Quality Certification vs. Product Traceability: Consumer Preferences for Informational Attributes of Pork in Georgia[*]

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ABSTRACT

Consumer willingness-to-pay for informational attributes of food products is important information for food producers and supply chain participants and policy makers. We examine consumer demand in the pork sector of the Republic of Georgia. Results of conditional and mixed logit estimation, conducted on choice experiment data, reveal that Georgian consumers treat quality certification and product traceability attributes as substitutes. We also find that producers and other supply chain participants should be concerned primarily with maintaining the appearance of pork products. Retailer specific factors such as location and type of outlet can also substitute for product traceability. Store location and product appearance, however, are complementary attributes. In light of the recent turbulence in Georgia these consideration may be of paramount importance as participants in the supply chain seek to rebuild damaged infrastructure.

Keywords: Choice Experiment; Conditional Logit; Mixed Logit; Informational Attributes; Product Traceability; Quality Certification; Willingness-to-Pay

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1. INTRODUCTION

Following the collapse of the Soviet Union, the New Independent States (NIS) began their transition towards market economies.[1] This process has proven lengthy and we hypothesize that the associated change and development of the socio-economic structure may have spawned modifications in the purchase attitudes of consumers. Instead of accepting a product "as is" (as was the case during the Soviet Era), consumers may now create demand for a variety of product characteristics and types. Likewise, suppliers, from their side of the marketplace, may find economic incentives to adopt strategies that are more competitive in a growing effort to satisfy consumer demand and hence maximize profit and/or market share. All of this is occurring simultaneously with pressure on NIS governments to promulgate policies that foster increased food safety as a precursor to entry into trade pacts and/or the EU.

In addition to market-supplied attributes, government policies may also create product attributes that may either be a substitute or complement for the former. This is particularly the case for information carrying attributes, such as quality certification, nutritional information, product traceability, and is particularly relevant to the NIS. EU Member States are considering the introduction of mandatory labeling of food products (e.g. [1]) and mechanisms for some degree of traceability are fundamentally built into the EU meat supply chain. For those NIS that desire to become EU members, upgrading lax or non-existent food policy regulations to a "standard European level" will be important steps. Such initiatives are more politically feasible if they coincide with an associated consumer demand.

Media has given much attention to the macroeconomic performance of these emerging economies but relatively little attention and research has been devoted to the analysis of consumer demand in the post-Soviet era. This is so even though there is substantial potential for demand growth and value adding in these locales. While, contrary to much of popular perception, it is possible that consumers in transitional countries behave much like those from developed countries. The results from one previous study of household food demand in transitional Bulgaria [2] suggest this is the case, and reveal that Bulgarian food demand is similar to what economists observe in many other non-transitional market economies. As Henson and Caswell [3] point out, there are more concerns about food safety issues in the countries with developed economies. However, together with economic development and the subsequent increase of household incomes food safety concerns become an urgent issue in the developing countries as well.

While people may be people no matter where they live, there are differences in consumer attitudes, habits, experiences and in the institutions underlying markets that engender caution in extrapolating previous research results collected in developed countries to transitional economies such as the NIS. Quality certification and product traceability fall into the category of credence attributes, which consumers are not able to judge even after the consumption of the product [4]. Following Antle [5], because consumers do not have perfect information about the credence attributes, a market is characterized by asymmetric information. In the food processing industry, however, it is often the case that suppliers also do not have perfect information about the product

quality characteristics (i.e., a symmetric imperfect information environment), and thus, the quality regulation mechanisms will not be perfectly effective because firms are unable to reveal or guarantee information which they do not posses. Whereas substantial support for government labeling of food safety concerns exists in developed markets (e.g. [6,7,8]), there are additional challenges in NIS economies, because the institutions that would ordinarily carry out such activities may not be well-developed or may not be trustworthy in the eyes of the consumers making them less willing to pay for a governmental label. As a result, the research objectives for examining consumer preferences for informational attributes in NIS economies are likely to be different from those for the developed economies.

Producers and retailers of meat products in the Republic of Georgia face difficulty in managing supply decisions partially because they face significant uncertainty concerning the willingness-to-pay (WTP) of Georgian consumers for various meat attributes in the emerging economy. This is especially true for the informational attributes of the product. The objective of this research is to estimate consumers' preferences for food safety attributes. We examine both privately supplied attributes and potentially regulated attributes with the goal of reducing the uncertainty concerning Georgian consumers' WTP for selected pork attributes. This information should enable meat suppliers to manage their decisions more optimally and clearly. In addition, government officials will be better informed in their policymaking activities regarding the introduction of food quality assurance and food safety regulations. This study concentrates on the pork market of the Republic of Georgia and WTP for selected pork attributes. However, the results of this research may be generalized to, or at least serve the comparison purposes with analogous studies of, other small post-Soviet countries with similar production and marketing conditions. The remainder of the paper is divided into sections as follows: a short background on the Georgian pork sector, a review of related demand literature, methods and procedures, results, and implications.

2. BACKGROUND

Towards the end of the Soviet era (in 1985), agricultural enterprises produced about 46 percent of Georgia's meat, and households produced the remainder. However, as a result of privatization and the simultaneous amortization of the state-owned meat producing enterprises, almost all of the meat is currently produced by households [9]. This means that the meat sector, including pork production, is very likely underdeveloped in the country. A large number of individuals (small-scale households) supply meat to the market, and so, information about food safety or other important livestock production issues is lost by the time the product reaches a retail outlet. As a result, consumers have very little, if any, information about product safety or the identity of the producer or processor of the product and are forced to use indirect indicators (such as the type or reputation of the retailer) of product quality in making purchase choices. This suggests that there may be demand for a more organized government led initiative to provide quality assurance from both meat quality and food safety perspectives and likewise that there may exist opportunity for entrepreneurs to market enhanced product attributes.

The primary supply channel for meat products, including pork, in Georgia has historically been via open farmers' markets. Such markets are typical throughout the world in less developed countries where the marketing systems have not evolved to take advantage of scale economies and technologies that extend the shelf life of perishable products. Taking into account the way food products are provided to the customers at those outlets, products are valued primarily according to their physical appearance and lack other (informational, safety, brand identity, etc.) attributes that one might typically find in a more highly developed marketing system.

Recently, however, meat products in Georgia have begun to appear at supermarkets and food store chains. At those outlets, meat is more conveniently processed and the overall food safety and product presentation environments are more appealing and controlled. The relationship with processors/suppliers is more integrated, and some of the products are processed in-house as is the case with the Goodwill retailing outlet's recent release of store branded meat products. Prices of meat products at these upscale stores are higher. However, if retailing meat through supermarkets is assumed to be a market-driven process, then it is important evidence of the emergence of a group of customers who are willing to pay a premium for specific product and/or store attributes. This research, therefore, concentrates on specific quality attributes that consumers may have positive valuation for when making their purchase decision.

3. THEORETICAL FRAMEWORK

The theoretical background of this research is based on the Lancasterian view of utility. Lancaster's approach to consumer theory was a break from the traditional approach that utilities are derived from goods and, instead, supposed that the properties or characteristics of the goods are the source of consumer utility [10]. In the current context pork can be viewed as the collection of its attributes such as nutritional value (proteins, fat, etc.), quality (freshness, tenderness, etc.), safety (raised and processed in a phytosanitary system, inspected for pathogens, antibiotic free, etc.), convenience attributes (pre-prepared, retailed at a convenient location, etc.) among others. Therefore, the consumer, with specific preferences for each of the above-mentioned characteristics and a budget constraint, will choose the bundle of attributes (product in total), that maximizes his/her utility.

The demand-side analysis of the market and consumer utility are the main issues of this research, but the supply side should not be neglected, because producers are the ones who ultimately utilize the market information and employ technological advances to meet new demand opportunities. Following Rosen's [11] development and assuming perfect competition, producers will supply a quality attribute if the marginal revenue of adding (improving) a quality attribute is larger than the marginal cost associated with adding (improving) that attribute. Alternatively, some governmental agency may require producers to supply a certain quality attribute [12]. The latter may lead to a significant reduction of both consumer and producer surpluses if there is a large difference between perceived marginal cost and benefit of adding the attribute to a product. Alternatively, this mechanism will have a less drastic effect on the market

if the quality improvement is well received by consumers. For example, mandatory inspection in meat processing plants generates surplus only if consumers value that information. Once the consumer WTP for the attributes is known, the appropriate activities both from producers and from policy makers becomes more apparent and effective.

Product specific attributes on one side and consumer characteristics on the other side make the prediction of the decision making process particularly complex for the researcher. However, a pattern of choice that is shared by the majority of the consumers may be observable in data from actual purchases or choice experiments.

4. DATA

The research approach in this study uses a choice experiment to collect the stated preferences of individual Georgian consumers for selected pork attributes. The main reason for using this approach is that, first, some attributes of interest do not exist in the Georgian market at this time and no historical data are available. Second, we use this approach because of poor monitoring. It is difficult to obtain information about the actual purchases of Georgian consumers due to archaic government statistical services as well as the lack of MIS systems among retailers. It has been argued that, in general, individuals tend to overstate their WTP in the hypothetical situations (e.g. [13,14]). However, recent studies show that the differences between the hypothetical and actual WTP values are not statistically significant (e.g. [15,16]). In addition, other studies point to choice experiments as having a number of advantages over other stated preference methods (see, for example, [17,18]).

The choice experiment approach implies providing the respondent with a set of alternatives with different attributes, among which the subject chooses. In this way, a choice experiment closely mimics the real purchase situation wherein the customer examines different varieties of the product and then chooses one of them or none at all.

This research examines five two-level attributes, including price as an attribute. The interpretations of the attributes are contained in Table 1.

< insert Table 1.>

Following Hensher, et al. [19] the minimum possible size of the set of choice experiments for estimating main and two-way interaction effects was determined to be 12 (df = (L-1)×A +X+1, where L is the number of the attribute levels, A is number of attributes, and X is the number of interaction terms). Further, the OPTEX procedure in SAS was used to obtain a D-optimal choice design by minimizing the inverse of the Fisher information matrix. Each respondent was provided with a same set of 12 choice experiments each featuring two hypothetical products and a do not purchase option that mimicked the decision-making situation at the store. The sample choice set is provided in Figure 1.

< insert Figure 1.>

The respondents in the sample were all interviewed at grocery stores in Tbilisi - the capital city of Georgia in spring 2006. We targeted Tbilisi for two main reasons. First, it is logistically easier

and less costly to conduct the survey process and extract the information from consumers in the city vs. the rural areas. Second, and perhaps more importantly, there are hardly any supermarkets in rural areas. Many households in rural regions do not participate as consumers in the meat markets because they raise livestock and poultry for their own consumption.

Taking into account the purchasing patterns in the city, this group is expected to be wealthier than average households in the country. The consequence is that results of the analysis should not be extended to the entire Georgian population, but only interpreted in terms of those who are most likely to shop at Tbilisi grocery stores.

Enumerators conducted the survey at three grocery stores during a one month period from February 15 to March 15, 2006. Two of the selected sites were convenience type stores (relatively small in size but still an upscale type of store located conveniently in the densely populated district of the city) of the same store chain, and the third store was a "Big Box" type supermarket, located outside the densely populated part of the city. The subjects were randomly selected (however, without any predefined randomization process) and interviewed in-person, and 159 total observations were obtained. Considering that each respondent had to complete 12 choice sets, a total of 1,908 choice experiments were available for the estimation, which yields a sufficient sample of data from a statistical research perspective. Table 2 presents the descriptive statistics of socio-demographic variables.

< insert Table 2.>

As can be seen from Table 2, about two-thirds of the shoppers were female. An interesting characteristic of the surveyed consumers is that more than 90 percent of them have at least an undergraduate education. This is a common characteristic of NIS citizens and separates them from people in other developing countries. The presence of the large share of educated customers in the market is especially important to this study, because we expect that these consumers are better equipped to assess product quality if the quality information is presented [5]. Household meat consumption is closely approximated by a normal distribution, with about 2-3 kg (4.5-6.5 lb) per week meat consumption on average. As for pork consumption, 30 percent of the households consume more than 2 kgs per week while the rest of them are approximately evenly distributed in the 0.5 kg intervals up to 2 kg per week.

It is interesting to compare the survey results with the statistical information for the entire country. For example, in terms of income, the average household monthly income in Tbilisi, Georgia at the time when survey was conducted was about 400 GEL [9]. Therefore, according to the survey results, 80 percent of the respondents had above average income, which emphasizes that relatively high-income consumers are patronizing the grocery stores and supermarkets.

5. METHOD

The random utility maximization (RUM) model is used to analyze consumer preferences. To develop the main idea of the RUM, we introduce the notation in terms of a decision maker, n, facing a choice among $j=1,\dots,J$ alternatives. The decision maker could attain a certain level of

utility from each alternative. Each derived utility can be denoted as U_{nj}. The assumed rational decision maker will choose the utility maximizing alternative. Thus, alternative *i* will be chosen over alternative *j* by consumer *n* if and only if $U_{ni} > U_{nj}$, $\forall i \neq j$.

The abovementioned utility, U_{ni}, for research purposes, can be additively decomposed into the systematic component, V_{ni}, associated with i^{th} alternative for n^{th} individual, and a stochastic component, ϵ_{ni}, which is i.i.d. extreme type I, and captures the non-systematic (or idiosyncratic) factors that affect utility but are not included in V_{ni}.

$$U_{ni} = V_{ni} + \epsilon_{ni} \tag{1}$$

Further, the probability that the nth individual chooses the ith alternative is expressed as:

$$P_{ni} = Prob(U_{ni} > U_{nj} \; \forall i \neq j)$$

$$= Prob(\epsilon_{nj} < \epsilon_{ni} + V_{ni} - V_{nj} \; \forall j \neq i) \tag{2}$$

Considering the underlying distribution of the error term, some algebraic manipulation[3] yields the closed form logit choice probability:

$$P_{ni} = exp(V_{ni})(\textstyle\sum_{j} exp(V_{nj}))^{-1} \tag{3}$$

In this study, we examine fixed effects and random effects specifications by implementing conditional logit and mixed logit models. Conditional logit treats individuals as homogenous in their consumption decisions. Therefore, the chosen specification for the systematic component of the utility is the following:

$$V_{ni} = \beta' x_{ni} \tag{4}$$

where β is a vector of parameters, and x_{ni} is a vector of attributes in the ith alternative. In mixed logit model, the homogeneity assumption is relaxed and some of the attribute parameters are assumed to be individual-specific:

$$V_{ni} = \theta' x_{ni} \tag{5}$$

where $\theta = (\beta', \bar{\gamma}', \eta_n')'$, and where β is the vector of fixed parameters, $\bar{\gamma}$ is the vector of population means of random parameters, η_n is the vector of stochastic deviations representing the individual's preferences relative to the average population preferences (see [20,21], for detailed discussion). Thus, if we assume that the coefficients vary over decision makers in the population with density $f(\theta)$, then the probability, that the nth individual chooses the ith alternative over the other $j = 1,\ldots,J$ alternatives can be represented as:

$$P_{ni} = \int exp(V_{ni})(\textstyle\sum_{j} exp(V_{nj}))^{-1} f(\theta) d\theta \tag{6}$$

where distributions of the random parameters are predetermined by the researcher, and the distributions of the fixed parameters are degenerate at β, so that $f(\theta) = 1$ for $\theta = \beta$, and 0 otherwise [22].

6. EMPIRICAL MODEL AND ESTIMATION

The model developed in this research considers the informational attributes – quality certification from a governmental agency and producer traceability, the physical attribute – color, and a convenience attribute – store location. Each of the above-mentioned attributes potentially delivers a certain level of utility to the consumer. In the case of the convenience attribute, however, certain transaction costs should also be considered together with the derived utility. That is, given that the consumer's goal is to maximize utility defined as U(x) subject to a budget constraint p'x=M where p represents a vector of prices, x represents a vector of products , and M represents income. Considering that the effective prices faced by the consumer are functions of convenience the budget constraint may be rewritten as p(d)'x=M, where d is the convenience variable. The first derivative of p(d) with respect to d is strictly negative (i.e., greater convenience reduces the effective price). According to the general comparative static results associated with this optimization problem demand is non-increasing in price. Because effective price is strictly decreasing in convenience, it is clear that demand is expected to be non-decreasing in convenience. The empirical implication of which is that one should expect WTP to increase with increased convenience, *ceteris paribus*. The inclusion of convenience is particularly important in the Georgian setting because most consumers shop daily and thus incur larger transactions costs than North American consumers who typically shop for a week's (or more) worth of food and store it in their homes.

We assume that product-specific characteristics interact with each other, and so introduce interaction terms between attributes. Taking all the above-mentioned into the account the deterministic component of the empirical model for conditional logit estimation is as follows:

$$V_{ni} = \beta_p P_{ni} + \gamma' x_{ni} + \beta' z_{ni} \tag{7}$$

where *P* is a price variable for the bundled product, x_{ni} is a vector of product-specific characteristics (COLOR, QUALITY, TRACE and LOCATION, as defined in Table 1) and z_{ni} is a vector of interaction terms between product specific characteristics of the ith alternative. β_p is a price parameter, γ is a vector of attribute parameters, and β is a vector of interaction term parameters to be estimated.

In mixed logit model, we hypothesize that product-specific parameters are random. However, we treat parameters of the attribute interaction terms and price as fixed. Specifying the price parameter as fixed has a number of modeling advantages: 1) with the price parameter fixed, the distribution of the derived WTP is the same as the distribution of the associated attribute parameter, instead of being the ratio of two distributions which would be inconvenient to evaluate; 2) selecting the distribution of price parameter is in many cases problematic because demand theory restricts the price coefficient to be negative, which, for example, is not guaranteed if a normal distribution is assumed [23]. The deterministic component of the mixed logit model in this research is represented as:

$$V_{ni} = \beta_p P_{ni} + (\bar{\gamma} + \eta_n)' x_{ni} + \beta' z_{ni} \tag{8}$$

where η_n is the vector of individual specific deviations from population mean, $\overline{\gamma}$; and the rest of the parameters and variables are as defined above.

Model estimates are obtained by maximizing the log-likelihood function in case of the conditional logit, and the simulated log-likelihood function (see [20,22] for details) in the case of the mixed logit estimation. We specify the random parameters to be normally distributed in the mixed logit model.

The obtained estimates are not conveniently interpretable. Therefore, we transform them into the WTP values. We obtain WTP estimates, as follows:

$$WTP = -\theta/\beta_p \tag{9}$$

Where θ is an estimated parameter of the product-specific attribute in case of the conditional logit model, and estimated mean or standard deviation parameter in case of the mixed logit model; β_p is the estimated price coefficient. A Delta method is used to obtain the standard errors of derived WTP values[4].

7. RESULTS AND FINDINGS

Table 3 presents the conditional and mixed logit model estimates and derived WTP values.

<insert Table 3. >

A majority of the estimated coefficients in conditional logit model and about half of the estimated coefficients in mixed logit model are statistically significant at $\alpha = 0.1$ level. As expected, price has a negative estimated coefficient, and all other attribute coefficient estimates are positive. All the statistically significant estimates of the interaction terms, except of the interaction term between color and location attributes, are negative, suggesting substitutability between most of the quality attributes. In other words, the presence of one quality attribute diminishes the marginal utility obtained from any other quality attribute, *ceteris paribus*. Alternatively, convenient location increases consumers WTP only if the product is of good physical quality.

Mixed logit estimation allows us to examine heterogeneity among consumers with respect to their WTP for product-specific attributes. As the results show, the random part of the parameter estimate is statistically significant only for product traceability, meaning that consumers' are heterogeneous in their preferences for this attribute only.

8. IMPLICATIONS

In general, all of the selected pork attributes provide positive utility to the consumers and the presence of any of the attributes increases WTP for pork. Based on the research results, the main issue the producers and other supply chain participants should be concerned about is maintaining the appearance of pork products. They can achieve that goal with more timely delivery of meat to the stores, using appropriate logistics, and more importantly handling, storing, and displaying pork products in environments that enhance and preserve its color.

The WTP derived from the information about the state quality assurance is promising for policy-makers wishing to begin reforms that might pave the way to EU membership. As institutions in Georgia develop, the demand for quality certification is likely to increase, and the quality certification to become a potential source of product differentiation and market segmentation leading to opportunities of market share expansion for processors and retailers. In addition, such labeling may evolve into a source for consumer confidence in meat product safety that would translate into potential welfare gains among consumers.

Consumer WTP for product traceability derived from the conditional logit model is statistically significantly larger than their WTP for quality certification. According to the results, consumers a willing to pay about 48 percent more for the traceability information compared to the quality certification label. This result is somewhat counterintuitive and deviates, for example, from the recent study of U.S. beef consumers [24], where consumers WTP for quality certification exceeded the WTP for traceability by about four times. One of the reasons for this could be a lack of the trust in the third party (state agency) certifiers among the consumers. It is also notable that when heterogeneity in preferences is assumed, we observe statistically significant deviations in consumers' WTP for the product traceability attribute, whereas consumer preferences for the quality certification remain homogeneous. This also suggests that even though product traceability can be profitably marketed, there is still a group of customers for whom traceability is not a utility-increasing attribute. At the same time, discovering that private informational mechanisms appear to be substitutes for government involvement suggests that the market may be at least as efficient at achieving food safety and product quality advancement as government regulation.

A high stated preference for the convenient store location (conditional essentially on acceptable physical attributes of the product) may primarily be the result of the reduced transaction costs associated with product purchase. In addition, the buying patterns of the Georgian (and most of the post-Soviet or Eastern European countries') population might extenuate the effect of convenience, because citizens of those countries are used to making food purchases on an almost daily basis. With respect to this, creating the appropriate distribution system, that delivers product to a variety of non-competing convenient locations, would be beneficial to the producers and retailers.

The above-mentioned suggestions should be considered in the context of the existing reality in the Georgian meat production sector. As highlighted earlier in the paper, most of the pork in Georgia is supplied to the market by intermediaries who purchase the pigs from very small-scale producers. This may lead to low application rates of safety standards for two main reason: first, in such conditions transactions between producers and processors are often fraught with informational asymmetries (for example, Gorton, et al. [25] argue that it is the case with milk sector in transitional Moldova); and second, these practices require some fixed costs which may be indifferent to scale and so small-scale producers are unable capture sufficient benefit to make the investment worthwhile. Consequently, concentration of livestock production and/or improved vertical coordination may be needed in Georgia if quality improvements are to be

provided to a large share of the market. North American and Western European pork interests have employed a variety of innovative governance structures that include cooperatives, vertical integration, and vertical coordination via contracts and strategic alliances to garner gains of specialization and reduce transactions costs broadly defined. The Georgian pork industry could incorporate any or all of such mechanisms into a more advanced pork sector of the future. In each case, there is an implication of a larger scale of production that makes it possible to spread the cost of quality improvements over more units of production and to replicate the process in multiple locations. Given the results of this study, there might be incentive for retailers to play a coordinating role in assisting the development of such governance structures to ensure a steady supply of pork with the desired attributes. Clearly, this last theme represents an interesting future area of inquiry for Georgia and Georgia-type (mainly small Post-Soviet) country meat sectors.

ENDNOTES

1. We use the term New Independent State to refer to the independent republics that sprang into existence after the disintegration of the Soviet Union. The list is quite long but fairly well known, and for the sake of brevity, we do not reproduce the list in this paper.

2. GEL – Georgian Lari is Georgian currency. Current exchange rate: 1 USD ≈ 1.4 GEL

3. A large number of papers that use the similar models describe the steps of going from systematic utility to the appropriate logit model. We therefore opted out to present those steps, but those who are interested may refer to Train (2003) for the more detailed explanation.

4. Estimation of standard errors using the delta method is quite straightforward, and for the sake of brevity, we do not present the equation in this paper.

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	Alternative 1	Alternative 2	Alternative 3
Price	8.5 GEL/kg	9.5 GEL/kg	I would not purchase pork
Color	Yes	Yes	
Info About Producer	No	Yes	
State Quality Assurance	Yes	Yes	
Convenient Location	Yes	No	
If I was buying pork, I would choose:	☐	☐	☐

Figure 1: Sample Choice Set

Table 1. Product-Specific Attributes Used in the Survey

Attribute	Levels	Description
Price (PRICE)	8.5 and 9.5	The price expressed in GEL[2] per kg of pork
Color (COLOR)	Binary	=1 if the color of the meat is appealing, associates with "fresh" perception of meat
Producer Traceability (TRACE)	Binary	=1 if the product carries the label containing name of the farm, and its location
Quality Certification (QUALITY)	Binary	=1 if the product carries the label issued by the state body (e.g. Ministry of Agriculture and Food of the Republic of Georgia) assuring that product (production process) was inspected for safety standards
Convenient Location (LOCATION)	Binary	=1 if the location of the store is such that no extra trip is required to get there – either close to home, or on the way from the job place to home, etc.

Table 2. Descriptive Statistics of Observed Sample Population

Sample Size (persons)	159
Gender (percent)	
Male	35.8
Female	64.2
Age (mean)	43.1
Education (percent)	
High School	7.5
Undergraduate	88.1
Graduate (PhD equivalent)	4.4
Household Income (percent)	
< 200 GEL/month	7.5
200-399 GEL/month	20.1
400-599 GEL/month	18.9
600-799 GEL/month	7.5
800-999 GEL/month	17.1
≥ 1000 GEL/month	28.9
Household Meat Consumption (percent)	
< 1 kg/week	7.5
1-2 kg/week	21.4
2-3 kg/week	34.0
3-4 kg/week	22.0
> 4 kg/week	15.1
Household Pork Consumption (percent)	
< 0.5 kg/week	19.5
0.5-1.0 kg/week	15.7
1.0-1.5 kg/week	18.9
1.5-2.0 kg/week	16.3
> 2.0 kg/week	29.6

Source: Survey Data

Table 3. Conditional and Mixed Logit Estimates and Derived WTP values.

Variable	Estimate^{CL}	Estimate^{ML}	WTP^{CL} (GEL/kg)	WTP^{ML} (GEL/kg)
PRICE	-0.863 ***	-0.791 ***	---	---
COLOR	4.745 ***	3.762 ***	5.496 ***	4.755 ***
S.D.	---	0.188	---	0.237
TRACE	3.426 ***	1.179	3.968 ***	1.490
S.D.	---	2.397 ***	---	3.029 ***
QUALITY	2.320 ***	3.391 ***	2.687 ***	4.285 ***
S.D.	---	0.027	---	0.034
LOCATION	2.283 ***	-0.250	2.644 ***	-0.316
S.D.	---	0.117	---	0.148
COLOR×TRACE	-1.733 ***	-0.040	-2.008 ***	-0.050
COLOR×QUALITY	0.498	-0.213	0.577	-0.269
COLOR×LOCATION	1.548 ***	4.390 ***	1.792 ***	5.549 ***
TRACE ×QUALITY	-0.598 **	-1.412 ***	-0.693 **	-1.784 ***
TRACE ×LOCATION	-1.102 **	1.081	-1.277 ***	1.366
QUALITY×LOCATION	-0.619 **	-0.344	-0.716 **	-0.435

*, **, and *** denote the statistical significance at α=0.1, α=0.05, and α=0.01 levels respectively.

Source: Survey Data