CONSUMER WILLINGNESS TO PAY FOR ATTRIBUTES OF FLAT IRON STEAK

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ABSTRACT

In a world of health conscious, dual income households, and the expectation of added value, the beef industry has been facing the challenge of producing a product with the attributes for which consumers are willing to pay. A survey was conducted to determine the willingness to pay for specific attributes of a new beef value cut, Flat Iron Steak, with respect to packaging, convenience, branding, and marbling. Using the choice-based approach, results suggest that branding and packaging were the main attributes that demanded a premium. More interestingly, certain convenience factors such as cut-up and pre-seasoned may not demand a premium.

INTRODUCTION

The beef industry has suffered from reduced demand since the early 1970's, largely due to nutritional concerns and the lack of product preparation convenience. A lack of quality and consistency and health concerns have contributed to the 23% decline in beef consumption seen from 1979 to 1990, USDA [21]. The beef industry is meeting these challenges by moving toward boneless cuts and also marketing fewer cuts to decrease confusion at the point of purchase (NCBA [16]).

In a world of health conscious, dual income households, the challenge becomes producing a product with the attributes for which consumers are willing to pay. The ability to understand lifestyle, purchase patterns and time and talent restrictions can aid the industry in presenting products which can recapture dollars being spent in restaurants or on various other products (Johnson [8]). The way to recapture these dollars is by making an effort to isolate and utilize muscles that might increase demand for raw products. The University of Nebraska and the University of Florida have recently identified several new steaks in a Muscle Profiling Study which may increase the competitiveness of beef and the role it plays in the fresh meat case. When removed intact and cut in a way that the muscle fiber orientation is correct, muscles from the round and chuck are desirable in their tenderness and palatability (Johnson [9]). This would meet the needs outlined in the National Consumer Retail Beef Studies (Savell et al.[18][19]) which indicates that consumers are looking for a convenient product that is palatable and is limited in the amount of plate waste. Currently, an effort is being made to promote cuts that have previously had little use or value.

Aside from the large piece of connective tissue, the muscle comprising the Flat Iron Steak is the second most tender muscle in the body and has not yet been utilized to capacity. Another advantage to having this steak in the retail case is that a void will be filled by offering a steak product that will compete at a much lower price than traditionally priced steaks, while offering an alternative to ground beef. This could be significant because it would allow the beef industry to recapture a portion of the market that is spent on other products. The ability to market meat components together in a bundle may help to increase margin potential.

The Flat Iron Steak was developed from the Muscle Profiling Study and is new to the beef market. Studying consumer perceptions for specific attributes (packaging, price, labeling, level of marbling (grade) and convenience) will help the industry determine where consumers gain satisfaction and the magnitude of their willingness to pay for these attributes. The National Research Council [17] identified three primary motivators that drive meat consumption and purchase: taste, price and healthfulness are motivators; however if taste is lacking then price and healthfulness no longer matter (Chamber and Chambers [3]). To try and counteract this situation, NCBA has introduced the product to restaurant operators who have the ability to promote a positive eating experience. After becoming acquainted with the steak at the restaurant level, the hope is that they will seek out the product when it reaches the retail market (NCBA [15]). This will allow for more focused marketing efforts and maximum economic returns, in a market that operates on slim margins. The goal of this research is to determine consumer acceptance and willingness to pay for specific attributes of the Flat Iron Steak.

METHODS

Select and choice Beef Chuck, Shoulder Clods (IMPS/NAMP 114) were procured from a local foodservice distributor[1]. Flat Iron Steaks were fabricated from the Beef Chuck, Shoulder Clod, Top Blade Roast (IMPS/NAMP 114D). A total of 32 Flat Iron Steaks weighing approximately .50lb were cut and randomly assigned to each of the attributes. Packaging and preparation of the products was performed at the Louisiana Tech Meat Laboratory[2]. Products were plastic overwrapped or vacuum packaged using a Busch Ultravac Model 2100 vacuum package machine. Photographs were taken of the scenarios for use on the choice cards.

Data were collected from 93 shoppers over a two day period in the southern United States. Shoppers were randomly asked if they would be willing to participate in a survey in which they would receive a cold drink. The choice experiment involved two steps.

Step 1: Shoppers who agreed to participate in the survey first answered a written survey. The written survey inquired about current beef consumption habits, such as how often beef was consumed, beef pricing preferences, reasons for not purchasing beef, preferred cuts of beef, whether the consumer had heard of and/or tasted Flat Iron Steak, package size preferences and demographic information. Also, a Likert scale was used to determine the importance of several attributes of Flat Iron Steak such as price, appearance, convenience, brand, country of origin, aroma, and texture.

Step 2: Shoppers were then shown a series of 16 cards. Each card had two pictures and a description of the two Flat Iron Steaks with the attributes changing.

Consumers were asked to choose between two cuts of meat (choice A and choice B) or they could choose not to buy. Attributes that changed included the price of the product, whether it was branded or not, the packaging type (vacuum or plastic wrap), whether it was seasoned, whole, or cut-up, and whether the meat cut was choice or select grade. The consumers made choices between the attributes, which is a type of conjoint analysis used often in environmental and marketing studies (Adamowicz et al. [1], Hudson and Lusk [6], Jayne et al.[7], Lusk et al. [14], Unterschultz et al. [20],)

The willingness-to-pay for specific attributes of Flat Iron Steak using a choice-based response model varying the attributes was elicited. This makes it possible to make inferences about consumer preferences and assign premiums or discounts to the various attributes. Given the selected five attributes with one at three levels (three different possible prices) and four at two levels (two different packaging options, two branding options, two marbling levels, and two convenience options) the experimental design yields 48 possible Flat Iron Steak profiles. However, using SPSS Conjoint 12.0, an orthogonal design with shifting was developed to reduce the number of profiles to 16, which is more manageable for surveying consumers. The underlying assumption is that consumers derive utility from a bundle of attributes, rather than the good itself (Lancaster [11]). This method can also predict the success of new products (Jayne et al. [7]).

The probability of choosing one profile over another can be estimated and then used to determine mean willingness to pay for each attribute. This is based upon the model of random utility (Louviere, Hensher, and Swait [13]):

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{1}$$

where U_{ij} is the utility that a consumer would receive from choosing the profile j, V_{ij} is the deterministic portion of utility and ε_{ij} is the stochastic component of utility. Figure 1 shows the first three options that the consumer must choose between, profile A, profile B, or no buy. The probability of the consumer choosing any of these j profiles is:

$$\Pr\{j \text{ is chosen}\} = \Pr\{V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik};\ \text{for all } k \in C_i\} \tag{2}$$

where C_i is the choice set for consumer i (C_i = profile A, B or no buy). If the random errors in equation (1) are independently and identically distributed across the alternatives and N individuals with a Type 1 extreme value distribution and scale parameters equal to 1, the probability of consumer i choosing profile j is given by:

$$\Pr\{j \text{ is chosen}\} = \frac{e^{V_{ij}}}{\sum_{k \in C} e^{V_{ij}}} \tag{3}$$

Equation 3 was estimated as a conditional logit model composed of the five attributes mentioned previously. Estimated coefficients are the marginal utility of each of the attributes, which can be used to determine willingness to pay by taking the ratio of the parameter estimate for each attribute to the parameter estimate for price. Krinsky and Robb [10], suggest developing a 95% confidence interval on each mean willingness to pay to test for statistical difference. This is done by estimating the bivariate normal distribution between the parameter estimates of the alternative specific constants and the price estimated parameters, which will provide a standard deviation of the distribution of willingness to pay, ultimately used to determine the confidence intervals.

DATA AND RESULTS

One hundred and twenty five people were asked to participate in the survey with 92 agreeing to participate for a 26.4% turn down rate. Table 1 provides the summary statistics on the consumers participating in the survey. Approximately 62% of the consumers were female with about half being under 40 years of age. Most consumers were white (73.9%), with almost 20% being African-American and 6.5% being some other ethnicity. Education ranged from no high school to a graduate degree. Almost 17% did not have any college, while over 38% had at least a bachelor's degree. Over half of the consumers surveyed had a combined household income of less than $50,000, with 4.4% generating an income over $100,000.

Respondents were asked to score the attributes of Flat Iron Steak on a scale of one to seven, with seven being the most important. Analysis indicated that appearance and texture were the most important with means of 5.65 and 5.35, respectively. Brand and convenience were ranked as the least important with mean scores of 3.77 and 4.62, respectively. Price and country of origin were moderate in importance relative to the other attributes (Table 2). When asked about consumption habits, 87% of those surveyed indicated that beef was served at least once per week. Consumers were also questioned about pricing preferences. Price per pound was slightly more favored than the total price on meat by consumers. Of the consumers who did not eat beef often, the most common reasons for the lack of consumption were the perception of beef not being healthy and that it was too expensive. The most popular forms of beef consumption were steak, ground beef and roast, with cuts from the round and cuts from the chuck being the least popular forms.

Flat Iron Steak is still rare in the southern United States supermarkets, but more common in restaurants. Only 16.3% of the surveyed consumers had heard of Flat Iron Steak, and only 5.4% had actually tasted it before. Over half the consumers indicated that the ideal package size for Flat Iron Steak was in a 1-2 pound package. Almost 22% wanted an even smaller package size, with approximately 16% wanting a three pound package or larger. Most consumers also indicated that they would prefer to purchase steaks whole as opposed to cut-up and would also prefer to season their own.

Demographic differences were measured to determine which consumers had statistically significant preferences for certain characteristics. For example, female consumers preferred cut-up steaks more so than males. Differences were also found with respect to income, where households with more income tended to prefer the larger package sizes.

Table 1
Demographic Characteristics Of The Consumers Surveyed

Variable		Frequency	Percentage
Gender	Male	35	38.0
	Female	57	62.0
Age	18-20	12	13.0
	21-23	12	13.0
	24-26	8	8.7
	27-30	3	3.3
	31-40	14	15.2
	40+	43	46.7
Ethnicity	White	68	73.9
	African-American	18	19.6
	Other	6	6.5
Education	No High school	3	3.3
	HS degree or GED	12	13.0
	Some College	42	45.7
	Bachelors degree	16	17.4
	Graduate degree	19	20.7
Income	Less than $25,000	34	37.4
	$25,001-$50,000	22	24.2
	$50,001-75,000	17	18.7
	$75,001-$100,000	14	15.4
	$100,000+	4	4.4

Table 2
Importance Of Flat Iron Steak Attributes

Variable	Mean	Median	Standard Deviation
Price	5.10	5.00	1.85
Appearance	5.65	6.00	1.83
Convenience	4.62	5.00	1.82
Brand	3.77	4.00	1.81
Origin	5.09	6.00	2.12
Aroma	5.19	6.00	2.05
Texture	5.35	6.00	1.82

The estimated conditional logit model is shown in Table 3. Parameter estimates for both constants were statistically significant and positive indicating that consumers prefer to buy a product as opposed to not buying a product. The variable price was also significant and negative, indicating that consumers would buy less as prices increase. Brand was significant and positive, indicating that consumers were more likely to buy a branded product than one that was not. Finally, the vacuum

variable was significant and negative; indicating that vacuum packaging was not preferred to plastic packaging. Similar results were found in a study comparing consumer preferences for meat color and packaging. Color and packaging both influenced visual scores and likelihood to purchase. Conventional PVC overwrap was consistently chosen over vacuum packaged product because of the bright red color (Carpenter et al. [2]). The variables cut-up, pre-seasoned, and marbling were not significant, indicating that consumers were not willing to pay a premium for these convenience items or the level of marbling (grade). The possibility exists that consumers perceive this product as being easy to prepare and would feel that they need not pay for this added convenience.

Table 3
Conditional Logit Model Results

Variable	Parameter Estimate	Standard Error	T-Value
Choice A	2.8887	0.3715	7.775[1]
Choice B	2.8150	0.3894	7.229[1]
Price	-0.4976	0.0926	-.372[1]
Brand	0.7405	0.0611	12.113[1]
Vacuum	-0.2924	0.0605	-4.831
Cut-up	0.0559	0.0791	0.706
Seasoned	-0.0639	0.0939	-0.681
Choice Grade	0.0121	0.0601	0.202
Log-Likelihood	-1350.159		
R-square	0.165		
Willingness to Pay	**Mean WTP**	**95% Confidence Interval**	
Brand	$1.54	[$1.10, $2.16]	
Vacuum	-$0.59	[-$0.77,-$0.44]	

[1]Denotes significance at 5%

The mean willingness to pay for a branded product was determined by the ratio of the coefficient for brand and the coefficient for price, while the mean willingness to pay for vacuum packaging was determined by the ratio of the coefficient for vacuum and the coefficient for price. The mean willingness to pay for a branded product was $1.54 with a 95% confidence interval of $1.10 to $2.16. The mean willingness to pay for vacuum packaging was -$0.59 with a 95% confidence interval of -$0.77 to -$0.44. The confidence intervals were calculated using the Krinsky-Robb parametric bootstrapping method (Krinsky and Robb [10]). The results, even if overstated due to a hypothetical situation, still reflect a relative magnitude (Cummings, Harrison, and Rutstrom [4], Fox et al. [5], List and Shogren [12]).

CONCLUSIONS

As Flat Iron Steak makes its way into retail grocery stores, there will be a variety of attribute combinations that will have an economic value to consumers. More interestingly, there are certain convenience factors such as cut-up and pre-

seasoned that may not demand a premium. Vacuum packaging, while more expensive for the manufacturer than plastic packaging, may actually discount the product. The retailer should be able to assess their market situation and adjust according to the consumer.

In this study, we examined the potential premiums for attributes such as brand, packaging, convenience, and marbling. Using the choice-based approach, we found that branding and packaging were the main attributes that demanded a premium. These results could be used in introducing the Flat Iron Steak to a larger audience with a potential to generate more income from the premiums.

Ultimately, we must continue to provide the consumer with an alternative to the restaurant experience through the use of lower-priced proteins and education.

ENDNOTES

1. Bill and Ralph's, P.O. Box 1125, Springhill, LA 71075.

2. Louisiana Tech Meat Laboratory, 10198 Tech Station, Ruston, LA 71272**.**

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