Puerto Rican Consumers' Attitude towards Willingness to Pay a Premium for Ethnic Produce: An Econometric Analysis

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Abstract

The primary objective of this study is to predict Puerto Rican consumer's willingness to pay a premium for ethnic produce. Particularly, this paper analyzes the effects of Puerto Rican consumers' socio-economic characteristics and their expressed value judgments on their willingness to pay a premium for ethnic produce using a logit analysis. A telephone survey was conducted by a private marketing company for the Puerto Rican ethnic group in 16 states of east-coast United States from Florida to Maine and Washington, D.C., and based on random sampling, 271 respondents were interviewed in 2006. Consumers who participated in the survey were asked whether they were willing to pay a premium price for Puerto Rican ethnic produce or not, and based on this response, a logit model was developed to predict their willingness to pay a premium for ethnic produce.

Keywords: willingness to pay a premium, Puerto Rican ethnic consumer, fruits and vegetables, produce, logit model
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1 Introduction

To increase profitability, many farmers have been adopting the move towards growing specialty crops. Specialty crops are non-commodity crops, and have unique characteristics for which consumers are willing to pay a premium. For instance, they may have differences in characteristics such as higher protein content, better shelf life, nutraceutical qualities, different colors etc. Niche crops are usually targeted toward a specific, small consumer base such as a particular ethnic population. Since the ethnic population in the northeastern and mid-Atlantic states has been growing steadily in the past decade, producing and marketing ethnic fruits and vegetables could be a profitable venture. The growing immigrant population also brings about a niche demand for familiar foods of their homelands. This creates a market for ethnic produce fueled by the increasing number of consumers eager to purchase them. This also has lead to the opening up of new supermarkets geared for the ethnic consumer, and an

increasing diversity of fresh fruits and vegetables even in the mainstream supermarkets of the region. Studies conducted throughout the region have shown that growing ethnic produce items is a viable venture (TUBENE et al., 2003; LAWRENCE et al., 2000, and HILCHEY, 2003).

Consisting largely of recent immigrant communities, these populations enjoy a strong bond to their cultures and ethnic cuisines. ASP (1999) argues that food decisions are made by consumers based on cultural factors, psychological factors, lifestyle factors, and food trends. In many communities, food is an integral part of the culture and there is an established link between food and culture (BHUGRA, 1999). The types of produce consumed, the purchasing pattern and the expenditures on different produce items depend on socio-cultural and economic factors and these underlying factors tend to influence ethic consumers to pay a premium for ethnic produce (GOVINDASAMY et al., 2006). Many of these ethnic communities have their own channels of produce distribution outside of the traditional retail supermarket industry.

Acceptance and willingness to purchase organic produce and genetically modified foods may influence the potential demand for ethnic produce (ARIAYAWARDANA et al., 2009; GOVINDASAMY and PUDURI, 2009). There have been various studies that estimate the consumer preferences toward genetically modified produce, organically grown food crops and Integrated Pest Management (IPM) produce. Consumers make such decisions based on a variety of factors such as the type of information they receive, cultural practices, the socio-economic factors around them, sensitivity to prices, concern to environmental effects etc. Hence, acceptance of such characteristics can vary significantly within a specific segment, even within the same ethnicity. The study aims to address these questions.

The concentration of population that surrounds the growers in the Mid-Atlantic and Northeast regions is rich in ethnic diversity. Ethnic identity is a term used to associate the membership in and identification with an ethnic group. Estimates show that there has been increase in the ethnic populations during the last few decades and is projected to continue. The Mexican population grew approximately by 52.9%, while the Puerto Rican and Cuban population increased by 24.9% and 18.9%, respectively during 1990-2000 (GUZMÁN 2001).

As 2000 census figures indicate, among the major four ethnicities of east-coast region of the U.S., the Puerto Rican population is 2.7 million which is 46% of all four ethnicities and followed by 1.5 million Mexicans (26%), 0.9 million Chinese (15%) and 0.8 million Asian Indians (14%) (LEE, 1998; U.S. DEPARTMENT OF COMMERCE, 2000). According to these census figures, among all ethnicities, Puerto Ricans are the first largest ethnic population segment in terms of population in the east-coast region

including Washington, D.C. A high concentration of Puerto Rican population presents significant opportunities for ethnic fruit and vegetable producers, especially in east-coast region to take advantage of their close proximity to the densely populated areas.

While growing specialty produce can be beneficial to farmers in general, with intensive production systems aimed at increasing production, there is a risk of oversupply in the market and price depreciation consequently. This creates a need to expand the markets to regions beyond the local area, which can be established with the help of affiliations with other produce marketing systems. Knowing how and where people purchase specialty crops currently will help us map a trajectory to establish such cooperatives. This objective of the present paper is to gather market information on Puerto Rican consumers of the U.S. east-coast region and assess their willingness to pay a premium price for ethnic produce.

2 Data Description

The data utilized in this paper was collected from an ethnic produce survey prepared for the Puerto Rican ethnic group. Sixteen states - Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia and Washington, D.C. were selected from the east-coast U.S. and based on random sampling, 271 samples were interviewed by a private company to collect data using a computer assisted telephone survey in 2006. In addition to consumer value attributes and attitudes, respondents were asked whether they were willing to pay a premium price for Puerto Rican ethnic produce or not, and based on this response, a logit model was developed to predict their willingness to pay a premium for ethnic produce.

3 Model Framework

In the model specification, a binary dependent variable was defined as one if the Puerto Rican respondent willing to pay a premium for ethnic produce, otherwise zero. Following the random utility framework, it is assumed that a Puerto Rican consumer faces a choice between willing to pay a premium for ethnic produce or not. The logit model was selected because of its asymptotic characteristics that constrain the predicted probabilities to a range of zero to one. Additionally, the logit model is favored given its mathematical simplicity and is often used in a setting where the dependent variable is binary. The estimation method utilizes the maximum likelihood estimation procedures (MLE) characterized by their consistent parameter estimates that are asymptotically efficient (GUJARATI, 1992; PINDYCK and RUBINFELD, 1991).

The relationship between Puerto Rican consumer's willingness to pay a premium for ethnic produce and their socioeconomic characteristics is explored by modeling the indicator variable Zi for the ith consumer as a function of his/her socioeconomic characteristics, as follows:

(1) $$Z_i = \boldsymbol{\beta}\mathbf{X}_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_k x_{ik} + \nu_i, \quad i = 1, 2, \ldots, n$$

Where xij denotes the jth socioeconomic attribute of the ith respondent, β = (β0, β1, …,βk) is the parameter vector to be estimated and νi is the random error or disturbance term associated with the ith consumer. Under the logistic distributional assumption for the random term, the probability Pi (that the ith consumer supports) in terms of willingness to pay a premium for ethnic produce can now be expressed as:

(2) $$P_i = F(Z_i) = F(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ij}) = F(\boldsymbol{\beta}\mathbf{X}_i) = \frac{1}{1 + \exp(-\boldsymbol{\beta}\mathbf{X}_i)}$$

The estimated β-coefficients of equation (2) do not directly represent the marginal effects of the independent variables on the probability P_i that a consumer's support towards willingness to pay a premium for ethnic produce. In the case of a continuous explanatory variable, the marginal effect of x_j on the probability P_i is given by:

(3) $$\partial P_i / \partial x_{ij} = \left[\beta_j \exp(-\boldsymbol{\beta}\mathbf{X}_i)\right] \Big/ \left[1 + \exp(-\boldsymbol{\beta}\mathbf{X}_i)\right]^2$$

However, if the explanatory variable is qualitative or discrete in nature $\partial P_i / \partial x_{ij}$ does not exist. In such a case, the marginal effect is obtained by evaluating P_i at alternative values of x_{ij}. For example, in the case of a binary explanatory variable x_{ij} that takes values of 1 and 0, the marginal effect is determined as:

(4) $$\partial P_i / \partial x_{ij} = P(x_{ij} = 1) - P(x_{ij} = 0)$$

The following empirical model is specified to capture the relationship between consumers' socioeconomic variables and their willingness to pay a premium for ethnic produce. The variables used in the model are explained in table 4.

The model was formulated as:

$$\begin{aligned} \text{WTP\_MORE} = {} & \beta_0 + \beta_1 \text{ ETH\_PROD\_EXP} + \beta_2 \text{ TOT\_PROD\_EXPEND} \\ & + \beta_3 \text{ BUY\_ETH\_AMER} + \beta_4 \text{ QUALITY\_IMP} + \beta_5 \text{ PRICE\_BETTER} \\ & + \beta_6 \text{ WTB\_ORG} + \beta_7 \text{ NOT\_WTB\_GM} + \beta_8 \text{ WTB\_COOL} \\ & + \beta_9 \text{ 4YEAR\_COLLEGE} + \beta_{10} \text{ SELF\_EMP} + \beta_{11} \text{ INC\_LESS20} \\ & + \beta_{12} \text{ INC\_20TO40} \end{aligned}$$

4 Results

4.1 Cross Tabulation Results

Tables 1 to 3 provide information relating to Puerto Rican consumers' willingness to pay a premium for their ethnic produce, categorized based on the demographic attributes used in the model. As can be seen in table 1, among the five categories of education levels (less than 12th grade, high school graduate, 2 year college degree,4 year college degree and post graduate), post graduates are less willing to pay a premium for ethnic produce, closely followed by those who graduated from high school.

Table 1. Willing to pay a premium for Puerto Rican ethnic produce by education

Education	Willingness to pay for ethnic produce				Total	
	Willing to pay a premium		Not willing to pay a premium			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than 12th grade	13	72%	5	28%	18	100%
High school graduate	61	64%	35	36%	96	100%
2 year college degree	40	75%	13	25%	53	100%
4 year college degree	38	69%	17	31%	55	100%
Post graduate or advanced degree	17	57%	13	43%	30	100%

Source: consumers telephone survey data (2006)

As shown in table 2, two categories, namely "other" and "unemployed" are most willing to pay a premium (75% and 73%) for ethnic produce compared to rest of the group, followed by "employed by someone else" and then "self-employed" category.

Table 2. Willing to pay a premium for Puerto Rican ethnic produce by occupation

Occupation	Willingness to ay for ethnic produce				Total	
	Willing to pay a premium		Not willing to pay a premium			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Employed by someone else	98	69%	44	31%	142	100%
Self-employed	21	68%	10	32%	31	100%
Retired	4	33%	8	67%	12	100%
Full-time homemaker	23	64%	13	36%	36	100%
Unemployed	19	73%	7	27%	26	100%
Other	3	75%	1	25%	4	100%

Source: consumers telephone survey data (2006)

As can be seen from table 3, more number of respondents in the "up to $99,999 income" category is willing to pay a premium for ethnic produce compared to those who earn $100,000 and above. Overall, majority of respondents (56% to 77%) are willing to pay a premium for ethnic produce in all income categories.

Table 3. Willing to pay a premium for Puerto Rican ethnic produce by income

Income	Willingness to pay for ethnic produce				Total	
	Willing to pay a premium		Not willing to pay a premium			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than $20,000	29	66%	15	34%	44	100%
$20,000 to $39,999	32	60%	21	40%	53	100%
$40,000 to $59,999	29	71%	12	29%	41	100%
$60,000 to $79,999	19	79%	5	21%	24	100%
$80,000 to $99,999	10	77%	3	23%	13	100%
$100,000 and above	14	56%	11	44%	25	100%

Source: consumers telephone survey data (2006)

4.2 Descriptive Statistics

Table 4 provides the summary statistics of explanatory variables which are used in the logit model. On average, each Puerto Rican respondent spends about $75 in a month on ethnic produce and the total monthly produce expenditure is about $122. Only 27% of Puerto Rican respondents buy their ethnic fruits and vegetable from American grocery stores. About 38% of respondents think that the quality of produce is better in ethnic stores than the conventional establishments. The results also indicate that 51% of respondents think that the price is better in ethnic stores than the conventional establishments. Furthermore, in terms of buying organic and genetically modified produce items, 55% of respondents are willing to buy organic produce and 64% of them are less willing to buy genetically modified produce items. With respect to labeling, 51% of respondents are willing to buy country of origin labeled (COOL) produce items. Among the survey respondents, about 21% of respondents have four years college degree and only 12% of them are self employed. In the case of family income, 22% of respondents have less than $20,000 and 27% of them have income between $20,000 and $39,999.

Table 4. Description of explanatory variables

S. No	Variable	Description	Mean/ Percentage	Standard Deviation
1	ETH_PROD_EXP	Monthly expenditure on ethnic fruits and vegetables	75.33	72.06
2	TOT_PROD_EXPEND	Total monthly expenditure on Fruits and Vegetables	122.36	114.97
3	BUY_ETH_AMER	1 if the respondents purchased all ethnic fruits and vegetables from typical American grocery store; 0=otherwise	27%	0.45
4	QUALITY_IMP	1 if respondent thought quality is better in ethnic store than the conventional establishment; 0=otherwise	38%	0.49
5	PRICE_BETTER	1 if respondent thought price is better in ethnic store than the conventional establishment; 0=otherwise	51%	0.50
6	WTB_ORG	1 if respondent was willing to buy organically grown produce; 0=otherwise	55%	0.50
7	NOT_WTB_GM	1 if respondent was less willing to pay for genetically modified produce; 0=otherwise	64%	0.48
8	WTB_COOL	1 if respondent was willing to buy country of origin labeled produce; 0=otherwise	51%	0.50
9	4YEAR_COLLEGE	1 if respondent had 4 years college degree; 0=otherwise	21%	0.41
10	SELF_EMP	1 if the respondent was self employed; 0=otherwise	12%	0.33
11	INC_LESS20	If respondent income was less than $20,000; 0=otherwise	22%	0.42
12	INC_20TO40	If respondents income between $20,000 and $39,999; 0=otherwise	27%	0.44

Source: consumers telephone survey data (2006)

4.3 Model Explanation

A logit model was used to analyze the Puerto Rican ethnic consumer preferences and their willingness to pay a premium for ethnic produce. Table 5 shows the coefficients, standard errors, t-ratios and estimated marginal effects of the explanatory variables. The McFadden's R-Square was 0.12, and represents the ratio of maximum likelihoods computed with and without the explanatory variable set. As can be seen in table 6, the

model predicted 185 of 255 cases correctly, or 72.6%. The logit model results in terms of marginal effects have explained the degree of Puerto Rican consumer's willingness to pay a premium for ethnic produce.

The study found that although many ethnic consumers may want to purchase produce, only 67% are willing to pay a premium. The results indicate that those who spend more on ethnic fruits and vegetables, those who spend more on total produce in a month, those who thought that the quality and price are better in ethnic stores than the conventional establishments, those who are willing to buy organically grown produce items and those who hold 4 years college degree are more likely willing to pay a premium for Puerto Rican ethnic produce. The study also indicates that those Puerto Recons who purchase all ethnic fruits and vegetables from typical American grocery stores, those who are willing to buy country of origin labeled produce items and self employed respondents are less likely to willing to pay a premium for ethnic produce.

The logit model results in terms of marginal effects explain the direction of willingness to pay a premium for Puerto Rican ethnic produce. According to the marginal probabilities shown in table 5, although those who spend more on ethnic produce and total produce are more likely to willing to pay a premium for ethnic produce, the magnitude of the marginal impact is small. The study also finds that those who thought the quality is better in ethnic stores than the conventional establishments are 4% more likely to willing to pay a premium for ethnic produce compared to those who thought otherwise. The results also suggest that those who thought that the price is better in ethnic stores than the conventional establishments are 4% more likely to willing to pay a premium for ethnic produce. Those who are willing to buy organically grown produce items are 3% more likely to willing to pay a premium for ethnic produce than those who did not. In terms of educational levels, those who hold 4 years college degree are 3% more likely to willing to pay a premium for ethnic produce compared to those who had other educational levels.

Furthermore, those who purchased all ethnic produce from typical American grocery stores are 3% less likely to willing to pay a premium for ethnic produce compared to those who bought ethnic produce from ethnic stores, community famers market, on-farm markets or roadside stands and other places. Those who are willing to buy country of origin labeled produce items are 3% less likely to willing to pay a premium for ethnic produce compared to those who are indifferent, less willing and unsure towards buying COOL produce items. The results also indicated that self-employed are 2% less likely to willing to pay a premium for ethnic produce compared to employed by someone else, retired, full-time homemakers, unemployed and other categories.

Table 5. Willing to pay a premium for ethnic produce: logit model estimates

S. No	Variable	Coefficient	Standard Error	t-ratio	Marginal Change
	Constant	0.3154	0.3922	0.8040	
1	ETH_PROD_EXP*	0.0007	0.0004	1.6730	0.0000
2	TOT_PROD_EXPEND*	0.0011	0.0006	1.7790	0.0001
3	BUY_ETH_AMER*	-0.5932	0.3335	-1.7790	-0.0294
4	QUALITY_IMP***	0.9303	0.3215	2.8940	0.0376
5	PRICE_BETTER***	0.8178	0.3049	2.6820	0.0364
6	WTB_ORG**	0.6746	0.3031	2.2260	0.0306
7	NOT_WTB_GM	-0.4379	0.3209	-1.3650	
8	WTB_COOL**	-0.6496	0.3081	-2.1080	-0.0284
9	4YEAR_COLLEGE*	0.5373	0.2955	1.8180	0.0233
10	SELF_EMP*	-0.5438	0.2957	-1.8390	-0.0236
11	INC_LESS20	0.2179	0.2382	0.9150	
12	INC_20TO40	-0.2182	0.2382	-0.9160	

*** $P< .01$; ** $P< .05$; * $P>0.10$

Source: consumers telephone survey data (2006)

Table 6. Predictive accuracy of logit model

Actual Value	Predicted		Total
	0	1	
0	29 (11.4%)	54 (21.2%)	83 (32.5%)
1	16 (6.3%)	156 (61.2%)	172 (67.5%)
Total	45 (17.6%)	210 (82.4%)	255 (100.0%)

Number of correct predictions: 185
Percentage of correct predictions: 72.6%
McFadden R^2: 0.12
Chi squared: 40.02
Degrees of freedom: 12
P-value= .11085 with degrees of freedom = 8
Overall Model Significance: 0.00

Source: consumers telephone survey data (2006)

5 Conclusions

This study aimed to identify Puerto Rican consumers' who are most likely willing to pay a premium for their ethnic produce. The main findings of the study conclude that about 67% of survey respondents' were willing to pay a premium for ethnic produce and 33% of them were not. Based on the descriptive statistics, on average, each Puerto

Rican respondent spend about $75 on ethnic produce and $122 on total fruits and vegetables. Only 27% of Puerto Rican respondents bought their ethnic fruits and vegetable from American grocery stores. According to the results, those who spend more on ethnic fruits and vegetables, those who spend more on total produce in a month, those who thought that the quality and price are better in ethnic stores than the conventional establishments, those who are willing to buy organically grown produce items and those who hold 4 years college degree are positively related to willingness to pay a premium for ethnic produce, whereas, in case of, those who purchased all ethnic fruits and vegetables from typical American grocery stores, those who are willing to buy country of origin labeled produce items and self employed respondents are negatively associated with the willingness to pay a premium for ethnic produce. The results are important to all the market segments such as producers, wholesalers, retailers and farm policy makers to develop production, marketing strategies and policies that instill consumer confidence, assure consumer satisfaction and therefore meet consumer demands.

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