

DEPARTMENT OF AGRICULTURAL ECONOMICS

Positioning the Beef Industry for the Future

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Dramatic changes in productivity, product developments, and meat product promotion have influenced consumer demand for meat. Although the beef industry has experienced increases in production efficiency, primary competing sectors (i.e., pork and poultry) have experienced even larger productivity gains. In addition, the pork sector appears well

positioned for additional significant efficiency increases in the near future. Efficiency gains in the poultry sector caused part of the beef demand decline observed over the last fifteen years. Future productivity gains in pork production and marketing could have similar effects on beef demand during the next decade.

Product promotion has been used by the beef industry to mitigate declining demand. To date, promotion efforts have been small compared to major food marketing firms, and have had little effect on beef prices. To remain profitable, the beef sector needs to closely examine its competitive position relative to other meats and focus its efforts where they will have greatest effect. This article discusses these issues and outlines strategies the beef industry may wish to consider when positioning itself in this dynamic environment.

Beef Industry Productivity

Productivity in the beef sector has been increasing for many years. Despite relatively large fluctuations in cattle inventory and slaughter numbers, annual beef production has been surprisingly stable, ranging from 22.6 to 24.3 billion pounds per year from 1985 to 1994. Average dressed weights have been increasing since

1975 (Figure 1), partially offsetting declines in slaughter numbers. For example, average commercial carcass weights increased 18 percent from 602 pounds in 1976 to 710 pounds by 1994.

Beef production per cow has also increased. Dividing commercial beef production by cow herd inventories shows that pounds of dressed beef produced per cow

increased by 22 percent from 449 pounds in 1980 to approximately 550 pounds in 1994 (Figure 2). The increase in beef production per cow is the result of several factors. First, because of changes in genetics and feeding programs, fed cattle are now typically slaughtered at heavier weights. Second, many of today's larger framed cattle are often fed finishing rations at a younger age, thereby circumventing extended growing programs. As a result, cattle are often slaughtered at a younger age compared to 10 or 15 years ago. Third, and perhaps most importantly, calf slaughter has declined dramatically in recent years. Since 1976, calf slaughter has fallen by

Figure 1. Estimated Commercial Cattle Carcass Weights

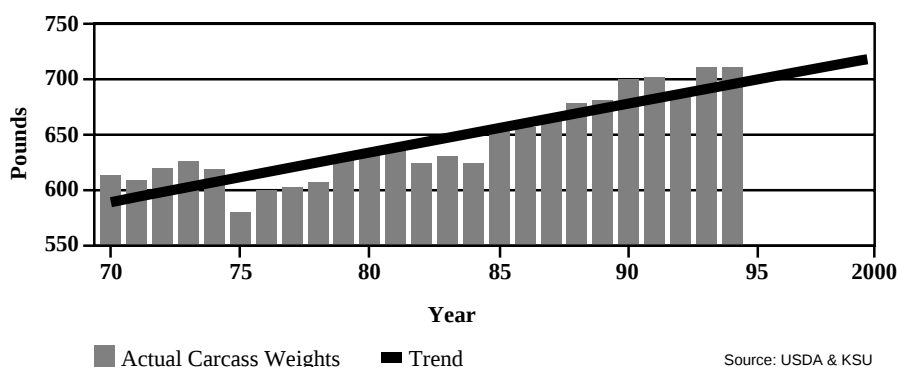
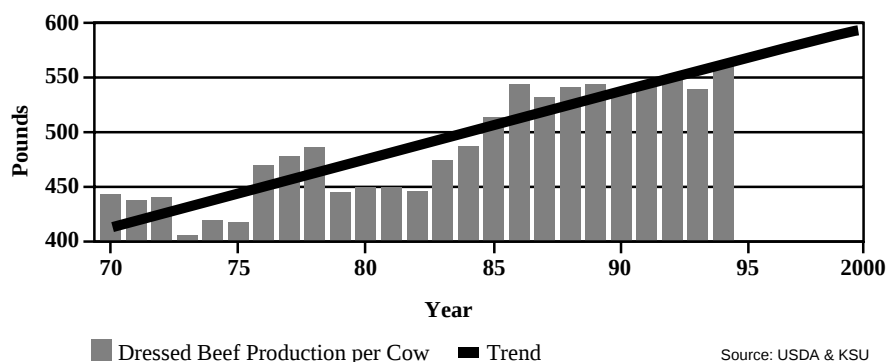


Figure 2. Pounds of Dressed Beef Produced per Cow per Year

heavier average dressed weights. The average dressed weight in 1994 was 185 pounds per head versus 171 pounds per head in 1980, an increase of 8 percent. Although this trend has been present for many years, it has recently become more pronounced. Genetic and nutritional improvements have made it possible to feed hogs to heavier weights and still produce relatively lean carcasses.

72 percent. Feeding dairy steers to slaughter weight has become an important component of the cattle feeding industry. In the past, many of those steers would have been slaughtered as calves. Finishing calves to slaughter weight effectively raises beef output per cow.

What does the future hold for the beef industry? Beef sector productivity will continue to increase, but the odds do not favor a rapid increase. A principal reason beef production per cow grew rapidly in recent years was the sharp decline in calf slaughter. Calf slaughter is not expected to decline from recent levels, primarily because most dairy steer calves are already being fed to slaughter weights. Future productivity gains will have to come from genetic improvements, feeding cattle to heavier slaughter weights, and shortening the feeding period.

What's Happening in the Pork Industry?

The pork industry is changing rapidly. The number of hog farms has been declining for many years and will continue to decline for the foreseeable future. The average number of hogs marketed per farm is increasing and, once again, is likely to continue doing so.

As the pork industry has consolidated, dramatic improvements in productivity have occurred. Pork production set a record in 1994 at approximately 17.7 billion pounds. Commercial slaughter during 1994 totaled almost 95.7 million head, just below the all-time high of 96.1 million head established in 1980, yet pork production was much larger than in 1980 because of

One measure of productivity is pounds of dressed pork produced annually per breeding sow. Dividing annual commercial pork production by the average number of breeding sows shows that productivity in the pork industry has been growing at an amazing pace. Since 1970, annual dressed pork production per sow has grown from 1,307 to 2,415 pounds, an increase of 80 percent (Figure 3).

One source of productivity growth in the pork sector has been increases in average dressed weights. A second major productivity improvement has been the adoption of improved genetics, coupled with better management, which allows top producers to wean as many as 50 percent more pigs annually per sow compared to 10 years ago. Well-managed farrow-to-finish operations now have a target of 24 or 25 pigs weaned per sow per year compared to objectives that were in the teens a few years ago.

This tremendous improvement in productivity means that the hog industry operates with a much smaller sow inventory today than it did a few years ago. A simple comparison between the sow herds of 1980 and 1994 illustrates this point. In 1980, there

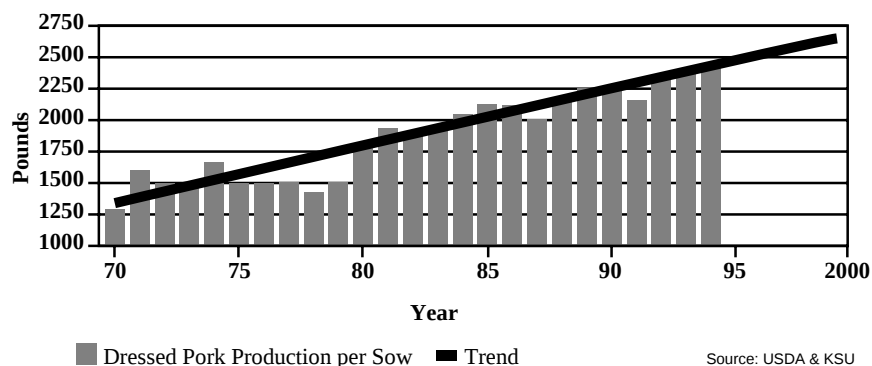
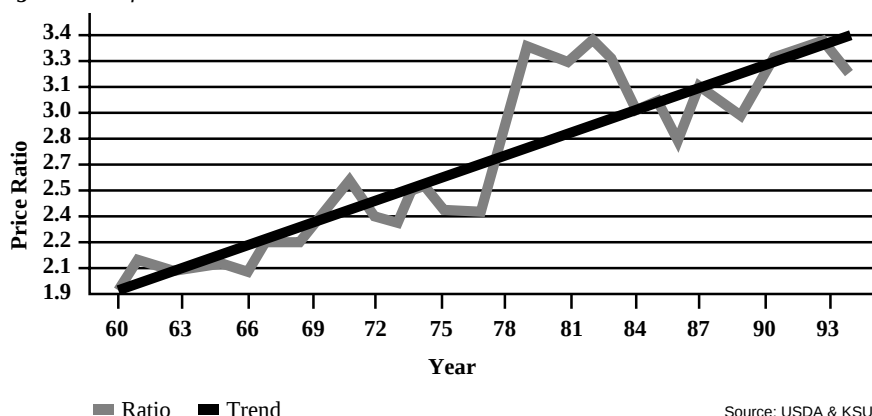
Figure 3. Pounds of Dressed Pork Produced per Sow per Year

Figure 4. Beef/Chicken Annual Retail Price Ratios

Source: USDA & KSU

production cost differences across meat sectors. Ultimately, differences in production costs create differences in supplies, which result in changes in the retail meat price relationships consumers face at the supermarket. That is, increases in productivity increase supply and reduce retail prices. Thus, meat sectors unable to match these productivity gains will be at competitive disadvantages as they become less price competitive.

were approximately 9.3 million sows in the breeding herd, whereas in 1994 there were approximately 7.3 million sows, a decline of 22 percent. The much smaller breeding herd of 1994 was able to produce almost as many hogs for slaughter (and more pork) as the 1980 breeding herd.

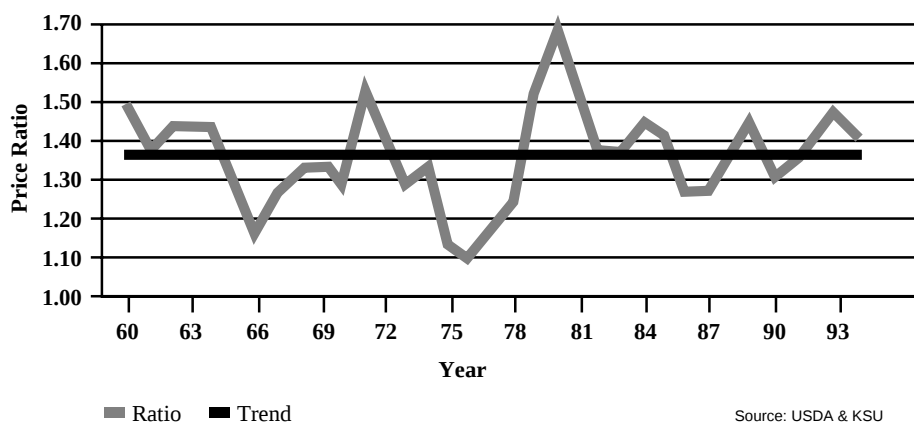
What does the future hold for the pork industry? Despite all the improvements in productivity that have occurred, there is still a sizable component of the industry that has not fully adopted current technology. Further consolidation is expected as firms take advantage of new technology to lower production costs and drive out firms that fail to adapt. Moreover, there is a great deal of new technology on the horizon, which is expected to yield a new round of productivity improvements. For example, widespread adoption of improved genetics, split-sex feeding, multiple site production, and segregated early weaning could contribute to future productivity gains in the pork industry. Technological change, combined with improved management, is driving the industry toward a lower cost structure. Ultimately, the reduction in the industry's cost structure will be reflected in lower cash hog prices. In short, expected productivity gains in the pork sector the next few years could dwarf expected productivity gains in the beef sector.

Relative Production Costs Matter

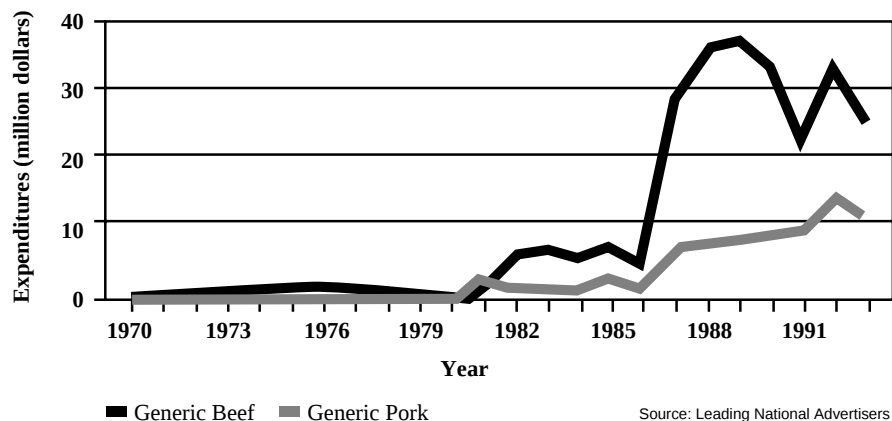
Why are differences in productivity across meat sectors important? Differences in productivity will be reflected in

An examination of meat consumption trends over the last 35 years reveals that while total meat consumption has been growing, individual meat commodities have not grown at equal rates. Pork consumption was relatively stable for many years, fluctuating around 60 pounds per capita through the mid-1980s. Recently, consumption reports ranged from 50 to 53 pounds per capita, partly because USDA revised their procedure for estimating retail weights from carcass weights. Beef consumption has declined since the mid-1970s. As with pork, part of the downtrend in beef consumption in recent years has been attributable to changes in the procedure used in estimating retail consumption. Finally, both pork and beef have lost market share to poultry as both chicken and turkey consumption increased.

Changes in relative prices among the three meats explain a major portion of the consumption changes. Although beef prices were higher than chicken prices throughout the 1960-1994 period, the ratio of beef to chicken prices was increasing which means beef

Figure 5. Beef/Pork Annual Retail Price Ratios

Source: USDA & KSU

Figure 6. Annual Generic Beef and Pork Advertising Expenditures, 1970-93 (1993\$)

Given the expected differences in productivity gains in the future, the possibility exists that the pork sector also will gain market share at the expense of beef.

Does this mean the pork sector can expect increases in demand similar to that experienced by the poultry sector?

Answering that question requires an examination of both pork and chicken demand. Remember that an increase in demand implies selling the

became more expensive relative to chicken (Figure 4). Consumers substituted lower priced chicken for more expensive beef in their diets. Beef prices relative to pork prices fluctuate considerably from year to year, but no long-term trend has been apparent (Figure 5). Since the beef to pork price ratio has changed little during this time period, it is not surprising that there has been no discernible trend in the beef to pork consumption relationship.

There has been considerable debate regarding whether changes in relative prices among competing meats explain all of the change in consumers' eating habits. Many believe that a change in consumers' tastes and preferences also occurred, which led to a shift away from red meat toward poultry consumption. Changes in preferences could have been caused by changes in the convenience attributes of products and/or health-related issues. There is little dispute, however, that changing price relationships explain much of the change in consumption patterns.

What will happen to the beef to pork price ratio in the future if pork productivity growth accelerates and beef productivity growth stagnates? Over time, the beef to pork price ratio could increase, thereby encouraging consumers to shift their meat consumption away from beef toward pork. Beef has lost market share relative to poultry for an extended period of time.

same quantity as before, but at a higher price; increasing quantity sold and selling it at the same price as before; or, the strongest case, simultaneous increases in price and quantity sold.

Poultry demand has been increasing, particularly in recent years, as the industry was able to increase the quantity sold, but hold the inflation-adjusted price steady. The picture for pork has not been as positive in recent years. Pork demand in 1994 was nearly the same as in 1993, but weaker compared to the late 1980s. Consequently, recent data suggest that the poultry sector has a stronger demand structure than the pork sector. What could cause that to change?

One reason the demand for chicken has been increasing is because the poultry industry has been very innovative and offers consumers a wide array of convenient, value-added chicken products that were not available just a few years ago. The introduction of new

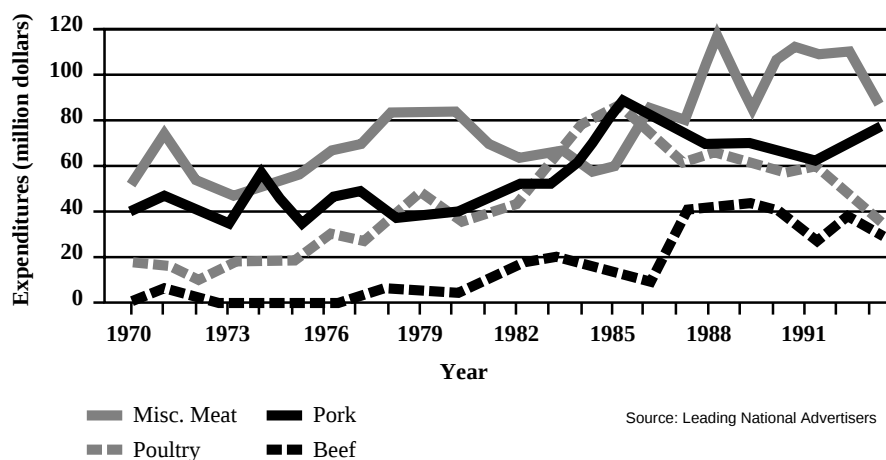
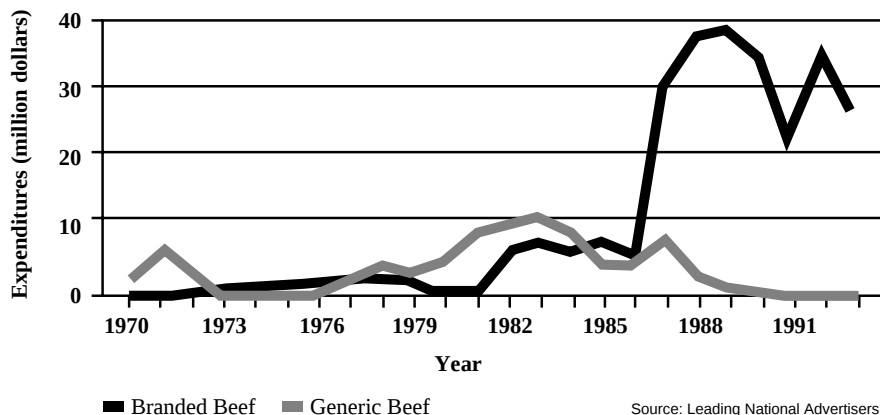
Figure 7. Real Annual Advertising Expenditures for Selected Meats, 1970-93 (1993\$)

Figure 8. Real Annual Beef Generic and Brand Advertising Expenditures, 1970-93 (1993\$)

products has taken place at both the retail supermarket level and in the hotel/restaurant/institution (HRI) trade. Consequently, for the pork sector to be in the same position as the poultry industry, innovative pork products need to be developed to meet the needs of today's discriminating consumers.

Product Promotion

One strategy used by both the beef and pork industries to increase consumer demand is generic product advertising. Starting in 1986-87, beef and pork producers launched separate national generic commodity advertising programs (Figure 6). Prior to 1986, beef and pork producers typically allocated less than \$2 million annually to advertising expenditures. Since 1987 annual producer-funded beef advertising expenditures have ranged between \$25 and \$35 million. Similarly, annual producer-funded generic pork advertising expenditures have ranged between \$7 and \$14 million since 1987. These generic advertising programs have been funded by producer checkoff assessments. The fact that the beef and pork sectors instituted commodity advertising programs at about the same time is important because beef and pork compete for consumer food expenditures. This also means beef and pork advertising campaigns compete with each other for consumers.

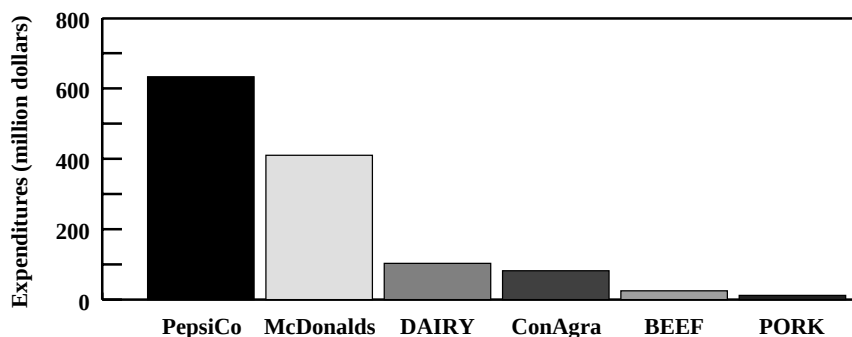
Although annual beef promotion expenditures appear large at first glance, they are relatively small compared to other meats

(Figure 7). Total beef advertising expenditures (generic plus branded) have been considerably smaller than those for miscellaneous meats (lunch meat, hot dogs, sandwich spreads, and other meat products), poultry, or total pork (generic plus branded). Since 1987, total beef advertising expenditures have averaged 53 percent of total pork advertising and 68 percent of poultry advertising.

Virtually all poultry advertising is of a branded form (i.e.,

products having the processor's name on the label). Since 1987, 84 percent of pork advertising expenditures have been for branded products and were funded by pork processing and merchandising firms. The remaining 16 percent of pork advertising expenditures consist of producer-funded generic programs. This contrasts sharply with the beef sector where less than 5 percent of total advertising expenditures were for firm-branded products and 95 percent of total beef advertising expenditures were funded by beef producers (Figure 8).

Why such large differences in generic and branded product advertising expenditure mixes among beef, pork, and poultry? Most retail beef is not differentiated, which means there is little incentive for beef processing and merchandising firms to advertise their products. In contrast, retail pork and poultry products are often more highly processed and differentiated than beef products (e.g., ham, bacon, sausage, etc. for pork and skinless, boneless, breaded, etc. for poultry). This

Figure 9. Advertising Expenditures of Selected Firms and Generic Dairy, Beef, and Pork, 1993

greater degree of product differentiation (and less variability in quality among different packages of the same product) at the retail counter for pork and poultry relative to beef results in a much stronger incentive to advertise branded pork and poultry products.

Further examination of beef advertising expenditures indicates that, as an industry, beef advertising is small relative to specific food processing firms. Figure 9 shows the 1993 advertising expenditures by selected food processing firms and generic beef, pork, and dairy promotion programs. Compared to these selected firms, beef industry advertising has been quite small. PepsiCo had advertising expenditures of \$633 million in 1993 and McDonalds spent \$410 million. In contrast, generic beef advertising totaled only \$25 million in 1993. The dairy industry spent about four times as much as the beef industry on generic advertising in 1993. Despite substantial expenditures by the beef industry on generic advertising, advertising expenditures by food manufacturing firms dwarf these efforts.

Effects of Advertising

A study recently completed at Kansas State University suggests that advertising's effect on consumer demand for beef has been quite small. Estimates at the retail level suggest that a 10 percent increase in branded beef product advertising increases retail beef price by 0.12 percent. Similarly, a 10 percent increase in generic beef advertising increases retail beef price by about 0.11 percent. Branded pork and poultry advertising have more than four times the effect on their respective retail prices.

Over the last ten years, a \$1/cwt increase in retail beef price has, on average, been associated with about

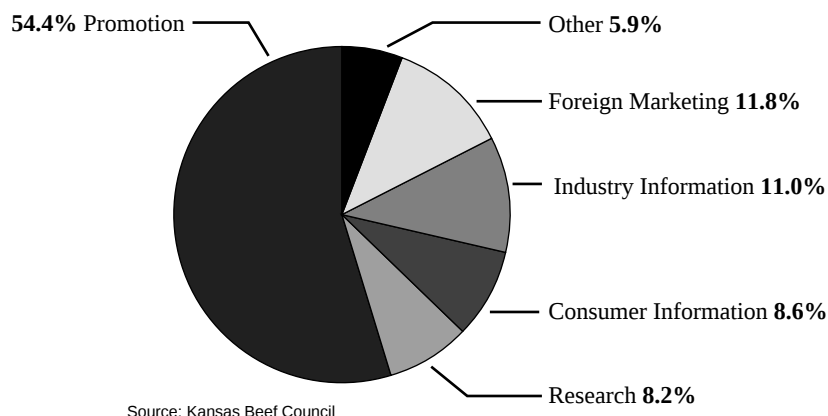
a \$0.24/cwt increase in live cattle price. That is, retail price changes are not fully reflected in the live price. This suggests that advertising intended to increase retail beef price will have a much smaller impact on live cattle price than on retail price. Relying on the historical relationship between retail beef and live cattle prices suggests that an additional \$1 million spent on beef advertising will increase live cattle prices at the farm level by less than \$0.01/cwt. This suggests a small return to beef producers from commodity advertising.

Alternative Strategies

The relatively small effect of beef promotion on live cattle prices raises questions regarding alternative strategies for producer checkoffs fund expenditures. Figure 10 illustrates audited expenditures of the 1994 Beef Promotion and Research Board. More than \$25 million (54.4 percent of the total budget) was spent on beef promotion whereas only 8.2 percent of the budget was allocated to research. Michael Wohlgenant, in a 1993 American Journal of Agricultural Economics article, argues that producers should not be indifferent to the allocation of funds between research and promotion. In particular, he shows that beef producers benefit more from innovations that reduce production costs than from promotion efforts that increase retail beef prices by the same amount. Thus, consideration should be given to allocating beef checkoff expenditures toward production cost-reducing research. This is consistent with the previous discussion indicating increases in consumer demand for poultry have resulted from relative price changes with respect to beef. Given this experience, it appears the pork sector will

enjoy similar gains relative to beef if future productivity gains cause retail pork prices to fall relative to beef prices. Research that helps reduce beef production and/or marketing costs will help the industry compete with both the poultry and pork industries. However, allocating more checkoff funds to finance production cost-reducing research activities are not allowed under the Beef Promotion and Research Act of 1986, which means legislative changes in the Act may be necessary for this change to be implemented.

Figure 10. Beef Board Expenditures, 1994; Total Budget \$46,410,196



The beef industry has generally promoted existing products rather than new products. Advertising is typically used to provide consumers with information regarding new product developments. The poultry industry is a good example of a sector that introduced a plethora of new consumer-oriented products and then followed these innovations with massive advertising campaigns. This suggests that a more effective long run beef industry strategy would be to use more funds to first develop consumer-oriented products and then advertise these products to inform consumers.

Concluding Comments

Beef producers have significantly increased productivity over the last 25 years. However, the pork and poultry sectors have enjoyed even larger productivity increases, and pork production and marketing is on the brink of becoming even more efficient. Over time, increased productivity in the poultry sector caused increased poultry supplies relative to beef. This increased relative supply caused significant reductions in poultry price relative to beef price, which contributed to poultry demand increases and beef demand decreases. Because relative prices determine how consumers allocate their food budgets, the beef industry needs to focus on production and marketing costs. Generic promotion programs that were launched in the late 1980s by beef and pork producers have been relatively small in scale compared with typical product or firm advertising. In addition, price effects of advertising on beef have been quite small. Producers should seriously evaluate the allocation of checkoff funds and consider the returns to advertising compared to returns resulting from increased productivity and consumer-oriented product development.

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