates, in simple terms, to an exterior fat thickness of anything greater than 1/4 inch. For a mid-point Yield Grade 2 carcass, this represents 18 percent excess fat, or 176 pounds of trimmable excess fat on a 700 pound carcass. A Yield Grade 3 carcass, would contain 22 percent excess fat, or 154 pounds of trimmable fat on a 700 pound carcass. When averaged across Yield Grade 2 and 3 and adjusted for trimmed fat that can be used with lean from each carcass to make ground beef (more difficult as fast food chains move towards 90 percent lean ground beef), the average excess fat from fed cattle equals about 88 pounds/head.

Total fed slaughter in 1989 was 26.2 million. Approximately 90 percent of all carcasses were Yield Grade 2 and 3. Hence, 23.6 million fed cattle that fall into the middle of the "acceptable" range produced approximately 2.07 billion pounds of excess trimmable fat.

The average feed cost per pound of gain in U.S. feedlots in 1989 is estimated at $0.45. This figure is inflated by the high cost of fat gain during the last 20 to 30 days in the feedlot. It is assumed that feed costs could be reduced by 5 percent if cattle were fed to a leaner end point. Hence, the "lean cost of gain" would be estimated at $0.4257/pound. It is well known that fat gain requires 2.25 times as much feed energy as lean growth. The cost of fat gain in the last 20 to 30 days in the feedlot could be as high as $0.96/pound (2.25 x $0.4275). The cost of producing 2.07 billion pounds of excess fat, much of which is gained during the last 20 to 30 days in the feedlot, is estimated to be $1.99 billion (2.07 billion pounds x $0.96).

The total cost of excess fat far exceeds the above estimate because packers, retailers, purveyors and restaurateurs all are forced to deal with the excess fat. This raises their costs and further decreases the competitive position of beef in the marketplace.

Assuming an average carcass price of $1.20/pound (the price is the same for lean and fat), a residual value for rendered fat at the packing level of $.05/pound and 2.07 billion pounds of excess trimmable fat. The industry could reduce costs at the post-feedlot level by $2.38 billion if excess fat production were eliminated (2.07 billion pounds x $1.15/pound). This analysis assumes that all fat is trimmed and rendered at the packer level. Fat trim is worth only $.03/pound at the retail level -- if the retailer doesn't have to pay someone to pick it up. An additional loss of $.02/pound on fat trim would amount to $41.47 million, bringing the total loss from managing and trimming fat in the current system to $2.42 billion.
This cost includes only the cost of purchasing the fat and trimming it at a discounted price. The additional cost of adding fat during the finishing period was calculated at another $1.99 billion. Transportation costs for fat through the marketing system (from the feedlot to the packer to the retailer) are not included in the above cost estimates. Conservatively, excess fat production, trimming and the difference between buying fat at carcass price and selling it for rendering costs the industry $4.41 billion.

It is conceivable and practical to assume that half of this excess could be prevented if adequate incentives existed in the marketplace to encourage marketing fed cattle at a leaner endpoint. Computer software has recently been developed that will enable retailers to determine value differences between quarter-inch trim boxed beef and traditional product with one inch or more of fat trim. The message will then be sent to the rest of the industry that quarter-inch trim is in demand. Traditional one-inch trim product will be discounted consistent with the value of quarter inch product at retail.

**Management Losses:** Estimated costs for other beef industry losses potentially avoidable by changes in management procedures include condemnations of carcass or offals, $47 million; and bruises, injections and abscesses, $96 million. Management losses total $143 million.

**Retail Shrink:** Recent industry analysis of retail beef markets indicates that product shrink (lost revenue from markdowns and price differentials on reworks) averages 6 percent of total retail (supermarket meat case) beef sales. Shrink for 19 high gross-margin cuts ranges from 10 percent to as much as 23 percent for rib eye steaks. The price of these high gross-margin cuts is relatively higher than the average Choice price -- ranging from $4.00/pound for flank and sirloin steaks to $6.00/pound for ribeye and T-bone to $7.00/pound for tenderloin.

In 1989 total U.S. beef consumption was 17.15 billion pounds (retail weight basis). Recent industry studies indicate that approximately 50 percent of all beef is consumed away-from-home [6]. Therefore, approximately 50 percent of beef consumed domestically is purchased at the retail meat case for at-home consumption (8.575 billion pounds) with the balance consumed away from home. The most recent 12-month average price for all beef sold at retail was $2.49/pound. Total revenues from all beef sold through retail meat cases would, therefore, total approximately $21.3 billion (8.575 billion pounds X $2.49). Total returns to the beef industry could be increased by more than $852 million if shrink at the retail meat case were reduced by two-thirds (an increase of 4 percent in total retail beef revenues). The returns would approach $1 billion if you consider that most of the shrink is in the relatively high priced cuts.
Out of Stock: Recent industry analysis of beef sales at retail meat counters indicated that certain beef products are not available to consumers or were "out of stock" on average at least 16 percent of the time. Individual meat stores do not fully satisfy consumer demand because the product mix of beef offered doesn't match consumer preferences when products are out of stock. It is estimated that offering an optimal variety of beef products could improve beef sales and provide a net contribution to retail revenues of 4.3 percent. Assuming revenue from all beef sold through the retail meat case totals $21.3 billion, the total contribution from reducing out-of-stocks would be $916 million.

The total value of economic opportunities in the beef industry summarized in Table I is nearly $12 billion.

Summary Table 1: Economic Opportunities Lost to the Beef Industry Annually

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Relevance of Lost Opportunities

In 1989, total gross revenues from beef sales and fed cattle by-products were approximately $44.85 billion. The beef industry could increase gross revenues by nearly 27 percent if existing lost opportunities were corrected. The total cost of these beef industry inefficiencies amounts to nearly $458 per fed cattle.
There will always be some lost opportunities or slack in the beef production system. However, if even one-half the total lost opportunities in the beef industry could be addressed, gross industry returns would increase by over $229 per fed steer and heifer.

Increased revenues could be distributed among various sectors. If were to be the case, approximately 41 percent ($93.89) would go to cow-calf producers; 19 percent ($43.51) would go to feedlots; 5.5 percent ($12.60) would go to packers and 34.5 percent ($79.00) would go to the breaker/distributor/retailer sector based on current sector margins.

Alternatively, current industry net margins could be maintained at current levels in each sector and retail beef prices could be reduced by $229 per head. Each sector would contribute to the overall retail price reduction based on its ability to correct existing inefficiencies. Producers in each sector would have the same net dollars of profit that they have under the existing system while increasing beef's competitiveness and market share.

LITERATURE CITED


