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THE CASE OF BEEF DEMAND

A Failure by the Discipline

by Wayne D. Purcell

> Industry leaders and some agricultural economists use flawed measures of demand for beef and fail to distinguish between a change in demand and a change in per capita consumption. The beef industry is not well informed on basic economic issues and that lack of information has contributed to forced disinvestment that has reached unprecedented levels. Agricultural economists have failed to educate, and our failures have come at a significant cost to society.

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DURING THE PAST 15 YEARS, THE BEEF INDUSTRY has experienced continual change and adjustment. In the early 1970s, retail beef price ceilings were imposed by the Nixon administration. Coming after a period of 3-5 percent yearly increases in the total cattle herd, the price ceilings helped launch a cyclical liquidation of cattle. From a peak of 132 million head in 1975, the industry has suffered through the most severe and sustained liquidation in history. In 1989, the U.S. cattle herd is down to 99.5 million head.

The prolonged liquidation created tremendous problems for the industry. A generation of cow-calf producers has seen their neighbors forced out of business. The processing sector has experienced a massive restructuring. It is clear that we in the research and education business need to understand why the liquidation that began in 1976 lasted for so long and why resources were forced to exit the industry on such a sustained basis. What happened, and what could have been done to minimize the problems?

The Forces of Change

With the herd size down sharply and per capita supplies showing no significant increase since 1976, it is safe to say low cattle prices, record low inflation-adjusted retail beef prices, and the related losses by producers were not due to supply-side pressure. Logic suggests that something happened on the demand side.

The scatter plot provides a revealing picture. Inflation-adjusted beef prices are plotted against U.S. per capita beef consumption. Each price-quantity coordinate is identified by year through 1988.

During the 1960s, the demand surface for beef recorded periodic shifts up and to the right. That pattern continued into the 1970s. Increases in per capita consumption at higher inflation-adjusted prices are a sure sign of increasing demand, and the industry continued to grow. From 1979 through 1986, however, the situation changed dramatically. To get the same per capita supply of beef sold, the inflation-adjusted or deflated price of Choice beef at retail had to drop over 32 percent.

Price changes come from a shift in supply, a shift in demand, or some combination of the two. We do not have to be expert economists to recognize that since 1979 the beef supply curve

has been traced out by a shifting demand curve. The scatter plot does not identify what is causing the shifts, but it is difficult to avoid the conclusion that demand has decreased. When a constant per capita quantity of product can be sold only at significantly lower prices each year, we have the textbook case for decreasing demand. The 1987 and 1988 price-quantity plot points suggest that demand may be starting to stabilize, but there is to date no evi-

dence that demand is starting to increase again.

There are a number of ways the industry could have reacted to the declining demand had it been recognized and documented shortly after 1980. Financing for educational and promotional programs might have been available earlier. Any needed changes in beef grading and market reporting policies and procedures could have been initiated in a proactive rather than a reactive context. Perhaps more importantly, the industry might have placed greater emphasis on product development. Consumers are concerned about fat and they increasingly demand convenience, but the way beef is offered in the supermarket has

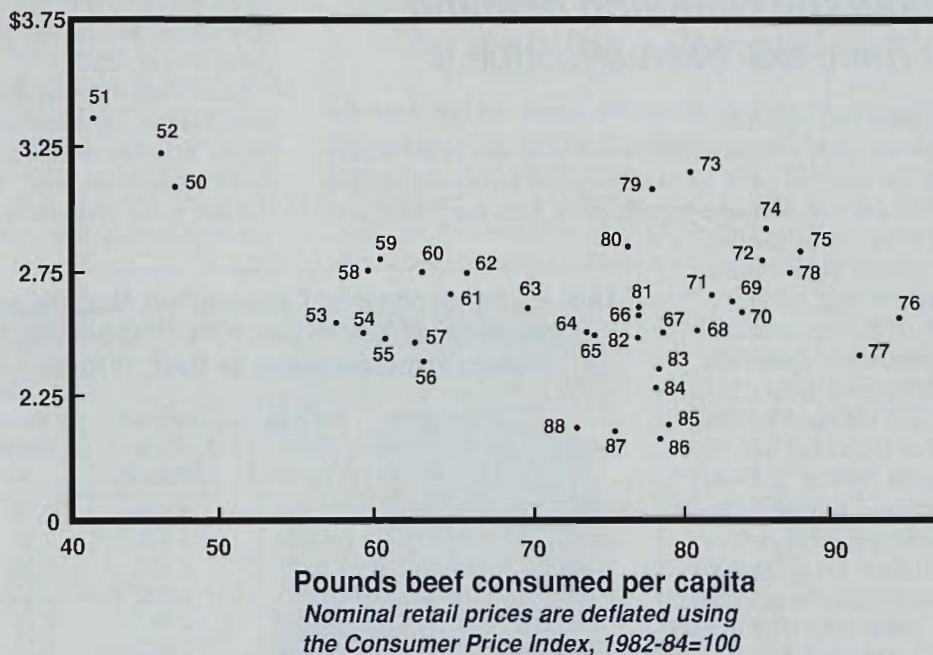
changed little since the 1950s.

The problems in demand and the need for major adjustments were not widely recognized. By 1987, however, a shrinking beef industry was forced to recognize and react to the increasingly obvious problems. Food retailers and packers argued that the industry needed to change more during the 1987-1990 period than it had in the previous 30 years.

One major packer launched a program of close trimming and private branding of retail-ready cuts of fresh beef. Another packer launched a program to sell pre-cooked beef. Close trimming of external fat has now gained industry-wide status. The industry trade group also launched a \$35 million advertising program, financed by a checkoff program approved in 1986 legislation. And during 1988, pressures increased for policy changes that would clear the way for hot-fat beef trimming in the packing plant.

Massive consolidation of packers, prompted at least in part by the difficult financial times, has quickly created a structure in which only 3 firms now produce over 80 percent of U.S. boxed beef. The unprecedented numbers of mergers and acquisitions have been justified by the need to reduce costs and garner the financial power to finance crash programs in product development. Consumers simply would not pay the prices needed to keep people employed and maintain anything other than a sharply reduced production base. Decreasing demand for beef, it appears, was the catalyst for forced changes that will shape and influence the beef industry for years to come.

Prices Were Forced Sharply Lower During the 1980s

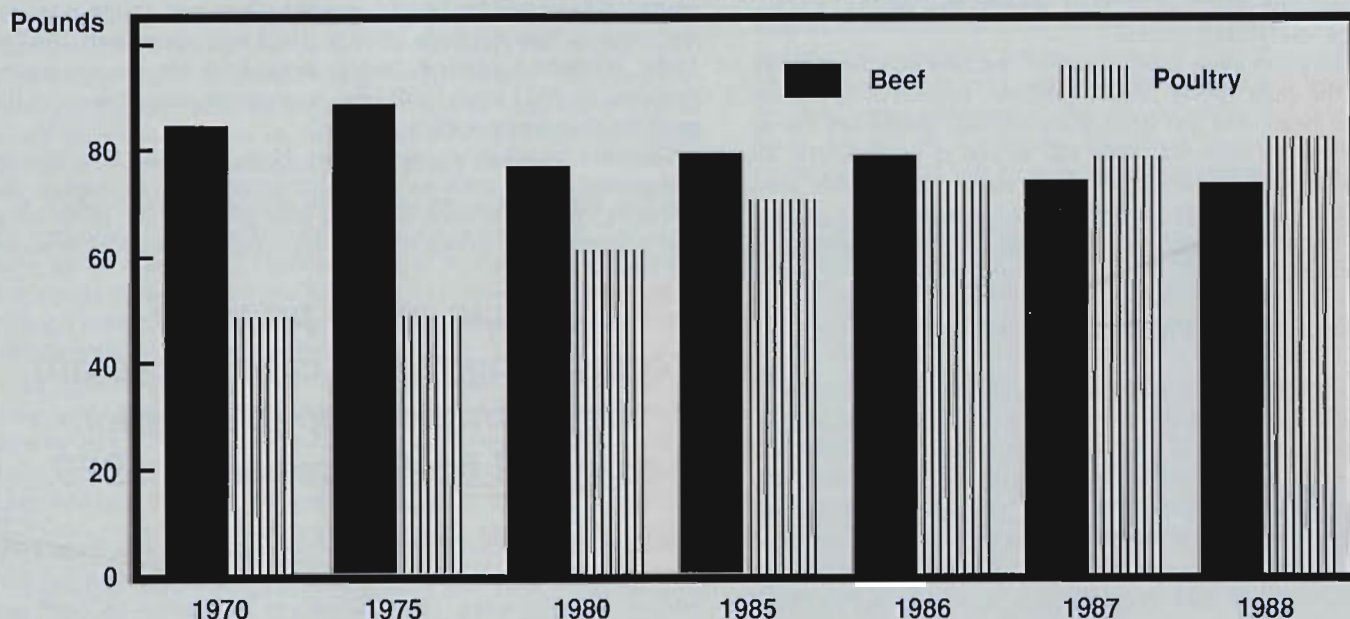


Performance of the Professional Community

Part of the shift in demand was likely due to changing lifestyles and preferences, and not all of this influence could have been avoided. Yet had the industry and the agricultural economists who work with the industry more quickly recognized the problems, the current state of the industry could be different however. Policies could have been adjusted and the private sector might have recognized the need to act much sooner.

But the recognition was simply not there. Research by agricultural economists in the mid-1980s yielded mixed evidence on whether the demand for beef had in fact changed at all. As late as 1987, journal articles still reflected disagreement on whether a

Total Poultry and Beef Consumption



Educational efforts about the changing demand have not been effective.

shift in demand had occurred.

The adjacent table reinforces the evidence shown in the scatter plot. Even the nominal price for beef the price before adjustment for inflation did not increase significantly between 1980 and 1988. During that period, surges in overall price inflation reached double digit levels.

In spite of the consolidation to larger processing operations, the middleman's costs still increased and the farm-to-retail price spread increased over 25 percent in the 1980s. Live cattle prices were forced down. Choice slaughter steers at Omaha sold for a significantly lower average price in nominal dollars in 1986 (\$57.76) than they did in 1979 (\$67.75). With prices at retail effectively capped, inflated processing costs put extreme pressure on cattle prices. The producer took the brunt of the pressure and forced disinvestment and a contracting industry was the inevitable result.

Why were we so slow to recognize what was happening? Perhaps we have lost our appetite for looking at the data, and it may be that we are trying to substitute technique that looks sophisticated for conceptual rigor and an informed perspective. How much has this failure cost the industry? And how much is it now costing society in the form of a reduced supply of product, a restricted variety of product offerings, and higher prices?

Had the problem been spotted earlier, the beef cow herd might now equal the early 1980s' 38 to 39 million, instead of its current 33.7 million head, and the more than 100,000 producers forced out of the cow-calf business might still be part of the industry. We would also be seeing a larger per capita supply of beef this year. Consumers would be able to choose from a wider array of beef products designed to more closely fit the demands of changing lifestyles and eating habits.

Private Sector Performance

Developments in the private sector suggest that educational efforts about the changing demand have not been effective. Industry participants were naturally reluctant to admit that beef demand was shifting adversely. Widespread use of a conceptually flawed measure of the level of demand—percent of income spent on beef—contributed to the failure to recognize what was happening and take positive action. This measure is continually cited in USDA publications and the writings of some agricultural economists. But the statistic is a valid measure of demand only if relative changes in retail prices are equal to associated relative

changes in quantities in the opposite direction; i.e., the own-price elasticity of demand for beef is equal to -1.0. No empirical evidence suggests that the own-price elasticity is that large in absolute value. Haidacher and associates estimate the elasticity parameter at -0.62.

If the demand elasticity is about -0.6, expenditures for beef were biased significantly upward during the late 1970s as per capita supplies declined. Accordingly, the measure "percent of income spent on beef" was biased upward, and that bias contributed to the complacency in the private sector and the research community.

The table also records the percent of income spent on beef during the decade. It was not until 1980, when the decreases in per capita supplies had run their course, that the "percent income" measure started to show significant declines. If the industry had better understood what was occurring and had been using more relevant measures of demand, the problems that hit with a vengeance in 1980 might have been anticipated earlier date.

The failure to recognize what was happening to demand is proving costly to the beef industry as competing meats, especially poultry, continue to make inroads. But in 1988, the same flawed measure was still being widely used, or misused, as a measure of demand. Much attention was paid to small, within-year increases in income spent on beef during 1988, and the increases were

presented as evidence that demand for beef is now increasing. Everyone involved must understand that the percent of income spent on beef will be biased upward when per capita supplies decrease as they did from 1986 to 1987 and again from 1987 to 1988. When the inherent bias is accounted for, the continued declines in 1987 and 1988 look even more negative—and the need for of urgency is even greater.

Contrary to what we sometimes hear, changes in prices of competing meats such as pork and poultry cannot explain the dramatic drop in inflation-adjusted beef prices since 1979. Inflation-adjusted pork prices at retail dropped only slightly between

**TABLE – Per Capita Beef Consumption, Nominal and Deflated Retail Beef Prices, (CPI, 1982-84=100)
Percent of Income Spent on Beef, 1970-88**

Year	Per Capita Consumption (lbs. retail)	Nominal Price (dollars/lb.)	Deflated Price (dollars/lb.)	% Income Beef (%)
1970	84.01	1.017	2.620	2.55
71	83.38	1.081	2.670	2.52
72	85.44	1.187	2.838	2.66
73	80.54	1.421	3.198	2.69
74	85.60	1.463	2.967	2.72
75	87.89	1.548	2.877	2.71
76	94.36	1.482	2.604	2.58
77	91.76	1.484	2.449	2.30
78	87.24	1.819	2.789	2.42
79	78.05	2.263	3.118	2.44
80	76.50	2.376	2.884	2.16
81	77.13	2.387	2.625	1.99
82	77.17	2.425	2.513	1.92
83	78.72	2.381	2.390	1.80
84	78.58	2.396	2.311	1.66
85	79.10	2.326	2.163	1.54
86	78.40	2.307	2.104	1.45
87	75.50	2.425	2.134	1.35
88*	73.10	2.593	2.151	1.31

*Preliminary

Changes in prices of competing meats cannot explain the dramatic drop in inflation- adjusted beef prices since 1979.

1980 and 1986. Inflation adjusted broiler prices stable from 1983 through 1986 were up in 1988, and per capita consumption has continued to increase. Given what was happening to pork and poultry prices, it is difficult to accept that there has been no structural change in beef demand or that any shifts in beef

demand can be explained by changes in prices of other products.

There is little doubt that leaders in the beef industry who look to agricultural economists for help are confused. Contrasting conclusions, ancient data bases, naive extension of historical trends, and unquestioning reliance on models that cannot account adequately for the economic significance of changes in trends and that take years to register a statistically significant change must be set aside. We need to get back to the basics. We have to get used to looking at the data again and we have to get reacquainted with theoretical and conceptual rigor in dealing with phenomena we cannot effectively quantify. And we need to stop substituting technique for thinking.

Final Observations

A critique of our effectiveness as a profession as the beef industry moves through major adjustment can be useful. Did we generate information that could have helped guide these continuing adjustments? Did we bring the proper perspective and analytical tools to the problems that emerged? If we failed, and I think we did, what could be done to increase the chances that the future performance of the research and education communities will be more nearly adequate and appropriate?

Immediate things we could do include:

- **Adjust the incentive system facing the young agricultural economist.** We need to ask whether there is any recognizable incentive for the young professional to establish the rapport and develop the insight needed to work effectively with the private sector.

- **Establish and maintain advisory panels and other infrastructure** that would allow us to communicate more effectively with leaders in the industry. During the 1970s and 1980s, agricultural economists who understood what was happening had no easily accessible forum to communicate with the private sector on research and education or needed policy changes.

- **Expand understanding of the basics of consumer demand** by agricultural economists and by leaders in the private sector. So long as we continue to confuse shifts in demand and changes in per capita consumption and continue to confuse the implications of such concepts as demand elasticity, there is no adequate base on which to build better communication.

To better serve the needs of the private sector, I propose a long-range action program involving two related and complementary thrusts. First, we need a "task force" charged with to periodically reviewing the demand situation for important agricultural commodities. Second, we need a session at the AAEA meetings each year oriented toward examination of what we know about current and pending developments in demand.


The task force should be comprised of rotating membership from the Economic Research Service, the land grant universities, and the private sector. An annual publication reviewing ongoing

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research and the status demand for selected commodities should be made available to the private sector and to policy makers. The task force could be organized with a regional focus, or it could be coordinated at the national level by the USDA, alternately, it could be the initiative of a single university. A continuing goal should be attempts to divert attention from short-run changes in

consumption or price as measures of change in demand, as well as developing a broad understanding of what constitutes a change in demand and what those changes mean to the economic viability of every participant at every level of the industry and to industry.

A price outlook session is conducted each year at the AAEA meetings. The session is designed primarily for extension economists who work in the price outlook and marketing strategy arenas. In the typical presentation, emphasis is on supply-side numbers. This professional audience would be better served if the session focused on demand and provided a framework within which the implications of both supply-side changes and shifts in demand could be effectively analyzed. A session of this type would also help raise the visibility of changes in demand as a critically important source of forced adjustment, and might exert a positive influence on the incentive systems on our university campuses.

One response to all this, of course, is that it is not our job to step in, to educate, or to fill the void that exists in the understanding of basic economic issues. I disagree. The costs to the industry and to society are too great. If we back away and leave the challenge of better education to the private sector and private consultants, we will be confirming mounting concerns that the Land Grant system has lost its direction and is neglecting its mission. 



For more information see:

"Structural Change in the Demand for Meat" by Jean-Paul Chavas in *American Journal of Agricultural Economics*, December 1987.

"Complete Flexibility Systems and the Stationarity of U.S. Meat Demands" by Roger Dahlgran in *Western Journal of Agricultural Economics*, December 1987.

Consumer Demand for Red Meats, Poultry, and Fish by R. Haidacher, J. Craven, K. Huang, D. Smallwood, and J. Blaylock, USDA-ERS-NED, AGES820818, September 1982.

"Parameter Stability and the U.S. Demand for Beef" by G. Moschini and K. Mielke in *Western Journal of Agricultural Economics* September 1984.