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The Impact of Socioeconomic Factors and Meat Attributes on Willingness to Pay for Locally or Regionally Produced Livestock Products in Alabama

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Abstract

Socioeconomic factors and meat attributes are believed to influence willingness to pay for specially produced livestock products. However, limited research has been done on this subject particularly in Alabama. The study, therefore, assessed the impact of socioeconomic factors and meat attributes on willingness to pay for locally or regionally produced livestock products in Alabama. Data were obtained from a convenience sample of participants from South Central Alabama, and were analyzed using descriptive statistics and ordinal logistic analysis. The socioeconomic characteristics reflected more middle-aged or younger persons, with a fairly good education, and with low to moderate household incomes. A majority thought using chemicals in locally or regionally produced beef or goat meat was a serious hazard. Therefore, many were willing to pay more for meat certified as locally or regionally produced. Also, most agreed or strongly agreed with statements on meat attributes. The ordinal logistic results revealed that household size, safety (safe to consume), no difference (in safety), and hygiene had significant relationships with willingness to pay more for meat certified as locally or regionally produced.
Keywords: socioeconomic factors, meat attributes, local or regional, willingness to pay, livestock products

1. Introduction

Food supply chain, which is defined as a sequence of economic activities through which resources, materials, and information are used to move food from the producer to the consumer (Stevens, 1989), is under public scrutiny. This is so because of the national attention given to recent cases of fresh agricultural produce contamination. Abidoye, Bulut, Lawrence, Mennecke, & Townsend (2006) emphasized that product contamination in the food supply chain, has led to a significant reduction in the consumption of certain affected food products in the U.S. As a result, food safety has become an important issue in consumers' food choices, increasing demand from consumers for assurances regarding various safety and quality standards. In addition, Campiche, Holcomb, & Ward (2004) argued that an apparent change in consumer tastes and preferences has created a significant change in marketing strategies in the food supply chain.

According to Taylor (2008), substantial changes in the meat market and consumer preferences have resulted in an environment favorable for local and organic meat consumption in the U.S. Previous studies (e.g., Weatherell, Tregear, & Allison, 2003; Roininen, Arvola, & Lahteenmaki, 2006) have revealed that consumers' preferences towards local foods are derived not only from preferences for product quality, freshness or taste, but also from the demand for public benefits related to job and income generation in the community as well as improvement of the environment. Darby, Batte, Ernst, & Roe (2006) further revealed that marketing locally produced products provide an opportunity for farms to capture a greater share of consumers' food budgets, and at the same time, generate greater incomes for rural communities.

Ortiz (2010) stated that interest in local foods is reflected in the increased number of farmers markets, community supported agriculture organizations (CSAs), government, and independent initiatives, all of which encourage a food system that is sustainable and oriented to connect farmers with consumers. According to the USDA AMS (2011), nationally, the number of local farmers' markets has increased from 1,755 in 1994 to 7,175 in 2011. The USDA NAL (2014) reported that, in 2012, 12,617 farms in the U.S. sold products through a CSA, an arrangement where the primary objective is to create a local (or regional) food system that connects farmers with community members. Taylor (2008) added that the popularity of local farm products lies in their perceived benefits to the consumer. These benefits include, but are not limited to, better appearance; fresher, tastier, healthier, and safer products; supporting the local economy and farmers; preserving farmland; food security; fewer pesticides applied; less distance traveled; more authentic product; less energy used; better treatment of workers and animals; and sometimes price.

Menkhaus, Colin, Whipple, & Field (1993) also emphasized that consumers have become concerned about specific attributes of meat products, such as tenderness, juiciness, cholesterol, calorie content, and artificial ingredients. Marenick, Gooch, & Felfel (2010) argued that attributes such as taste, quality, price, and convenience are equally important in consumer purchasing decisions. However, it is difficult for consumers to evaluate all quality and safety characteristics regarding meat products merely by looking at the product. Bredahl (2004), Glitsch (2000), and Grunert (1997) contended that consumers evaluate the quality of meat products based on quality cues such as the color, fat content, place of purchase, appearance, absence of packaging, origin, aroma, display hygiene, and brand freshness. According to Carlsson, Frykblom, & Lagerkvist (2005) meat quality attributes are critical in influencing the consumers' preferences and willingness to pay. In the same vein, socioeconomic factors are expected to influence willingness to pay. Although the preceding may be true, there has been limited research done in Alabama on the influences of socioeconomic factors and meat attributes on willingness to pay for livestock products.

The purpose of the study, therefore, was to assess the impact of socioeconomic factors and meat attributes on willingness to pay for locally or regionally produced livestock products in Alabama. Specific objectives were to (1) identify and describe socioeconomic factors, (2) describe and assess meat attributes, (3) develop models for willingness to pay, and (4) estimate the extent to which socioeconomic factors and meat attributes influence willingness to pay for meat products.

2. Literature Review

2.1Socioeconomic Factors and Willingness to Pay

Several studies have reported on socioeconomic factors and their relationships to willingness to pay. These factors include gender, age, household income, household type, education, and household size. For example, Lusk, Fox, Schroeder, Mintert, & Koohmaraie (2001) analyzed in-store valuation of steak tenderness, based on willingness to pay. They reported that gender and age had positive and significant effects on willingness to pay; females and younger consumers were willing to pay more for tender steak. Education, income, and household size did not have any significant effect on willingness to pay more for tender steak.

Campiche et al. (2004) assessed impacts of consumer characteristics and perceptions on willingness to pay for natural beef. They reported that consumers with household incomes greater than $100,000 were willing to purchase natural beef than respondents with an annual household income of between $40,000 and $69,999. Furthermore, consumers' gender, age, household size, and educational level did not have statistically significant effects on willingness to pay more for natural beef.

Angulo, Gil, &Tamburo (2005) evaluated consumers' willingness to pay a price premium for certified beef. Results showed that age and income had positive and significant effects on willingness to pay a price premium for certified beef. Older respondents and respondents with higher incomes were willing to pay a premium for certified beef. Also, respondents who frequently bought beef were more willing to pay a

premium for certified beef. However, education did not have any significant effect on willingness to pay a price premium for certified beef.

Umberger, Boxall, & Lacy (2009) assessed the role of credence and health information in determining U.S. consumers' willingness to pay for grass-finished beef. The study revealed that age was negative and significant implying that older consumers were less willing to pay for grass-finished beef. Households with children living at home also showed a negative and significant effect on willingness to pay, implying that consumers with children living at home were less willing to pay for grass-finished beef. Household income had a negative and significant effect on willingness to pay for grass-finished beef, implying that households with high incomes were less willing to pay for grass-finished beef. The authors explained that high-income consumers may already be confident in the safety and quality of the meat they purchased; hence, the negative relationship. Education, gender and ethnicity did not have any significant effect on willingness to pay for grass-finished beef.

Xue, Mainville, You, & Nayga (2009) examined nutrition information, nutrition knowledge, and consumers' willingness to pay for pasture-fed beef. They reported that living status (whether respondent lived alone or with others in household) and household size had negative and significant effects on consumers' willingness to pay

for pasture-fed beef. Gender, age, ethnicity, education, and income were not significant.

Lyford et al. (2010) investigated the effect of consumer demographics and meat consumption preferences on willingness to pay for beef quality grades. The authors reported that age was the only significant factor affecting willingness to pay. Older consumers were more likely to pay more for beef quality than younger consumers. Income, number of children in the house, number of adults in the house, main grocery purchaser, occupation, and gender did not have significant effects on willingness to pay for quality beef.

Gunduz & Bayramoglu (2011) evaluated consumer's willingness to pay for organic chicken meat. They found that household income had a positive and statistically significant effect on consumers' willingness to pay more for organic chicken meat. In addition, university educated consumers were willing to pay more for organic chicken meat than secondary and high school educated consumers. However, household size, gender, and age were not significant.

Ibrahim (2011) examined consumer willingness to pay a premium for halal goat meat. The author found that household income had a positive and significant effect on willingness to pay a premium for halal goat meat. Consumers who earned less than $50,000 were less willing to pay a premium for halal goat meat than those earned $50,000 or more. Consumers' monthly consumption of halal goat meat was also positive and significant, implying that for each pound increase in monthly consumption of halal meat goat, the consumer was willing to pay a premium. Household size had a negative and significant effect on willingness to pay, implying that respondents were less willing to pay a premium as the family size increased.

Bett, Peters, Nwankwo, & Bokelmann (2013) analyzed consumer preferences and willingness to pay for underutilized indigenous chicken products. The authors reported that age of consumer and household size had negative and significant effects on willingness to pay. This showed that younger consumers and households with smaller family sizes were willing to pay more for indigenous chicken. However, number of years of education, had a positive and significant effect on willingness to pay; implying that the higher the number of years of education, the more the respondent's willingness to pay more for indigenous chicken. Employment status, income, and gender were not significant.

Liu, Nelson, & Styles (2013) assessed the demand for goat meat in the U.S. meat market. They found that age had a positive and significant effect on willingness to purchase and try goat meat. Those 55 or over were more likely to purchase and try goat meat compared to those younger than 55 years old. Though gender was not significant, it showed more flexibility of females than males in willingness to purchase goat meat. Consumers with an associate's degree or some college education were less willing to purchase and try goat meat, but those with college degrees were more likely to purchase and try meat goat. Likewise, middle income households were less willing to purchase and try goat meat than higher income households. The consumption of other meats had a significant impact on the consumption of goat meat. Consumers who purchased beef and chicken regularly, were willing to purchase and try goat meat.

Dobbs (2015) examined consumers' willingness to pay for beef produced in Tennessee. The author found older consumers as well as those with moderate incomes (between $50,000 and $70,000) were less willing to purchase Tennessee steak. Households with children aged less than 6 years were more likely to purchase Tennessee ground beef. There was no significant effect of households with children less than 6 years on willingness to purchase steak. Age and income were, however, not significant regarding willingness to purchase ground beef. Gender, education, household size, farm background, and frequency of meals serving beef did not have significant effects on willingness to purchase either ground beef or steak.

2.2 Meat Attributes and Willingness to Pay

Also, a number of studies have reported on meat attributes and willingness to pay. Some of these attributes are price, fat content, cholesterol, sodium content, artificial ingredients, safety, traceability, place of origin. For instance, Feuz & Umberger (2001) examined consumer willingness to pay for flavor in beef. It was reported that consumers were willing to pay a slightly higher price for the more marbled choice beef than the lower marbled select beef. In addition, consumers were willing to pay more for domestic beef than Argentine grass-fed beef.

Campiche et al. (2004) evaluated the impacts of consumer characteristics and perceptions on willingness to pay

for natural beef. They found that respondents who checked food labels frequently were more likely to purchase and willing to pay more for natural beef than those who did not; respondents who said price was "very important" were less likely to purchase and pay more for natural beef than those who said otherwise; respondents who were concerned about high cholesterol content in meat were more likely to purchase and pay more for natural beef than those who were not concerned; respondents who were concerned about "low" sodium content in beef were more likely to purchase and willing to pay more for natural beef than those who were not concerned; respondents who indicated marbling and brand were "not important" were less likely to purchase and pay more for natural beef compared to respondents who indicated otherwise; respondents who said that minimum external fat and tenderness were "very important" were less likely to pay more for natural beef than those who said otherwise (contrary to expectation); and respondents who stated the lack of artificial ingredients in beef as "very important" were willing to purchase and pay more for natural beef than those who were indifferent to artificial ingredients.

Latvala (2010) assessed factors explaining consumer willingness to pay for risk, information, and trust in the food chain regarding beef. The author found that food-related risk factors affected consumer willingness to pay. Nearly three-fourths were willing to pay for increased information related to the safety, origin, and quality attributes of beef. Respondents, who considered genetic modification of food as harmful or extremely harmful, were willing to pay more for quality information about beef.

Cicia & Colantuoni (2010) analyzed willingness to pay for traceable meat attributes. The results revealed that on-farm traceability had a positive and significant effect on willingness to pay. Consumers were willing to pay a premium for information on the "meat's path" from the farm to the table. Other attributes that had positive and significant effects on willingness to pay more was assurance about animal welfare and food safety. However, place of origin was not a significant factor in determining willingness to pay for traceable meat attributes.

Liu et al. (2013) examined the demand for goat meat in the U.S. meat market. Price, safety assurance, and fat content were significant attributes regarding willingness to pay more for goat meat. This implied that

lower goat meat price, better safety assurance, and lower fat content labeling were attractive to some consumers and they were willing pay more for goat meat with these attributes.

Bett et al. (2013) assessed consumer preferences and willingness to pay for underutilized indigenous chicken products. They reported that meat flavor; knowledge of source of chicken product, and form in which the product is sold had positive and significant effects on willingness to pay more for indigenous chicken. Meat color and fat content did not have significant effects on willingness to pay more for indigenous chicken products. Consumers were willing to pay more for dressed indigenous chicken meat products from supermarkets and the municipal abattoirs.

Kuo-Lian, Xu, Underwood, Mayen, & Langelette (2013) analyzed consumers' willingness to pay for locally produced ground beef. They reported that leanness of ground beef had a positive and significant effect on willingness to pay more for ground beef. Cut difference, Grass-fed, and organic attributes had no significant effects on consumers' willingness to pay more for ground beef.

Dobbs (2015) examined consumers' willingness to pay for beef produced in Tennessee. Consumers were willing to pay premiums for both steak and ground beef. Price conscious consumers were less willing to pay a premium for steak. Consumers who valued grain-fed, flavorful beef products were more likely to purchase and pay more for steak. Also, consumers who valued freshness, safety, and natural production were more likely to purchase and pay more for ground beef. Grass-fed label, natural label, color, juiciness, freshness, lean, and humane treatment of animals had no significant effects on willingness to pay more for steak. Whereas, grain-fed label, grass-fed label, price, color, flavor, juiciness, tenderness had no significant effects on willingness to pay more for ground beef.

3. Methodology

3.1Data Collection

A questionnaire was developed and used to collect data for the study. Some of the questions on the questionnaire were adopted, with permission, from Govindasamy, Italia, & Rabin (1998). It had two major parts: attitudes and

beliefs, and demographic information. The questionnaire was submitted to the Institutional Review Board, Human Subjects Committee of the Institution for approval before being administered. It was administered to residents using convenience sampling. Convenience sampling was used because it was the most appropriate approach under the circumstances. There was a lack of a known sampling frame from which subjects could be drawn.

Data were collected using self-administered techniques in several program activity sites and the respondents were from South Central Alabama Counties (Autauga, Barbour, Bullock, Dallas, Greene, Hale, Lowndes, Macon, Marengo, Montgomery, Perry, Sumter, and Wilcox). Extension agents from various counties, specialists from the Federation of Southern Cooperatives/Land Assistance Fund, Epes, Sumter County, as well as graduate students helped with collecting the data. The data were collected in the summer of 2013 through the spring of 2014. The sample size was 432, and this was considered adequate for analysis.

3.2 Data Analysis

The data were analyzed by using descriptive statistics and ordinal logit regression analysis. The regression model used a modified version of the one used by Banterle & Cavaliere (2009), and is stated as follows:

$$C_j(X_i) = \ln[P(Y>j|X_i)/P(Y\leq j|X_i)] = \beta_1 X_{i1} + \ldots + \beta_n X_{in} - \tau_j + 1 \quad (1)$$

Where:
$C_j(X_i)$ = cumulative odds of being at or below category j of an ordinal variable with k categories, $1 \leq j \leq k\text{-}1$
i = number of participants considered
j = score for a category
Y = dependent variable
n = number of independent variables
X_i = independent variables
β_i = coefficients
τ = cut points between categories

Two models were used; the estimation model for model 1 is stated as:

$$\ln(P\text{WTP}>j/P\text{WTP}\leq j) = \beta_1 \text{HHS} + \beta_2 \text{GEN} + \beta_3 \text{RAE} + \beta_4 \text{AGE} + \beta_5 \text{EDU} + \beta_6 \text{HHI} + \beta_7 \text{MAS} - \tau + 1 \quad (2)$$

Where:
$\ln(P\text{WTP}>j/P\text{WTP}\leq j)$ = cumulative odds of being at or below a willingness to pay (WTP) category.
HHS = Household size
GEN = Gender
RAE = Race/ethnicity
AGE = Age
EDU = Education
HHI = Household income
MAS = Marital status

In brief, the estimation model hypothesizes that willingness to pay more for beef or goat meat certified as locally or regionally produced is influenced by household size, gender, race/ethnicity, age, education, household income, and marital status. It was assumed that the expected signs of the independent variables were not known a priori. The details of the independent variable names and descriptions used for model 1 are shown in Table 1.

Table 1. Variable Definitions and Description of Data for Model One

Variable	Description	Mean	Standard Deviation
Household Size	1 = 1-3 2 = 4-6 3 = 7-9	1.40	0.58
Gender	1 = male 0 = female	0.37	0.48
Race/ethnicity	1 = Black 2 = White 3 = other	1.14	0.38
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	3.51	1.56
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.62	1.45
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = $60,001-70,000 8 = more than $70,000	3.18	1.88
Marital status	1 = single, never married 2 = married 3 = separated 4 = divorced 5 = widowed	2.07	1.29

An identical model, model 2, was set up for meat attributes as follows:

$$\ln(P\text{WTP}>j/P\text{WTP}\leq j) = \beta_1\text{SAF} + \beta_2\text{NDI} + \beta_3\text{AVA} + \beta_4\text{AFF} + \beta_5\text{QUA} + \beta_6\text{DES} + \beta_7\text{HYG} - \tau + 1 \quad (3)$$

Where:
$\ln(P\text{WTP}>j/P\text{WTP}\leq j)$ = cumulative odds of being at or below a willingness to pay (WTP) category.
SAF = Safety
NDI = No Difference (in safety)
AVA = Availability
AFF = Affordability
QUA = Quality
DES = Desirability
HYG = Hygiene

In sum, the estimated model hypothesizes that willingness to pay more for beef or goat meat certified as locally or regionally produced is influenced by the perception of being safe to consume, no difference between the

safety of locally or regionally produced product and non-locally or regionally produced product, availability of product, affordability of product, quality (taste and texture) of product, desirability (appearance and smell) of product, and hygiene of product. Again, it was assumed that the expected signs of the independent variables were not known a priori. The details of the independent variable names and descriptions used for model 2 are shown in Table 2. For the dependent variable, WTP, a value of 0 was assigned for "not willing to pay more for beef or goat meat certified as locally or regionally produced;" a value of 1 was assigned for willingness to pay 1 to 5 cents more for beef or goat meat certified as locally or regionally produced;" a value of 2 was assigned for willingness to pay 6 to 10 cents more for beef or goat meat certified as locally or regionally produced;" a value of 3 was assigned for willingness to pay 11 to 15 cents more for beef or goat meat certified as locally or regionally produced;" a value of 4 was assigned for willingness to pay 16 to 20 cents more for beef or goat meat certified as locally or regionally produced;" and a value of 5 was assigned for willingness to pay over 20 cents more for beef or goat meat certified as locally or regionally produced. This is summarized in Table 3. The ordinal logistic regression analysis was run for the models, using SPS 12.0© (MapInfo Corporation, Troy, NY). The criteria used to assess the model were the model chi-square, beta coefficients, and *p* values.

Table 2. Variable Definitions and Description of Data for Model Two

Variable	Description	Mean	Standard Deviation
Safety	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.71	0.83
Difference	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.03	1.09
Availability	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.78	0.82
Affordability	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.69	0.92
Quality	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.71	0.89
Desirability	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.69	0.87
Hygiene	0 = strongly disagree 1 = disagree 2 = neutral 3 = agree 4 = strongly agree	2.13	1.14

Table 3. Description of Willingness to Pay Categories and Variable Definitions

Category	Description	Mean	Standard Deviation
No	0	1.43	1.46
1-5 cents	1		
6-10 cents	2		
11-15 cents	3		
16-20 cents	4		
More than 20 cents	5		

4. Results and Discussion

Table 4 presents the socioeconomic characteristics of the respondents. Nearly 63% had 1-3 persons in their households, and 30% had 4-6 persons in their households. The mean number of persons in the household was six (not shown in Table); about 63% were males. Considering race/ethnicity and age, 88% were Blacks and 11% were Whites; also, 51% were 44 years or less and 48% were more than 44 years of age. Furthermore, looking at education and annual household income, 32% had high school or below education; about 36% had a two-year/technical degree or some college education; 63% earned $30,000 or less annual household income and 28% earned over $30,000 as annual household income. Approximately 66% were singles, and 34% were married. The respondents comprised more males than females, more Blacks than Whites, more middle-aged or younger persons than older persons, with a fairly good educational level, with low to moderate household incomes, and more singles than married persons. About 24% were not willing to pay more for their favorite beef or goat meat or related products if it were certified as locally or regionally produced; 47% were willing to pay 1-5 cents more, and nearly 12% were willing to pay 6-10 cents more.

Table 5 reflects attitudes and beliefs about selected attributes of locally or regionally produced beef or goat meat. Nearly 67% agreed or strongly agreed that locally or regionally produced beef or goat meat is generally safe to consume (safety); 40% agreed or strongly agreed that there is no difference between the safety of locally or regionally produced beef or goat meat and non-locally or regionally produced beef or goat meat (no difference in safety); 73% agreed or strongly agreed that they would buy locally or regionally produced beef or goat meat if it were more readily available (availability); 67% agreed or strongly agreed that they would buy locally or regionally produced beef or goat meat if it were cheaper (affordability). Moreover, about 68% agreed or strongly agreed that they would buy locally or regionally produced beef or goat meat if it were of equal quality [taste and appearance] as non-locally or regionally produced beef or goat meat (quality); 69% agreed or strongly agreed that they would buy locally or regionally produced beef or goat meat if it were of equal desirability [appearance and smell] as non-locally or regionally produced beef or goat meat (desirability); 47% agreed or strongly agreed that they would buy locally or regionally produced beef or goat meat not worrying about how it was raised if it appeared hygienic and wholesome (hygiene). Both the no difference attribute and hygiene attribute showed less than 50% agreed or strongly agreed, indicating either a fairly strong “neutral factor” or a tilt to disagreed/strongly disagreed, reflecting that either respondents were not sure or they simply disagreed.

Table 6 shows estimates for model 1, socioeconomic factors and their influence on willingness to pay more for beef or goat meat certified as produced locally or regionally. It reflects overall significance of the model (p = 0.010), i.e., at least one or all of the socioeconomic variables jointly explain the dependent variable (willingness to pay more for beef or goat meat certified as produced locally or regionally, WTP). Willingness to pay more for beef or goat meat certified as produced locally or regionally is significantly

Table 4. Socioeconomic Characteristics (N = 432)

Variable	Frequency	Percentage
Number of Persons in Household		
1-3	270	62.5
4-6	131	30.3
7-9	18	4.1
10 or more	1	0.2
No Response	12	2.8
Gender		
Male	274	63.4
Female	158	36.6
Race/Ethnicity		
Black	379	87.7
White	47	10.9
Other	6	1.4
Age		
20-24 years	44	10.2
25-34 years	89	20.6
35-44 years	89	20.6
45-54 years	78	18.1
55-64 years	73	16.9
65 years or older	58	13.4
No Response	1	0.2
Educational Level		
High School Graduate or Below	140	32.4
Two-Year/Technical Degree	71	16.4
Some College	84	19.4
College Degree	67	15.5
Post-Graduate/Professional Degree	62	14.4
No Response	8	1.9

affected by household size, $p = 0.023$. The coefficient for household size implies that for one unit increase in household size, the expected ordered log odds decreases by 0.41 moving from one category to the next higher category of willingness to pay more for beef or goat meat certified as produced locally or regionally. Identical explanations apply to the other variables in models 1 and 2. In sum, household size contributes immensely to willingness to pay more for beef or goat meat certified as produced locally or regionally. The higher the household size, the less likely the willingness to pay more for beef or goat meat certified as produced locally or regionally. This result is identical to those obtained by Bett et al. (2013), Umberger et al. (2009), and Xue et al. (2009) who reported that household size had negative and significant effect on willingness to pay more for livestock products. Gender, race/ethnicity, age, education, annual household income, and marital status were statistically insignificant. Although race/ethnicity, education, and household income were not significant, they had positive relationships. Age had a negative relationship indicating younger consumers were not willing to pay more for the product.

Table 5. Attitudes and Beliefs about Selected Attributes of Locally or Regionally Produced Beef or Goat Meat (N = 432)

Variable	Frequency	Percentage
Locally or Regionally Produced Beef or Goat Meat is Generally Safe to Consume		
Strongly Agree	58	13.4
Agree	230	53.2
Neutral	111	26.6
Disagree	20	4.6
Strongly Disagree	9	2.1
No Difference between Safety of Locally or Regionally Produced Beef or Goat Meat and Non-Locally or Regionally Produced Beef or Goat Meat		
Strongly Agree	24	5.6
Agree	149	34.5
Neutral	118	27.3
Disagree	99	22.9
Strongly Disagree	42	9.7
Would Buy Locally or Regionally Produced Beef or Goat Meat if More Readily Available		
Strongly Agree	63	14.6
Agree	251	58.1
Neutral	90	20.8
Disagree	18	4.2
Strongly Disagree	10	2.3
Would Buy Locally or Regionally Produced Beef or Goat Meat if Cheaper		
Strongly Agree	65	15.0
Agree	225	52.1
Neutral	100	23.1
Disagree	28	6.5
Strongly Disagree	14	3.5
Would Buy Locally or Regionally Produced Beef or Goat Meat if of Equal Quality as Non-Locally or Regionally Produced Beef or Goat Meat		
Strongly Agree	60	13.9
Agree	235	54.4
Neutral	103	23.8
Disagree	18	4.2
Strongly Disagree	16	3.7

Table 5. Continued

Variable	Frequency	Percentage
Would Buy Locally or Regionally Produced Beef or Goat Meat if of Equal Desirability as Non-Locally or Regionally Produced Beef or Goat Meat		
Strongly Agree	52	12.0
Agree	247	57.2
Neutral	93	21.5
Disagree	27	6.3
Strongly Disagree	13	3.0
Would Buy Locally or Regionally Produced Beef or Goat Meat not Worrying about how Raised if it Appeared Hygienic or Wholesome		
Strongly Agree	31	7.2
Agree	172	39.8
Neutral	96	22.2
Disagree	87	20.1
Strongly Disagree	46	10.6

Table 6. Estimates for Socioeconomic Factors and their Influence on Willingness to Pay More Beef or Goat Meat Certified as Produced Locally or Regionally

Variable	β	*P*
Household Size	-0.409**	0.023
Gender	-0.134	0.518
Race/ethnicity	0.429	0.109
Age	-0.017	0.818
Education	0.126	0.143
Household Income	0.054	0.329
Marital Status	-0.033	0.701
Chi-square	18.464*** ($P = 0.010$)	
Nagelkerke R^2	0.051	

Table 7 shows estimates for model 2, meat attributes and their influence on willingness to pay more beef or goat meat certified as produced locally or regionally. It shows overall significance of the model ($p = 0.001$), i.e., at least one or all of the meat attributes jointly explain the dependent variable (willingness to pay more for beef or goat meat certified as produced locally or regionally, WTP). Willingness to pay more for beef or goat meat certified as produced locally or regionally is significantly affected by perception of being safe to consume (safety); no difference between the safety of locally or regionally produced meat and non-locally or regionally produced meat (no difference in safety), and hygiene of meat, respectively, $p = 0.056$, $p = 0.032$, and $p = 0.003$. For safety, the stronger the perception that beef or goat meat certified as produced locally or regionally is safe to consume, the more the willingness to pay more for it. Similarly, for no difference, the stronger the perception that there is no difference between the safety of beef or goat meat certified as produced locally or regionally and beef or goat meat non-locally or regionally produced, the less the willingness to pay more for the former. Also,

for hygiene, the stronger the perception that beef or goat meat certified as produced locally or regionally is hygienic and wholesome (hygiene), the less the willingness to pay more for it. The latter result may be due to the fact that consumers expect meat sold to be hygienic and wholesome anyway so they do not expect to pay more for this attribute. Regarding safety, the finding is comparable to those found by Dobbs (2015), Lieu et al. (2013), and Latvala (2010). They reported consumers were willing to pay more for safety, and safety had a significant effect on willingness more for livestock products. Availability of product, affordability of product, quality (taste and texture) of product, and desirability (appearance and smell) of product were statistically insignificant. In addition, availability, quality, and desirability, although not significant, positively influenced willingness to pay more for beef or goat meat certified as produced locally or regionally. Contrarily, affordability negatively influenced willingness to pay more; price may be a sensitive attribute.

Table 7. Estimates for Product Attributes and their Influence on Willingness to Pay More Beef or Goat Meat Certified as Produced Locally or Regionally

Variable	β	*P*
Safety	0.252*	0.056
No Difference	-0.188**	0.032
Availability	0.232	0.112
Affordability	-0.145	0.281
Quality	0.043	0.783
Desirability	0.170	0.283
Hygiene	-0.261***	0.003
Chi-square	25.923*** ($P = 0.001$)	
Nagelkerke R^2	0.062	

***Significant at 1%; **Significant at 5%; *Significant at 10%

5. Conclusion

The study assessed the impact of socioeconomic factors and meat attributes on willingness to pay for locally or regionally produced livestock products. Specifically, it identified and described socioeconomic factors; described and assessed meat attributes; developed models for willingness to pay, and estimated the extent to which socioeconomic factors and meat attributes influenced willingness to pay for meat products. The socioeconomic characteristics reflect more males than females, more Blacks than Whites, more middle-aged or younger persons than older persons, with a fairly good educational level, with low to moderate household incomes, and more singles than married persons.

In addition, about 58% were willing to pay 1-10 cents more for their favorite beef, goat meat or related product if it were certified as locally or regionally produced. Also, most (at least 67%), agreed or strongly agreed with the perceptions on selected meat attributes, except in the cases of the no difference in safety and hygiene attributes. The ordinal logistic regression results revealed that, among the socioeconomic factors, only household size had a significant relationship with willingness to pay more for meat certified as locally or regionally produced. Also, among the meat attributes, safety (safe to consume), no difference

(in safety), and hygiene had significant relationships with willingness to pay more for meat certified as locally or regionally produced.

From the foregoing, the willingness to pay more for beef or goat meat certified as produced locally or regionally may be a noble thing to do. However, in this study, the socioeconomic factors did not appear to weigh heavily on willingness to pay. Only one factor, household size, had a significant effect. Furthermore, three (safety, no difference in safety, and hygiene) out of seven meat attributes had significant effects on willingness to pay. The study has contributed an insight into how socioeconomic factors and meat attributes affect willingness to pay more for beef or goat meat certified as produced locally or regionally. Its major contribution is the indication that

household size, safety (safe to consume), no difference (between the safety of beef or goat meat certified as produced locally or regionally and beef or goat meat non-locally or regionally produced), and hygiene influence or affect willingness to pay more for beef or goat meat certified as produced locally or regionally. It confirms that socioeconomic factors and meat attributes affect willingness to pay in "mixed" ways, taking into consideration the literature. This notwithstanding, a concerted effort by local or regional communities should be made to promote locally or regionally produced livestock products, such as beef and goat meat. This is based on the perception that such products are safer; have potential to facilitate social interaction between producers and consumers, and have potential to help vitalize the local or regional economy. Community leaders, public officials, producers, and consumer representatives should be involved in this effort, focusing more on meat attributes. Future studies may be needed to confirm the results of the study. Ways to do this may include replicating the study, using a larger sample size, or covering a wider geographical area to determine if the findings will replicate. Such future studies will only strengthen the knowledge base on willingness to pay for locally or regionally produced livestock products. A key limitation of study is the use of convenience sampling, which can bias results; however, it is still used in research because of its ability to yield useful information.

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