

Demand Potential for Goat Meat in Southern States: Empirical Evidence from a Multi-State Goat Meat Consumer Survey ¹

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Multi-State Goat Meat Consumer Survey

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Abstract: A survey conducted in 11 Southeastern states elicits consumers' demand and preferences for various goat meat products. The data permit examination of goat meat demand of ethnic populations and the diversity among the states surveyed. The study uses five econometric models to examine the current demand, potential demand, and demand related to season and occasions on the goat meat market. Our analysis suggests that there exist a substantial demand for goat meat and the potential increase in the demand. The findings also identify the major factors in the determination of goat meat purchasing behavior.

Introduction

The past decades have experienced substantial changes in meat demand and consumer preferences. The declining beef, fast growing poultry, and leveling-off pork consumption characterized the well-known shift from “Red” to “White” meat (USDA/ERS).

Consumers have become concerned more about specific attributes of meat products, such as tender, juicy, cholesterol, calorie contents, and artificial ingredients (Menkhaus et al.).

Visible and intramuscular fat emit more the detrimental effect on the willingness to purchase meat (Levy & Hanna). Price retains its influence on the market share of various meat products, although the demand is less elastic. The extensive discussion on more issues on meat market has been well documented in a large body of literature (Gao and Spreen; Menkhaus et al.; Moschini et al.; Levy and Hanna; Resurrection).

The substantial changes on meat market and evolution of consumer preferences slowly created a market environment favorable for goat meat consumption. Goat meat has won favorable recognition for its quality (Babiker, et al.; Rhee, et al.), which match consumer preferences for low-fat meat and consumer concerns on health. The increasing demand for goat meat drew some attention (Dubeuf, et al.; Rhee, et al.; Pinkerton, et al.; Zachery and Nelson). Yet, in contrast to other meat products, goat meat remains a segment largely neglected on meat market and an issue less discussed in academia. Only a limited list of publications was identified from our literature search. Problems remain on the lack of understanding of demand assessment, consumer preferences, niche markets, and other aspects of the goat meat market. Quite often, the data required for qualified studies were either unavailable or of poor quality on both time and space dimensions. Studies on the demand for goat meat based on reliable data thereby are warranted.

The purpose of this study is to examine the demand for goat meat and its potential increase in Southern states. The study analyzes data from an extensive consumption survey in 11 Southern states (Alabama, Arkansas, Florida, Georgia, Mississippi, North Carolina, Oklahoma, Louisiana, South Carolina, Tennessee, and Texas) and establishes econometric models for the four-layers of goat meat demand: (1) current demand; (2) demand increase from per capita consumption; (3) demand increase from new consumers; and (4) demand changes related to season and occasions. Based on the fitted models, the study identifies the major factors influencing goat meat purchasing in a large set of socioeconomic and demographic variables. The analysis differs from others in its solid data source and quantitative assessment of multiple layer demand.

Data

The data used in this study are from a telephone consumption survey conducted through the Survey Research Center of University of Georgia in 2004. More than 2751 households in eleven Southern states were interviewed. The survey followed a complete random sampling procedure and samples were taken from local telephone books. The sample size for each state was roughly the same and with the minimum sample size of 237 and the maximum of 257 households.

The questionnaire used in the survey has 48 primary questions. Twenty three of the questions are one-layer queries; the other twenty five are multiple-layer queries, in which 1 to 8 sub-queries were raised to collect further information. The problems fall into the categories: (1) consumption behavior encompassing whether consumers ate goat meat at the survey time, whether they were willing to consume more, how much a household consumed annually, and whether there was a willingness to buy for non-goat-meat

consumers; (2) consumer preferences including preferences for various cuts, for different sensory attributes (freshness, color, and fat content), and for health and risk attributes (cholesterol, free from chemicals, and USDA label, etc.); (3) ways of cooking such as broil, roast, and barbeque; (4) dishes made from goat meat, including soup, meat sauce, chili, and meat loaf; (5) consumption of other meats such as beef, pork, chicken, turkey, lamb, and fish; (6) demographic characteristics such as gender, age, race affiliation, household size, and family structure; (7) socioeconomic factors such as education and household income; (8) marketing tools such as food page advertisement, store display, price specials, in-supermarket taste test, safety assurance, convenient products.

The major variables of interest and available in the survey are as follows:

(1) Ethnic and religious identity Religion and race affiliation of consumers were regarded as factors of importance in the determination of goat meat consumption. The race variable in this survey was designed multiple levels: White, African American, black not African American, Hispanic, Asian, and other multi-racial race affiliation. More variables related are the origin of the minority groups (Mexican descent, Cuban descent, Puerto Rican Descent, Spanish), the length of time away from original culture, and the number of generation of immigrant. Those variables, although very informative, may not be retained in the model because of the short of responses.

(2) Real Income The impact of income on consumption could never be down played. High income was believed to lead to more consumption. However, previous studies did not identify close relationships between goat meat consumption and real income. The results may not be generally true for minority groups or in a narrower income domain. Hypothetically, real income would affect the consumption of goat meat on some niche

markets. Household income, therefore, was designed as an important factor in our survey. It was measured at the 9 levels, with small intervals in the low income range and large interval in the high range. Such categorization was to keep focus on consumption behavior of low- and middle-income families.

(3) *Age* Consumer preferences could differ substantially with age. This is worthwhile to be tested in goat meat consumption. Previous studies demonstrated that most goat meat consumers were of middle age or the elder, and the young were less likely to consume goat meat. Our survey classified interviewees into 10 age categories in order that consumption patterns of various ages could be identified.

(4) *Geographic factors* Geographic factor was a contributing element for goat meat consumption. The variability in goat meat consumption among states had been documented, but was not proved on the basis of quantitative evidence. Southern states were known for their shares in goat production, but consumption information on goat meat consumption in the area is vague. The data collected in 11 Southern states would enhance the insight into the understanding of geographic factors.

(5) *Education* Knowledge and training level was deemed as another potential factor in the determination of goat meat consumption. Consumer preferences were experiencing an evolution toward freshness, juicy, nutrition, non-organic components, and less pathogen contamination. The awareness could be closely related with the levels of education. Consumers with higher education could be more likely to show concerns about food health and food safety, which would lead to some favors for goat meat. The education variable in the survey was designed to have six categories to test the hypotheses above.

Method Framework

Consumer behavior and potential influencing factors in this study are measured with a mix of binary, ordinal, nominal, and cardinal data. Most response variables of interests are non-cardinal. Hence, models for categorical response variables are chosen as the major tools of analysis. Categorical analysis methods have been used in many fields of social investigation, especially when data are gathered through survey (Agresti; Greene). The model-building paradigm, including the linear probability models (LPM), probit models, and logit models, is more informative than others for its focus on estimating parameters and assessing effects of factors related. Varying in some degree, the three models share more similarities. A common for all models is categorical response variable, which could be the binary response (eating or not eating goat meat), the ordinal response (ratings of an attribute: important, neutral, and unimportant), or the nominal response (seasonal consumption preferences: winter, summer, fall or spring). For binary and multinomial response variables, logistic models with general logit functions are usually used. For ordinal response variables, ordinal logistic models with accumulative logit functions are suitable.

In the binary case, we have a response y_i for observation unit i . y_i equals 1 if the event of interest occurs for the i^{th} observation unit, equals 0 if the event of interest does not occur for the i^{th} observation unit. The density function of y_i is where P_i is $E(y_i)$,

$$(1) \quad f(y_i) = \frac{1!}{y_i! * (1 - y_i)!} P_i^{y_i} (1 - P_i)^{(1 - y_i)} \quad y_i = 0, 1$$

the probability that y_i equals one, and $(1-P_i)$ is the probability that y_i equals zero. LPM links y_i with the explanatory variable set linearly (equation 2) and could be estimated using OLS as traditional regression does. The flaws of LPM are inefficient estimators,

$$(2) \quad y_i = B_1 x_{i1} + \dots + B_{k-1} x_{i,k-1} + B_k x_{i,k} + e_i$$

violation of $0 \leq$ prediction of $y_i \leq 1$, and the dependence of variance on particular values of independent variables. Probit and logit models avoid those problems by defining the probability of the event, P_i , with nonlinear functions of a linear combination of variables (equation 3). The probit model links I , the linear combination of independent variables, with an accumulative distribution of a standardized normal variable defined in equation 4,

$$(3) \quad I_i = B_1 x_{i1} + \dots + B_{k-1} x_{i,k-1} + B_k x_{i,k} + e_i$$

and the logit model links I with an accumulative distribution defined in equation 5.

$$(4) \quad P_i = F(I_i) = \int_{-\infty}^{I_i} \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$$

$$(5) \quad P_i = F(I_i) = \frac{e^{I_i}}{1 + e^{I_i}}$$

In both equation (4) and (5), P_i is constrained between 0 and 1. Thus, probit and logit models offer a solution to the dilemma in LPM. Both models find applications in academic investigation. But the logit model was more extensively used because of much easier interpretation of its parameters. The logit model works for both binary and multiple outcomes (ordinal and nominal). Depending on response variables, the response function could be either the cumulative logit or the general logit. The cumulative logit function is used for ordinal response with multiple ordered levels. The generalized logit function fits for nominal response with unordered multiple alternatives. In the case of the generalized logit, each non-reference category is contrasted with a specified reference category.

Given a reference group $k+1$, the logit of j level and the probability could be computed with equation (6) and (7) respectively.

$$(6) \quad \log \frac{p_j}{p_{k+1}} = B_j x \quad \text{for } j = 1, \dots, k$$

$$(7) \quad p_j = \frac{\exp(B_j x)}{\sum_j \exp(B_j x)} \quad \text{for } j = 1, \dots, k+1$$

When the cumulative logit function is implemented, the reference category is not fixed and changes with the level of the event. The logit and the corresponding probability would be computed with equation (8) and (9). Parameters in logit models are interpreted

$$(8) \quad \log \frac{p_1}{1-p_1}, \quad \log \frac{p_1 + p_2}{1-(p_1 + p_2)} \quad \dots \quad \log \frac{p_1 + p_2 + \dots + p_k}{1-(p_1 + p_2 + \dots + p_k)}$$

$$(9) \quad p_j = \frac{\exp^{B_j x}}{\sum_{j=1}^k \exp^{B_j x}} - p_{j-1} \quad \text{for } j = 1, \dots, k$$

as corresponding increases in logit of the response variable to a unit increase in explanatory variables. If explanatory variables are categorical, such logit change reflects the relative impact of a level to the reference level. As indicated in equations (7) and (9), the probability of specific behavior choices could be derived from estimated parameters.

Model Implementation

The demand analysis in this study consists of: the existing demand, the demand potential from per capita consumption increase, the demand potential from new consumers, and the demand changes related to season and occasions. In each case, we start with an initial set

of variables selected on the basis of the demand theory and fit logistic model with the SAS logistic procedure.

Demand Model

(1) Model of current demand. This model examines households' existing consumption behavior and focuses on the explanation of consumer behavior with a set of demographic and socioeconomic variables. The purpose of this model is to identify the current consumers and to define the current niche markets. The dependent variable is valued with the response to a survey question "have you or any member of your immediate family member ever eaten goat meat?" The initial set of independent variables includes consumption behavior of substitution meat such as beef, pork, and chicken; demographic factors, such as household size, age, and race; and socioeconomic variables such as education and household real income. A logistic regression with the general logit function is fitted. To reduce the lost of information in original data, most original levels of variables in the survey were kept. However, levels of some variables were combined to avoid bias if few observations observed or to increase efficiency if similar impacts from multiple levels. Models were first tested with the global hypothesis on whether the model as a whole help to explain the variability of response variable, then each variable was further examined on the basis of the type 3 analysis, and individual level was tested with the Wald statistics. To avoid the lost of the degree of freedom, variables were eliminated from the model if failed to pass statistical tests, even some variables may be the influencing factors from the theoretical perspective. This treatment differs from other studies in which variables were still retained even not significant statistically.

(2) Model of demand increase from per capita consumption growth. Previous studies and the survey data used in this study noticed low level of per capita goat meat consumption. Half current goat meat consuming households buy only 4 pound or less every year. A question of interest is whether consumers have willingness to increase per capita consumption? If yes, which population group has the intention and what are their demographic and socioeconomic characteristics? This model uses a dependent variable valued with the response to the survey question “would your family eat more goat meat if it was available in your local grocery stores?” and is fitted as logistic regression with the general logit function. The selection of initial variables, model specification and other, implementations are similar to model 1.

(3) Model of increasing demand from new consumers. More than 20% households (576 households on the goat meat market) responded in the survey that they would like to shift to goat meat consumption. This indicated that the potential demand increase from new consumers. The purpose of this model is to assess potential demand increase from new consumers and to identify the driving forces. The dependent variable is valued with the response to the survey question “if goat meat was available in your area food stores, do you think you will try it?” The logit model with a general logit function is used to fit the relationship. The selection of initial variables, specification of model and other implementations are similar to model 1.

(4) Model of demand related to season and occasions. Goat meat is not in a position of daily consumption for most families. Seasonal and occasional consumptions reflect the current status of goat meat consumption. About one third of goat meat consumers were reported to be seasonal consumers in 11 Southern states, and about 42.1% of households

responded that they only eat goat meat on special occasions. We examine seasonal and occasion related consumption (Christmas, 4th of July, Family re-union, Marriage, Ramadan, Cinco De Mayo) against the set of explanatory variables used in previous models. The response variables with multiple nominal levels in this model lead to the adoption of multinomial logit model with the generalized logit function. In contrast to the previous models, multinomial logit models have a fixed reference category, and all other categories are coded to contrast with the reference category.

Model Selection and Checking

The survey data in this study encompass an extensive domain. The initial set of variables for each model is selected from a large pool of variables on the basis of the demand theory and previous publications. As such, the initial set of variables comes to including the consumption of other meats, real income, age, education, household structure, gender, and geographic variables, etc. The initial variables are tested against a set of statistical criteria and those pass tests will be retained in the model.

Model diagnostic and checking have been the topic of discussion for decades and ended up with a large body of literature (Hocking; Judge et al.; Wallace). However, more questions raised than solved. Model selection and checking is still a complicated issue and no simple steps could lead to the finding of the true model. We did not use the stepwise regression procedure for its flaws extensively discussed. Rather, we tested variables and models based on a set of statistical criteria (R^2 , C_p , P-value, and the Wald and the likelihood ratio statistics). C_p was close to the potential number of explanatory variables to avoid the over- or under-specification of models. For each variable, we use the Wald statistic to test its significance. For variable set, we use the likelihood-ratio

statistic $-2(L_0 - L_1)$ to test the hypothesis that certain parameters equal zero. Variables in the initial set would be eliminated if they lack appropriateness or power in explaining consumer purchasing behavior.

Results and Discussion

We use logistic procedure in the SAS software package to estimate models. The estimated results of the existing demand, potential demand, and demand related to season and occasions are reported as follows:

Results of the Existing Demand

The model for the existing demand in Southern states is estimated with effective observations of 2675. The estimated parameters are presented in Table 2.

Multiple statistics (Likelihood ratio, Wald, and Score) confirm that the variability of response variable is largely explained by the retained set of variables. The results in Table 2 demonstrate multiple factors in the determination of goat meat consumption. First, the consumption of other meat influences goat meat consumption, but not all of them are significant. No impact from beef consumption is observed, and the expected substitution effect of Lamb is also not observed. In fact, households are less likely to eat goat meat if they never consume lamb, suggesting a complimentary relationship. The impacts of the consumption of chicken and pork are evidenced. Consumers eating chicken once a week is more likely to eat goat meat than other categories. For pork, the compliment impact is observed.

Demographic variables including race and age play a significant role. Race is a critical driving force for goat meat consumption. Compared with the White, the odds

ratio of goat meat consumption is 0.33 for African American, 1.42 for Black non African American, and 1.18 for Hispanic. The likelihood of goat meat consumption for non-White population is significantly higher. An exception is that the households of Asian origin demonstrate the same likelihood as the White. This may be explained as bias due to the small number of households of Asia origin (15) in the survey. Age is another demographic contributor. The elder is more likely to consume goat meat, and the peak consumption age group is 55-74. It may be explained as differences between generations, or as differences between the young and the elder. Further clarification needs time series or cohort data.

Among socioeconomic variables, no significant impact is observed among levels of education, but the influences of gender, income and geographic are observed. The odds ratio for males is significantly higher than that for females. Household income influences consumption behavior. The household with \$25,000 income represents a threshold. Households earning less than the threshold are more likely to consume goat meat than those earning more than the threshold. This signals an inferior good characterization of consumer perception for goat meat. Different consumption patterns are observed among the 11 Southern states. Nine of them have a similar tendency, but Florida and Texas differ. Compared with other states, households in Florida are less likely to consume goat meat; households in Texas are more likely to buy.

Results of Demand from per Capita Consumption Increase The model starts with a similar variable set as model 1, ends up with variables quite different. Notably, the goodness of fit is improved with some preference variables. The estimated results are reported in table 3.

The consumption of other meat remains a weak influence on goat meat consumption. Only beef and pork are retained in the model. Consumers eat more beef are less likely to increase per capita goat meat consumption. Similarly, consuming more pork means less willingness to raise per capita goat meat consumption.

Race remains a significant demographic factor. Households of black and the multi-culture are more likely to increase per capita consumption, while Hispanics are less likely to consume more. Age is an influencing factor in the determination of whether to consume goat meat as demonstrated in model 1, but reveals no impact on the willingness to consumer more or not as in this model.

Socioeconomic factors demonstrate some weak influence on the willingness to increase per capita goat meat consumption. The impact of education is evidenced the willingness to increase consumption with college or higher education. But the impact of income and geographic variables are not identified.

The findings of interest are impacts from attitude variables. The results in Table 3 illustrate the significant influence of consumers' attitude (towards organically raised goat, prepackaged products, ways of cooking, and concerns about food safety) on consumption behavior. Those who rate organically grown meat high and prefer prepackaged products and labeling cook instructions have willingness to buy more goat meat. Consumers who make broil goat and barbeque tends to consume more goat meat. Consumers who are sensitive to price, care about supermarket taste test, and like convenient food are likely to buy more goat meat.

Results of Demand Increase from New Consumers The estimated results of the potential demand from new consumers are reported in Table 4. The likelihood ratio and the Wald statistics show that the fitted model has the significant explanation power.

More variables were eliminated in this model as compared with previous models. Pork consumption, race, and income become insignificant. But beef consumption, age, gender, and geographic variables remain as influencing factors. Households consume more beef seems more willing to try goat meat. For various age groups, the elder is more likely to become new consumer of goat meat. As for gender, females tend to stick to existing consumption behavior, and are less likely to shift to goat meat consumption than males. The geographic variable again is an influencing factor. Households in Florida and Arkansas are more likely to become new goat meat consumers, while consumers in other states share the same tendency. Finally, we also identify the impacts of consumer attitudes towards store displays, price specials, in-supermarket test, and USDA inspection.

Results of Seasonal Demand The results of seasonal demand model are reported in table 5. We did not identify the impact from geographic, race, age factors. However, education, income, gender, ranking of importance of marketing tools, and pork consumption do play roles in seasonal consumption. Consumers with more education tend to consume goat meat non-seasonally. Households of higher income are more likely to eat goat meat seasonally. The parameter of the gender variable suggests that females are more likely to be all-season consumers than males. No impacts on goat meat consumption are observed from the consumption of other meats except pork. Consumers eat pork less frequently are less likely to eat goat meat seasonally. It should be noticed that seasonal consumption behavior was also affected by the attitude of consumers towards marketing tools. Those,

who rank “meat store display” and “meat price special” high, tend to change consumption pattern in different season.

Results of Occasional Demand The estimated results of model related occasional demand are reported in Table 6. We do not identify significant effects from geographic, income, education, and the consumption of other meats. However, we observe the impacts from race, gender, and age.

Less occasional consumption is observed from Black of non African American, while Hispanic and multi-racial populations are likely consume goat meat on special occasions. As for people of different age, the elder consume goat meat more regularly, while the young shows clear occasional consumption tendency. Females are less likely to consume goat meat irregularly than males. The perception of marketing tools is observed to affect occasional consumption. Households ranking meat price specials high tend to consume goat meat on special occasions than those ranking it low. Households ranking meat taste test low tend to consume goat meat more regularly than those ranking it high.

Conclusions

A substantial demand for goat meat exists from the evidence revealed in 11 Southern states. Driven by the willingness to purchase more by the existing customers and the potential entry of new consumers into the market, the demand tends to expand.

Multiple factors influence the current demand for goat meat and its potential of increase. Race, age, real income, and the consumption of other meat products are a few of such factors. Centered to those characterizations is ethnic population, the major driving force of goat meat consumption. In the near future, the continuous growth of immigrants

is likely to drive the expansion of goat meat demand. The elder is another notable factor. As more “baby boom” population get retired in the coming years, the demand potential for goat meat is expected to be at record high.

Goat meat consumption is still seasonal and occasional. This may not change in a short time. Such general status of consumption has import implication for producers, purveyors and retailers in production and marketing decision making. In the long run, goat meat could have a competitive share on meat market only when the convenient goat meat products suitable for daily consumption are developed.

To end this paper, we would like to notice that an issue not fully discussed in this paper is consumer preferences for goat meats and various attributes. In fact, meat attributes have attracted more attention than ever before and will contribute more to explain consumers’ purchasing behavior. Further exploration in the issue will no doubt enhance the insight into the understanding of the goat meat market. The discussion of this issue will be the focus in our separate paper.

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Table 1. Variable Definitions and Summary Statistics

Variable	Definition & code	Treatment Average			
<i>Dependent Variables</i>					
Q1	Existing Consumer 1 if eat goat meat; 0 if not	80.9% (0)	16.8% (1)		
Q2x1	Potential Consumer 1 if intend to buy; 0 if not	57.9% (0)	20.6% (1)		
Q8	Seasonal Consumption 1 if yes; 0 if not	67.5% (0)	32.5% (1)		
Q9	Occasion consumption 1 if yes; 0 if not	57.9% (0)	62.1% (1)		
Q11	Willingness to consume more 1 if yes; 0 if not	48.1%(0)	41.0% (1)		
<i>Explanatory Variables</i>					
Q14	Beef Consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions); 6 (never)	7.4% (0)	24.7% (2)	5.3%(4)	3.0% (6)
		47.9%(1)	8.8% (3)	2.5% (5)	
Q15	Chicken Consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions) ; 6 (never)	5.9% (0)	16.0% (2)	2.5%(4)	2.1.%(6)
		68.1%(1)	4.6% (3)	0.6% (5)	
Q16	Turkey Consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions) ; 6 (never)	1.3% (0)	8.8% (2)	12.5%(4)	6.3% (6)
		10.0%(1)	9.3% (3)	51.6% (5)	
Q17	Lamb Consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions) ; 6 (never)	0.1% (0)	0.5% (2)	2.9%(4)	76.2% (6)
		0.4%(1)	1.7% (3)	17.7% (5)	

Table 1. Variable Definitions and Summary Statistics (continue)

Variable	Definition & code	Treatment Average			
Q19	Seafood Consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions) ; 6 (never)	1.0% (0)	26.4% (2)	13.1%(4)	6.2% (6)
Q20	Pork consumption 0 (daily); 1 (multiple times a week); 2 (weekly); 3 (multiple times a month); 4 (monthly); 5 (special occasions)	28.8%(1)	19.0% (3)	5.3% (5)	
Q47	Family Size Number of person in household				
Q48	Number of persons of less than 18 in household				
Q49	0 for White; 1 for African American; 2 for Non-African American; 3 for Hispanic, 4 for Asian, 5 for multi-racial	77.2% (0)	13.9% (1)	1.4% (2)	0.5% (4)
Q54	0 for <20; 1 for 20-24; 3 for 25-34; 4 for 35-44; 5 for 45-54; 6 for 55-59; 7 for 60-64; 8 for 65-74; 9 for 75-84, 10 for >85	1.9% (0)	19.4%(3)	2.8%(3)	2.0% (5)
Q55	Education level 0 less than High School Diploma; 1 High School Diploma; 2 Associate Degree; 3 Some College; 4 College Graduate; 5 Post Graduate /Professional	14.8%(2)	9.7% (5)	6.0% (8)	6.0% (9)
Q56	0 if female; 1 if male	9.7% (0)	6.7%(2)	22.4%(4)	
Q57	Household Income 0 for less than 10,000; 1 for 10,000-14,999; 2 for 15,000-19,999; 3 for 20,000-24,999; 4 for 25,000-34,999; 5 for 35,000-49,999; 6 for 50,000-74,999; 7 for 75,000-99,999; 8 for 100,000 or more	24.8%(1)	22.5%(3)	11.6%(5)	
Q58	AL, AR, FL, GA, MS, MC, OK, LA, SC,TN, TX	68.8% (0)	31.0%(1)		
		4.3% (0)	4.5% (3)	15.3% (6)	
		3.2% (1)	9.2% (4)	8.3% (7)	
		3.5% (2)	12.0% (5)	7.8% (8)	

Table 2. Existing Demand and Variables Associated

Variable	Level	Estimate	p-value	Variable	Level	Estimate	P-value
Intercept		-1.44	0.15				
Q14	1	0.55	0.02	Q54	4	1.62	0.02
Q14	2	0.13	0.36	Q54	5	1.79	0.01
Q14	4	0.09	0.69	Q54	6	2.03	0.00
Q14	5	0.27	0.33	Q54	7	1.88	0.01
Q14	6	-0.03	0.94	Q54	8	2.00	0.00
Q14	7	-0.12	0.77	Q54	9	1.53	0.03
Q14	9	3.45	0.01	Q54	10	1.26	0.16
Q15	1	0.22	0.36	Q54	11	1.26	0.13
Q15	2	-0.42	0.00	Q55	2	0.18	0.41
Q15	4	0.00	1.00	Q55	3	0.41	0.14
Q15	5	-0.71	0.08	Q55	4	0.17	0.45
Q15	6	-1.68	0.13	Q55	5	-0.01	0.96
Q15	7	-1.27	0.03	Q55	6	0.48	0.06
Q15	9	-2.71	0.16	Q55	9	0.81	0.05
Q17	1	0.54	0.74	Q56	2	-0.62	0.00
Q17	2	-1.17	0.28	Q56	9	-13.41	0.97
Q17	4	0.17	0.81	Q57	2	-0.66	0.09
Q17	5	-0.49	0.49	Q57	3	-0.09	0.80
Q17	6	-0.49	0.46	Q57	4	-0.66	0.07
Q17	7	-1.49	0.02	Q57	5	-0.32	0.29
Q17	9	-0.32	0.76	Q57	6	-0.86	0.00
Q20	1	0.41	0.17	Q57	7	-0.53	0.07
Q20	2	0.29	0.06	Q57	8	-0.70	0.03
Q20	4	-0.24	0.16	Q57	9	-0.79	0.02
Q20	5	-0.12	0.56	Q57	10	-0.95	0.00
Q20	6	0.33	0.20	Q57	11	-0.71	0.01
Q20	7	-0.01	0.97	Q58	2	0.32	0.22
Q20	9	-1.17	0.45	Q58	3	-0.52	0.07
Q47		0.07	0.07	Q58	4	-0.37	0.17
Q49	2	0.33	0.05	Q58	5	-0.14	0.59
Q49	3	1.42	0.00	Q58	6	-0.25	0.35
Q49	4	1.18	0.00	Q58	7	0.12	0.63
Q49	5	0.03	0.97	Q58	8	0.31	0.23
Q49	6	1.22	0.00	Q58	9	-0.35	0.20
Q49	9	0.27	0.48	Q58	10	-0.04	0.88
Q54	2	0.88	0.23	Q58	11	0.58	0.02
Q54	3	1.19	0.09	Q58	99	-0.03	0.96

Table 3. Demand from Per Capita Consumption Increase and Variables associated

Variable	Level	Estimate	P-value	Variable	Level	Estimate	P-value
Intercept		1.52	0.47	Q30	5	-0.40	0.79
Q12X3	1	-0.05	0.95	Q30	9	-5.46	0.01
Q12X3	2	1.82	0.02	Q31	1	0.56	0.51
Q12X3	4	0.90	0.26	Q31	2	2.26	0.00
Q12X3	5	1.57	0.12	Q31	4	0.99	0.22
Q12X3	9	2.47	0.04	Q31	5	1.64	0.07
Q12X5	1	0.94	0.26	Q31	9	2.86	0.03
Q12X5	2	0.08	0.92	Q32	1	-2.60	0.07
Q12X5	4	-1.44	0.12	Q32	2	-0.99	0.49
Q12X5	5	-1.45	0.20	Q32	4	-0.77	0.67
Q12X5	9	-3.74	0.00	Q32	5	-3.22	0.07
Q12X6	1	1.55	0.11	Q32	9	0.52	0.77
Q12X6	2	1.74	0.06	Q33	1	0.70	0.42
Q12X6	4	1.05	0.27	Q33	2	0.72	0.33
Q12X6	5	1.40	0.21	Q33	4	-1.61	0.07
Q12X6	9	-0.34	0.79	Q33	5	0.28	0.77
Q13X4	2	2.53	0.00	Q33	9	-0.55	0.70
Q13X4	3	0.68	0.45	Q49	2	1.53	0.02
Q13X4	4	0.86	0.18	Q49	3	2.65	0.03
Q13X4	9	2.95	0.47	Q49	4	-1.57	0.05
Q13X6	2	1.57	0.33	Q49	5	0.39	0.90
Q13X6	3	1.59	0.25	Q49	6	2.86	0.02
Q13X6	4	-0.05	0.97	Q49	9	-3.25	0.06
Q13X6	9	2.24	0.61	Q55	2	-1.23	0.12
Q13X7	2	-0.17	0.78	Q55	3	-2.82	0.01
Q13X7	3	-1.99	0.02	Q55	4	-1.41	0.09
Q13X7	4	-2.27	0.00	Q55	5	0.02	0.98
Q13X7	9	-4.85	0.00	Q55	6	1.46	0.11
Q14	1	0.31	0.71	Q55	9	-1.46	0.29
Q14	2	-1.14	0.04	Q57	2	-1.67	0.16
Q14	4	-1.09	0.18	Q57	3	-0.01	0.99
Q14	5	-0.07	0.94	Q57	4	-0.87	0.47
Q14	6	-0.71	0.57	Q57	5	-1.35	0.17
Q14	7	1.32	0.49	Q57	6	-2.20	0.03
Q14	9	-1.41	0.63	Q57	7	0.26	0.77
Q20	1	0.51	0.66	Q57	8	-1.57	0.11
Q20	2	-0.80	0.15	Q57	9	-0.93	0.37
Q20	4	-1.15	0.07	Q57	10	-0.45	0.69
Q20	5	0.75	0.27	Q57	11	-0.55	0.51
Q20	6	-1.54	0.11	Q58	2	-0.25	0.78
Q20	7	-0.36	0.68	Q58	3	0.26	0.80
Q20	9	14.46	0.99	Q58	4	-0.75	0.43
Q29	1	-0.68	0.44	Q58	5	-0.95	0.35
Q29	2	-1.35	0.09	Q58	6	0.43	0.64
Q29	4	-1.72	0.05	Q58	7	-2.03	0.03
Q29	5	-2.05	0.02	Q58	8	-0.25	0.75
Q29	9	2.21	0.11	Q58	9	0.03	0.98
Q30	1	1.54	0.21	Q58	10	0.18	0.85
Q30	2	2.35	0.06	Q58	11	-0.57	0.48
Q30	4	1.75	0.22	Q58	99	1.21	0.48

Table 4. The Potential of Consumption Increase from Entry of New Consumers and Variables associated

Variable	Level	Estimate	P-value	Variable	Level	Estimate	P-value
Intercept		-0.87	0.20	Q49	4	0.27	0.46
Q29X1	1	0.26	0.29	Q49	6	0.50	0.22
Q29X1	2	0.44	0.04	Q49	9	0.36	0.37
Q29X1	4	0.18	0.42	Q54	2	0.46	0.31
Q29X1	5	-0.04	0.88	Q54	3	0.71	0.09
Q29X1	9	0.23	0.64	Q54	4	0.69	0.09
Q30X1	1	0.62	0.02	Q54	5	0.90	0.03
Q30X1	2	0.25	0.36	Q54	6	1.01	0.02
Q30X1	4	0.25	0.43	Q54	7	1.10	0.01
Q30X1	5	0.32	0.34	Q54	8	0.82	0.05
Q30X1	9	0.33	0.62	Q54	9	0.82	0.07
Q31X1	1	0.43	0.08	Q54	10	0.71	0.25
Q31X1	2	-0.01	0.98	Q54	11	-0.10	0.88
Q31X1	4	-0.16	0.44	Q55	2	-0.48	0.02
Q31X1	5	-0.53	0.01	Q55	3	-0.17	0.52
Q31X1	9	0.37	0.29	Q55	4	-0.09	0.66
Q32X1	1	-1.04	0.00	Q55	5	-0.16	0.45
Q32X1	2	-0.92	0.01	Q55	6	0.07	0.75
Q32X1	4	-0.90	0.08	Q55	9	-0.18	0.72
Q32X1	5	-0.90	0.06	Q56	2	-0.94	0.00
Q32X1	9	-2.75	0.00	Q56	9	-0.82	0.51
Q34X1	1	0.17	0.54	Q57	2	-0.02	0.95
Q34X1	2	0.36	0.19	Q57	3	-0.21	0.60
Q34X1	4	0.54	0.10	Q57	4	-0.34	0.35
Q34X1	5	0.26	0.49	Q57	5	-0.29	0.36
Q34X1	9	1.04	0.15	Q57	6	-0.27	0.38
Q14	1	0.10	0.66	Q57	7	-0.30	0.34
Q14	2	0.34	0.01	Q57	8	-0.13	0.71
Q14	4	-0.21	0.34	Q57	9	-0.84	0.02
Q14	5	-0.50	0.09	Q57	10	-0.22	0.48
Q14	6	0.15	0.69	Q57	11	-0.43	0.15
Q14	7	0.01	0.97	Q58	2	0.42	0.09
Q14	9	-12.38	0.97	Q58	3	0.51	0.04
Q20	1	0.37	0.22	Q58	4	0.17	0.50
Q20	2	0.20	0.19	Q58	5	0.25	0.33
Q20	4	0.04	0.79	Q58	6	0.34	0.17
Q20	5	0.06	0.73	Q58	7	0.13	0.61
Q20	6	0.36	0.19	Q58	8	0.19	0.45
Q20	7	-0.07	0.77	Q58	9	-0.01	0.97
Q20	9	0.09	0.95	Q58	10	-0.05	0.83
Q49	2	-0.06	0.72	Q58	11	0.03	0.92
Q49	3	-0.72	0.28	Q58	99	0.71	0.20

Table 5. Seasonal Demand and Variables associated

Variable	Level	Estimate	P-value	Variable	Level	Estimate	P-value
Intercept	1	-0.87	0.29	Q55	4	-0.88	0.03
Q29X1	1	1.37	0.00	Q55	5	-1.06	0.01
Q29X1	2	0.45	0.25	Q55	6	-1.18	0.01
Q29X1	4	0.52	0.21	Q55	9	-0.18	0.79
Q29X1	5	0.40	0.36	Q56	2	-1.01	0.00
Q29X1	9	1.98	0.02	Q57	2	-0.77	0.24
Q30X1	1	0.94	0.05	Q57	3	-1.95	0.00
Q30X1	2	0.95	0.05	Q57	4	-1.61	0.01
Q30X1	4	-0.12	0.85	Q57	5	-0.44	0.38
Q30X1	5	0.58	0.32	Q57	6	-0.70	0.15
Q30X1	9	1.22	0.29	Q57	7	-0.77	0.11
Q20	1	0.92	0.07	Q57	8	-0.64	0.24
Q20	2	-0.47	0.08	Q57	9	0.00	0.99
Q20	4	-0.02	0.95	Q57	1	-1.52	0.01
Q20	5	-0.05	0.89	Q57	1	-0.34	0.46
Q20	6	0.14	0.74	Q58	2	0.22	0.63
Q20	7	-0.40	0.34	Q58	3	0.20	0.70
Q20	9	-1.15	0.55	Q58	4	-0.14	0.78
Q49	2	0.18	0.53	Q58	5	0.39	0.42
Q49	3	-0.29	0.63	Q58	6	-0.41	0.41
Q49	4	0.15	0.73	Q58	7	0.55	0.22
Q49	5	-1.42	0.26	Q58	8	0.88	0.05
Q49	6	0.33	0.52	Q58	9	0.00	0.99
Q49	9	-1.53	0.02	Q58	1	0.07	0.88
Q55	2	-0.70	0.08	Q58	1	0.64	0.14
Q55	3	-0.41	0.43	Q58	9	0.03	0.97

Table 6. Occasion Demand and Variables associated

Variable	Level	Estimate	P-value	Variable	Level	Estimate	P-value
Intercept	1	1.51	0.41	Q49	4	1.25	0.01
Q29X1	1	0.68	0.14	Q49	5	-0.24	0.87
Q29X1	2	0.49	0.23	Q49	6	0.16	0.77
Q29X1	4	0.21	0.63	Q49	9	-1.65	0.03
Q29X1	5	0.24	0.60	Q54	2	-2.46	0.11
Q29X1	9	1.16	0.21	Q54	3	-3.00	0.04
Q30X1	1	1.21	0.02	Q54	4	-2.74	0.06
Q30X1	2	1.11	0.03	Q54	5	-3.10	0.03
Q30X1	4	0.42	0.51	Q54	6	-3.03	0.04
Q30X1	5	-0.41	0.52	Q54	7	-2.83	0.05
Q30X1	9	2.66	0.09	Q54	8	-2.95	0.04
Q31X1	1	-0.47	0.31	Q54	9	-3.16	0.04
Q31X1	2	-0.59	0.13	Q54	1	-4.47	0.02
Q31X1	4	-0.39	0.31	Q54	1	-4.18	0.02
Q31X1	5	-0.72	0.07	Q55	2	-0.02	0.97
Q31X1	9	-1.17	0.13	Q55	3	0.07	0.89
Q32X1	1	0.11	0.88	Q55	4	-0.20	0.64
Q32X1	2	0.28	0.71	Q55	5	-0.14	0.76
Q32X1	4	0.57	0.55	Q55	6	-0.20	0.67
Q32X1	5	0.86	0.42	Q55	9	0.79	0.30
Q32X1	9	2.23	0.08	Q56	2	-0.57	0.01
Q34X1	1	-0.49	0.28	Q57	2	0.87	0.22
Q34X1	2	-0.47	0.29	Q57	3	-0.64	0.30
Q34X1	4	0.22	0.69	Q57	4	-0.48	0.47
Q34X1	5	-0.08	0.90	Q57	5	-0.25	0.63
Q34X1	9	-1.44	0.17	Q57	6	0.35	0.50
Q14	1	-0.15	0.71	Q57	7	0.80	0.11
Q14	2	-0.23	0.39	Q57	8	0.28	0.63
Q14	4	-0.34	0.41	Q57	9	1.41	0.02
Q14	5	-1.12	0.02	Q57	1	0.25	0.67
Q14	6	0.42	0.53	Q57	1	0.67	0.16
Q14	7	0.90	0.29	Q58	2	-0.39	0.40
Q14	9	-0.09	0.96	Q58	3	-0.20	0.71
Q20	1	0.56	0.30	Q58	4	-0.37	0.47
Q20	2	-0.05	0.84	Q58	5	-0.36	0.48
Q20	4	-0.06	0.85	Q58	6	0.05	0.93
Q20	5	0.06	0.87	Q58	7	-0.27	0.58
Q20	6	0.38	0.41	Q58	8	0.65	0.15
Q20	7	0.92	0.05	Q58	9	-0.56	0.29
Q20	9	10.81	0.99	Q58	1	-0.12	0.81
Q49	2	0.38	0.23	Q58	1	0.20	0.66
Q49	3	-1.28	0.04	Q58	9	-0.22	0.82