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ABSTRACT: Research was conducted in two phases to determine the optimum beef LM size for retail consumers. In Phase I, 50 USDA Choice beef carcass sides were selected at a commercial packing plant and assigned to five different categories (10 sides per category) based on LM size: 61 to 68 cm^2 (A), 70 to 78 cm^2 (B), 80 to 90 cm^2 (C), 92 to 103 cm^2 (D), and 105 to 119 cm^2 (E). Ribeye rolls were retrieved from all carcass sides. Steaks (2.5-cm thick; 14 per ribeye roll) were cut as needed and transported in groups of 35 steaks (seven per LM size category) to a retail grocery store in Brookings, SD, where they were placed into a designated section of the retail meat case. Steaks were tallied every 4 h on weekdays and every 2 h on weekends and holidays to determine the number of monitoring periods that each steak remained in the retail case. Steaks that did not sell within an allotted time were removed from the case and termed "pulled." Time in case and percentage of steaks pulled from the case did not differ among LM size categories ($P > 0.16$). Quadratic regression indicated that larger LM steaks sold faster ($P < 0.05$) than average and small LM steaks. Steaks from rib locations 6 and 7 spent more ($P < 0.05$) time in the case than steaks from rib locations 8 through 12. Steaks from the 7th rib location were more ($P < 0.05$) likely to be pulled than steaks from the 8th through 12th rib locations. In Phase II, 15 USDA Choice ribeye rolls were selected from a commercial packing plant to represent two LM size categories: 80 to 90 cm^2 (AVG; n = 5); and 105 to 119 cm^2 (LARGE; n = 10) and cut into 2.5-cm-thick steaks. A portion of the LARGE steaks was subsequently cut in half (HALF). Four display steaks represented each treatment group in each of five random nth price auctions. Seventy-five people were recruited from the Brookings, SD area to participate in the auctions to determine their willingness to pay for the three different types of ribeye steak. Consumers were willing to pay a premium of \$1.50/kg for LARGE ribeye steaks over AVG ribeye steaks ($P < 0.05$). Consumers discounted HALF ribeye steaks by \$1.01/kg compared with AVG ribeye steaks ($P < 0.05$). In conclusion, no optimum LM size existed for beef retail consumers; however, a trend existed toward greater demand for larger LM sizes over smaller LM sizes.

Key Words: Beef, Consumer, Longissimus Muscle, Portion Size, Retail

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Introduction

The National Beef Quality Audit reported that LM sizes of beef carcasses from fed steers and heifers in the United States ranged from 50 to 150 cm^2 (McKenna et al., 2002). Such wide variation in LM size can be partially attributed to variation in carcass weight, sex class, breed, genetic differences within breed, implant protocol, and feeding and management strategies. Given such variation in LM size, determining an optimum LM size or an optimum range in LM size would be beneficial for the beef industry to enhance customer satisfaction.

Dunn et al. (2000) determined that the optimum LM sizes for portion cutting steaks for the foodservice sector were between 77 and 97 cm^2. Steaks from those LM sizes optimized both cooking time and tenderness for the foodservice sector (Dunn et al., 2000). However, the optimum LM size for retail consumers has not been determined. According to the National Cattlemen's Beef Association (NCBA, 2004), roughly 70 to 80% of all roasts and steaks are prepared in the home, so a large percentage of steaks is sold at the retail level. Identifying an optimum LM size at the retail level may allow for production of a more uniform product in the retail setting and allow producers to make sound decisions on the appropriate muscling of cattle. Therefore, the objectives of this study were to determine the optimum LM size for beef retail consumers (Phase I) and to determine whether large LM (ribeye) steaks could

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be marketed more effectively by cutting them in half (Phase II).

Materials and Methods

Phase I—Retail Consumer Preference

Product Selection. Fifty USDA Choice beef carcass sides were selected at a commercial packing plant and assigned to five different categories (10 sides per category) based on LM size: 61 to 68 cm^2 (A); 70 to 78 cm^2 (B); 80 to 90 cm^2 (C); 92 to 103 cm^2 (D); and 105 to 119 cm^2 (E). Ribeye rolls were retrieved from all carcass sides, vacuum-packaged, and transported to South Dakota State University, where they were aged at 2 to 3°C for at least 10 d. The five LM size categories were created to represent the variability present in the US beef industry. According to the results from the 2000 National Beef Quality Audit, the five categories used in this experiment represent 5.0, 26.9, 42.5, 21.3, and 4.3% of the US-fed steer and heifer carcass population, respectively; however, when dairy carcasses were excluded from the 2000 National Beef Quality Audit data, the five categories used in this study represent 4.2, 24.8, 44.4, 22.7, and 4.3%, respectively (G. C. Smith, J. W. Savell, J. B. Morgan, T. H. Montgomery, K. E. Belk, J. C. Brooks, Z. L. Carpenter, T. G. Field, D. B. Griffin, D. S. Hale, F. K. Ray, J. A. Scanga, D. L. Roeber, D. R. McKenna, P. K. Bates, T. B. Schmidt, G. L. Cowman, R. M. Lloyd, and C. A. Vorthmann, unpublished data from the 2000 National Beef Quality Audit).

Fabrication. Ribeye rolls were weighed, cut into 2.5-cm-thick steaks (n = 14 steaks per ribeye roll), and trimmed of excess peripheral fat. Kernel fat (intermuscular fat located between the LM and spinalis dorsi) was trimmed if it exceeded 1.3 cm in width, and each steak was weighed, placed on a white styrofoam tray, and retail-wrapped. Steaks were then grouped according to which half of the ribeye roll the steak came from. Beginning at the posterior end of the ribeye roll, the first seven steaks were classified as from the caudal end, whereas steaks 8 through 14 (from the posterior end) were classified as from the cranial end. One ribeye roll yielded only 13 steaks (seven caudal and six cranial steaks).

Retail Store. The 699 LM steaks were divided into 19 groups of 35 steaks each and one group of 34 steaks: each group of steaks was termed a “set.” Each set (except the set of 34 steaks) contained seven steaks from each of the five LM size categories. Ten sets contained only caudal half-steaks, and 10 set contained only cranial half-steaks. The first set was transported to a retail grocery store in Brookings, SD, and the 35 steaks were placed randomly into a designated section of a coffin-style retail case in the meat department of the retail store along with a sign that read: “Price Decline, Bnls Beef Ribeye Steaks $6.99/lb, was $8.99/lb.” Steaks were monitored at 0900, 1300, 1700, and 2100 on Mondays (except Memorial Day), Tuesdays, Wednesdays, and Thursdays and at 0900, 1100, 1300, 1500, 1700, 1900, and 2100 on Fridays, Saturdays, Sundays, and Memorial Day. Retail steak monitoring occurred from Tuesday, May 20, through Wednesday, June 4, 2003. At each monitoring time, the identification number of each steak remaining in the retail case was recorded to determine the number of monitoring periods that each steak remained in the retail case. Whenever the number of steaks in the retail case fell below 15, the next set was placed randomly into the retail case, mixing the 35 “new” steaks with any remaining steaks from the previous set. On placing a new set into the retail case, any steaks still remaining from the set two before the new set were removed and termed “pulled.” Throughout the study, the sets were alternated between caudal and cranial so that a cranial set was followed by a caudal set, which was followed by a cranial set, and so forth.

Beginning on May 23, 2003, a flyer labeled with the identification number of the steak was placed in each retail package inconspicuously underneath the steak. Shoppers who purchased a steak and found the flyer were invited to participate in Phase II of the study. The shoppers who found the flyer also were asked to answer a few questions about their name, address, phone number, age, and gender, and to return the flyer to the researchers.

Phase II—Willingness to Pay

Product Selection. A willingness-to-pay study was designed to determine whether consumers would discount ribeye steaks from large LM sizes (>105 cm^2) compared with ribeye steaks from average LM sizes and to determine whether cutting steaks in half was a viable marketing option for excessively large ribeye steaks. Fifteen USDA Choice ribeye rolls were selected from a commercial packing plant to represent two of the five LM size categories described previously, 80 to 90 cm^2 (**AVG**, n = 5) and 105 to 119 cm^2 (**LARGE**, n = 10). On the day of an auction, one ribeye roll from size category AVG and two ribeye rolls from size category LARGE were selected randomly, cut into 2.5-cm-thick steaks, trimmed of excess external fat, and used to fit into one of three treatment groups. From the posterior (caudal) end, the 2nd, 6th, 10th, and 14th steaks from one AVG and one LARGE were placed on individual white styrofoam trays, retail-wrapped, and used as display steaks for the auction. Steaks from the other LARGE ribeye roll were cut in half (**HALF**), and both halves of the 2nd and 14th steaks were placed on individual white styrofoam trays, retail-wrapped, and used as display steaks for the auction. Four display steaks represented each treatment group in the auction.

Auction. Seventy-five people were recruited from the Brookings, SD area to participate in one of five sessions of a random nth price auction, as described by J. L.

Table 1. Least squares means for carcass characteristics by LM size category

LM size category[a]	No.	Hot carcass weight, kg	Fat thickness, cm	LM size, cm^2	KPH[b]	Yield grade	Marbling[c]
A	10	299.0^d	1.2	66.5^d	2.8	3.4^d	539^d
B	10	353.2^e	1.4	76.1^e	2.6	3.6^d	480^e
C	10	376.4^f	1.3	87.1^f	2.3	3.0^e	483^e
D	10	390.2^f	1.2	98.7^g	2.3	2.5^f	479^e
E	10	387.3^f	1.1	109.7^h	2.4	1.9^g	443^e
SE		5.52	0.08	0.75	0.19	0.12	19.68
P-value		<0.001	0.198	<0.001	0.224	<0.001	0.026

[a]A = 61 to 68 cm^2, B = 70 to 78 cm^2, C = 80 to 90 cm^2, D = 92 to 103 cm^2, and E = 105 to 119 cm^2.
[b]Estimated as a percentage of hot carcass weight.
[c]400 = $Small^{00}$, 500 = $Modest^{00}$, and 600 = $Moderate^{00}$.
[d,e,f,g,h]Within a column, least squares means that do not have a common superscript letter differ, $P < 0.05$.

Lusk and T. C. Schroeder (unpublished data, Manhattan, KS), to determine their willingness to pay for the three different ribeye steak treatments. The participants were asked to fill out a demographic questionnaire concerning their age, income level, gender, and household size.

A practice auction was conducted, using candy bars, to familiarize the participants with the auction procedures. The participants were given $15 in cash to use to purchase packages of the three different steaks. The participants were given the option to leave the auction at any time and keep the $15. Instructions for the steak auction were read to participants, and each participant was given a paper copy. Participants also were given the current retail price of $19.82/kg ($8.99/lb) for a LM steak in Brookings, SD, to use as a reference when making their bids. During the auction the participants submitted sealed bids (on a price per pound basis) on all three packages of steaks (AVG, LARGE, and HALF) for each of three auction rounds. A random number (n) was drawn after the bids were collected for each round of the auction. The number (n) ranged from two to one-half of the number of people participating in the auction session and was used to determine the number of winners (n – 1) and the price (the price bid by the nth bidder) for each round. The price and the winning bidders were reported for each round for all participants to review before submitting bids for the next round. A binding round (the round that determines the winning bidders and winning bids for an auction session) was selected randomly at the completion of the final round. The winning bidders in the binding round were then required to purchase the steaks that they had won at the winning price.

Statistical Analyses

Retail Preference Data. A completely randomized design using the GLM procedure of SAS (SAS Inst., Inc., Cary, NC) was used for analysis of the effect of LM size category on carcass traits, ribeye roll weight, steak weight, percentage of steaks trimmed of kernel fat, time in case, and percentage of steaks pulled. Longissimus muscle size category was the only independent variable, and the experimental unit was ribeye roll. Least squares means were calculated and separated using the PDIFF option in SAS.

Data from two adjacent 2.5-cm-thick steaks constituted one rib bone location: starting from the caudal end of the ribeye roll, Steaks 1 and 2 constituted rib bone location 12, Steaks 3 and 4 constituted rib bone location 11, Steaks 5 and 6 constituted rib bone location 10, Steaks 7 and 8 constituted rib bone location 9, Steaks 9 and 10 constituted rib bone location 8, Steaks 11 and 12 constituted rib bone location 7, and Steaks 13 and 14 constituted rib bone location 6. The effects of rib bone location on steak weight, percentage of steaks trimmed of kernel fat, time in case, and percentage of steaks pulled also were analyzed using the GLM procedure of SAS. The model contained LM size category, ribeye roll within LM size category, rib bone location, and LM size category × rib bone location as the independent variables. The experimental unit was rib bone, with two steaks per rib bone location (i.e., seven rib bones per ribeye roll). Additionally, the effects of consumer gender and age were analyzed using the GLM procedure of SAS; consumer was the experimental unit, and separate models used gender or age category as the independent variable and actual LM size as the dependent variable. Least squares means were calculated and separated using the PDIFF option in SAS.

Auction Data. Price differentials were calculated between AVG and LARGE and between AVG and HALF for each auction participant; these differentials were averaged over all three rounds within an auction. Price differentials were analyzed with auction participant as the experimental unit and tested for statistical significance from zero using *t*-tests. The effects of gender, age, income level, and household size on price differential were analyzed using the GLM procedure of SAS; auction participant was the experimental unit.

Table 2. Least squares means of ribeye roll and ribeye steak attributes

LM size category[a]	No.	Ribeye roll weight, kg	Steak weight, g	Price per kg, $	Price per package, $	Percentage of steaks trimmed of kernel fat	Time in case[b]	Percentage of steaks pulled[c]
A	10	3.87[d]	246[d]	15.41	3.80[d]	27[d]	3.73	9
B	10	4.58[e]	293[e]	15.41	4.54[e]	23[d]	4.52	17
C	10	5.03[f]	318[f]	15.41	4.89[f]	26[d]	3.95	10
D	10	5.44[g]	346[g]	15.41	5.33[g]	8[e]	3.63	14
E	10	5.56[g]	355[g]	15.41	5.46[g]	18[d]	3.18	7
SE		0.11	7		0.11	0.03	0.38	0.03
P-value		<0.001	<0.001		<0.001	<0.007	0.168	0.227

[a]A = 61 to 68 cm^2, B =70 to 78 cm^2, C = 80 to 90 cm^2, D = 92 to 103 cm^2, and E = 105 to 119 cm^2.
[b]Average number of time periods the steak remained in the case.
[c]Percentage of the steaks that were pulled from the retail case because they did not sell within the allotted time.
[d,e,f,g]Within a column, least squares means that do not have a common superscript letter differ, $P < 0.05$.

Results and Discussion

Phase I—Retail Consumer Preference

Table 1 summarizes the carcass characteristics for the five LM size categories. Category A had the lightest ($P < 0.05$) hot carcass weight followed by Category B. Categories C, D, and E had similar hot carcass weights and were heavier ($P < 0.05$) than Categories A and B. Fat thickness ($P = 0.198$) and percentage of KPH ($P = 0.224$) did not differ among LM size categories. As expected, LM size differed among LM size categories. Category E had the lowest ($P < 0.05$) yield grade, followed by Category D, then C. Categories A and B did not differ in yield grade, but had greater ($P < 0.05$) yield grades than Categories C, D, and E. Differences in yield grade could be largely attributed to the larger LM sizes in relation to hot carcass weight for Categories C, D, and E. Category A had carcasses with the greatest ($P < 0.05$) marbling scores, but no difference existed in marbling score among the other LM size categories. Only carcasses from the USDA Choice quality grade were selected, and individual marbling score (Small, Modest, Moderate) was not selected for, which allowed for differences in mean marbling scores.

Ribeye roll weight, steak weight, and price per package increased ($P < 0.05$) as LM size category increased, except that no differences ($P > 0.05$) were found between Categories D and E for ribeye roll weight, steak weight, or price per package (Table 2). Category D had a lesser ($P < 0.05$) percentage of steaks trimmed of kernel fat than the other LM size categories.

The purpose of monitoring the length of time steaks spent in the case was to determine the LM size(s) most preferred by retail consumers. Time in case ($P = 0.168$) and the percentage of the steaks that were pulled ($P = 0.267$) did not differ among LM size categories. Longissimus muscle size did not influence ($P = 0.168$) the amount of time that the steak spent in the case, nor did LM size influence ($P = 0.267$) whether the steak would be pulled from the case. Either LM size was not a factor for consumers when purchasing a LM steak or there was a consumer for every LM size. The effect of LM size category on time in case and percentage of steaks pulled also was analyzed with marbling as a covariate, which was not significant for either time in case ($P = 0.53$) or percentage of steaks pulled ($P = 0.38$); therefore, these results were not presented in tabular form. Therefore, marbling did not have an effect on time in the case or the percentage of steaks pulled from the case.

A quadratic relationship ($P < 0.05$) between LM size and the number of time periods that a particular LM size was left in the case existed (Figure 1). Time spent in the case showed little to no relationship with LM size in the range of 65 to 95 cm^2; however, time spent in the case was less for steaks from LM sizes of 95 cm^2 to 113 cm^2 compared with smaller sizes. Even though no optimum LM size was found, a slightly greater demand existed for larger LM sizes over smaller LM sizes. Therefore, beef producers should not make decisions limiting LM size based on retail consumer preferences.

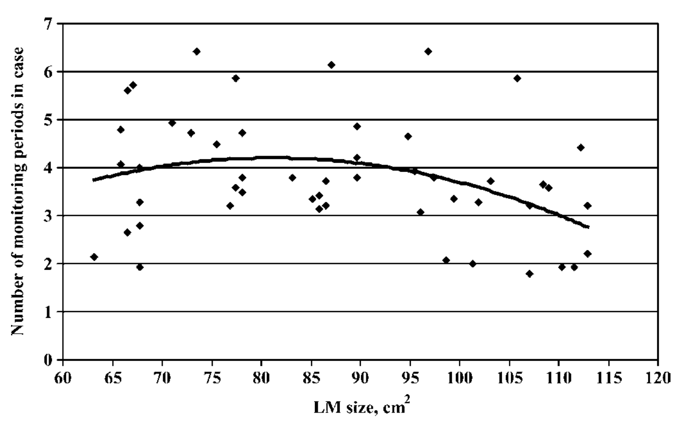

Figure 1. The quadratic relationship ($P < 0.05$) between LM size and the number of periods that a particular LM size was left in the case ($R^2 = 0.13$).

Table 3. Effect of consumer age on LM size purchased ($P = 0.008$)

Age category, yr	No.	LM size, cm^2	SE
<30	10	82.2[a]	4.51
30 to 45	11	100.1[b]	4.30
46 to 60	6	76.5[a]	5.82
>60	7	82.8[a]	5.38

[a,b]Least squares means that do not have a common superscript letter differ, $P < 0.05$.

For the foodservice sector, Dunn et al. (2000) determined that the optimum LM size was from 77 to 97 cm^2 when portion cutting steaks. In their study, steaks from carcasses with LM sizes from 77 to 97 cm^2 had optimal cooking times and tenderness. Furthermore, Dunn et al. (2000) cut steaks of varying thickness from different LM size groups to attain specific portion sizes that are common in the foodservice sector. In contrast, thickness of steaks used in this study was held constant at 2.5 cm. Dunn et al. (2000) determined the optimum LM size by determining the LM sizes that gave optimum cooking times and tenderness for the foodservice sector. In this study, the optimum LM sizes were determined based on consumer preference for the visual appearance of the steak in a retail setting.

Of those consumers who returned the questionnaire, male consumers bought steaks with a 6 cm^2 larger LM size than female consumers; however, this difference was not significant ($P = 0.304$). Additionally, consumers between the ages of 30 and 45 bought steaks with a larger LM size than all other age groups (Table 3).

Rib Bone Location. Steak weight increased from the 6th rib bone to the 10th rib bone and decreased slightly from the 11th to 12th rib bones (Table 4). Steaks that required the most kernel fat trimming came from the 7th rib bone, followed by the 8th, and then 6th rib bones. Steaks from the 9th through 12th rib bones required little to no kernel fat trimming. Reuter et al. (2002) reported that the 7th and 8th rib bones required the most kernel fat trimming, which agrees with our findings. Wulf et al. (1994) found that the amount of kernel fat varied greatly from anterior to posterior end of the ribeye roll, with the greatest amount of kernel fat found at the 8th rib bone and decreasing amounts toward both the cranial and caudal ends.

Time in the case differed between rib bone locations (Table 4). Steaks from rib bone locations 6 and 7 spent more ($P < 0.05$) time in the case than steaks from rib bone locations 8 through 12, suggesting that consumers visually preferred steaks from the 8th through 12th rib bone locations over steaks from the 6th and 7th rib bone locations. Reuter et al. (2002) found that consumers preferred steaks from the 9th through 12th rib bone locations over steaks from the 6th and 7th rib bone locations. Additionally, steaks from the 6th rib bone location were more likely ($P < 0.05$) to be pulled than steaks from the 11th rib bone location. Steaks from the 7th rib bone location were more likely ($P < 0.05$) to be pulled than steaks from the 8th through 12th rib bone locations. Generally, steaks that had the most kernel fat trimmed and the greatest number of muscles spent the most time in the case and were the most likely to be pulled from the case. These results indicate that rib bone location has a greater effect than LM size on consumer preference for ribeye steaks at retail.

LM Size Category × Rib Bone Location. An interaction ($P < 0.05$) was detected between rib bone location and LM size category for steak weight (Table 5). The steak weights of the smaller LM size categories exhibited less variation from the caudal to the cranial end of the ribeye roll compared with steaks from larger LM size categories, which differed more in steak weight from end to end. The mean weights of steaks from Category A had a range of 20 g from smallest to largest, whereas the mean weights of the steaks from Category E had a range of 57 g from smallest to largest.

The interaction ($P < 0.05$) between rib bone location and LM size category was a source of variation for per-

Table 4. Least squares means of ribeye steak attributes by rib bone location

Rib bone location	No.	Steak weight, g	Percentage of steaks trimmed of kernel fat	Time in case[a]	Percentage of steaks pulled[b]
6	50	290[c]	22[c]	4.60[c]	15[cd]
7	50	297[d]	72[d]	4.91[c]	23[c]
8	50	304[e]	40[e]	3.67[d]	12[de]
9	50	317[f]	8[f]	3.18[d]	7[de]
10	50	325[gh]	0[f]	3.50[d]	8[de]
11	50	328[h]	0[f]	3.30[d]	5[e]
12	50	321[fg]	0[f]	3.49[d]	10[de]
SE		2.41	0.03	0.38	0.03
P-value		<0.001	<0.001	<0.001	0.005

[a]Average number of time periods the steak remained in the case.

[b]Percentage of the steaks that were pulled from the retail case because they did not sell within the allotted time.

[c,d,e,f,g,h]Within a column, least squares means that do not have a common superscript letter differ, $P < 0.05$.

Table 5. Least squares means for steak weight (g) by LM size category and rib bone location (interaction; $P = 0.033$; SE = 5.4g)

LM size category	Rib bone location 6	7	8	9	10	11	12
A	235^{a}	238^{ab}	244^{abc}	249^{abc}	255^{c}	255^{bc}	244^{abc}
B	275^{d}	283^{de}	283^{de}	298^{ef}	306^{fgh}	309^{fgh}	298^{ef}
C	301^{fg}	303^{f}	306^{fgh}	320^{hij}	335^{jkl}	337^{kl}	326^{ijk}
D	315^{ghi}	326^{ijk}	343^{lm}	357^{mo}	360^{nop}	360^{nop}	360^{nop}
E	323^{ij}	332^{jkl}	346^{lmn}	360^{op}	371^{pq}	380^{q}	377^{q}

[a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q]Least squares means that do not have a common superscript differ, $P < 0.05$.

centage of steaks trimmed of kernel fat. Steaks in category D only required kernel fat trimming at rib bone locations 6 and 7, whereas all other LM size categories required kernel fat trimming at rib locations 6 through 9 ($P < 0.05$). However, there were no ($P > 0.36$) LM size category × rib bone location interactions for time in retail case or percentage of steaks pulled.

Phase II—Willingness to Pay

Five sessions of an experimental auction were set up to determine consumer willingness to pay for a ribeye steak from a carcass with an average-sized LM (80 to 90 cm^2; AVG), a ribeye steak from a carcass with a large LM size (105 to 119 cm^2; LARGE), and a ribeye steak from a carcass with a large LM size (105 to 119 cm^2) cut in half (HALF).

Demographic data are summarized in Table 6. Just over one-half (58%) of the participants of the auction were female. All income and age categories were well-represented, with the most common household size represented by two persons.

Using AVG steaks as a reference, price differentials were calculated for LARGE and HALF steaks (Table 7). Participants were willing to pay a premium of $1.50/kg for LARGE ribeye steaks over AVG steaks, suggesting that participants visually preferred a larger LM size. Participants discounted ribeye steaks that were cut in half (HALF) by $1.01/kg from AVG ribeye steaks, suggesting that it would be an economic disadvantage to cut ribeye steaks in half. Age, gender, income, and the size of the participants' household had no ($P > 0.54$) effect on the size of the premium paid for LARGE steaks or the size of the discount paid for HALF steaks.

Table 6. Auction participant demographic frequencies (n = 73)

Variable	Frequency, %
Gender	
Male	42
Female	58
Income, $	
<20,000	12
20,000 to 30,000	33
30,000 to 40,000	19
40,000 to 50,000	12
50,000 to 60,000	7
>60,000	16
Household size	
1	16
2	56
3	10
4	16
5	1
Age, yr	
<20	4
20 to 29	22
30 to 39	16
40 to 49	19
50 to 59	22
>59	16

Implications

No optimum longissimus muscle size existed for beef retail consumers; however, a trend existed toward greater demand for larger longissimus muscle sizes over smaller sizes. Therefore, the beef industry should not limit longissimus muscle size based on consumer preference for longissimus muscle size in a retail setting. To improve customer satisfaction with ribeye steaks, anatomical location within the ribeye roll subprimal is more critical than longissimus muscle size. Furthermore, results of this study indicate that cutting large ribeye steaks in half to achieve smaller portions is not a viable retail marketing option because consumers had a lower willingness to pay for ribeye steaks cut in half; however, there is no need to cut large ribeye steaks in half because retail consumers do not discriminate against large longissimus muscle sizes.

Table 7. Average price differentials for ribeye steaks by treatment using treatment AVG (80- to 90-cm^2 LM size) as a reference

Treatment	Price differential, $/kg	$P \neq 0$
AVG	$0.00	
105- to 119-cm^2 LM size	$1.50	<0.001
105- to 119-cm^2 LM size with steaks cut in half	$–1.01	0.001

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