

# Consumer Tastes, Preferences, and Behavior in Purchasing Fresh Tomatoes

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**Abstract.** Face-to-face interviews of produce customers at Kings Super Markets in New Jersey yielded data on consumers' tastes and preferences, quantities purchased, and prices paid for fresh tomatoes (*Lycopersicon esculentum* Mill.). Purchase behavior indicated that during the local season, consumers preferred tomatoes grown in New Jersey to tomatoes from other origins. Data were fitted to demand equations to determine the factors affecting demand for fresh tomatoes. Tomato origin significantly influenced consumer purchases. Consumer perceptions of product characteristics such as color, freshness nutrition, and appearance do not appear to significantly influence tomato purchase patterns. However, prices of the tomatoes or substitutes and income were important determinants of quantity purchased of both New Jersey grown and other tomatoes. New Jersey grown tomatoes were generally perceived to be of superior quality.

Consumer preferences and tastes are key factors affecting consumer purchase decisions regarding horticultural products. Recognition of this fact is perhaps the major reason for the growing interest among horticulturists in observing and measuring consumer attitudes about these products. Growers and others involved in the sale of horticultural products can improve product attributes, competitiveness, and marketability by using knowledge about product attributes that consumers demand.

Several approaches have been used in previous studies of consumer tastes and preferences for horticultural products. Some studies took the "opinion study" approach, whereby consumers are asked to rank the importance of attributes relative to their purchase decisions and to indicate how these attributes would affect their future purchase patterns (Brooker et al., 1987; Brooker et al., 1988). These studies do not measure actual consumer behavior. Another category of studies are those based on observed consumer purchase patterns and observed product attributes. For example, the hedonic pricing approach, which involves regressing product price on product attributes, is based on the premise that the price of a product is a function of its measured attributes (Jordan et al., 1985; Hicks et al., 1975). A third approach, the demand function approach, is preferable to other approaches in studying how purchase decisions of horticultural products are made. According to the economic theory of demand, the demand for a product is a function of the price of the product, price of substitutes, consumer income, population, socioeconomic and demographic factors, and consumer tastes and preferences (Tomek and Robinson, 1972; Nicholson, 1978). The demand function approach, therefore, involves estimating the demand for a product by regressing the quantity purchased on the factors noted. In practice, however, most

studies using this approach ignore consumer tastes and preferences.

This study combines the opinion study and demand function approaches in studying the effects of consumer preferences on consumer behavior. Consumers were questioned about their tastes, preferences, and their socioeconomic characteristics, while their actual purchase behaviors were simultaneously observed. Opinion variables were constructed and accounted for in the specifications of the demand function. This approach allowed for statistical testing of the importance of specific determinants of tomato demand, including demographics and measures of consumer tastes and preferences. To investigate the acceptance of Israeli greenhouse tomatoes by consumers in the northeastern United States, Goldman (1988) examined purchase patterns and consumer tastes and preferences. The study, however, was not based on the demand function framework and did not involve statistical comparison of the demand for Israeli vs. other tomatoes.

Tomatoes were chosen for the study because of their importance to New Jersey and U.S. agriculture and because of recent changes in the tomato market. Tomatoes and lettuce account for 43% of fresh vegetable expenditures in the United States (Huang, 1985). Tomatoes are the leading vegetable in New Jersey in terms of farmers' revenue. The dollar value of vegetable production in New Jersey has declined in recent years (N.J. Dept. of Agr., 1991) primarily because of shifts in comparative advantage in tomato production to other U.S. regions and other countries. This shift is due to (i) improvements in transportation; (ii) economics of scale in other areas; (iii) more costly land, labor, and other production inputs as a result of increasing urban pressure in New Jersey, and (iv) a shift in preference by wholesalers and retailers from seasonal to more nearly year-round supply sources (Econ. Res. USDA, 1990; Hamm, 1992; Lopez and Munoz, 1987). Consequently, growers and policy makers in New Jersey have been interested in reviving the market for New Jersey tomatoes. This interest has led to a demand for information on how purchase decisions are made.

All fresh market, field-grown tomatoes produced in New Jersey are picked in the "breaker" stage, i.e., when they are just starting to turn red, but are sufficiently mature to finish ripening and become completely red within a few days. They are marketed as "vine-ripened" tomatoes. Because some varieties grown in New Jersey ripen unevenly, the shoulder at the stem end may still be green at the time they reach retail outlets, making them unattractive to some people. New Jersey produced tomatoes compete with greenhouse-grown tomatoes from The Netherlands and field-grown tomatoes

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from California and other distant locations during the short, local marketing season (July through September). Tomatoes from competing sources often have been picked mature-green and treated with ethylene gas to ripen them. If the fruit is picked when it is immature or is handled improperly, ethylene-ripened tomatoes can have a dry, mealy interior, and inferior flavor. Greenhouse and ethylene-gassed tomatoes are both more uniform in size and in color than New Jersey tomatoes, which gives them eye appeal over New Jersey tomatoes.

The "Jersey Fresh" standard tomato was introduced by the New Jersey Dept. of Agr. in the early 1980s as part of its "Jersey Fresh" campaign to promote local produce and to reverse the shift in

## Materials and Methods

Jersey Fresh standard, Jersey Fresh Premium, and other types of tomatoes were offered for sale at various prices in four stores in the Kings Super Markets chain in northern New Jersey in July and Sept. 1988. The Kings Super Markets chain targets high income consumers and was thus identified as a potential market niche for premium tomatoes.

A total of 757 face-to-face interviews with both purchasers and nonpurchasers were conducted in the produce section of four selected Kings stores after respondents had selected tomatoes but before they had paid for them. Prices on dates of the survey were

Table 1. Prices for fresh tomatoes sold in supermarkets at specified dates during the survey.<sup>z</sup>

Tomato type	Store #1		Store #2		Store #3	Store #4
	28-29 July	24 Sept.	28-29 July	24 Sept.	29-30 July	28 July
Jersey Premium	\$3.72	\$5.04	\$4.38	\$5.93	\$5.48	\$4.38
Jersey Standard	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84	\$2.84
The Netherlands	\$5.48	\$5.48	\$5.48	\$5.93	\$5.48	\$5.48
Cherry	\$3.28	\$4.38	\$3.28	\$4.38	\$3.28	\$3.28
Plum	\$1.96	\$2.18	\$1.96	---	\$1.96	\$1.96
Florida	\$2.84	\$2.84	---	\$2.84	\$2.84	\$2.84
Salad	---	---	\$2.84	---	\$2.84	---
Florida Premium	---	---	\$4.38	---	---	---
California	---	\$3.72	---	---	---	---
Connecticut	---	---	---	\$2.84	---	---

<sup>z</sup>Prices are dollars per kilogram of fresh tomatoes.

vegetable production from New Jersey to other areas. In 1988, the "Jersey Fresh Premium" tomato was introduced. This tomato was graded and packaged to be a superior and differentiated product of even higher quality than the Jersey Fresh standard. The expectation was that these products labeled as high quality would command higher prices. In reality, whether or not consumers realize such expectation depends on how they perceive the differentiation and superiority of these two products.

A differentiated product is one that is truly unique in the mind of the consumer. A differentiated product of higher quality should command a higher price (Jordan et al., 1985) and should have fewer substitutes than competing products (Tomek and Robinson, 1972). Such products are also expected to have a lower own-price elasticity of demand than competing products; this means that quantity demanded for a superior quality-differentiated product changes by a smaller percentage than does the quantity demanded of a low quality product when the prices of both products change by the same percentage (consumers are less sensitive to the price of better quality products). Better quality, differentiated products should also have greater income elasticity than lower quality products; this means that when consumers' incomes increase (everything else held constant), they increase their consumption of a better quality, differentiated product by a larger percentage than that of a lower quality product. If consumers perceive Jersey Fresh tomatoes to be a superior, differentiated product, that perception should be reflected in their purchasing patterns and in the estimated elasticities of demand for various types of tomatoes.

A demand regression analysis conducted in this study helps to determine the factors that significantly affect the demand for Jersey Fresh tomatoes and competing tomatoes and helps to identify the uniqueness and quality of Jersey Fresh tomatoes. The regression analysis considered consumer perceptions of tomatoes and actual purchase behavior.

collected (Table 1) and the distribution of purchases on the day of the survey monitored (Table 2). Surveyors recorded quantities, prices, and types of tomatoes respondents bought. Respondents were asked three sets of questions to determine their tastes and preferences for Jersey Fresh tomatoes and other fresh tomatoes. Respondents were asked if lack of blemishes, firmness, ripeness, color, time of year, origin, price, size, uniformity, household size, and package size were "important" to their purchase decisions. Their responses were converted into integer variables (1 if unimportant, 2 if important, and 3 if very important). Respondents were also asked how Jersey Fresh tomatoes compare with other tomatoes in terms of freshness, flavor, appearance, price, storage life, nutrition, and overall. These "ranking" variables were expressed as binary variables (1 if Jersey Fresh was better, 0 if Jersey Fresh was not better). Consumers were further asked if they had been disappointed with past purchases of fresh tomatoes because of flavor, not ripe, overripe, firmness, freshness, color, damaged/bruised, blemishes, or size. The "disappointment" variables were also expressed as binary variables (1 if an item was a reason for disappointment, 0 if it was not). The important ranking and disappointment variables constitute taste and preference variables.

Demographic variables (education, income, age, family size, gender, and race) were tested for independence. Education and income were positively correlated with each other, whereas age and income were negatively correlated with each other. Based on correlation coefficients and the parameter estimates of an equation that described household income as a function of education, age, and family size, age and education were dropped from equation (1) to reduce multicollinearity (Maddala, 1977). A dummy variable for gender was included as an exogenous variable and was found to be strongly nonsignificant; therefore, gender was eliminated from the demand equation. Quantity purchased was expressed on

a per capita basis and family size was eliminated as a separate variable. Minority population of the respondents was <5%, which implied that the racial factor also could be ignored in the equation. Elimination of family size, gender, race, education, and age made income the only independent demographic variable to be included in the demand equations.

Jersey Fresh Premium tomatoes ('Pik-Red', 'Valarie', and 'Red Star') test marketed during the survey period were picked at the "breaker" stage, were uniform in size, color, and ripeness, and were medium in size (5.7 cm to 6.4 cm in diameter). Vine-ripened tomatoes have been demonstrated to have greater appeal among higher income individuals than lower income individuals, an indication that such tomatoes are perceived to be of better quality (Hicks et al., 1975). To ensure high quality when the tomatoes reached the consumer, and to provide an in-store promotional display, growers packaged the Jersey Fresh Premium tomatoes in molded plastic inserts that form a cup for each tomato inside a one-layer, 4.5-kg cardboard box with a lid that could be folded upright for display. Growers received a price premium of \$0.67 per kilogram to compensate them for the additional labor involved in selecting and packaging premium tomatoes and the extra cost of using a 4.5-kg box rather than the current industry standard 11.3-kg box.

Kings sold Jersey Fresh Premium tomatoes at retail premiums of \$0.89 to \$3.11 per kilogram above the price of the Jersey Fresh standard tomatoes. Stickers bearing the Jersey Fresh logo were placed on each Jersey Fresh Premium tomato to differentiate it from the Jersey Fresh standard tomato. Jersey Fresh standard tomatoes were the same varieties as Jersey Fresh Premium, but were not graded for uniformity and were packaged in 11.3-kg boxes. Other tomatoes available in retail stores during the test market period were salad, cherry, and plum tomatoes of undisclosed origin and tomatoes in boxes from The Netherlands, Florida, California, and Connecticut.

Demand equations were estimated by regressing quantity purchased by the  $i^{\text{th}}$  consumer of the  $j^{\text{th}}$  product ( $Q_{ij}$ ) on causal factors as described by Eq. [1]:

$$\log Q_{ij} = \alpha_j + \beta_j \log P_{ij} + \phi_j \log I_i + \mu_j \log S_i + \sum_{m=1}^n \sigma_{mj} \log X_{im} + \epsilon_{ij}$$

for each  $j$  where  $j = 1$  if Jersey Fresh tomatoes were purchased and  $j = 2$  if other tomatoes were purchased.

In Eq. [1], quantity purchased ( $Q_{ij}$ ) is per capita quantity purchased, defined as total quantity (in kilograms) purchased by each respondent divided by family size.  $P_{ij}$  was the actual price paid by the  $i^{\text{th}}$  respondent for the type of tomatoes purchased.  $I_i$  is the respondent's per capita annual income obtained by dividing the annual household income by the number of people in the family. If Jersey produce was bought, the price of the substitute product

( $S_i$ ) was the weighted average unit price of all non-Jersey tomatoes sold in that store on the day of survey. Similarly, if non-Jersey grown tomatoes were purchased,  $S_i$  was the weighted average unit price of Jersey Fresh Premium and Jersey Fresh standard tomatoes in that store on the day of the survey.  $X_{im}$  represents  $n$  different taste, preference, and demographic variables listed earlier.

The parameters  $\beta_j$ ,  $\phi_j$ ,  $\mu_j$  are the own-price, income, and cross-price elasticities, respectively. These measure the percentage of changes in quantity demanded for a given percentage increase in price of the product, income and price of substitutes. The  $\sigma_{mj}$  are the parameter estimates of the taste, preference, and demographic variables. The parameter,  $\alpha_j$ , is the intercept of the regression equation. The random error term,  $\epsilon_{ij}$ , has a mean of zero and a constant variance.

## Results and Discussion

Seventy-three percent of the respondents purchased tomatoes on the day of the survey (Table 3). While the remaining consumers did not purchase tomatoes on the day of the survey, 99% indicated that they purchase tomatoes sometime during the year. The methodology used in this study requires the use of a dummy variable to indicate the purchase of one type of tomato, but does not allow the use of data on multiple purchases. Therefore, nonpurchasers and purchasers of more than one type of tomato were excluded from the demand equations. This is not likely to be a serious problem since <5% of respondents were multiple purchasers. The total number of single item purchasers with nonmissing data was 423 (53% of people surveyed). One fourth of the respondents were seasonal purchasers, but the majority purchase tomatoes year-round (Table 3).

### The demand equation

Taste and preference variables as well as the price and income variables were included as independent variables in the demand equation. Statistical significance of each variable was tested using a two-tailed  $t$  test and  $f$  tests to arrive at a final demand equation for fresh tomatoes in New Jersey:

$$\log Q_{ij} = \alpha_j + \beta_j \log P_{ij} + \phi_j \log I_i + \mu_j \log S_i + \sigma_1 \log \text{Overall} + \sigma_2 \log \text{Origin} + \epsilon_{ij}$$

where  $j = 1$  if Jersey Fresh tomatoes are purchased and  $j = 2$  if other tomatoes are purchased.

According to the parameter estimates of Eq. [2], the price of the tomatoes purchased, the price of substitutes, and consumer incomes affect quantity purchased of both Jersey and non-Jersey tomatoes (Table 4), as was expected. Also as expected, both types of tomatoes have negative own-price elasticities, i.e., as the price of a tomato type increases, fewer of that type are bought. Overall preference for Jersey Fresh's attributes and origin are important

Table 2. Distribution of fresh tomato purchases on day of the survey.

No./types of tomatoes purchased	No. of respondents	Percent
One type	511	67.5
Two types	26	3.4
Three types	4	0.5
Never purchase	8	1.1
No purchase on day of survey	<u>208</u>	<u>27.5</u>
Total	757	100.0

Table 3. Purchase patterns of fresh tomato consumers.

Seasonal tomatoes are purchased	No. of respondents	Percent
Year-round	556	73.4
Seasonal	184	24.3
Off season	9	1.2
Never	<u>8</u>	<u>1.1</u>
Total	757	100.0

Table 4. Parameter estimates of demand for Jersey Fresh and other tomatoes.

Variable <sup>z</sup>	Parameter estimates		
	Coefficient	Jersey Fresh	Other
Price	$\beta$	-0.1317*	-0.2300**
Income	$\phi$	0.3350**	0.2630**
Price of substitutes	$\mu$	0.0249*	0.1113*
Overall	$\sigma_1$	0.0661**	-0.0135*
Origin	$\sigma_2$	0.1135***	-0.0993*
Intercept	$\alpha$	0.4261*	0.3251*
Sample size		217	206
$R^2$		0.1274 <sup>y</sup>	0.1035

<sup>z</sup>Variables are in natural logarithmic form.

<sup>y</sup>A low  $R^2$  value is expected when using cross sectional data to predict consumer behavior (Kennedy, 1985).

The parameters  $\beta_j$ ,  $\phi_j$ ,  $\mu_j$  are the price, income, and cross-price elasticities, respectively.

\*\*\*, \*\* Significant at  $P = 0.10, 0.05, 0.01$ , respectively.

determinants of demand for the product. The estimated equation is further explained below.

*Price.* The price variable was statistically significant in both demand equations. The larger absolute value of the price elasticity for tomatoes other than Jersey Fresh tomatoes indicates that consumers are less sensitive to changes in the price of Jersey Fresh than to changes in the price of other tomatoes and, hence, they may perceive Jersey Fresh tomatoes to be of higher quality than are tomatoes from other sources. Specifically, if price for both products increases by 1%, the percent decrease in the quantity demanded of Jersey Fresh tomatoes will be less than the decrease in the demand for other tomatoes.

*Price of substitutes.* The significance of the price of substitutes in both demand equations suggests that both types of tomatoes are substitutes for each other. The cross-price elasticity of demand for Jersey Fresh with respect to the price of other tomatoes is lower than that of other tomatoes with respect to the price of Jersey Fresh. This may indicate that consumers perceive Jersey Fresh tomatoes to have fewer substitutes than do other tomatoes. The implications are: 1) When the price of other tomatoes increases, consumers purchase more Jersey Fresh and fewer other tomatoes. 2) When the price of Jersey Fresh increases, consumers purchase more of other tomatoes and fewer Jersey Fresh. 3) The increase in the quantity of Jersey Fresh from the first case exceeds the increase in the quantity of other tomatoes in the second case. This is further evidence that Jersey Fresh tomatoes are perceived to be a differentiated and more preferred product.

*Income.* The income coefficient, although significant for all tomatoes, was larger for Jersey Fresh than for other tomatoes, suggesting that Jersey Fresh tomatoes are more income elastic than other tomatoes. The implications are that higher income individuals are more likely to purchase the Jersey Fresh tomato, and that as income increases, Jersey Fresh's appeal and demand should increase. This result also suggests that Jersey Fresh tomatoes are preferred over other tomatoes.

*Taste and preference variables.* When all factors related to taste and preference were considered simultaneously in the demand model, the only taste and preference variables that were significant at  $P = 0.05$  or  $0.10$  were product origin and overall quality. To determine if the other taste and preference variables were insignificant as a result of multicollinearity, a nonstructured test to detect collinearity between income and other demographic variables was applied to Eq. 1. Results indicated multicollinearity between the overall variable and other taste and preference variables. Therefore, origin and overall preference variables were retained in the

final equation and other taste and preference variables were dropped to reduce multicollinearity.

In the final equation, the coefficient of the origin variable for Jersey Fresh tomatoes was positive and had a larger absolute value than the negative coefficient for other tomatoes. Respondents who said origin was important, purchased more Jersey tomatoes and fewer other tomatoes than did respondents who did not feel origin was important. Given the significance of the origin variable, it appears that characteristics of the tomato itself are not the only factors that consumers consider when making their purchasing decisions. This suggests brand loyalty to Jersey Fresh.

Given the problem with multicollinearity, an attempt was made to investigate how taste variables perform individually. When freshness, flavor, nutrition, and overall consumer perceptions were added to the demand equation as a group, they were nonsignificant, but when added one at a time with the origin variable, they were all significant. This result implies that consumers are not able to separate their individual perception factors, and that consumers look at a group of attributes in making their fresh tomato-purchasing decisions rather than relying on a single attribute.

Another reason why some of these factors (e.g., flavor, storage life, and nutrition) were not significant may be that consumers cannot determine these factors at the time of purchase. Consumers must resort to other attributes in making their purchase decisions and these factors become difficult for consumers to separate from each other. While not significant in the final equation, nutrition of Jersey Fresh tomatoes was thought to be better than other tomatoes by one third of the respondents. People who believed that Jersey Fresh tomatoes were more nutritious than other tomatoes purchased more Jersey Fresh tomatoes than other tomatoes.

Like nutrition and freshness, flavor was significant when added to the demand equation with price, price of substitutes, income, and overall preference, but was not significant when all of the taste and preference variables were included in the demand equation. While flavor was the most common cause for past disappointment, apparently consumers did not associate attributes that would result in better flavor with a particular type of tomato.

Time of year is related to origin, since Jersey Fresh tomatoes are only available during the summer months; however, time of year was nonsignificant in the demand equation, possibly because of collinearity between origin and time of year. Respondents' stated perception of price as a factor in their purchase decisions and their attitudes about how the price of Jersey Fresh tomatoes compared to other tomatoes were not significant in the demand equation. However, actual purchase prices were significant in the demand

equation, suggesting that price does impact on quantity demanded. The coefficients of price suggest that price has less of an impact on quantity purchased of Jersey Fresh tomatoes than on other tomatoes. Actual behavior is a more accurate measure of the effect of price on quantity demanded than is the result of the perception question. In addition, the questions about prices of tomatoes did not take into account magnitude of price changes.

Color was not significant in Eq. [2]. This may indicate that color means different things to different consumer groups. Many consumers recognize tomatoes with some green or pink coloration as vine-ripened tomatoes and consider this attribute an indication of good flavor. However, as consumers become several generations removed from agriculture and do not have experience with producing tomatoes in home gardens, they often are not familiar with natural ripening, and prefer the more uniform color of gassed tomatoes. In this survey, 63.7% of the respondents never obtain tomatoes from home gardens. Some varieties sold in New Jersey do not have a uniform ripening gene and have green shoulders in the store if they are displayed before they are completely red. Consumers may find this unattractive. However, many people who felt that Jersey Fresh was better overall, commented that Jersey Fresh tomatoes are the "ugly tomato that tastes good." These people may not consider color to be important to their purchase decision or they may consider the uneven coloring a preferred trait. Color can be important to purchasers of Jersey Fresh tomatoes and other tomatoes for different reasons, making it a nonsignificant variable in the demand function.

Most consumers use color as an indication of ripeness at the time of purchase. Many consumers feel the uniform color of gassed tomatoes indicates ripeness, while others look for the depth of red coloration on vine-ripened, locally grown tomatoes as an indication of ripeness. Thus, the differences in perception of color among consumers similarly apply to degree of ripeness.

Historically, medium tomatoes (5.7 cm to 6.4 cm in diameter) have returned much less revenue by weight to New Jersey farmers than the large tomatoes associated with New Jersey. Size was not a significant variable. Sixty percent of the people surveyed preferred medium-sized tomatoes and only 34% preferred large, a possible indication that growers may receive a high price for medium tomatoes as well as large tomatoes traditionally associated with New Jersey.

The only taste and preference variables that were included in the final demand equation were origin and overall quality. Significance of the overall variable indicated a preference for Jersey Fresh tomatoes that was linked to the attributes of the tomato itself. The coefficient of the overall variable was negative and significant for other tomatoes, indicating that respondents who said Jersey Fresh tomatoes were better than other tomatoes overall purchased more Jersey Fresh tomatoes than other tomatoes.

The nonsignificance of other taste and preference variables when these are included in the demand equation may also be explained on the basis that demand for Jersey Fresh Premium and standard tomatoes was combined in the same equation (aggregation error). Kings Super Markets was not willing to vary the price of the Jersey Fresh standard tomatoes during the course of the survey. As a result, separate demand equations for standard and premium tomatoes were not obtained because price variability was needed to test the effect of price on demand. This may be a significant limitation of this study. Fifty-six percent of respondents had been disappointed with past purchases of fresh tomatoes, but since 44% had not been disappointed; combining both groups of

respondents resulted in aggregation error where differences that might be significant in individual equations were lost.

Intercept. The intercept for Jersey Fresh tomatoes was larger than that obtained for other tomatoes, indicating a general New Jersey consumer preference for Jersey Fresh tomatoes. The difference in the intercepts captures the additional demand for Jersey Fresh tomatoes not explained by the other variables in the demand function (Rosen, 1974). The findings are consistent with earlier research that suggests consumers are willing to pay a premium for locally grown tomatoes that are considered to be fresher than tomatoes from distant markets (Brooker et al., 1987; 1988), and that they are more likely to purchase a higher quality product when prices are rising.

*Conclusions.* Jersey Fresh tomatoes had a lower own-price elasticity, higher income elasticity, and lower cross-price elasticity than other tomatoes, all of which indicate that Jersey Fresh tomatoes are considered to be a superior, differentiated product. Overall, consumers ranked Jersey Fresh above other tomatoes and favored them because of their origin. Findings suggest that local New Jersey-grown tomatoes should be promoted under the Jersey Fresh logo as vine-ripened tomatoes of local origin that are better than other tomatoes. The scope of this work did not permit testing whether this finding would apply to locally grown tomatoes in other areas of production. Flavor, freshness, and nutrition should also be promoted because these were all significant in the demand equation when added one at a time. Higher priced premium tomatoes should also be promoted based on these three factors but, in addition, should be targeted to high-income consumers for whom uniformity of size and color, better appearance, and lack of blemishes is important.

Consumers are willing to pay a premium for Jersey Fresh tomatoes. From the producer's point of view, a price premium is necessary if they are to market Jersey Fresh Premium tomatoes because of additional grading and packaging costs of these premium tomatoes. In an urbanized environment such as New Jersey, upper-income consumers tend not to have home gardens and are not familiar with truly vine-ripened tomatoes. Only 36% of respondents indicated that they obtain tomatoes from home gardens. Promotion should include educating consumers about the appearance and superior flavor of vine-ripened tomatoes.

Since consumers perceive Jersey Fresh tomatoes to be a better tomato overall (attribute preference), in addition to preferring tomatoes of local origin (nonattribute preference), improvements in the quality and the appearance of the tomatoes themselves should continue to be made. Varieties and production techniques that will reduce the problem of green shoulders, nonuniformity, and blemishes should be selected for and developed further. Using uniform ripening tomato varieties would eliminate the problem of green shoulders, and increased adoption of trellising and more careful grading would help reduce blemishes and increase uniformity.

Although this study focuses on New Jersey tomatoes, the findings may be relevant to other crops and other areas. Promotion of local produce has become more important in recent years as states attempt to maintain and expand their market shares. The importance of origin in consumer purchasing decisions suggests other states may be successful in promoting local produce on the basis of origin alone. Results also indicate that product attributes are important. Thus, improvements in the produce should be made in addition to promoting and branding local produce. Otherwise, a state could find itself with produce that is highly visible but recognized for inferior attributes.

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