

Beef Demand: What is Driving the Market?

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Demand is a term we here everyday. We know it is important but at the same time hard to explain. We see reports that the demand for beef has declined over time and that is why cattle prices are so low. There is often confusion it exactly what we are talking about and even more questions when we try to measure it. In the next few minutes I what to address the issue of beef demand and then provide some empirical insight into what drives demand in the long run. In its simplest terms demand is a reflection of consumer preferences for a good. It is the way consumers “vote” when they choose how much to purchase among different substitutable products. Everyday consumers vote with their pocketbooks to buy beef, pork, poultry, fish, or no meat at all. There are limits on how we vote because of our income constraints, our preferences and eating habits, our understanding of the products attributes, and the relative costs or prices. When demand is measured, we are trying to place some relative importance on each of the factors that influence consumers’ decisions to buy or not buy the product. If we can measure the impact of each factor then that helps us explain why the market moves in different directions over time.

For almost every product there is some relationship between the price of the good and the amount we consume. If the product is essential to our daily diet (or use) then this relationship may not be very strong. That is, prices can change and we do not adjust our purchasing behavior very much. Whereas, if the product is less essential and there are other alternatives to choose from, then consumers may be very responsive to price changes. The sensitivity between the quantity consumed and the price is most often explained with the term price elasticity. Elasticity is simply an index of the relationship between the quantity and prices. In some circumstances the price is

some function of how much product is in the market. In other cases, the amount consumed is some function of the prices along with the other factors influencing the purchasing decisions. To understand the changes in cattle prices one must measure the demand.

In our allotted time this morning let me address several dimensions to demand and show you a ranking of factors that influence beef demand over time. To this extend I will identify several important trends in the beef industry and try to put the factors known to influence beef demand in some relative ranking.

Major Trends in the Beef Industry

The beef industry like much of the U.S. agricultural sector has experienced major structural and economic changes over the last two decades and, particularly, in the 90's. Alternative product forms have evolved, consumer preferences have shifted, health concerns have been heightened, and eating lifestyles have changed with more away-from-home consumption. These events all translate into changes in the demand for beef and subsequent changes in the underlying stability of the beef industry. During the same period beef exports, while still a small part of the total industry, have grown with most of the exports going to the Asian markets. A national promotion program was developed as one means for the industry to have some influence on the demand changes and the flow of information about beef.

Like most agricultural commodities there are underlying production cycles that contribute to the variation in per capita consumption and market prices. Any relationship between the quantity of beef consumed and the corresponding prices is a direct function of the demand for beef and beef substitutes. Hence, for a general overview one

must look at both the volume and total industry revenues to gain insight into the long term trends for beef.

Between 1960 and 1997 the U.S. beef production increased from 14.7 billion to 25.5 billion pounds. During the same period, the poultry industry grew from .4 billion to 27.2 billion pounds while the pork production increased from 13.9 billion to 17.3 billion pounds. Clearly, the growth in poultry consumption reflects a fundamental change in consumers preferences for alternatives to beef. Figure 1 converts the meat production to pounds per capita at the retail level. Before the 90's retail beef consumption exceeded both pork and poultry. Starting in the early 90's retail poultry consumption exceeded that of beef. This trend as seen in Figure 1 is indicative of the major changes seen over the last two decades that have profoundly affected the beef sector.

Starting with 1979, beef's share of the meat market was around 40 percent on a quantity basis and by the end of 1997 this percent dropped to approximately 32 percent. Expressing the market shares on a retail expenditure basis, in 1979 beef captured 58 percent the household expenditures on meat and, again, by the end of 1997 this share dropped to around 45 percent (see Figure 2). Thus, there has been an 8 percentage point drop in beef share of the meat market on a volume basis and a 13 percentage drop based on expenditure shares.

Part of the changes in expenditures share must be attributed to differences in relative prices and how these prices have changed. That is, has poultry or pork become cheaper over longer time periods. If the relative prices have not shown major changes, then clearly the shifts in shares must be attributed to factors in addition to price differences. In fact, that is precisely the case. Using Figure 3, we have shown the relative retail prices comparing beef to poultry (beef/poultry) and beef to pork. On average, retail beef prices are around 3 times that of poultry prices on a pound basis while beef is 1.5

times that of pork prices. During short periods such as the last quarter of 1998, such ratios can change dramatically as has been seen with the large decline in pork prices. Yet over longer periods, one would expect the price ratios as depicted with Figure 3 to be representative of the relative prices. While there have been fluctuations in the ratios, there is no long term underlying trends in these ratios. That is, beef is not becoming more (or less) expensive relative to poultry and pork over the long term. Hence, much of the shifts in shares indicated with Figure 2 are attributed to other factors such as health concerns, preference shifts, population aging, incomes, etc.

In addition to relative prices, long term patterns in beef producers' share of the retail expenditures on beef gives some insight into the performance of the beef market. U.S. beef goes through three major point of exchange as the product passes through to the final consumer: liveweight, boxed beef, and retail sales. If changes at the retail are not ultimately reflected back to producers, then cattle producers may not benefit from efforts to influence the retail market for beef. Using Figure 4, the relative prices between the liveweight to boxed beef and then boxed beef relative to the retail prices are illustrated. As shown with the lower curve in Figure 4, the relative prices between liveweight and boxed beef have been fairly stable since 1979 as shown with the box-to-live ratio being slightly above 1.5. In contrast, the ratio of retail-to-boxed beef prices point to a steady rise in the retail beef price relative to the boxed beef. Over the last two decades the ratio increased from near 2.0 to around 2.75. While part of this rising spread can be attributed to increased marketing and distribution costs, part may be attributed to the changing distribution system with increased concentration at the retail end of the distribution chain.

What do these figure mean for the beef industry? While more time is needed to give adequate treatment, it is clear that the beef sector

has and continues to face profound changes in the demand for red meat in comparisons to poultry and somewhat less with pork. Even though the beef sector continues to maintain the largest share of the meat market on a dollar basis, one can expect continue pressure on the market with consumers seeking alternative meat products that are safe, convenient, and of high quality.

Identifying the Demand Drivers

While the trends in the above figures reflect underlying production patterns in all meat sectors, ultimately the economic value of the beef depends on consumer preferences and resulting buying behavior. Some preferences are directly correlated with our socio-economic differences and one would expect beef demand to differ across these characteristics. Preferences change over time as consumers seek out convenience, variety, and safer foods. One only has to look at the British market for beef to see the devastating effect of food safety concerns. To some extent preferences can be influenced through promotions and other sources of information designed to inform and education the consumer. Your beef checkoff dollars are intended to precisely do that and the research shows that they have been effective. Yet positive gains from promotions, for example, may not be adequate to offset other factors such as health related concerns and their impact on demand. For some factors the beef industry has absolutely no influence on and simply must be prepared to deal with the negative (or accept) market pressures. For example, an usually large pork supply in one year will put pressure on the demand for beef and there is little that the beef industry can do about it.

As one looks at the array of factors influencing the demand for beef, we can generally identify groups of factors that help us gain a clearer picture of the demand drivers. To gain a better understanding of the demand drivers an ongoing survey of U.S. households has been used to determine

how beef demand differences across these groups of factors. Each household reported the number of beef servings included in the diet over a specific period. They were asked a series of questions designed to focus on issues such as health concerns, eating habits, general demographics, and others. Using economic models, we were then able to take the range of factors and determine the relative role of each on the demand for beef in the U.S. domestic market. Some factors have a negative impact on beef demand such as health concerns while others have a positive effect such as income. After measuring the independent effect each factor, they were then ranked from the most negative to the most positive. Figure 5 shows the overall ranking and the results of each are presented.

Three general types of question with one requiring an *agreed or disagree* range of responses; a second response was in terms of *encouragement or discouragement*; and the third type was scaled in terms of the *degree of concern* about a particular issues. All types of questions required a 1 to 6 scale with 1 being encourage, agree, or strong concern while a 6 is discourage, strongly disagree, or of no concern. So if the factor effect is negative, then a scale of 6 would reduce the demand for beef more than a score of one. Similarly, for positive effects and score of 6 would add to beef demand more than one. Using this procedure, Figure 5 shows the rankings with the top portion giving those with the greatest negative impact on beef demand and the bottom scale giving the largest positive impact. Again one has to be careful with how the question was asked when interpreting the factors impacting on beef demand. Overall the range of impacts are quite mixed and each will be briefly reviewed.

Beef demand differ across *education groups* and the impact is one of the largest negative factors as seen in Figure 5. Beef demand declines as the educational level of the female head of the

household increases. No high school was scored as 1 and college as 4, and with the negative response beef demand declines considerably with the more educated population. State another way, one finds considerable variation in beef demand across educational levels with the demand declining with the higher educational levels.

A second category related to *planning nutritious meals* and this factor ranked second among the negative factors. The use of beef declined when the person disagreed with the importance of planning nutritious meals. That is, when consumers agreed with planning nutritious meals beef was more likely to be included in the diet. This results will be somewhat at odds with later health impacts.

Both the *female age* and *employment* status are two demographic variables of particular importance and have a major negative impact on beef demand. Beef demand declines as households age and this variable is the third largest in terms of relative impact on beef demand. Similarly when the female is employed beef demand drops often to nearly the same effect as age. Most likely the employment is a measure of the demand for convenience, indicating that preparation of beef is viewed as less convenient. Hence, beef demand declines as females move more and more into the labor force.

The next group of six variables were designed to focus on eating habits. Probably any one of the variables could have been used as a proxy for eating habits. Consumers were asked if they encourage their families to *eat less fried and high fat foods* such as luncheon meat, hot dogs, tacos, pizza, and fried chicken. Thus a score of 1 implies that the household head encourages the family to consumer less of the fried foods. Clearly this group of variables have an impact where beef demand declines when one is more concerned about the consumption of high fat products such as fried foods. Consumption of these products is a

reflection of our lifestyle for eating fast foods and the beef industry benefits from that trend.

Beef *prices* show a negative impact on demand as must be the case. Contrary to what one might initially expect, the negative effects of prices on beef demand is considerably smaller than the preceding variables. That is a decline in beef demand associated with age, employment, education, and eating habits are far more important than the prices in adding negative pressure to the market in the long run.

A middle group of variables such as the female being on a diet, eating regular meals, and taking a doctors advice for eating are all quite small relative to the more pronounced variables. Likewise the changes in the price of pork and poultry impacts are small relative to the other factors.

Turning to the bottom portion of the figure, income levels are shown to have a major positive impact on the demand for beef. It is the largest of the positive factors. Of near equal importance is the effect of lack of nutritional knowledge. Beef consumption goes up when the household has less than the average knowledge about nutrition. Similarly, when households are less concern about fats and cholesterol their consumption of beef increases. Yet these health related variables are of less importance than income and knowledge. Another interesting factor is the effects of concerns about calories. While the at dieting showed minimal effect, beef demand does decline as household shown more concern about calories.

Overall Figure 5 is important in that it establishes that demand differences are attributed more to demographics and health issues than to differences in prices among the competing products. Furthermore, it shows that the promotions can have a positive impact with increased expenditures. Yet if consumers are becoming more concerned about health related issues, that ranks above the checkoff and there

concerns could negate some of the promotion efforts. We know that beef demand has declined over time as suggested with Figures 1 and 2. Monitoring the change in employment status, aging, and health concerns are among the major factors contributing to the longer term trend. If the industry wants to deal with these trends, then more of the focus should be on health related issues, possibly product convenience, and communicating more with the older populations. Dealing with those variables near the middle group are simply going to have a smaller impact on beef demand.

Turning to the Future

Time does not permit me to show how these empirical results are used in detail. To close let me at least suggest how the ranking are important to the beef industry. There are economic and non-economic factors that the industry has little influence over. Yet through a concerned efforts to provide the consumer with factual information about the attributes and uses of the product one

may be able to change these rankings. For example, the health concerns could be changed. Likewise products that are more convenience would change the negative impacts current seen for that factor. The models provide a direct way to quantify the range of variables impact beef and to have some expectation of the gains if the consumers preferences were changed.

Currently these type models are used to assess the impact of the beef promotions and to show the impact if there were profound changes in the beef export levels. Likewise, they are used to estimate revenue changes over time and to predict beef share of the market over extended periods. One can convert the impact of each factor such as aging, education, convenience, health concerns directly into changes in the pounds of beef per capita and then show the gains in pounds if one or more of the factors were changed. The beef industry has tried to used these rankings as one input into developing their long term demand strategies.

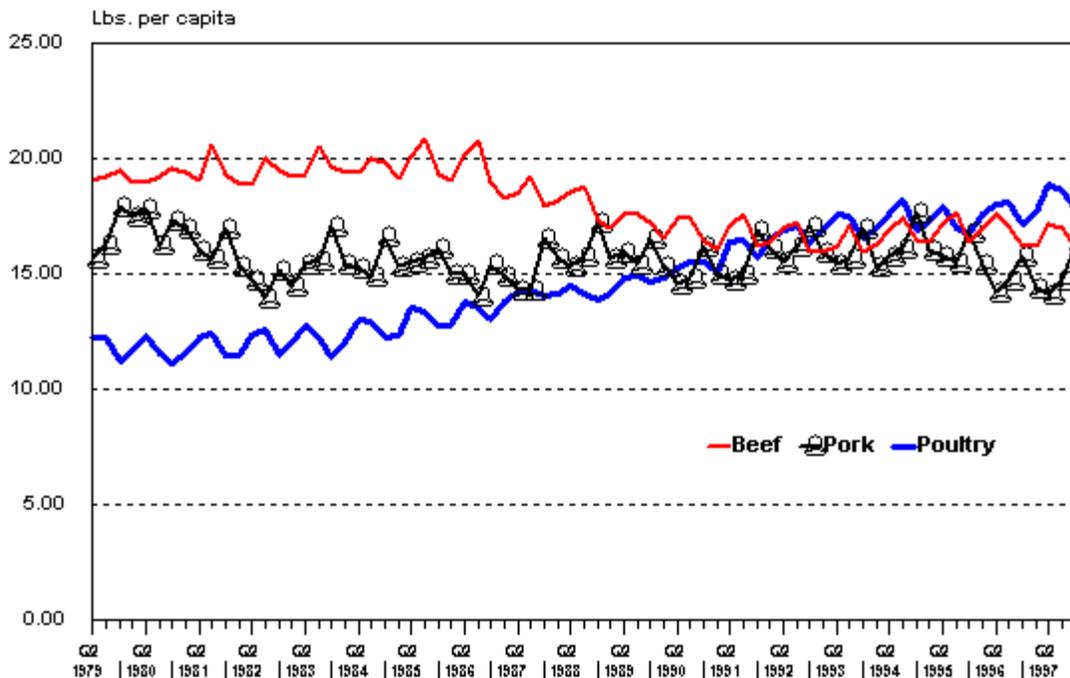


Figure 1. Domestic Consumption of Beef, Pork, and Poultry

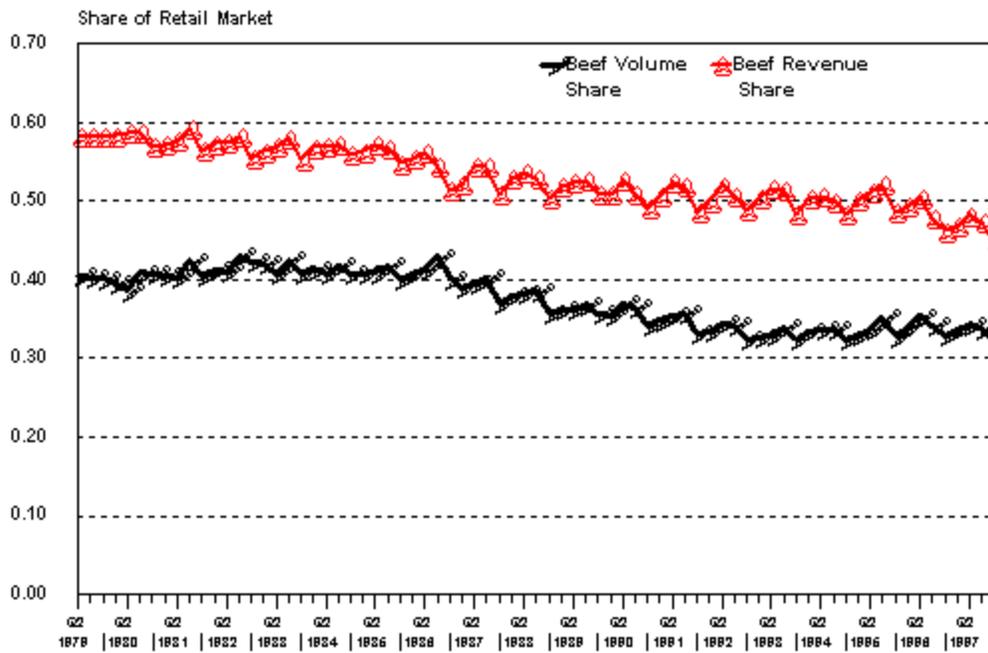


Figure 2. Beef Share of the Market

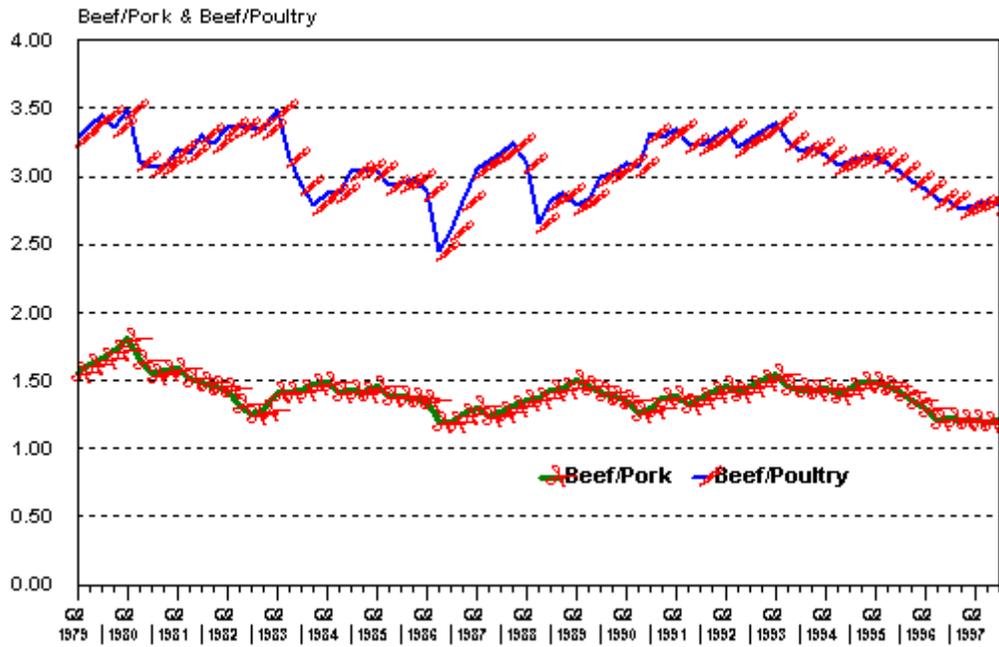


Figure 3. Retail Beef Prices Relative to Pork and Poultry

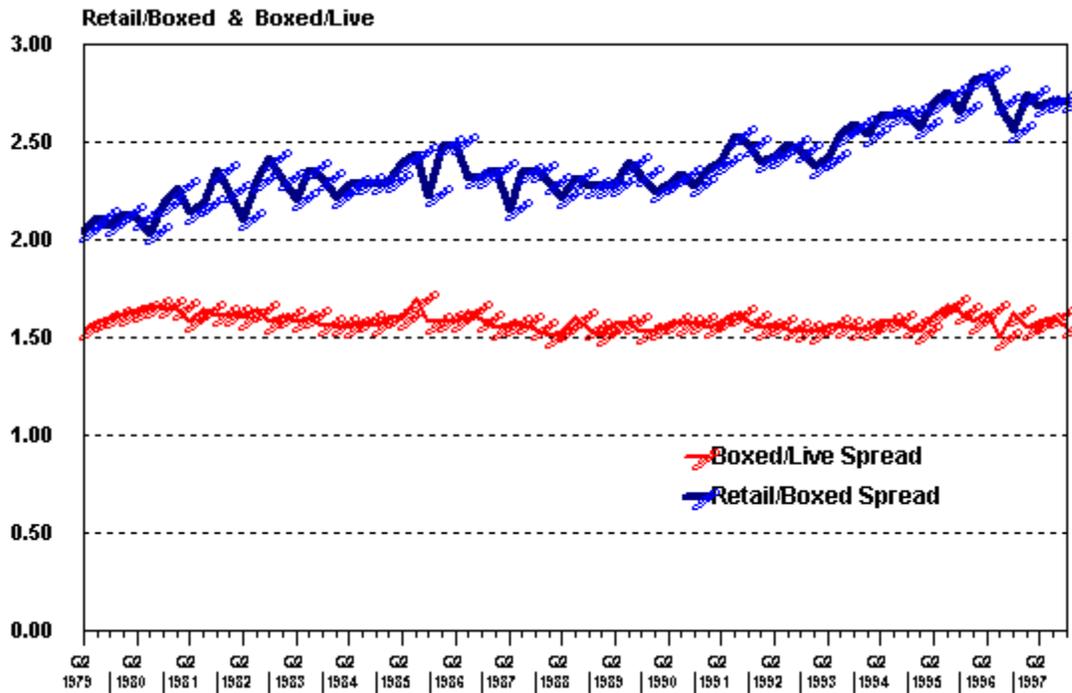


Figure 4. Relative Beef Price Spreads

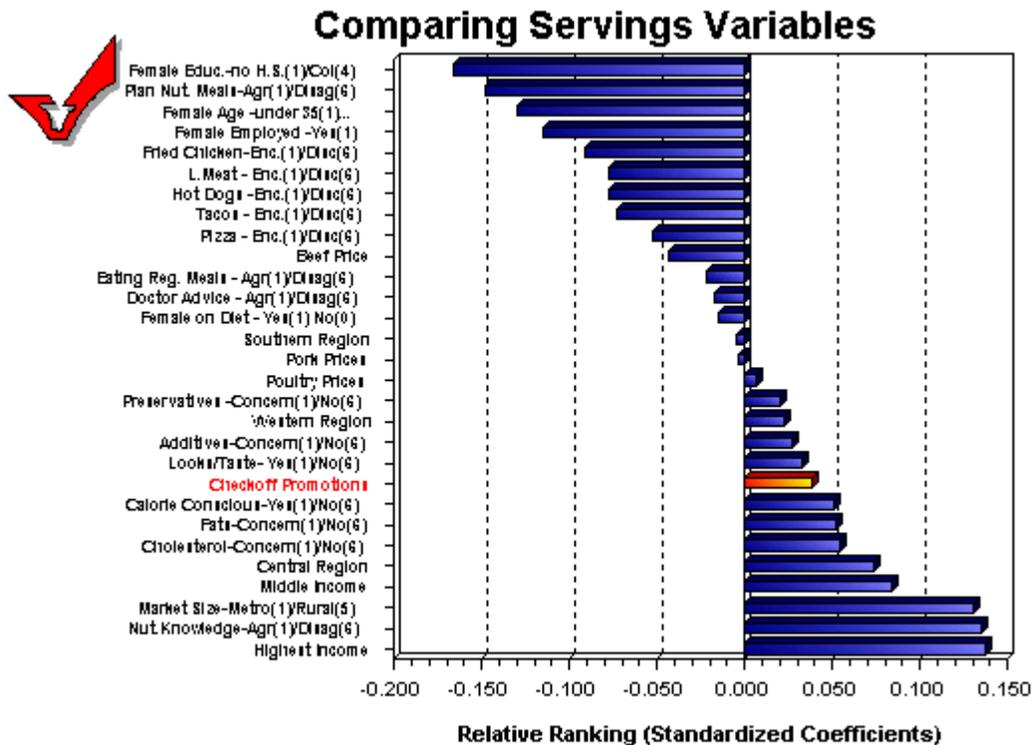


Figure 5.

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