

Cornhusker Economics

Cooperative Extension

Institute of Agriculture & Natural Resources
Department of Agricultural Economics
University of Nebraska – Lincoln

Consumer Willingness-to-Pay for Flavor in Beef Steaks: An Experimental Economics Approach

Market Report	Yr Ago	4 Wks Ago	3/16/01
<u>Livestock and Products,</u>			
<u>Average Prices for Week Ending</u>			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt	\$71.94	\$78.87	\$79.88
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt	93.44	*	97.02
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg	98.07	96.22	98.94
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt	112.16	120.41	121.19
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt	44.50	40.62	47.37
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd	57.50	*	58.50
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt	112.00	110.90	131.80
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt	75.92	80.37	*
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt	170.00	165.00	171.00
<u>Crops,</u>			
<u>Cash Truck Prices for Date Shown</u>			
Wheat, No. 1, H.W. Omaha, bu	2.89	3.17	3.17
Corn, No. 2, Yellow Omaha, bu	2.10	1.91	1.85
Soybeans, No. 1, Yellow Omaha, bu	4.94	4.34	4.23
Grain Sorghum, No. 2, Yellow Kansas City, cwt	3.62	3.61	3.45
Oats, No. 2, Heavy Sioux City, IA, bu	1.37	1.42	1.36
<u>Hay,</u>			
<u>First Day of Week Pile Prices</u>			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton	87.50	115.00	115.00
Alfalfa, Lg. Round, Good Northeast Nebraska, ton	82.50	70.00	70.00
Prairie, Sm. Square, Good Northeast Nebraska, ton	*	110.00	117.50

* No market.

This article summarizes the major findings of a just completed agricultural economics dissertation research project that analyzed consumers' perceptions of beef flavor, and more importantly, their willingness-to-pay for various flavor preferences. The research was conducted jointly with the Animal Science Department at UNL. A novel experimental design was used to determine consumers willingness-to-pay for their flavor preferences. After tasting various steak samples, consumers were given the opportunity to bid on and purchase steaks from the same sample. The experimental auction was a sealed-bid, fourth-price auction (similar to a Vickrey auction) where the fourth highest bid determined the market price and the top three bidders all purchased steaks at the market price.

The dissertation had three specific objectives. The first objective was to establish consumers' preferences and willingness-to-pay for flavor characteristics in beef steaks. The second objective was to determine if consumers' visual preferences differed from their taste preferences, and the factors leading to the discrepancy. The final objective was to extend the knowledge and understanding of experimental auctions by evaluating the dynamics of repeated uniform price auctions. Only results from the first two objectives are presented in this article.

Consumers were recruited in Chicago, IL and San Francisco, CA to participate in the experiment. In total 248 consumers participated in the experimental procedures, 124 in Chicago and 124 in San Francisco. Consumers were paid \$25 or \$35 for their participation, and two surveys were used to gain information on participants' demographic characteristics, beef preferences, consumption habits and beef knowledge. Consumers visually evaluated a pair of steaks differing only in the degree of marbling (intramuscular fat) and were then given the opportunity to taste, evaluate and purchase six different steak samples.

Flavor Preference and Willingness-to-Pay

The first analysis examined consumers' flavor preferences and willingness-to-pay for flavor by comparing: 1) highly marbled USDA Choice versus low marbled USDA Select beef, and 2) U.S. corn-fed beef versus Argentine grass-fed beef, both grading USDA Select. In order to isolate the flavor characteristics of the steaks, tenderness was held constant within paired



comparisons.

On average, consumers were willing-to-pay a slightly higher price for the more marbled Choice beef over the lower marbled Select beef. Results from the domestic corn-fed beef versus the Argentine grass-fed beef comparison showed that on average, consumers bid more for the domestic steak sample, Table 1.

Overall, acceptability ratings and bid differentials between pairs of steaks were used to identify consumers who preferred and were willing-to-pay more for a particular flavor. Twenty-nine percent of the consumers consistently preferred the USDA Choice steak to the USDA Select steak and were willing-to-pay an average of \$1.30 per pound more for their preference, however, 13.7% of the consumers consistently preferred the Select steak over the Choice steak and were willing-to-pay \$1.63 per pound more for the Select steak. Sixty-two percent of the participants preferred, and were willing-to-pay an average of \$1.61 per pound more for the domestic steak; and 23% of the participants preferred the flavor of the Argentine steak and were willing-to-pay an average of \$1.36 more per pound for their preference.

Various statistical procedures were used to try and identify groups of consumers who would prefer a particular flavor. In general, it was difficult to accurately predict flavor preferences, but a few characteristics were significant in explaining preferences. Older individuals tended to prefer high marbled USDA Choice over low marbled USDA Select beef flavor. Consumers who typically purchase Choice beef were less likely to prefer Select beef flavor. Males, individuals who prefer to eat beef over other meats, and those who typically do not eat Choice grade beef were all more likely to prefer domestic, corn-fed beef to international, grass-fed beef. Non-Caucasian and Chicago consumers were more likely to prefer grass-fed beef than Caucasian and San Francisco consumers. The results provide the beef industry with the information that different segments of consumers exist, and one commodity beef product will not meet the demands of all consumers.

Visual versus Taste Preferences

The second phase of the research examined the relationship between consumers' expected steak quality from visual appraisal and the quality that is actually experienced when consuming a steak. The decision variable was the amount of marbling in a steak. Data were obtained from consumers after they performed

both a visual evaluation and a taste evaluation of a pair of New York Strip steaks (one high marbled, USDA Choice and one low marbled, USDA Select steak). This was used to determine if consumers' visual preferences for marbling differed from their taste preferences for marbling. After visually evaluating steaks, consumers were on average willing-to-pay more per pound for the low marbled, USDA Select steak than for the high marbled, USDA Choice steak. However, after tasting paired steaks, consumers were willing-to-pay slightly more per pound, on average, for the higher marbled steak. For the majority of the consumers in the experiment, their taste preference differed from their visual preference. Generally, those consumers who visually preferred the low marbled Select steak, indicated that it contained less fat and to them fat was a definite negative beef quality attribute. However, for those who visually preferred the heavier marbled Choice steak, they generally stated that the steak was heavier marbled and they viewed marbling as a positive beef trait.

Implications

This research demonstrated that when tasting beef steaks of equal tenderness, consumers could perceive flavor differences associated with marbling level (USDA Quality Grades) and associated with domestic corn-fed versus international grass-fed beef. More importantly, the majority of consumers were willing-to-pay a significantly higher price to purchase steaks with their preferred flavor. However, many consumers, it would appear, don't purchase beef that would provide them with the greatest level of taste satisfaction. Their visual preference differs from their taste preference. For some consumers, this may be a conscious choice. Others may be choosing beef in ignorance of how marbling impacts flavor.

This research should be of interest to agri-business firms interested in branding beef. It may be possible to sell both Choice and Select beef at a premium to targeted markets. Likewise, their appears to be a niche market for grass-fed beef. However, for a branded beef product to be successful, it is likely that some consumer education about the attributes of the branded product will be necessary.

Dillon M. Feuz, (308) 632-1232
Panhandle Research & Extension Center
Wendy J. Umberger, (402) 472-4624
Graduate Student, Dept. of Agricultural Economics

Table 1. Average Experimental Auction Bids (\$/lb) for Various Groups of Consumers and Flavors of Beef Steaks

	Overall Average	High Marbled Preferring	Low Marbled Preferring	Indifferent
High Marbled	\$2.57	\$3.44	\$1.72	\$2.34
Low Marbled	\$2.43	\$2.14	\$3.35	\$2.34
Number of Consumers	226	65	31	130
	Overall Average	Domestic Preferring	Argentine Preferring	Indifferent
Domestic Corn-fed	\$2.67	\$3.21	\$2.15	\$1.22
Argentine Grass-fed	\$1.97	\$1.60	\$3.51	\$1.22
Number of Consumers	226	141	51	34