Factors affecting beef demand

J. Mintert

Ted C. Schroeder

T. Marsh

Factors affecting beef demand

Abstract

We investigated factors that have affected beef demand over the last two decades. Beef demand is typically modeled as a function of beef prices, competing meat prices, prices of all other goods, and consumer expenditures. Our comprehensive model also investigated the impact on beef demand of food safety issues, health concerns, and changes in consumer lifestyle and demographics. Results from this analysis help explain changes in beef demand that occurred during the 1980s and 1990s. First, consumer concerns about food safety, as measured by increases in beef recalls, had a negative impact on beef demand over the last two decades. Second, consumer awareness of the linkage between cholesterol and heart disease also contributed to the decline in beef demand. In contrast, as the net number of medical journal articles linking cholesterol and heart disease increased, poultry demand actually increased. Finally, increased labor force participation by females had a negative impact on beef demand, because an increase in female employment outside the home likely resulted in a decline in time available for food preparation. Because poultry demand benefitted from this consumer demographic shift and because of beef's negative health image, these results suggest that beef industry efforts to provide consumers with more convenient, high quality products have lagged behind those of the poultry industry.

FACTORS AFFECTING BEEF DEMAND[1]

J. Mintert[2], T. Schroeder[2], and T. Marsh[2]

Summary

We investigated factors that have affected beef demand over the last two decades. Beef demand is typically modeled as a function of beef prices, competing meat prices, prices of all other goods, and consumer expenditures. Our comprehensive model also investigated the impact on beef demand of food safety issues, health concerns, and changes in consumer lifestyle and demographics. Results from this analysis help explain changes in beef demand that occurred during the 1980s and 1990s. First, consumer concerns about food safety, as measured by increases in beef recalls, had a negative impact on beef demand over the last two decades. Second, consumer awareness of the linkage between cholesterol and heart disease also contributed to the decline in beef demand. In contrast, as the net number of medical journal articles linking cholesterol and heart disease increased, poultry demand actually increased. Finally, increased labor force participation by females had a negative impact on beef demand, because an increase in female employment outside the home likely resulted in a decline in time available for food preparation. Because poultry demand benefitted from this consumer demographic shift and because of beef's negative health image, these results suggest that beef industry efforts to provide consumers with more convenient, high quality products have lagged behind those of the poultry industry.

(Key Words: Beef Demand, Food Safety, Health Concerns, Consumer Demographics.)

Introduction

Beef demand improved modestly during 1999 and 2000, increasing an average of about 4% in each of the last 2 years. However, prior to the recent rebound, the beef industry was plagued with nearly 20 years of declining demand. Inflation-adjusted, retail-beef prices were collapsing at the same time per capita consumption was declining. For example, a beef-demand index that accounts for changes in per capita beef consumption and inflation-adjusted, retail-beef prices indicates that 1998 Choice retail-beef prices were 50% lower than they would have been if beef demand had been held constant at its 1980 level (Figure 1). If the beef industry is to successfully improve long-term demand, the impact of individual demand determinants on beef demand must be quantified. Our study was designed to determine the major factors causing beef demand to shift over time.

Procedures

It is impossible to accurately assign relative demand shifts to individual demand determinants through casual observation of trends and beef demand shifts because many beef-demand determinants, as well as beef production, change at the same time. As a result, a meat demand system was estimated using quarterly time series data over the 1982 through the 1998 period. The system included factors accounting for prices of competing meats and total consumer expenditures, changing consumer demographics,

---

[2]Department of Agricultural Economics.

food safety problems, health information, and seasonality.

Results and Discussion

Our model indicates that beef demand is inelastic with respect to beef price and that pork and poultry are weak substitutes for beef. From 1982 through 1998, on average, beef quantity demanded declined 0.61% given a 1% increase in beef price. Responses to competing meat-price changes were much smaller. Beef quantity demanded increased 0.04% and 0.02%, given a 1% increase in retail pork and poultry prices, respectively. These elasticity estimates indicate that although relative prices matter, per capita beef consumption is not highly responsive to changes in pork and poultry prices. More-over, beef expenditures represent a progres-sively smaller proportion of total consumer expenditures. This implies that beef demand could become even more inelastic (i.e., quantity demanded could be less responsive to price changes) in the future.

Beef demand is highly responsive to changes in total per capita expenditures on all goods. Changes in total per capita expen-ditures occur when personal disposable income increases, consumer willingness to spend income increases, or a combination of the two. Consumer willingness to spend a larger proportion of total income has been an important source of economic growth for the U.S. economy in recent years. For example, consumer expenditures rose from less than 90% of disposable income in the early 1980s to near 98% by 1999. Demand-model results indicate that beef demand increases 0.90% for a 1% increase in total per capita expendi-tures. This means that beef demand was a major beneficiary of increasing consumer expenditures. However, if consumers choose to increase savings in the future (in lieu of consumption), or if disposable income de-clines, it will have a negative impact on beef demand.

Beef demand declines when beef-safety recalls occur. Beef recalls averaged 2.1 per quarter from 1982 through 1998, but the number of recalls varied across quarters and years. For example, beef recalls ranged from 4 to 8 per quarter during 1998. Over the 1982 through 1998 period, the number of Food Safety Inspection Service recalls were relatively few in number and their impact on beef demand was generally small. But the demand model indicates that a large increase in beef recalls can lead to an economically significant downward shift in beef demand.

Health information linking cholesterol and heart disease weakened beef demand, from 1982 through 1998, by about 0.60% annually. As more medical journal articles are published linking cholesterol and heart disease, beef demand declines modestly, whereas pork and poultry demand actually increase. Importantly, the negative impact of heath information on beef demand increased over the study period.

Changing demographics suggest that consumers are placing more emphasis on how quickly meat items can be prepared for consumption. The percentage of females in the labor force rose from 52% in 1982 to 60% in 1998. As a greater proportion of females enter the labor force, less time is available for at home food preparation. This change had a negative effect on beef de-mand, but a positive effect on poultry de-mand. Beef demand declined an average of 1.3% annually over the 1992-99 period as a result of an increasing female labor force. Assuming that consumer demand for conve-nience is related to female labor force partic-ipation, this suggests that the poultry sector benefitted over time by offering more conve-nient products to consumers. At the same time, beef demand suffered through 1998 as time allocated for food preparation declined and the beef industry failed to offer consum-ers high quality, convenient, easy-to-prepare beef products.
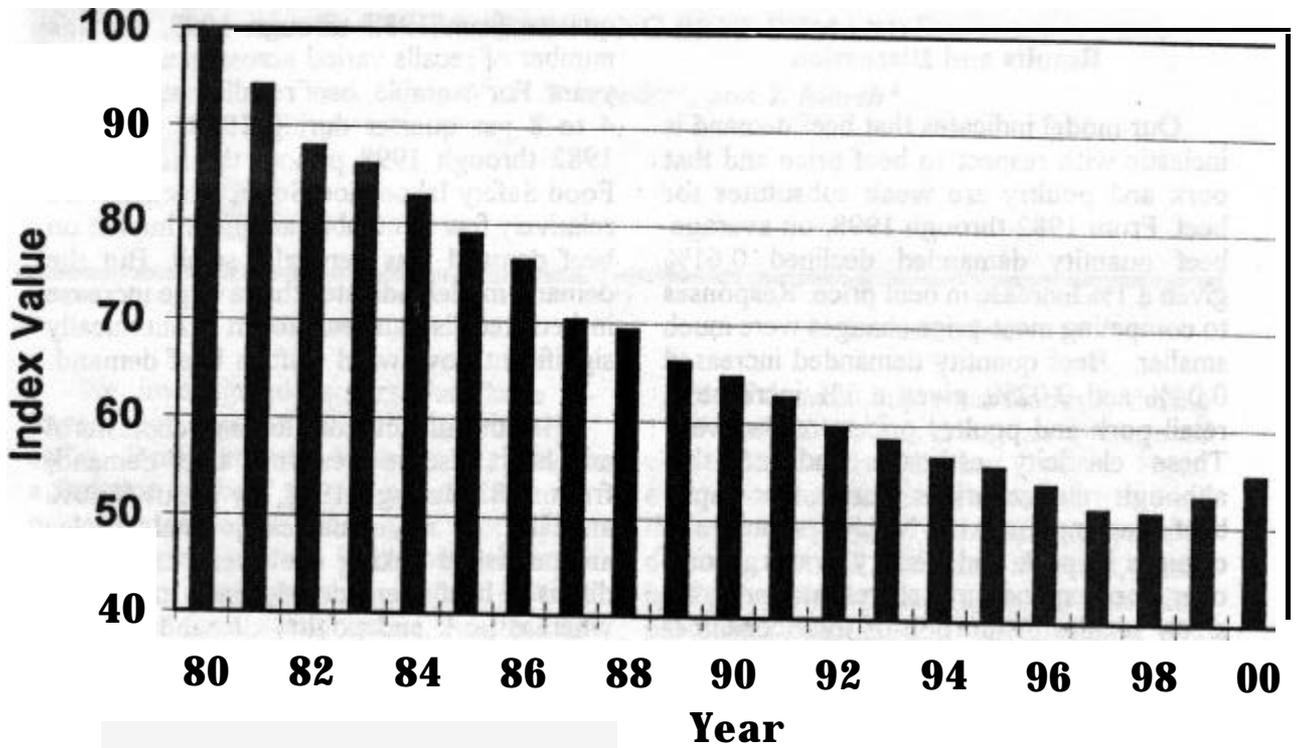
Source: USDA, Dept. of Commerce and K-State Research & Extension, 2000 partially estimated.

Figure 1.   Choice Retail Beef Demand Index, 1980 = 100.