Journal of Agricultural and Resource Economics 38(3):379–396 ISSN 1068-5502

Consumer Preferences for Tomatoes: The Influence of Local, Organic, and State Program Promotions by Purchasing Venue

Kathryn A. Carroll, John C. Bernard, and John D. Pesek, Jr.

A choice experiment of consumers from five Mid-Atlantic states was conducted to compare marginal willingness to pay for fresh tomatoes with the attributes locally grown, state marketing program promoted, and organic from either a grocery store or farmers' market. Data were analyzed using a mixed logit model. Results show that consumers in Maryland, Pennsylvania, and Virginia prefer local tomatoes, while those in Delaware and New Jersey prefer state program versions. Unexpectedly, price premiums for organic over conventional tomatoes were only exhibited in Maryland, and Virginia was the only state with a significant premium for the farmers' market venue.

Key words: choice experiment, consumer preference, farmers' markets, local food, organic, state marketing program, tomatoes, willingness to pay

Introduction

U.S. consumers have exhibited increased interest in locally grown, state marketing program promoted, and organic foods. Of these trends, locally grown foods have perhaps seen the most dramatic recent rise in availability and demand. This increase is clearly evident in local food sales, which were close to $5 billion in 2008 (Low and Vogel, 2011). States have attempted to take advantage of this interest in local foods by marketing products produced within their borders, to the extent that every state has at some point had some type of promotion, including logos, slogans, and a variety of other activities (Onken and Bernard, 2010). To understand how rapid the growth in these programs has been, note that more than half of those in use were established after 2000. Accompanying these trends, the number of farmers' markets—which sell primarily locally grown products—more than tripled in size from 1994 to 2011. In 2011 alone more than 1,000 new farmers' markets opened across the United States, a 17% increase from 2010 (U. S. Department of Agriculture, 2011a).

The other major trend in U.S. food over the past decade has been the increase in the organic food market. Organic produce in particular remains a fast-growing and heavily promoted component of the U.S. food industry. From 1990 to 2009, U.S. sales for organic fruits and vegetables grew $9.5 billion (Organic Trade Association, 2010). According to the Organic Trade Association, organic fruits and vegetables currently represent 39% of organic food sales and 11.4% of the total sales of fruit and vegetables in the United States. Part of this success may stem from the fact that the meaning of the word "organic" is governed by specific standards. Unlike products designated as

Kathryn A. Carroll is a PhD student in the Department of Consumer Science at the University of Wisconsin-Madison. John C. Bernard is a professor and John D. Pesek, Jr. is an associate professor in the Department of Applied Economics and Statistics at the University of Delaware.
University of Delaware funds for this project were matched with Federal funds under the Federal-State Marketing Improvement Program of the Agricultural Marketing Service, U.S. Department of Agriculture.

Review coordinated by Hayley Chouinard.

Table 1. Average Square Mileage and Population per Farmers' Market and State, 2010

State	Number of Farmers' Markets	Square Mileage per Farmers' Market	Population per Farmers' Market
Delaware	12	162	74,828
New Jersey	133	55	66,104
Maryland	122	80	47,324
Pennsylvania	266	168	47,753
Virginia	174	227	45,983

Notes: Calculations were performed using statistics provided by the U.S. Census Bureau: State and County QuickFacts (2010) and the USDA-AMS National Farmers' Market Database (2011b).

local, a definition that may vary with the individual consumer, the USDA has an official definition and certification process for products identified as organic.

Understanding the growing trends of locally grown, state program promoted, and organic attributes and how they interact are areas in need of additional examination. For consumers purchasing fresh produce, these three attributes may accompany one another on the same item or may be promoted separately. Comprehending consumer attitudes toward and preferences among these attributes as well as comparing the value for them at farmers' markets relative to traditional grocery stores, would be of importance to fresh produce growers, marketers, and state marketing agencies. For state marketing programs, evidence of effectiveness could be crucial for deciding whether their programs are worth continuing. Marketers in the food industry could gain information that would help them better reach and promote to their target audience. Producers could use this information to help determine whether or not the attributes of their products are meeting the needs of consumers. Lastly, those running or considering establishing farmers' markets would benefit by examining whether price premiums for such attributes exist.

The goal of this research was to determine consumer preferences and willingness to pay (WTP) for tomatoes with the attributes of locally grown, promoted by a state marketing program, and organic across farmers' market and grocery store purchasing venues. Tomatoes were selected as the focus for this study because they are a commonly available fresh produce item with all of the considered attributes. The secondary goal was to determine whether these preferences and WTP varied across the Mid-Atlantic region, where geographic state size, farmers' market density, and differences in state marketing programs may have an influence. A large-scale mail survey targeted consumers from Delaware, Maryland, Virginia, New Jersey, and Pennsylvania. The key part of the survey was a choice experiment (CE) for fresh tomatoes.

Background and Literature Review

Mid-Atlantic Farmers' Markets and State Marketing Programs

Relative to the U.S. overall, the eastern portion of the country has a heavy clustering of farmers' markets that is particularly evident in the Mid-Atlantic region (U. S. Department of Agriculture, 2011c). Table 1 presents the number of farmers' markets and both the average square mileage and population per farmers' market in 2010 for each state surveyed. Delaware, the smallest state in area in this study, had only twelve markets, by far the fewest in the sample area. The next smallest in geographic size, New Jersey, had 133 markets. Pennsylvania and Virginia had 266 and 174 markets, respectively, and Maryland had 122 (U. S. Department of Agriculture, 2011b). In terms of recent growth, the number of farmers' markets in Pennsylvania increased approximately 31% from 2010 to 2011, which was the largest growth exhibited in the region. Also, New Jersey had the greatest density of farmers' markets per square mile in the region, with an average of one market every fifty-five square miles. Virginia had the largest density of farmers' markets by population, with an average of 45,983 people per market, despite the fewest per square mile.

In addition to the heavy presence of farmers' markets in many Mid-Atlantic states, each state also had an individual marketing program at the time of this study. Many of these programs worked in conjunction with area farmers' markets to ensure products with their program slogans were displayed. The five programs examined here varied in terms of time in operation, level of establishment and promotion, and certification and percentage requirements.[1] The region contains arguably the best known program, New Jersey's *Jersey Fresh* campaign, which was established in 1983 (State of New Jersey, 2009). This program is thought to have prompted many other states to begin their own efforts. The next oldest program in the region is *Virginia's Finest*, begun in 1989 (Commonwealth of Virginia, 2009). These two programs were also the only ones of the five with formal certification processes in place.

The other three programs were much newer. *PA Preferred*, Pennsylvania's marketing logo, was established in 2004 (Commonwealth of Pennsylvania, 2009). The *Grown Fresh with Care in Delaware* program was launched in 2007 and discontinued in 2010 (State of Delaware, 2009). The *Maryland's Best* program was created in 2002 (State of Maryland, 2009).

Consumer Preference and WTP

Studies examining consumer preferences for purchasing venue have been mixed in their conclusions. An experiment by Toler et al. (2009) investigated Oklahoma consumers' preferences for grocery store and farmers' market settings and concluded that willingness to pay (WTP) did not differ between the two venue types. However, they concluded that participants preferred to allocate more of their money toward purchases from local farmers as opposed to nonlocal farmers. In contrast, Onken, Bernard, and Pesek (2011) found an increased WTP for strawberry preserves from a farmers' market relative to grocery stores. In terms of reasons why consumers may be willing to offer higher premiums at farmers' markets, Onianwa, Mojica, and Wheelock (2006) identified several areas where consumers had a preference for farmers' markets over supermarkets, including atmosphere. Zepeda and Leviten-Reid (2004) noted similar advantages for farmers' markets, such as being seen as a form of entertainment or a chance to interact with farmers.

In addition to investigating purchasing venue, several studies concerning consumer preferences for locally grown foods compared to organic foods have been conducted. Thilmany, Bond, and Bond (2008) used data from a national survey to conclude that consumers often place a greater value on local production over organic production. Hu, Woods, and Bastin (2009) investigated Kentucky consumers' WTP for processed blueberry products using a CE and found that consumer preference was stronger for products identified as local compared to products identified as organic. Loureiro and Hine (2002) surveyed Colorado consumers and concluded they were willing to pay more for potatoes designated as *Colorado Grown* compared to potatoes identified as organic or GMO-free. Yue and Tong (2009) also investigated consumer WTP for local and organic tomatoes in Minnesota and found a similar WTP for both. Their study identified local tomatoes using the state program slogan *Minnesota Grown*.

Numerous other consumer studies have focused primarily on organic foods. Batte et al. (2007) surveyed grocery shoppers in Ohio and found them willing to pay a price premium for organic, value-added products compared to identical products containing locally grown ingredients. Yiridoe, Bonti-Ankomah, and Martin (2005) found evidence that consumers were willing to pay premiums for organic products in their review of the literature. They also suggested that consumers were willing to pay higher price premiums for organic products (such as fresh produce) that typically have a shortened shelf life compared to other food items. Hughner et al. (2007) performed a similar review and argued that consumer interest in organic products varied mainly due to a lack of understanding about the meaning of "organic."

---

[1] For more details on state programs and their requirements, see Onken and Bernard (2010), which covers all state programs, or Onken, Bernard, and Pesek (2011), which discusses the Mid-Atlantic state programs more thoroughly.

Table 2. Choice Experiment Attributes and Levels

Attribute	Levels
Purchasing Venue	Grocery Store, Farmers' Market
Production Method	Conventional, Organic
Location	Local, Nonlocal, State Marketing Program (*Grown Fresh with Care in Delaware*, *Maryland's Best*, *Jersey Fresh*, *PA Preferred*, *Virginia's Finest*)
Price	\$2.49, \$3.99, \$5.49

Notes: The level "State Marketing Program" featured the program slogan of the respondent's state.

Other studies have focused on local foods. Darby et al. (2008) surveyed grocery store and farmers' market shoppers and found that Ohio consumers preferred fresh strawberries marketed as locally grown over those identified as grown in the United States. Giraud, Bond, and Bond (2005) surveyed Maine, Vermont, and New Hampshire and found that consumers from all three were willing to pay a premium for specialty food products produced within their state. Schneider and Francis (2005) determined that some Nebraska consumers were willing to pay a 10% premium for products from their county, suggesting a smaller scope for local products. Brown (2003) also found that Missouri consumers considered local to be an area smaller than their state's borders.

According to Jekanowski, Williams, and Schiek (2000), perceived quality of a local product had the strongest impact on Indiana consumers' purchasing likelihood. Their results suggested that a well-planned state marketing program could capture the demand for local products. However, they emphasized that if state programs allowed their quality standards to fall below those of competing states, the state would essentially be branding their products as lower in quality. Thus, with studies showing consumer preference for local, a key question is whether consumers exhibit a preference difference between products identified as local and products identified with a state marketing program.

Studies suggest some state marketing programs have successful increased consumer demand and WTP for various products. Carpio and Isengildina-Massa (2009) evaluated South Carolina's *SC Grown* program and found that consumers within the state willing to pay a 27% premium for fresh fruits and vegetables featuring the program slogan compared to out-of-state produce. Govindasamy et al. (2004) estimated that for the year 2000, the *Jersey Fresh* program had increased sales of fresh produce by \$36.6 million. Onken, Bernard, and Pesek (2011) found that some Mid-Atlantic consumers' had a preference for state program versions of strawberry preserves, but others preferred local. Nganje, Hughner, and Lee (2011) investigated the *Arizona Grown* label and concluded that consumers were willing to pay a premium for produce identified as *Arizona Grown* compared to produce identified as local. In an earlier study conducted in Arizona, Patterson et al. (1999) similarly concluded that consumers preferred to purchase local products, in particular those identified with the *Arizona Grown* logo.

Choice Experiment Design

The focal point of the study was a CE designed to explore consumer preference and WTP for fresh tomatoes with varying attributes. Fresh tomatoes were chosen as they were a familiar product available locally in each state and under each state's promotional slogan. CEs are a common tool used in marketing research and are particularly useful as they closely mimic actual consumer shopping behavior (Lusk and Hudson, 2004). Recent examples of this approach include Chalak and Abiad (2012) and Janssen and Hamm (2012).

Table 2 shows the four attributes used in the survey, including purchasing venue, production method, location, and price. The purchasing venue and production method attributes each had two levels. For production method, conventional was the base level relative to organic. The location attribute consisted of three levels, which included the relevant state program slogan, local, and nonlocal. Finally, the price attribute contained three levels chosen using current prices from a number

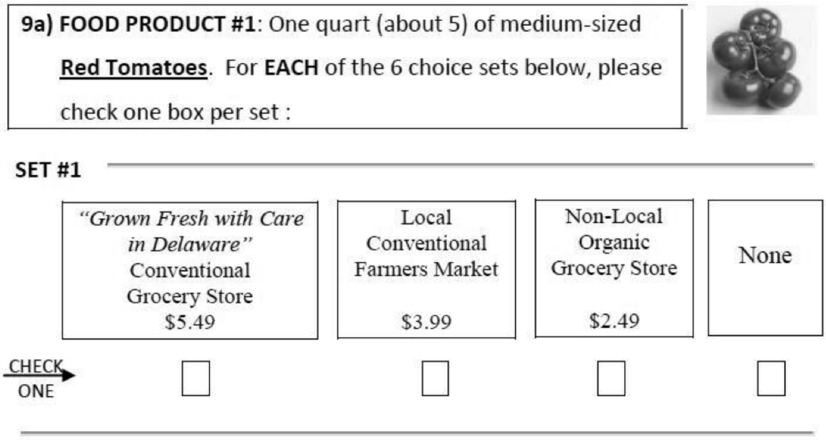

Figure 1. Sample Choice Set

of farmers' markets and grocery stores in the survey region. The design of a CE must consider and balance the inclusion of any term that might be of importance while limiting the number of choice sets in order to avoid respondent fatigue (Lusk and Norwood, 2005). The terms selected for the model included the effects of purchasing venue, production method and their interaction, and a quadratic functional form for price along with the interactions price by purchasing venue and price by production method. A quadratic relation between price and utility was postulated because while basic economic theory says that utility will fall as price increases, it is unlikely that it will do so at a constant rate. A quadratic functional form allows this rate to vary.

To limit respondent fatigue, the number of choice sets for each respondent was limited to six. As discussed below, the design required a minimum of twelve choice sets, so a blocking factor was introduced in order to allow six sets per respondent. Specifically, one randomly selected half of the respondents answered six of the choice sets and the other half answered the remaining six. This required two surveys for each state for a total of ten different versions.

Figure 1 presents a sample choice set. Respondents were additionally given instructions asking them to consider which choice they would purchase for each food product presented in order to induce shopping behavior. They were also instructed to note that the prices and attributes might vary throughout the different choice sets. Since there were two purchasing venues, two production methods, and three prices, there were twelve ($2 \times 2 \times 3 = 12$) possibilities for each of the choices of state program, local and nonlocal, and one possibility for the no-purchase option. These four choices were the choices presented in each choice set throughout the CE. The no-purchase option was included both to facilitate a real-world shopping scenario as well as to account for respondents who may not eat tomatoes.

The total number of choice sets available was then $12^3 \times 1 = 1{,}728$. The CE featured here was constructed as a D-optimal design using SAS programs developed by Kuhfeld (2009). This D-optimality criterion was used to conduct a computer search for a close-to-optimal conditional logit model using the terms mentioned above,[2] which ultimately identified the twelve choice sets for our design.

[2] The coefficients are assumed to be zero for the optimization since there is no information about them.

Table 3. Demographics of Survey Respondents, by State (n=1,846)

Category	Delaware	Maryland	New Jersey	Pennsylvania	Virginia
Female (%)	56.84	48.50	53.29	53.04	48.67
Age (in years)	54.02	53.43	53.53	54.13	53.19
Income (in thousands):	75.64	96.23	94.42	69.98	85.92
Children < 18 in household (%)	32.34	25.76	36.55	29.28	32.33
Education (%):					
< High school graduate	3.45	1.21	3.28	1.73	6.60
High school graduate	20.16	14.15	20.66	28.61	12.87
Some college, no degree	25.99	18.97	17.38	18.51	19.80
Associates degree	9.81	9.34	8.85	8.38	7.92
Bachelor degree	20.96	24.70	23.93	25.43	30.37
Graduate /Professional degree	19.63	31.63	25.90	17.34	22.44
Race (%):					
White	85.24	77.44	80.13	90.66	81.65
Black/African American	7.13	14.63	7.57	3.02	12.34
Hispanic/Latino	1.78	1.22	6.62	1.10	0.95
Asian	3.05	4.27	4.10	3.57	3.16
Other	2.80	2.44	1.58	1.65	1.90

Survey Data

To obtain a sample of Mid-Atlantic consumers, mailing lists of 1,000 households each from Delaware, Maryland, Virginia, New Jersey, and Pennsylvania were purchased from USAData for a total of 5,000 households (4,661 after undeliverable addresses were removed). Following Salant and Dillman (1994), a series of five separate contacts with the respondents were made. The survey was announced using an advance postcard mailed in the third week of October 2009. Following this, the survey was mailed at the beginning of November. Included with it were a cover letter, an information sheet, a stamped return envelope, and a one-dollar token of appreciation. In addition to the CE, the survey also contained standard demographic questions as well as preference and opinion questions concerning locally grown and organic. The information sheet contained definitions of terms appearing in the study, with explanations for organic adapted from USDA sources, as well as brief definitions of the terms local, state marketing programs, and conventional.[3] Next a reminder postcard was mailed, and a second mailing was sent to everyone who had not responded.

The final response rate for the survey was 39.6%, which yielded 44,304 total observations (6 choice sets per respondent $\times$ 4 choices per set = 24 CE observations per respondent). Response rates varied by state, with 45.5% for Delaware, 39.1% for Maryland, 36.7% for New Jersey, 40.5% for Pennsylvania, and 36.3% for Virginia. In addition to the CE, standard demographic questions such as gender, age, education, number of children under eighteen, race, and income were included in the survey and are reported by state in table 3. These demographics were compared to the 2000 Census figures for each state. In general, the population of each state was found to be well represented, although the sample had slightly higher education and income levels and less racial diversity.

Data Analysis

The data were analyzed using a mixed logit model (see Hensher, Rose, and Greene (2005) and Train (2009)). A mixed logit model is a random coefficient model that allows for consumer heterogeneity, which Hensher, Rose, and Greene (2005) note gives valuable additional information

[3] Survey materials are available from the authors upon request.

Table 4. Description of Variables

Variable Name	Description
Local	1 if the respondent selected the Local choice option
NonLocal	1 if the respondent selected the Nonlocal choice option
NoPurchase	1 if the respondent selected the No Purchase choice option
FarmMkt	1 if the respondent chose the farmers' market venue
Price	Price for one quart of medium-sized tomatoes
Organic	1 if the respondent chose the organic attribute
MD	1 if the respondent lived in Maryland
NJ	1 if the respondent lived in New Jersey
PA	1 if the respondent lived in Pennsylvania
VA	1 if the respondent lived in Virginia

Notes: All except *Price* are dummy variables where the value is zero otherwise. State Program is represented by setting *Local*, *NonLocal* and *NoPurchase* to zero. Delaware is represented by setting *MD*, *NJ*, *PA*, and *VA* equal to zero.

about consumers. The general utility equations for the mixed logit model are[4]

$$U_{jtq} = \sum_{k=1}^{K} \beta_{qk} x_{jtqk} + \varepsilon_{jtq} = \boldsymbol{\beta}' \boldsymbol{x}_{jtq} + \varepsilon_{jtq}, \tag{1}$$

where $j = 1, \ldots, J$ represents the $J = 4$ choices State Program, Local, Nonlocal, and No Purchase respectively. The index $t = 1, \ldots, T$ indicates the $T = 6$ choice sets that the respondents evaluated, and q indicates the qth respondent of the survey. The index $k = 1, \ldots, K$ indicates the K covariates in the set of utility equations, of which some are random. The choice experiment attributes are represented by the vector $\boldsymbol{x}_{jtq}$. The ε_{jtq} are independent and identically distributed (i.i.d.) errors with an extreme value distribution. It is assumed that the respondent will choose the alternative that provides them with the maximum amount of utility.

In general it is assumed that

$$\boldsymbol{\beta}_q = \boldsymbol{\beta} + \boldsymbol{\Delta} \boldsymbol{z}_q + \boldsymbol{\Gamma} \boldsymbol{v}_q = \boldsymbol{\beta} + \boldsymbol{\Delta} \boldsymbol{z}_q + \boldsymbol{\eta}_q, \tag{2}$$

or $\beta_{qk} = \beta_k + \delta_k' \boldsymbol{z}_q + \eta_{qk}$, where η_{qk} is a random term whose distribution over individuals depends on underlying parameters, $\boldsymbol{z}_q$ is a vector of observed information about the qth respondent, Δ is a matrix of constant coefficients that allows the specification of interactions of the attributes of the choice experiments with the observed data (such as the respondent's state), $\boldsymbol{v}_q$ is a vector of uncorrelated variables with known variances on the diagonal of a variance-covariance matrix ε, and $\boldsymbol{\Gamma}$ is a lower triangular matrix. Since $\text{var}[\boldsymbol{\beta}_q] = \boldsymbol{\Gamma \varepsilon \Gamma}'$, this allows for free variances and correlations of the parameters. The distribution of ε is assumed here to be normal. Nonrandom coefficients can be included by having a component of ε with 0 variance.

As required by the model (see above), terms involving a state were fixed so that each state caused fixed deviations from possibly random terms. Testing for overall significance showed that only the terms for local, nonlocal, and organic had a significant random component.[5] While the experimental design allowed for an organic-by-venue interaction, a likelihood ratio test for this was not significant and it was subsequently dropped from the model. It was also assumed that the random effects of organic, local, nonlocal and no purchase were not correlated.[6] Thus the first four coefficients—β_1, β_2, β_3, and β_4—are random. Specifically, they are independent and normally distributed with means μ_1, μ_2, μ_3, and μ_4 and standard deviations σ_1, σ_2, σ_3, and σ_4.

[4] Hensher, Rose, and Greene (2005) divide the covariates into choice experiment attributes such as local and organic, indicated by x_{jtq}, and variables measured on individuals such as state dummy variables, indicated by the vector $\boldsymbol{z}_q$. This distinction is not shown in the actual utility equations for the model.

[5] The no-purchase term was assumed to be random so that all the choice terms were random, though the test for the no-purchase term was not significant.

[6] An analysis was attempted that estimated the correlations between random variables, but the model failed to converge. As noted in Johnston and Duke (2007), such failure is a common occurrence, and it is often necessary to use a more basic model.

The utility equations of the final model (excluding the random term ε_{jtq}) were[7,8]

$$
\begin{aligned}
(3)\quad U(\text{State Program}) = {} & \beta_5 FarmMkt_{tq} + \beta_6 Price_{tq} + \beta_7 Price^2_{tq} + \beta_8 Price_{tq} FarmMkt_{tq} + \\
& \beta_9 NJ_{tq} FarmMkt_{tq} + \beta_{10} NJ_{tq} Price_{tq} + \beta_{11} NJ_{tq} Price^2_{tq} + \\
& \beta_{12} NJ_{tq} Price_{tq} FarmMkt_{tq} + \beta_{13} MD_{tq} FarmMkt_{tq} + \beta_{14} MD_{tq} Price_{tq} + \\
& \beta_{15} MD_{tq} Price^2_{tq} + \beta_{16} MD_{tq} Price_{tq} FarmMkt_{tq} + \beta_{17} PA_{tq} FarmMkt_{tq} + \\
& \beta_{18} PA_{tq} Price_{tq} + \beta_{19} PA_{tq} Price^2_{tq} + \beta_{20} PA_{tq} Price_{tq} FarmMkt_{tq} + \\
& \beta_{21} VA_{tq} FarmMkt_{tq} + \beta_{22} VA_{tq} Price_{tq} + \beta_{23} VA_{tq} Price^2_{tq} + \\
& \beta_{24} VA_{tq} Price_{tq} FarmMkt_{tq} + \beta_1 Organic_{tq} + \beta_{25} NJ_{tq} Organic_{tq} + \\
& \beta_{26} MD_{tq} Organic_{tq} + \beta_{27} PA_{tq} Organic_{tq} + \beta_{28} VA_{tq} Organic_{tq};
\end{aligned}
$$

$$
\begin{aligned}
(4)\quad U(\text{Local}) = {} & \beta_5 FarmMkt_{tq} + \beta_6 Price_{tq} + \beta_7 Price^2_{tq} + \beta_8 Price_{tq} FarmMkt_{tq} + \\
& \beta_9 NJ_{tq} FarmMkt_{tq} + \beta_{10} NJ_{tq} Price_{tq} + \beta_{11} NJ_{tq} Price^2_{tq} + \\
& \beta_{12} NJ_{tq} Price_{tq} FarmMkt_{tq} + \beta_{13} MD_{tq} FarmMkt_{tq} + \beta_{14} MD_{tq} Price_{tq} + \\
& \beta_{15} MD_{tq} Price^2_{tq} + \beta_{16} MD_{tq} Price_{tq} FarmMkt_{tq} + \beta_{17} PA_{tq} FarmMkt_{tq} + \\
& \beta_{18} PA_{tq} Price_{tq} + \beta_{19} PA_{tq} Price^2_{tq} + \beta_{20} PA_{tq} Price_{tq} FarmMkt_{tq} + \\
& \beta_{21} VA_{tq} FarmMkt_{tq} + \beta_{22} VA_{tq} Price_{tq} + \beta_{23} VA_{tq} Price^2_{tq} + \\
& \beta_{24} VA_{tq} Price_{tq} FarmMkt_{tq} + \beta_1 Organic_{tq} + \beta_{25} NJ_{tq} Organic_{tq} + \\
& \beta_{26} MD_{tq} Organic_{tq} + \beta_{27} PA_{tq} Organic_{tq} + \beta_{28} VA_{tq} Organic_{tq} + \\
& \beta_2 Local_{tq} + \beta_{29} NJ_{tq} Local_{tq} + \beta_{30} MD_{tq} Local_{tq} + \\
& \beta_{31} PA_{tq} Local_{tq} + \beta_{32} VA_{tq} Local_{tq};
\end{aligned}
$$

$$
\begin{aligned}
(5)\quad U(\text{NonLocal}) = {} & \beta_5 FarmMkt_{tq} + \beta_6 Price_{tq} + \beta_7 Price^2_{tq} + \beta_8 Price_{tq} FarmMkt_{tq} + \\
& \beta_9 NJ_{tq} FarmMkt_{tq} + \beta_{10} NJ_{tq} Price_{tq} + \beta_{11} NJ_{tq} Price^2_{tq} + \\
& \beta_{12} NJ_{tq} Price_{tq} FarmMkt_{tq} + \beta_{13} MD_{tq} FarmMkt_{tq} + \beta_{14} MD_{tq} Price_{tq} + \\
& \beta_{15} MD_{tq} Price^2_{tq} + \beta_{16} MD_{tq} Price_{tq} FarmMkt_{tq} + \beta_{17} PA_{tq} FarmMkt_{tq} + \\
& \beta_{18} PA_{tq} Price_{tq} + \beta_{19} PA_{tq} Price^2_{tq} + \beta_{20} PA_{tq} Price_{tq} FarmMkt_{tq} + \\
& \beta_{21} VA_{tq} FarmMkt_{tq} + \beta_{22} VA_{tq} Price_{tq} + \beta_{23} VA_{tq} Price^2_{tq} + \\
& \beta_{24} VA_{tq} Price_{tq} FarmMkt_{tq} + \beta_1 Organic_{tq} + \beta_{25} NJ_{tq} Organic_{tq} + \\
& \beta_{26} MD_{tq} Organic_{tq} + \beta_{27} PA_{tq} Organic_{tq} + \beta_{28} VA_{tq} Organic_{tq} + \\
& \beta_3 NonLocal_{tq} + \beta_{33} NJ_{tq} NonLocal_{tq} + \beta_{34} MD_{tq} NonLocal_{tq} + \\
& \beta_{35} PA_{tq} NonLocal_{tq} + \beta_{36} VA_{tq} NonLocal_{tq};
\end{aligned}
$$

$$
(6)\quad U(\text{NoPurchase}) = \beta_4 \text{NoPurchase}_{tq};
$$

where variables are as defined in table 4.

[7] In order to keep the random terms together in table 4, the appearance of the terms in the utility equations is not always in numeric order.

[8] Equations (3)–(6) were generated from one overall utility equation by setting the dummy variables *Local*, *NonLocal*, and *NoPurchase* to the appropriate values for each (Kuhfeld, 2009). For example, equation (4) is derived from setting *Local* equal to 1 and *NonLocal* and *NoPurchase* equal to 0. While each is thus a constant in its respective equation, they have been left in each to be clear that the corresponding variables are effects and interactions specific for that portion of the utility equation.

Computations were performed using NLOGIT 3.0 (Greene, 2003). Computation was carried out using a simulated log-likelihood, which required the evaluation of certain multidimensional integrals, for which the most practical method is simulation. As suggested by Train (2009), the Halton draws method was used and modified by adding shuffling, which may improve estimates, especially for higher dimensions.[9]

Predicted Probabilities

It can be difficult to comprehend the relationships between the choices from the coefficients alone. By computing and graphing predicted probabilities, these relationships become more evident. These are given by the multiple integral

$$P_{jq}(X_q, z_q, \Omega) = \int L_{jq}(\beta_q | X_q, \boldsymbol{\eta}_q) f(\eta_q | z_q, \Omega) d\boldsymbol{\eta}_q, \tag{7}$$

where the probability for the event given X_q and $\boldsymbol{\eta}_q$ occurs is

$$L_{jq}(\beta_q | X_q, \boldsymbol{\eta}_q) = \frac{\exp(\beta_q' x_{jq})}{\sum_k \exp(\beta_q' x_{kq})}, \tag{8}$$

and where $f(\eta_q | z_q, \Omega)$ is the joint density of $[\eta_{q1}, \eta_{q2}, \ldots, \eta_{qK}]$ with parameters Ω.

The predicted probabilities may also be estimated by simulation. The fundamental result is that under certain conditions (Train, 2009),

$$\text{plim} \frac{1}{R} \sum_{r=1}^{R} f(v_{qr}) = E[f(v_{qr})], \tag{9}$$

where $r = 1, \ldots, R$ indicates the R random simulation draws performed. Thus the unconditional probability above may be estimated using simulation (Caflisch, 1998). Predicted probabilities were estimated for each of the choices. The probability of each choice was then graphed against price for each state and for each of the four combinations of the attributes grocery store vs. farmers' market and conventional vs. organic.

Marginal Willingness to Pay

Determining marginal willingness to pay (mWTP) when price has a quadratic functional form is more complex than when it has the more common linear functional form. Here there are two cases to consider. The first case considers a change in choices such as from nonlocal to local or from conventional to organic. In the expression for utility, let β_{price} and β_{price^2} be the coefficients for *Price* and *Price*^{2} respectively (different for each state). Let C be the current price, and let Δu be the change in utility resulting from a shift between choice versions J. The mWTP is the price change needed to equalize utilities, which is the solution to

$$(\beta_{price}(C + WTP) + \beta_{price^2}(C + WTP)^2) - (\beta_{price}C + \beta_{price^2}C^2) = -\Delta u. \tag{10}$$

This can be rewritten as a quadratic equation in which $a = \beta_{price^2}$, $b = \beta_{price} + 2C\beta_{price^2}$, and $c = \Delta u$. As β_{price^2} is always negative, the desired solution is the one with the minus sign.

The second case is computing mWTP when going from the grocery store venue to the farmers' market venue. Since there is a venue-by-price interaction, it is necessary to treat this differently. Let β_{price^2} be the coefficient for *Price*^{2}, β_{price} be the coefficient for price for grocery store, and

[9] Several different seeds were used to set up the shuffling, and it was noted that results agreed to within two significant figures. The number of draws chosen for the Halton sequences was 500.

$\beta_{price*venue}$ be the interaction term for price by venue (grocery store being the reference level). Again let C be the current price and Δu be the change in utility when going from grocery store to farmers' market. This change in utility then depends both on the shift in the constant term and the shift caused by the interaction. Therefore the mWTP is a solution to

$$(11)\quad ((\beta_{price} + \beta_{price*venue})(C + WTP) + \beta_{price^2}(C + WTP)^2) - (\beta_{price}C + \beta_{price^2}C^2) = -\Delta u.$$

This can be rewritten as a quadratic equation in which $a = \beta_{price^2}$, $b = \beta_{price} + \beta_{price*venue} + 2C\beta_{price^2}$, and $c = \Delta u + 2C\beta_{price*venue}$. As above, the solution is the one with the negative sign. Quadratic functional forms and WTP have been considered before (see Roe, Irwin, and Morrow-Jones, 2004).

It be may be useful to note a few expectations. It was assumed that consumers would have higher WTP for an organic version relative to a conventional version and higher WTP for both local and state marketing program labeled versions relative to nonlocal versions. The ranking between these two was uncertain however and potentially variable across states. Lastly, it was hypothesized that consumers would be willing to pay a higher price premium for fresh tomatoes purchased at a farmers' market compared to those purchased at a grocery store.

Results

Results from the mixed logit model can be viewed in table 5.[10] The terms *Organic*, *Local*, and *NonLocal* had a significant effect on the probability of choice for fresh tomatoes. They also had a significant standard deviation and hence were random as expected. *Price* and *Price*^{2} were also significant, demonstrating the appropriateness of the quadratic form for price over the typical linear form investigated in CEs. The other key variable, *FarmMkt*, was insignificant, suggesting that venue would not be a determinant of consumer WTP.

A number of the variables had significant interactions with various states. Considering price first, Pennsylvania interacted significantly with both *Price* and *Price*^{2}. Over the studied price range, \$2.50 to \$5.50, predicted utility decreased by values ranging from 0.7 to 0.9. This general decrease in utility of around 0.8 might indicate an increased probability of no purchase in Pennsylvania. Additionally, Virginia had negative interaction terms with *Price* and with *Price*FarmMkt*, indicating greater price sensitivity in Virginia compared to Delaware and an even greater sensitivity when the venue was a farmers' market. Such a situation could be reflected in a greater probability for no purchase in this state, similar to Pennsylvania. Additionally, *Organic* had a significant positive interaction with Maryland, indicating a preference for organic that was larger than those of the other states.

Interpreting the interaction terms is made easier by examining the predicted probabilities. Figures 2a and 2b show the probability of choice by price for the conventional and farmers' market attributes for New Jersey and Pennsylvania, respectively. The results from these two states are representative of the five states surveyed due to similarities in results between states. Specifically, New Jersey displays results very similar to those for Delaware, while Pennsylvania provides results similar to those found for Maryland and Virginia. Furthermore, preference ordering did not vary between conventional and organic versions, nor between farmers' markets and grocery store venues, which allows these figures to be used to discuss findings across both of these attribute versions.

Figure 2a showed a clear preference for state program over local in Delaware and New Jersey, reflecting the fact that term *Local* was significant and negative, while the interaction with New Jersey was insignificant. This difference essentially vanished at the high price point, with no obvious preference between the two. Both state program and local were preferred to *NonLocal*. *NonLocal* was the most consistent in terms of preferences, with a probability of choice of a little less than 10%

[10] The base scenario is a conventionally produced tomato in a grocery store being promoted by a state program; Delaware is the reference state.

Table 5. Mixed Logit Model Results

Variable	Coefficient	Standard Error	z-statistic	P-value
Means of random parameters in utility functions				
Organic	**−0.2378**	**0.0844**	**−2.818**	**0.0048**
Local	**−0.2264**	**0.0797**	**−2.842**	**0.0045**
NonLocal	**−2.2593**	**0.2200**	**−10.268**	**< 0.0001**
NoPurchase	−0.0114	0.7915	−0.014	0.9885
Nonrandom parameters in utility functions				
FarmMkt	−0.6460	0.3815	−1.693	0.0904
Price	**2.3739**	**0.4142**	**5.732**	**< 0.0001**
Price^2	**−0.4527**	**0.2750**	**−8.231**	**< 0.0001**
Price × FarmMkt	0.1604	0.0989	1.622	0.1048
NJ × FarmMkt	−0.0957	0.5704	−0.168	0.8667
NJ × Price	−0.2113	0.1288	−1.640	0.1010
NJ × Price^2	0.0223	0.0277	0.805	0.4206
NJ × Price × FarmMkt	0.1268	0.1483	0.855	0.3926
MD × FarmMkt	−0.3557	0.6212	−0.573	0.5669
MD × Price	−0.0958	0.1396	−0.686	0.4928
MD × Price^2	−0.0255	0.0304	−0.841	0.4004
MD × Price × FarmMkt	0.1544	0.1639	0.942	0.3459
PA × FarmMkt	1.0211	0.6180	1.652	0.0985
PA × Price	**−0.4864**	**0.1378**	**−3.530**	**0.0004**
PA × Price^2	**0.0659**	**0.0295**	**2.232**	**0.0256**
PA × Price × FarmMkt	−0.2460	0.1620	−1.392	0.1639
VA × FarmMkt	**1.2429**	**0.6294**	**1.975**	**0.0483**
VA × Price	**−0.4148**	**0.1363**	**−3.043**	**0.0023**
VA × Price^2	0.0362	0.0295	1.240	0.2205
VA × Price × FarmMkt	**−0.3550**	**0.1679**	**−2.114**	**0.0345**
NJ × Organic	−0.0205	0.1240	−0.166	0.8684
MD × Organic	**0.3757**	**0.1332**	**2.821**	**0.0048**
PA × Organic	−0.0471	0.1334	−0.353	0.7243
VA × Organic	−0.0187	0.1330	−0.141	0.8880
NJ × Local	−0.0784	0.1139	−0.688	0.4912
MD × Local	**0.5327**	**0.1287**	**4.139**	**< 0.0001**
PA × Local	**0.5134**	**0.1269**	**4.045**	**0.0001**
VA × Local	**0.5194**	**0.1327**	**3.915**	**0.0001**
NJ × NonLocal	−0.2051	0.1551	−1.322	0.1860
MD × NonLocal	**0.3971**	**0.1635**	**2.429**	**0.0151**
PA × NonLocal	**0.4936**	**0.1653**	**2.986**	**0.0028**
VA × NonLocal	**0.8378**	**0.1710**	**4.898**	**< 0.0001**
Derived standard deviations of parameter distributions				
Organic	**1.6099**	**0.1600**	**10.065**	**< 0.0001**
Local	**1.2607**	**0.1888**	**6.679**	**< 0.0001**
NonLocal	**1.4142**	**0.2794**	**5.062**	**< 0.0001**
NoPurchase	0.3434	0.4683	0.733	0.4634

Notes: Text in bold indicates that the coefficient is significant at the 5% level.

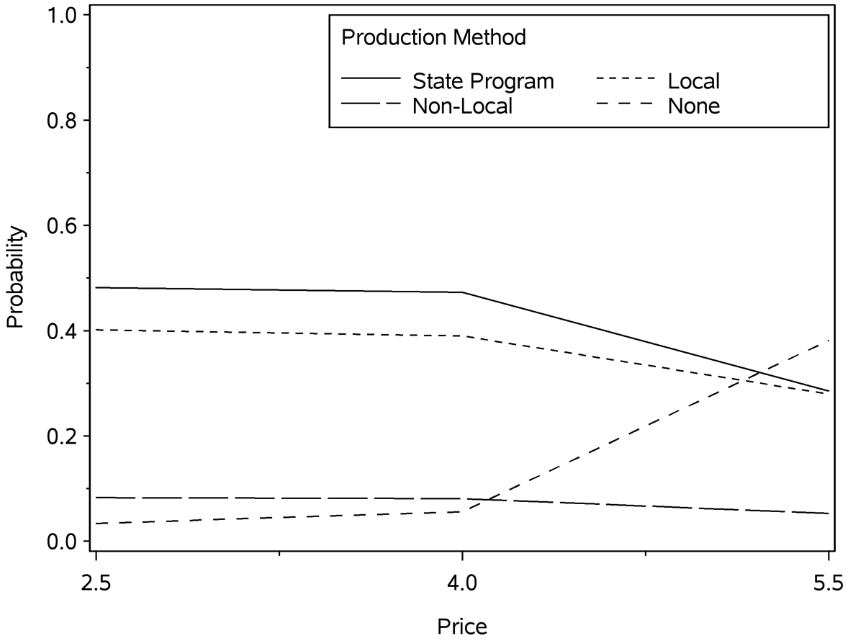

Figure 2a. Probability of Choice by Price for the Farmers' Market Attribute; New Jersey (Conventional Tomatoes)

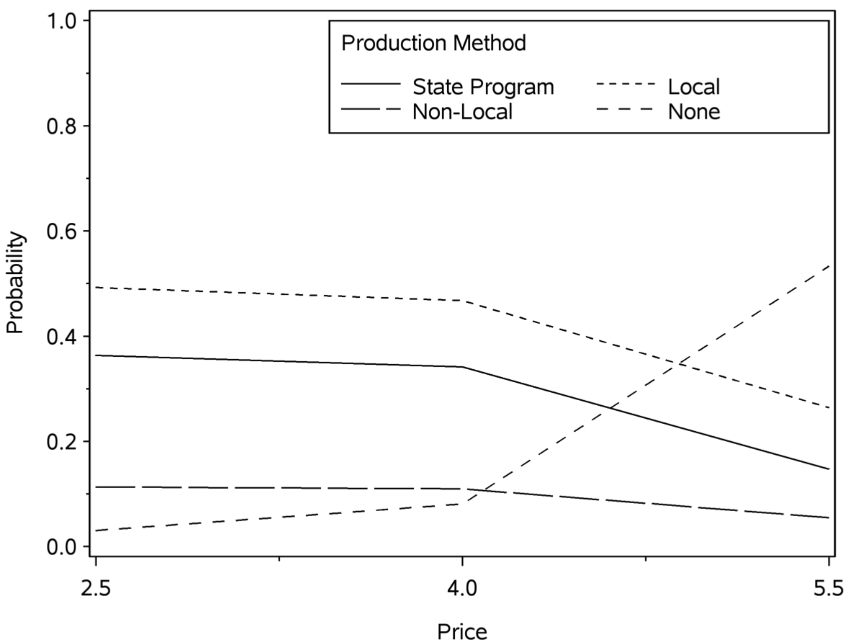

Figure 2b. Probability of Choice by Price for the Farmers' Market Attribute; Pennsylvania (Conventional Tomatoes)

throughout the price range. At the top price examined, the highest probability was that consumers would not select any of the products, showing the importance of price on preferences. At the low price there was only a small probability of a consumer choosing the no-purchase option.

Figure 2b shows that consumers in Pennsylvania, Maryland, and Virginia preferred the local attribute relative to both state marketing program and nonlocal versions. Table 5 shows that *Local* interacted significantly with all three states, and in each case the sign was positive. Unlike New Jersey and Delaware, the gap between local and state program remained at the high price point. In addition, the table shows that *NonLocal* interacted significantly with all three states and was positive as well. This indicates that the preference for state program over nonlocal in these states was less than those for Delaware and New Jersey. The probability of a consumer choosing a state program fell below 20% at the top price, much lower than in the two states above. This could be viewed as a negative toward consumer interest in state programs across these states, especially if the goal was to market products with high premium prices. At the high price, the majority of consumers preferred the no-purchase option, reflecting the high price sensitivity suspected in Virginia and Pennsylvania. Similar to the previous figure, the probability of selecting the *NonLocal* option was relatively consistent and low.

Marginal Willingness to Pay

Marginal WTP (mWTP) estimates by purchasing venue and state can be viewed in table 6.[11] As hypothesized, consumers exhibited higher mWTP for tomatoes identified as either state program or local compared to nonlocal tomatoes for both purchasing venues in all five states. More specifically, consumers in Delaware and New Jersey were willing to pay more than double for state-program tomatoes priced at $2.50/quart from a farmers' market compared to nonlocal tomatoes from the same venue. The premiums for local over nonlocal were not much less, and (in the case of New Jersey) still double the base price of $2.50. In the grocery store venue these premiums were less, but not by a significant amount. Premiums in the other three states for both local and state program over nonlocal did not reach as high a level, but remained large. Of these, Maryland tended to have the highest premiums over nonlocal, with Pennsylvania slightly lower. Premiums in Virginia were the lowest of any state. All states had a decrease in premiums at higher price levels, which was expected.

The difference in mWTP between local and state programs was of more interest. In Delaware and New Jersey, price premiums existed for state-program tomatoes compared to those identified as local, affirming results from the figures above. While these premiums reached over a dollar at the $2.50 price level, they also exhibited a rapid decay as price increased to $5.50. Whether such price premiums justify the costs associated with state marketing programs is debatable and in need of further consideration. Changes are already apparent: Delaware ended its program and *Jersey Fresh* faced large budget cuts in 2009.

For consumers in Maryland, Pennsylvania, and Virginia, the local attribute was preferred over each state's promotional marketing program. This finding should be viewed as problematic for proponents of state programs. If producers are able to achieve higher premiums with a simple local claim rather than joining the program, there may be little incentive to do so or to continue doing so. In terms of specific mWTP figures across these states and purchasing venues, Maryland consumers had the highest premium of $0.28 for tomatoes from a farmers' market at the $4.00 price level. For the other states and venues at this price level, the premium range fell between $0.20 and $0.26. The range of premiums was even more consistent at the $5.50 price level, with a low of $0.10 to a high of $0.12. This amount of agreement was unexpected and suggests strong similarities in consumer preferences for local and state program across these states.

---

[11] Some of the quadratic equations had imaginary solutions at the lowest price of $2.50. This indicated an issue with extrapolation, and under these circumstances the mWTP cannot be computed.

Table 6. Marginal WTP Estimates for Tomatoes; by Purchasing Venue and State

	Delaware			New Jersey			Maryland		
	$2.50	*$4.00*	*$5.50*	*$2.50*	*$4.00*	*$5.50*	*$2.50*	*$4.00*	*$5.50*
Farmers' Market Purchasing Venue:									
Nonlocal to State Program	2.55	1.34	0.80	2.76	1.50	0.92	2.20	1.07	0.63
Nonlocal to Local	2.44	1.23	0.73	2.61	1.37	0.82	2.35	1.20	0.72
Local to State Program	1.07	0.19	0.09	1.26	0.27	0.13	***	-0.28	-0.12
Conventional to Organic	***	-0.24	-0.10	***	-0.30	-0.12	0.79	0.11	0.05
Grocery Store Purchasing Venue:									
Nonlocal to State Program	2.36	1.25	0.77	2.41	1.33	0.84	1.86	0.93	0.57
Nonlocal to Local	2.24	1.15	0.70	2.25	1.20	0.75	2.01	1.06	0.66
Local to State Program	0.84	0.17	0.09	0.85	0.22	0.12	***	-0.21	-0.10
Conventional to Organic	***	-0.21	-0.09	***	-0.22	-0.10	0.43	0.09	0.05
Grocery Store to Farmers' Market:	***	0.00	0.09	***	0.32	0.32	***	0.17	0.25

	Pennsylvania			Virginia		
	$2.50	*$4.00*	*$5.50*	*$2.50*	*$4.00*	*$5.50*
Farmers' Market Purchasing Venue:						
Nonlocal to State Program	2.00	1.05	0.66	1.50	0.76	0.47
Nonlocal to Local	2.24	1.22	0.77	1.68	0.89	0.56
Local to State Program	***	-0.24	-0.12	***	-0.20	-0.11
Conventional to Organic	***	-0.24	-0.12	***	-0.17	-0.09
Grocery Store Purchasing Venue:						
Nonlocal to State Program	2.08	1.09	0.67	1.71	0.83	0.50
Nonlocal to Local	2.24	1.22	0.77	1.89	0.97	0.60
Local to State Program	***	-0.26	-0.12	***	-0.23	-0.11
Conventional to Organic	***	-0.26	-0.12	***	-0.20	-0.10
Grocery Store to Farmers' Market:	0.47	0.08	0.01	0.20	-0.11	-0.16

Notes: Asterisks indicate missing values that were unable to be estimated because the utility had a maximum close to $2.50, making it impossible to equalize utilities by lowering price.

In considering state differences further, it is possible that geography played a role. Pennsylvania and Virginia are much larger, and a state label might not mean "local" to all their inhabitants. Maryland is not nearly as large as Pennsylvania and Virginia, but there is a substantial distance between its eastern and western parts. The state is also divided by the District of Columbia-Baltimore metropolitan area and the Chesapeake Bay, which can be crossed only at the Bay Bridge and at the extreme northeastern part of the state. New Jersey is small, and travel within the state is relatively convenient. The metropolitan areas near New York City are not a barrier to travel within the state. Finally, Delaware is the second smallest state in the United States, and it is easy to get from one place to another within its borders. It may be that a state label in New Jersey and Delaware represents "local" to consumers, whereas consumers in the other states may view "local" as an area smaller than their full state.

Consumer mWTP for the farmers' market attribute compared to the grocery store venue, independent of the other attributes investigated, was also computed. The only term in the model involving venue that was significant was the Virginia price by venue term noted earlier. Even here, the result was not the expected consistent premium for farmers' markets. Instead, while there was a positive mWTP for tomatoes from a farmers' market at the $2.50 price, it was negative at $4.00

and above. This illustrates the greater sensitivity to price at the farmers' markets noted earlier for Virginia. Weaker evidence suggested consumers in Pennsylvania might be willing to pay more for tomatoes at the farmers' market venue. While only meaningful at the 10% significance level, this potential premium was particularly high at the $2.50 level. Recognition of this possibility by producers may be why this state has been experiencing such rapid growth in farmers' markets. However, this premium quickly reduces at higher price levels, making the full price benefit to producers from using farmers' markets questionable. While somewhat unexpected, these findings mirrored those of Toler et al. (2009).

Lastly, Maryland was the only state that exhibited an increased mWTP for organic tomatoes over conventional ones. For organic tomatoes, Maryland consumers were willing to pay a premium of $0.79 for farmers' market tomatoes priced at $2.50 and $0.43 for organic tomatoes from a grocery store. It had been expected that consumers in all states would have a positive premium for organic, and it was not clear why Maryland was the only state for which this was found. Although some studies have noted a lack of consumer understanding of organic (e.g., Gifford and Bernard, 2011), definitions were included in the survey package. Perhaps there is a greater regard for organic among subpopulations of the District of Columbia-Baltimore metropolitan area. Further research of this finding would be necessary.

Conclusions

This study used a mail survey of consumers across five Mid-Atlantic states to determine consumer preferences and WTP for tomatoes marketed as local, state program promoted, or organic from either grocery stores or farmers' markets. Preference ordering between local and state program versions was not the same throughout the region. For the three geographically largest states—Virginia, Pennsylvania, and Maryland—a product claim of local was preferred over being part of a state program. Increased marketing and education efforts may be helpful, although as Virginia's program is long established, it may be difficult to change existing impressions and it might be time to reassess the value of the program.

In the geographically larger states, consumers likely consider local to mean an area smaller than their state's borders, which would agree with earlier studies. State marketing program officials may want to consider county-level campaigns as a potential alternative that better reflects consumers' impressions about the definition of local. In the smaller states of New Jersey and Delaware, consumers showed a preference and greater WTP for state program promoted tomatoes over local ones. While for New Jersey this could be due to the strength of the well-established *Jersey Fresh* program, Delaware's program was recent and not heavily promoted. The finding that consumers in Delaware had a preference for their state program contrasted with the state's decision to discontinue it not long after the survey was completed. Given the premium potential found here, the state may wish to consider reinstating the program in the future.

The lack of a significant difference between grocery stores and farmers' markets across most of the states was somewhat surprising. Even where it was suggested, any increased mWTP was only exhibited at the lowest price level. This differed with a previous study in this region, which found an increased mWTP across all states for farmers' markets for a value-added food product, strawberry preserves. It appears instead that consumers in this region view local or state-program tomatoes from either venue equivalently. It may be that consumers expect to pay less at a farmers' market, understanding that the middlemen (and their share of the price) have been eliminated. Future research regarding price expectations may be able to address this issue. In the meantime, farmers selling at these markets may need to look for other ways to gain higher premiums, such as value-added products or special programs. Otherwise, farmers could put more efforts into getting their local fresh products marketed as such in area grocery stores.

In another unexpected result, this study failed to find increased WTP for organic within the region, with the exception of consumers in Maryland. Despite its growth, organic remains a relatively small segment of the overall produce market, and this study found the majority of Mid-Atlantic consumers either do not see a need for organic tomatoes or simply do not have the inclination to pay more for them. Results suggest that consumers in this region are more concerned with location attributes than production methods. This aligns with some past studies and with recent media reports that "local is the new organic." Producers looking to sell organic products in this region will need to improve their marketing, and perhaps their educational efforts, if they desire an increased premium.

Overall, these findings provide support for the increased consumer interest in local food products within the region and the expansion of such offerings. Particularly at lower price levels, the premium consumers would pay for either local or state-program tomatoes was quite substantial. Still, the lack of apparent benefit from programs in some states may lead policy makers to consider the value of continuation more carefully. Farmers should question the value of being part of these programs relative to any costs from them compared with using a generic local claim. To maintain the growth of farmers' markets, novel ways of attracting customers may be necessary, while local producers could benefit if grocery stores decide to offer more local produce. It would be interesting to see if similar situations are found elsewhere in the United States and to see whether these results hold for other fresh produce items.

[Received October 2012; final revision received December 2013.]

References

Batte, M. T., N. H. Hooker, T. C. Haab, and J. Beaverson. "Putting Their Money Where Their Mouths Are: Consumer Willingness to Pay for Multi-Ingredient, Processed Organic Food Products." *Food Policy* 32(2007):145–159.

Brown, C. "Consumers' Preferences for Locally Produced Food: A Study in Southeastern Missouri." *American Journal of Alternative Agriculture* 18(2003):213–224.

Caflisch, R. E. "Monte Carlo and Quasi-Monte Carlo Methods." *Acta Numerica* 7(1998):1–49.

Carpio, C. E., and O. Isengildina-Massa. "Consumer Willingness to Pay for Locally Grown Products: The Case of South Carolina." *Agribusiness* 25(2009):412–426.

Chalak, A., and M. Abiad. "How Effective Is Information Provision in Shaping Food Safety Related Purchasing Decisions? Evidence from a Choice Experiment in Lebanon." *Food Quality and Preference* 26(2012):81–92.

Commonwealth of Pennsylvania. *PA Preferred*. Harrisburg, PA: Pennsylvania Department of Agriculture, 2009. Available online at http://www.papreferred.com/program.aspx.

Commonwealth of Virginia. *What is Virginia's Finest?* Richmond, VA: Department of Agriculture and Consumer Services, 2009. Available online at http://www.vafinest.com/about.shtml.

Darby, K., M. T. Batte, S. Ernst, and B. Roe. "Decomposing Local: A Conjoint Analysis of Locally Produced Foods." *American Journal of Agricultural Economics* 90(2008):476–486.

Gifford, K., and J. C. Bernard. "The Effect of Information on Consumers' Willingness to Pay for Natural and Organic Chicken." *International Journal of Consumer Studies* 35(2011):282–289.

Giraud, K. A., C. A. Bond, and J. K. Bond. "Consumer Preferences for Locally Made Specialty Food Products across Northern New England." *Agricultural and Resource Economics Review* 34(2005):204–216.

Govindasamy, R., B. J. Schilling, K. P. Sullivan, C. G. Turvey, L. Brown, and V. S. Puduri. "Returns to the Jersey Fresh Promotional Program: The Impacts of Promotional Expenditures on Farm Cash Receipts in New Jersey." Food Policy Institute Publication RR-0404-006, Rutgers University, Department of Agricultural, Food and Resource Economics, 2004. Available online at http://www.dafre.rutgers.edu/documents/ramu/jerseyfreshreturnsstudyfinal2004report.pdf.

Greene, W. H. *NLOGIT Version 3.0: Reference Guide*. Plainview, NY: Econometric Software, Inc., 2003.

Hensher, D. A., J. M. Rose, and W. H. Greene. *Applied Choice Analysis: A Primer*. New York: Cambridge University Press, 2005.

Hu, W., T. Woods, and S. Bastin. "Consumer Acceptance and Willingness to Pay for Blueberry Products with Nonconventional Attributes." *Journal of Agricultural and Applied Economics* 41(2009):47–60.

Hughner, R. S., P. McDonagh, A. Prothero, C. J. Shultz, and J. Stanton. "Who Are Organic Food Consumers? A Compilation and Review of Why People Purchase Organic Food." *Journal of Consumer Behaviour* 6(2007):94–110.

Janssen, M., and U. Hamm. "Product Labelling in the Market for Organic Food: Consumer Preferences and Willingness-to-Pay for Different Organic Certification Logos." *Food Quality and Preference* 25(2012):9–22.

Jekanowski, M. D., D. R. Williams, and W. A. Schiek. "Consumers' Willingness to Purchase Locally Produced Agricultural Products: An Analysis of an Indiana Survey." *Agricultural and Resource Economics Review* 29(2000):43–53.

Johnston, R. J., and J. M. Duke. "Willingness to Pay for Agricultural Land Preservation and Policy Process Attributes: Does the Method Matter?" *American Journal of Agricultural Economics* 89(2007):1098–1115.

Kuhfeld, W. F. "Marketing Research Methods in SAS." Technical Paper MR-2009, SAS Institute Inc., Cary, NC, 2009. Available online at http://support.sas.com/techsup/technote/mr2009.pdf.

Loureiro, M. L., and S. E. Hine. "Discovering Niche Markets: A Comparison of Consumer Willingness to Pay for Local (Colorado Grown), Organic, and GMO-Free Products." *Journal of Agricultural and Applied Economics* 34(2002):477–487.

Low, S. A., and S. Vogel. "Direct and Intermediated Marketing of Local Foods in the United States." ERS Report 128, U.S. Department of Agriculture, Economic Research Service, Washington, DC, 2011. Available online at http://www.ers.usda.gov/publications/err-economic-research-report/err128.aspx.

Lusk, J. L., and D. Hudson. "Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making." *Review of Agricultural Economics* 26(2004):152–169.

Lusk, J. L., and F. B. Norwood. "Effect of Experimental Design on Choice-Based Conjoint Valuation Estimates." *American Journal of Agricultural Economics* 87(2005):771–785.

Nganje, W. E., R. S. Hughner, and N. E. Lee. "State-Branded Programs and Consumer Preference for Locally Grown Produce." *Agricultural and Resource Economics Review* 40(2011):20–32.

Onianwa, O., M. N. Mojica, and G. Wheelock. "Consumer Characteristics and Views Regarding Farmers Markets: An Examination of On-Site Survey Data of Alabama Consumers." *Journal of Food Distribution Research* 37(2006):119–125.

Onken, K. A., and J. C. Bernard. "Catching the "Local" Bug: A Look at State Agricultural Marketing Programs." *Choices* 25(2010):1–7.

Onken, K. A., J. C. Bernard, and J. D. Pesek. "Comparing Willingness to Pay for Organic, Natural, Locally Grown, and State Marketing Program Promoted Foods in the Mid-Atlantic Region." *Agricultural and Resource Economics Review* 40(2011):33–47.

Organic Trade Association. "Organic Food Facts." 2010. Available online at http://www.ota.com/organic/mt/food.html.

Patterson, P. M., H. Olofsson, T. J. Richards, and S. Sass. "An Empirical Analysis of State Agricultural Product Promotions: A Case Study on Arizona Grown." *Agribusiness* 15(1999):179–196.

Roe, B., E. G. Irwin, and H. A. Morrow-Jones. "The Effects of Farmland, Farmland Preservation, and Other Neighborhood Amenities on Housing Values and Residential Growth." *Land Economics* 80(2004):55–75.

Salant, P., and D. A. Dillman. *How to Conduct Your Own Survey*. New York: Wiley, 1994.

Schneider, M. L., and C. A. Francis. "Marketing Locally Produced Foods: Consumer and Farmer Opinions in Washington County, Nebraska." *Renewable Agriculture and Food Systems* 20(2005):252–260.

State of Delaware. *Marketing: Our Services*. Dover, DE: Department of Agriculture, 2009. Available online at http://www.delawarefresh.com.

State of Maryland. *Maryland's Best*. Annapolis, MD: Department of Agriculture, 2009. Available online at http://www.marylandsbest.com.

State of New Jersey. *Jersey Fresh Quality Grading Program*. Trenton, NJ: Department of Agriculture, 2009. Available online at http://www.state.nj.us/agriculture/divisions/md/prog/jfqgp.html.

Thilmany, D., C. A. Bond, and J. K. Bond. "Going Local: Exploring Consumer Behavior and Motivations for Direct Food Purchases." *American Journal of Agricultural Economics* 90(2008):1303–1309.

Toler, S., B. C. Briggeman, J. L. Lusk, and D. C. Adams. "Fairness, Farmers Markets, and Local Production." *American Journal of Agricultural Economics* 91(2009):1272–1278.

Train, K. *Discrete Choice Methods with Simulation*. New York: Cambridge University Press, 2009, 2nd ed.

U. S. Department of Agriculture. "Farmers Market Growth: 1994-2011." Tech. rep., U.S. Department of Agriculture, Agricultural Marketing Service, Washington, DC, 2011a. Available online at http://www.ams.usda.gov.

———. *Farmers Market Search*. Washington, DC: U. S. Department of Agriculture, Agricultural Marketing Service, 2011b. Available online at http://search.ams.usda.gov/farmersmarkets/.

———. *National Map of Farmers Markets*. Washington, DC: U. S. Department of Agriculture, Agricultural Marketing Service, 2011c. Available online at http://apps.ams.usda.gov/FarmersMarkets/farmersmarketsmap.jpg.

Yiridoe, E. K., S. Bonti-Ankomah, and R. C. Martin. "Comparison of Consumer Perceptions and Preferences toward Organic versus Conventionally-Produced Foods: A Review and Update of the Literature." *Renewable Agriculture and Food Systems* 20(2005):193–205.

Yue, C., and C. Tong. "Organic or Local? Investigating Consumer Preference for Fresh Produce Using a Choice Experiment with Real Economic Incentives." *HortScience* 44(2009):366–371.

Zepeda, L., and C. Leviten-Reid. "Consumers' Views on Local Food." *Journal of Food Distribution Research* 35(2004):1–6.