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# Consumer Willingness to Pay and Marketing Opportunities for “Quality Guaranteed Tree-Ripened Peaches” in New York State

Wen-fei L. Uva and Mei-luan Cheng

This study identifies consumer characteristics associated with willingness to pay a higher price for quality guaranteed tree-ripened peaches, with a focus on evaluating factors important to consumers when making decisions to purchase tree-ripened peaches. Telephone interviews were conducted with consumers in New York State in summer, 2002. Seventy-eight percent of the 258 survey respondents reported that they were willing to pay a higher price. A logistical regression model of willingness to pay was estimated. The empirical results indicated that willingness to pay was positively affected by the existence of previous experiences in purchasing tree-ripened peaches and by consumer dissatisfaction with peaches consumed in the past. An analysis of consumer experiences and consumer dissatisfaction showed that consumers in the two identified segments had mutually exclusive characteristics that present marketing opportunities for high quality New York-grown peaches.

Fruits growers in New York State are adding alternative crops to their production acreage in an effort to diversify their orchards and exploit profitable niche markets. Peaches (*Prunus persica L.*) are a major crop used for this purpose, and also the most important stone fruit produced in New York State. In an effort to research the best peach varieties for the New York stone fruit industry, Cornell Cooperative Extension and the Agricultural Experiment Station in Geneva, New York have worked closely with growers to develop new peach varieties that are suitable for the New York State growing environment and possess higher eating quality and more eye-appealing characteristics for the consumer market (Anderson 2003). The New York peach industry is positioned to expand the market for New York-grown premium tree-ripened peaches.

The Northeast region offers premier marketing opportunities along the Washington, D.C.-to-Boston corridor. However, locally grown stone fruit, including peaches, appears to have only a small share of this market at present. In addition, consumers increasingly demand high-quality natural food products, especially those perceived as having gourmet appeal or health benefits. Thus the market for high-quality locally grown stone fruit in the Northeast is probably grossly underdeveloped. New York peach growers have the competitive advantage of

shorter transportation distance compared to West Coast suppliers, so they will be able to supply better quality tree-ripened peaches. Retailers may also benefit from marketing “locally grown premium peaches.” There is a potentially lucrative market for specialty peaches grown in New York State, but exploiting it, as always, demands an understanding of consumers in the market.

In an earlier study, focus groups were used to assess consumer attitudes and purchasing behaviors for fresh peaches and to explore consumer reactions to “New York-grown premium tree-ripened peaches” (Uva, Cuellar, and Cheng 2004). To verify results from the focus-group discussion, this study used data from a phone survey to provide a quantitative research. The objective of this study was to provide a better understanding of consumer preferences and buying behaviors for tree-ripened peaches. The information is expected to help growers develop marketing strategies to expand, distribute, and promote New York State-grown premium tree-ripened peaches.

## Survey Data

A random sample of households was selected for telephone interviews from five geographic regions in New York State: Ithaca, Syracuse, Rochester, Buffalo, and Albany. The eligibility-screening criteria required that the respondents be over the age of 18 and be the primary food shopper in the household. The telephone survey commenced on

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Uva is senior extension associate and Cheng is doctoral candidate, Department of Applied Economics and Management, Cornell University, Ithaca, NY.

August 19, 2002 and ended September 21, 2002. This study defined consumers of fresh peaches as those who had purchased fresh peaches during the three months prior to the interview. A total of 258 qualified consumers completed the interviews. The survey had two main components: consumer characteristics, including shopping habits and demographic characteristics, and ratings of a list of factors important to consumers when making decisions to purchase tree-ripened peaches.

The average age of consumers in the survey was 48.9 years old; 61 percent of all respondents were 45 years old or older. The majority of respondents were female (76%). Sixty-nine percent of the respondents reported their education level as at least some years of college. Sixty percent of the respondents were employed. Forty-one percent of the respondents reported having children under the age of 18 years living in their households. Sixteen percent of the respondents reported household-income levels at or below \$25,000; 29 percent between \$25,001 and \$50,000; 24 percent between \$50,001 and \$75,000; and 17 percent over \$75,000.

Consumers were asked a list of questions related to their shopping behaviors. Ninety percent reported that they shopped for fruits once a week or more often. Only 32 percent of the consumers reported they bought fruits as gifts. Fifty-three percent reported that they bought a majority of fresh peaches in supermarkets, while 47 percent reported they bought most of their peaches at farmers' markets, farm stands or other places. Only one-tenth of the consumers were not satisfied with the fresh peaches they purchased. However, 19 percent reported they consumed fewer fresh peaches today than they did 4 or 5 years ago. Sixty-five percent of consumers surveyed had purchased tree-ripened peaches in the past, and 78 percent reported that they are willing to pay a higher price for the truly tree-ripened peaches if quality is guaranteed. Summary statistics and descriptions of variables are presented in Table 1.

The survey solicited information regarding factors consumers considered important when deciding to purchase premium tree-ripened peaches. Consumers rated the importance of six factors on a five-point scale. The results in Table 2 indicate that "guaranteed good quality and flavor" is the most important factor to consumers; the factors "available in the supermarket that I shop at," "available in the local stands or farmers' markets," and "locally grown in New York" are somewhat important.

Consumers rated "packaged well and appealing" and "an identifiable label and brand" as the less important factors when deciding to purchase premium tree-ripened peaches.

### Empirical Analysis

The empirical analysis was divided into two subsections. The first illustrated the econometric model of willingness to pay a higher price for quality guaranteed tree-ripened peaches. The second subsection described an analysis of the consumer characteristics that significantly affected consumer willingness to pay to explore marketing opportunities and targets for premium tree-ripened peaches.

#### *The Econometric Model*

The bivariate relationship between willingness to pay and each explanatory variable (variable definitions and descriptions were given in Table 1 and Table 2) was examined first to determine which consumers were most interested in premium tree-ripened peaches and to elicit factors which were significantly important to consumers who were willing to pay more for quality-guaranteed tree-ripened peaches, using  $\chi^2$  and  $t$  statistics as a test of significance (Table 3).

A binary logistic-regression model was then estimated to assess the effect of each explanatory variable on consumer willingness to pay more for quality-guaranteed tree-ripened peaches while statistically controlling all other explanatory variables (Hosmer and Lemeshow 2000). This model was preferred because the dependent variable was dichotomous. Consumers provided a "Yes" or "No" answer to the question about whether or not they would be willing to pay a higher price for tree-ripened peaches if quality is guaranteed. Also, the simple design of the survey to ensure data quality provided limited information and knowledge for a more complicated model. Given the binary dependent variable, WTP (willingness to pay a higher price for quality-guaranteed tree-ripened peaches)—which can be equal either 1 or 0—the model assumed that probability of willingness to pay a higher price for quality-guaranteed tree-ripened peaches,  $\pi_i = \text{Probability (WTP=1)}$ , is related to  $X_i$  by

$$1) \log\left(\frac{\pi_i}{1 - \pi_i}\right) = \alpha + \beta X_i,$$

**Table 1. Descriptions and Summary Statistics of the Consumer Characteristic Variables Used in Empirical Model Estimation.**

Variable	Description (Coding)	Distribution (N=258)
<b>Socioeconomic variables</b>		
Age_45	0= age under 25	6%
	0= age 26-34	13%
	0= age 35-44	20%
	1= age 45-54	23%
	1=age 55-64	16%
	1=age 65 or older	21%
Gender	0 if male	24%
	1 if female	76%
Education	0 if below college	31%
	1 if some college or above	69%
Employment	0 if not employed	40%
	1 if employed	60%
Children	0 if only adults in household	59%
	1 if children under 18 in household	41%
Income	1= \$25,000 or less	16%
	2= \$25,001 - \$50,000	29%
	3= \$50,001 - \$75,000	24%
	4= more than \$75,000	17%
	Refused to answer	14%
<b>Variables of shopping habits</b>		
FreqShopper	1 if shopping for fruits once a week or more often	90%
	0 otherwise	10%
Gift	1 if buying fresh fruits as gifts	32%
	0 otherwise	68%
SuperMkt	1 if buying most of the fresh peaches at supermarkets	53%
	0 otherwise	47%
Satisfaction	1 if satisfied with fresh peaches purchased in the past 3 months	89%
	0 otherwise	11%
Consumption	2 if consuming more fresh peaches today than 4 or 5 years ago	37%
	1 if consuming about the same fresh peaches today as 4 or 5 years ago	44%
	0 if consuming less fresh peaches today than 4 or 5 years ago	19%
Experience	1 if having bought tree-ripened fresh peaches in the past	65%
	0 otherwise	35%
WTP	1 if willing to pay a higher price for quality guaranteed tree-ripened peaches	78%
	0 otherwise	22%

**Table 2. Descriptions and Summary Statistics of the Ratings of Factors Important to Consumers When Deciding to Purchase Premium Tree-Ripened Peaches.**

Variables	Description (Coding)	Mean rating	SEE*
Factors	(Importance rating based on a scale of 1 to 5, where 1= not important at all and 5= very important)		
QualityFlavor	Guaranteed good quality and flavor	4.67	0.72
AvailSupMkt	Available in the supermarket that I shop at	4.03	1.09
AvailFarm	Available in the local farm stands or farmers' markets	3.98	1.22
LocalGrown	Locally grown in New York State	3.84	1.25
PackAppeal	Packaged well and appealing	3.26	1.46
LableBrand	An identifiable label and brand	2.75	1.43

\* SEE: Standard Error of the Estimate.

**Table 3. The Bivariate Analysis of Consumer Characteristics and Factors Impacting the Purchase Decision, by Willingness to Pay.**

Variables	WTP (N= 202)	Non-WTP (N=56)		
Consumer characteristics	%	%	Chi-square	p-value
Age_45				
Above	82.8	17.2		
Below	71.3	28.7	4.796	0.029
Satisfaction				
Yes	76.4	23.6		
No	93.1	6.9	4.216	0.040
SuperMkt				
Yes	73.9	26.1		
No	83.3	16.7	3.352	0.067
Consumption				
More	78.9	21.1		
About the same	72.8	27.2		
Less	89.8	10.2	5.858	0.053
Experience				
Yes	82.6	17.4		
No	70.3	29.7	5.248	0.022
Factor Rating	Rating Mean (SEE)	Rating Mean (SEE)	t - statistics	p -value
QualityFlavor	4.75 (0.62)	4.39 (0.98)	3.302	0.001
LableBrand	2.84 (1.42)	2.45 (1.45)	1.810	0.071
AvailFarm	4.11 (1.14)	3.52 (1.37)	3.275	0.001

where  $X_i$  is a vector of explanatory variables that may influence consumer willingness to pay,  $\alpha$  is intercept,  $\beta$  is the vector of coefficients, and  $\pi_i/(1 - \pi_i)$  is the odds ratio in favor of paying more for quality-guaranteed tree-ripened peaches—that is, the odds ratio of the probability of being willing to pay more to the probability of not being willing to pay more. This model assumed the log of the odds is a linear function of the explanatory variables,  $X$ . The effect of each explanatory variable was measured by the adjusted odds ratio,  $\text{Exp}(B)$  in Table 4, which represented the impact of a one-unit increase in the explanatory variable on the predicted odds that a consumer was willing to pay while holding other explanatory variables constant. The  $\chi^2$  tests,  $t$  test, and logistic model were estimated using SPSS version 12 software package.

In Table 3, the bivariate analysis showed statistically significant differences in willingness to pay by the consumer characteristics and by factors impacting purchase decisions. Consumers who were more likely to be willing to pay more for quality-guaranteed tree-ripened peaches were persons age 45 and older, persons who were dissatisfied with the peaches they consumed, persons who bought a majority of their fresh peaches in farm stands or farmers' markets, persons who consumed fewer peaches today than 4 or 5 years ago, and persons with previous experiences in purchasing tree-ripened peaches. Consumers in the "willing to pay more" group rated "guaranteed good quality and flavor" and "available in the local farm stands or farmers' markets" as significantly more important

factors when making the decision to purchase tree-ripened peaches.

The logistic regression of willingness to pay more for quality guaranteed tree-ripened peaches is reported in Table 4. Four explanatory variables were included in the model. Other variables were not included due to multicollinearity problems. Also, the  $t$  value of the coefficient of the omitted variables was not significant, indicating that omitting these variables does not significantly change the model. The empirical results indicated that the willingness to pay more was positively affected by consumer dissatisfaction with peaches consumed in the past and by previous experiences in purchasing tree-ripened peaches.

Also, for a one-unit increase in the ratings of factors, "guaranteed good quality and flavor" and "available in local farm stands or farmers' markets," the odds of consumer willingness to pay more for quality guaranteed tree-ripened peaches increased by 1.9 and 1.6, respectively. None of the demographic characteristics identified, including gender, age, income, education, employment, and children, significantly affected consumer willingness to pay more for quality-guaranteed tree-ripened peaches.

#### *The Analysis of Consumer Characteristics Affecting WTP*

The results of logistic regression indicated that consumer experiences in purchasing tree-ripened peaches in the past and satisfaction with peaches consumed significantly influenced consumer will-

**Table 4. Logistic Regression Estimates for the Willingness to Pay Model.**

	B <sup>a</sup>	SEE	Wald statistics	p-value	Exp(B) <sup>b</sup>
Constant	-1.943	1.264	2.360	0.124	0.143
Consumer characteristics					
Satisfaction	-1.990	0.793	6.303	0.012	0.137
Experience	0.619	0.334	3.427	0.064	1.857
Factor Rating					
QualityFlavor	0.647	0.202	10.242	0.001	1.909
AvailFarm	0.451	0.133	11.523	0.001	1.569

<sup>a</sup> B indicates the strength of the relationship in terms of difference from zero.

<sup>b</sup> Exponent B (adjusted odds ratio) indicates the increase in favor of willingness to pay (WTP/ Not WTP) for a one-unit increase in the explanatory variable while controlling for other explanatory variables in the model.

ingness to pay a higher price for quality-guaranteed tree-ripened peaches. This study used bivariate analysis to identify all other consumer characteristics associated with these two consumer characteristics, with a focus on importance ratings of factors impacting purchase decisions.

Sixty-five percent of respondents reported having purchased tree-ripened peaches in the past; 83 percent of these reported a willingness to pay more for quality-guaranteed tree-ripened peaches. The results of bivariate analysis in Table 5 suggest that consumers with experience in purchasing tree-ripened peaches in the past are likely to have certain characteristics, including at being 45 years old and older, buying a majority of their peaches at farmers' markets or local road stands, being satisfied with the peaches consumed, and buying fresh fruits as gifts. They also rated the factors "available in the

local farm stands or farmers' markets" and "locally grown in New York State" as being significantly more important to them when purchasing tree-ripened peaches. In contrast, they did not value the factors "available in the supermarket that they shop at" and "packaged well and appealing" as being as significantly important to them as did those consumers who had not purchased tree-ripened peaches in the past.

Although only one-tenth of respondents reported that they were not satisfied with the fresh peaches they consumed, 93 percent of these dissatisfied consumers expressed willingness to pay more for quality-guaranteed tree-ripened peaches. These dissatisfied consumers were likely to be persons who bought fresh peaches at supermarkets, persons who consumed fewer peaches today compared to 4 or 5 years ago, and persons who reported no experi-

**Table 5. Significant Consumer Characteristics and Importance Ratings of Factors for the Purchase Decision, by Experiences in Purchasing Tree-Ripened Peaches in the Past.**

Variables	Experience (N=167)	No Experience (N=91)	Chi-square	p-value
Consumer characteristics	%	%		
Age_45				
Above	70.7	29.3		
Below	55.4	44.6	6.265	0.012
Gift				
Yes	72.3	27.7		
No	61.1	38.9	3.064	0.080
SuperMkt				
Supermarket	50.7	49.3		
Other outlets	80.8	19.2	25.486	0.000
Satisfaction				
Yes	67.2	32.8		
No	44.8	55.2	5.668	0.017
WTP				
Yes	68.3	31.7		
No	51.8	48.2	5.248	0.022
Factor rating	Mean (SEE)	Mean (SEE)	t-statistics	p-value
PackAppeal	3.12 (1.46)	3.51 (1.43)	-2.045	0.042
LocalGrown	4.00 (1.14)	3.54 (1.39)	2.868	0.004
AvailSupMkt	3.92 (1.16)	4.25 (0.93)	-2.386	0.018
AvailFarm	4.20 (1.08)	3.57 (1.35)	4.106	0.000

ence in purchasing tree-ripened peaches. They also rated “available in the supermarket that they shop at” as a significantly more important factor to them when making the decision to purchase premium tree-ripened peaches. In contrast, the dissatisfied consumers did not seem to care as much about “available in the local stands or farmers’ markets” and “locally grown in New York State” as did the satisfied consumers (Table 6).

### Summary and Conclusion

While 78 percent of respondents expressed willingness to pay more for quality-guaranteed tree-ripened peaches, the results of the logistic regression indicated that the probability of willingness to pay more was positively related to “experiences in purchasing tree-ripened peaches” and negatively related to “satisfaction with peaches consumed.” An analysis of consumer characteristics showed that although both of these groups included persons who were willing to pay more for quality-guaranteed tree-rip-

ened peaches, they included consumers with mutually exclusive characteristics. Therefore, these are two distinct market segments (Table 7); we defined them as the experienced segment and the dissatisfied segment, and suggest that these two segments could be the most likely marketing targets for premium tree-ripened peaches.

These two market segments present a marketing opportunity for marketing high-quality New York-grown peaches through different retail outlets. A previous study (Uva, Cueller, and Cheng 2004) showed that consumers usually recognize that good-quality tree-ripened peaches can be found in direct-marketing outlets such as farm stands or farmers’ markets, and the findings in the experienced segment were consistent with this perception. While the dissatisfied segment reported consuming fewer fresh peaches today than 4 or 5 years ago, they overwhelmingly expressed willingness to pay a higher price for quality-guaranteed tree-ripened peaches to give them another try. To reach this market segment, a potential target is dissatisfied

**Table 6. Significant Consumer Characteristics and Importance Ratings of Factors for Purchase Decision, by Consumer Satisfaction with Fresh Peaches.**

Variables	Satisfied (N=229)	Not satisfied (N=29)		
Consumer characteristics	%	%	Chi-square	p-value
SuperMkt				
Supermarket	83.3	16.7		
Other outlets	95.0	5.0	8.757	0.003
Consumption				
More	96.8	3.2		
Same	90.4	9.6		
Less	69.4	30.6	24.941	0.000
Experience				
Yes	92.2	7.8		
No	82.4	17.6	5.668	0.017
WTP				
Yes	86.6	13.4		
No	96.4	3.6	4.216	0.040
Factor rating	Mean (SEE)	Mean (SEE)	t -statistics	p-value
LocalGrown	3.93 (1.21)	3.14 (1.41)	3.250	0.001
AvailSupMkt	3.99 (1.11)	4.41 (0.82)	-1.994	0.047
AvailFarm	4.06 (1.15)	3.38 (1.57)	2.862	0.005



supermarket shoppers. The New York stone fruit industry could capture this market opportunity and develop a marketing plan with supermarkets that are interested in differentiating themselves as suppliers of premium produce for their customers.

Although consumers were generally willing to pay more for premium tree-ripened peaches, maintaining quality and consistency of fresh peaches to ensure consumer satisfaction and labeling products clearly to help consumers identify the “quality guaranteed premium tree-ripened peaches” are critical in terms of increasing consumer demand for the specialty peach product. It is also worth mentioning that the earlier research of focus groups indicated that consumers’ expectations of a lower price for locally grown products due to lower transportation costs constituted a significant marketing challenge for selling them at a premium price (Uva, Cuellar, and Cheng 2004). Therefore, in order to expand and penetrate the premium niche market successfully,

exploring the definition of competitive pricing in consumers’ minds for the quality-guaranteed premium product would be another important focus in future research.

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**Table 7. Two Market Segments.**

Consumer Characteristics	Experienced segment <sup>a</sup>	Dissatisfied segment <sup>b</sup>
Age_45	Age>=45	
Gift	Buy	
SuperMkt	Not Supermarket	Supermarket
Consumption		Decrease
Experience	YES	NO
Satisfaction	YES	NO
WTP	YES	YES
Factor Rating		
PackAppeal	Not as Important as	
QualityFlavor		
LableBrand		
LocalGrown	More Important to them	Not as Important as
AvailSupMkt	Not as Important as	More Important to them
AvailFarm	More Important to them	Not as Important as

<sup>a</sup> Compared with consumers without experiences of purchasing tree-ripened peaches.

<sup>b</sup> Compared with consumers who are satisfied with fresh peaches consumed.