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# Analysis of Point-of-Sale Purchases of Fresh Beef

## For a Retail Food Firm\*

by

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### Problem Addressed

Though much empirical work and theoretical work exists with respect to demand analyses in recent years, reliable estimates of demand parameters for disaggregate food commodities are few in number. Moreover, traditional analysis of consumer demand has generally been dependent upon aggregate annual, quarterly, or monthly time series data of consumer purchases and prices. To circumvent these shortcomings, this study uses scanner data to examine demand relationships for fresh beef products at the retail level. The fresh beef products used in the analysis are brisket, chuck, ground, loin, rib, round, and all other beef. The purpose of this study is to identify and assess factors affecting purchases of fresh beef products.

### Methodology Used

The source of data for this study is a retail food firm in Houston. Scanner data from all stores in the firm are aggregated to form 113 weekly time series observations.

The dependent variable in the demand models corresponds to purchases of fresh beef (in

pounds) per 1,000 customers. The respective exogenous variables are the following: (1) own-price; (2) prices of competing beef products; (3) price indices for fish, pork, and poultry; (4) price of convenience beef products; (5) advertisement variables; (6) seasonality (monthly dummy variables); and (7) holidays. This analysis centers attention on descriptive statistics of the respective variables as well as price and advertisement elasticities.

### Major Findings

The average purchase per 1,000 customers for fresh beef is roughly 350 pounds per week. Fresh beef products yield almost \$600,000 in sales on a weekly basis. Ground beef makes up about 37 percent of dollar sales; loin, 19 percent; round, 12 percent; rib, 10 percent; chuck, 6 percent; and brisket, 4 percent. Remarkably, the models capture significant amounts of variation in quantities purchased per 1,000 customers. The  $R^2$  statistic ranges from 0.5536 (rib) to 0.9076 (chuck). Own-price elasticities for fresh beef products are statistically significant, negative, and are elastic in range. The respective measures vary from -1.115 (ground) to -6.506 (brisket). All the own-advertisement elasticities are positive.

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Among these, only "all other beef" is not significantly different from zero. The own-advertisement elasticities range from 0.036 (ground) to 0.123 (brisket). Cross-cut and cross-product prices play a relatively minor role. The cross advertisement effects are marginal, although negative for all the statistically significant cross-advertisement elasticities. Seasonality is a key factor only for purchases of brisket and "all other beef." As well, purchases of fresh beef products during holidays are not significantly different from these purchases during non-holidays.

#### **Contact Persons**

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