"Local is the New Organic": Do Consumers Agree?

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Abstract

There have been numerous studies and growing interests to identify consumer preferences and compare willingness-to-pay for different value-added food labels or attributes. This paper uses stated preference data from choice experiments in a mail survey in Kentucky and Ohio to analyze consumer preferences for a host of value-added attributes of processed blackberry jam. Results from the study confirm positive willingness-to-pay for both organic and local attributes as well as other label claims. However, consumers were found to be willing to pay less for organic blackberry jam than jam identified as being produced in smaller state regions. Furthermore, the study found some evidence of substitution between these two attributes, an issue receiving minimal attention in the existing literature.

Keywords:

Willingness-to-pay, Local and organic processed food products, Choice experiment, Conditional Logit model, Mixed Logit model, Processed food labels

JEL Code: Q13

Increasingly food labeling has become an important and integrated part of firm's value-added process. Firms search for appealing attributes and include information about these attributes on the labels (Golan, Kuchler and Mitchell 2001). The decision to provide extra information on product labels is dictated by the benefit-cost analysis. The costs come not only from the labelling of the information itself but may also from production process modification. The attritibutes that are attractive to consumers are determined by consumers' consumption choices, and the associated willingness-to-pay (WTP) signals the benefit that firms expect to receive. Finding the WTP for these attributes thus becomes an important task.

Besides traditional product attributes such as taste, texture, and appearance, comsumers also care about other aspects like brand, nutrition, safety (e.g. organic), production practice (e.g. small-scale, local), etc. This study investigates WTP for a host of labels indicating these non-conventional attributes on processed blackberry jam products and, most importantly, tests the substitution or complementarity between the different levels of attributes revealed by the labels.

Stated preference data have been used for this study. These data were collected in a choice-based conjoint analysis survey administered in two U.S. states: Kentucky and Ohio. The blackberry jam products presented in the choice sets were differentiated with respect to a number of value-added attributes, among them organic and local attribute claims at different levels. Part-worth utility and WTP were estimated using conditional and mixed logistic regression. Besides the attributes considered in the experimental design, we examine the interaction between organic and location attributes in an attempt to answer whether they complement each other.

The organic and local food sectors have both enjoyed greater popularity and steady growth over the last few decades. Unlike existing literature, our study examines organic and local food claims at different levels. Organic attribute was considered at four levels: 100% organic, a seal implying at least 95% organic, and made with organic blackberries as opposed to no label. On the other hand, the location claims included the indication at state and multi-state regional or sub-state regional levels in comparison to no location indication. In addition, several other value-added labels of attributes were considered along side: product brand (whether national, regional, or store brand); (fictitious) small family farm association (SFFA) endorsement; and nutritional claim (whether generic or firm-specific claim). Although organic and local food systems have been devoted a great deal of attention, a major question remains unaddressed is whether these two food attibutes are substitutes or complements. Answers to this question yield useful information for producers, marketers and state-marketing agencies alike.

The paper proceeds with a brief review of the relevant literature, followed by the description of the survey and experimental designs. We next describe the methodology employed in analyzing the choice data. Following this, the results from the estimation of the choice model and WTP estimates are reported. The last section provides a summary on the issues and discusses the business and policy implications with regard to our findings.

Background

Recent data all point to the growth in demand and popularity of organic food in the U.S. markets and other developed countries. U.S. sales of organic food and beverages have experienced significant growth in the past two decades, with sales increased from $1 billion in 1990 to $26.7 billion in 2010. The annual growth rates averaged more than 15 percent in the last decade (Organic Trade Association 2011).

The other popular alternative to conventional food is what dubbed ‘local’ food. Similar fast expansion has also been documented for this emerging food category. Rising consumer preference for local food and its popularity and availibility have been reflected in the rapid growth in the number of registered farmer markets in the U.S.. These local markets, featuring their products heavilly as locally grown or made, have more than quadrupled from only 1,755 in 1994 to 7,864 in 2012 (USDA-AMS, 2013a). Annual sales from these farmer markets were over $1 billion in 2009 (USDA-AMS, 2013b).

Although the marketing and consumption of local food has gained momentum in the past two decades, there is still no single definition as to how food should be defined as 'local'. Often the definitions of local food come with geographic connotation (Martinez et al. 2010). A common approach to define local food is to base on the distance from where the food products were transported from. Though, the distance for food to be considered 'local' varies.

Some scholars like Smith and Mackinnon (2007) advocate for a 100-mile radius limit for 'local' food, while consumers' perception on what is 'local' may indeed vary. Surveys by the Hartman group (2008) found that the majority agreed with the distance of 100 miles or less while some even accepted 'state' as a proxy for being local. Adams and Adams (2008) and Hu et al. (2010) found the limit perceived by the majority of their respondents to be lower, at only 50 miles or less.

Nevertheless, greater proximity has still been used. The 2008 U.S. Farm Bill (Food, Conservation, and Energy Act of 2008, P.L. 110-246, §6015) stipulates that products to be marketed as "locally or regionally produced agricultural food product" must be transported less than 400 miles from its origin or within the state in which they are produced. Although this definition is only in place to set eligibility for production under a USDA's Business and Industry loan program, it indicates the acceptance of using state boundary as a proxy for local food claim.

The state boundary has long been used to market fresh produce or product as locally grown or made. State agricultural marketing programs promoting home state products have been established across all 50 states of the U.S., with the first program established as early as 1980 (Onken and Bernard 2010). These programs include slogans, logos, and other campaigns branding their respective state's products as local food. Jekanowski, Williams II and Schiek (2000) studied state-branded products as local food products and found strong willingness to purchase among consumers. Logo like *Ohio Proud* is one of such state marketing programs. It was also found as a useful proxy for locally grown products that can capture consumer premium (Ernst and Darby 2008).

Besides organic and local food claims, food marketers and producers have also sought out other labels to add value to their products, such as product brand and nutritional claim. There have aslo been studies investigating the effect of these other value-added labels on consumption choices. For example, Hu, Adamowicz and Veeman (2006) compared the marginal values of national and store brands on bread products. On the other hand, Bond, Thilmany and Bond (2008) studied the role of nutritional claim on purchasing choices.

In addition to the focus on single attribute, our study attempts to examine the interaction between potentially substitute attributes. Generally the rise of local food's popularity can be attributed to the support given to local agriculture. However, purchase of organic food has also been found to be linked to supporting local farmers (perhaps those whose farms are local, small, and family-own) and local economy (Hughner et al. 2007). Interestingly, Adams and Salois (2010) found that, with more entries by large scale organic food corporations in recent years, consumers have shifted their preferences away from organic food and toward local products. This suggested that stronger consumer preferences for local than organic food may have accumulated over time.

Numerous studies have confirmed strong and consistent WTP for organic (Batte et al. 2007; Bond, Thilmany and Bond 2008) and locally produced food (Carpio and Isengildina-Massa 2009; Hu, Woods and Bastin 2009). Furthermore, a number of studies have compared WTP for organic and local attributes of food. For fresh produce, Yue and Tong's (2009) small study on consumer preferences for organic and locally grown fresh produce in Minnesota found almost equal WTP for both attributes. However, other studies suggested that consumers have higher preferences for locally grown than organic food. Loureiro and Hine (2002) compared consumers' WTP for Colorado potatoes. They found that the premium consumers are willing to pay was higher for locally grown than organic potatoes.

For processed products, Batte et al. (2007) assessed Ohio grocery store shoppers' WTP for cereal breakfast associated with four different levels of organic content and locally grown ingredient claim. They found that the premium for the local claim was only lower than that for the 100% organic claim but was well over those for the other organic levels. Using choice experiment, Hu et al. (2009) found that Kentucky consumers' WTP was much higher for processed blueberry products identified as (state level) local than organic. Similarly, in a large mail survey on Pennsylvania residents, James, Rickard, and Rossman (2009) concluded that the WTP for applesauce made from locally grown ingredient was higher than organic applesauce in their choice experiment survey.

Nonetheless, there have been very few known studies examining the substitution or complementary nature between organic and local claims for either fresh produce or processed food products. Even less work has been conducted considering the various levels of these two attributes. This study attempts to fill this literature gap by investigating the compatibility of these two food attributes, using choice experiment data.

In the choice experiment, a product is presented to consumers with different attributes (or levels of attributes) or price. Consumer preferences can be solicited, and part-worth utility, and subsequently WTP, can be estimated for each attribute of the product. This form of conjoint analysis has been a useful tool to elicit consumers' WTP, especially when actual purchase data are not readily available to study consumers' revealed preferences.

Model

Lancaster (1966) introduced the concept that a product is a bundle of attributes and utilities are derived from consuming the bundle of attributes rather than merely the product as a whole. The concept suggests that the utilities generated from consuming the same product differ when it come with different attributes or different levels of attributes.

A random utility theory can be used as a framework to analyze consumer choice. Consumer *i*'s utility (U_{ijn}), from choosing the *j*-th product (*j*=1, 2 or 3) in the *n*-choice situation (*n*=1, 2 or 3), can be modeled as a linear function of product attributes X_{ijn} (McFadden 1974):

$$U_{ijn} = X_{ijn}\boldsymbol{\beta} + \varepsilon_{ijn} \tag{1}$$

where $\boldsymbol{\beta}$ is a vector of unknown part-worth utilities associated with product attributes X_{ijn} of the alternative *j* in choice situation *n*, and ε_{ijn} is the random error component of the utility.

Assuming utility maximizing behavior, consumer *i* chooses alternative *j* in the *n*-choice situation only when *j* provides the highest utility compared to the other options available (McFadden, 1974). When the error term (ε_{ijn}) can be assumed to be independently and identically distributed (iid) following a Type I extreme value distribution, such that $F(\varepsilon_{ijn}) = \exp(-e^{-\varepsilon_{ijn}})$, and the Independence of Irrelevant Alternatives (IIA) assumption holds, a conditional logit (CL) choice model can be applied to the probability of the *j*-th option being selected as follow:

$$P(Y_{in} = j) = \frac{\exp(X_{ijn}\boldsymbol{\beta})}{\sum_{j=1}^{J} \exp(X_{ijn}\boldsymbol{\beta})} \qquad \text{For } j = 1, 2, \dots, J \tag{2}$$

where Y_{in} is an indicator variable showing which option consumer *i* has chosen in the *n*-choice situation. With a closed form probability function, the CL can be estimated using Maximum Likelihood method.

Another popular alternative to approximate random utility model is the mixed logit (ML) model proposed by Train (1998). The significant advantage of using a ML model over the CL model is that the IIA assumption is fully relaxed, which allows parameter estimates to vary across individuals and thus the heterogeneity to be captured (Hensher, Rose and Greene 2005; Train 2009). The unobserved heterogeneity in consumer choices can be revealed through a more general specification of the unknown part-worth utilities defined on the entire sample of consumers. Under a ML model, coefficients in vector $\boldsymbol{\beta}$ are defined as random variables following density function **f**:

$$\beta_i \sim f(\beta_0, G) \tag{3}$$

where β_0 are the means of β_i, and G is the variance matrix. Given this specification, the ML model specifies the choice probability as:

$$P(Y_{in} = j) = \int \frac{\exp(X_{ijn}\boldsymbol{\beta})}{\sum_{j=1}^{3} \exp(X_{ijn}\boldsymbol{\beta})} f(\boldsymbol{\beta}) d\boldsymbol{\beta} \tag{4}$$

Because the probability in a ML model is to be evaluated over a range of possible values of β_i and does not have a closed-form solution, simulation method has to be applied. Therefore, the ML model is estimated using a simulated maximum likelihood approach that approximates the likelihood function, as demonstrated by Train (2009).

This study uses SAS program software to estimate both the CL and ML models. In both models, the Dual-Quasi Newton optimization method was used. For the ML model, equation (4) was estimated using Halton draws with 500 simulations (and the starting point of Halton random number sequence was set to 1).

Following the estimation of $\boldsymbol{\beta}$ in either CL or ML model, WTP for an attribute *k* can be calculated as the part-worth utility estimate for the attribute divided by the negative of the marginal utility of income (negative part-worth of price) (Louviere, Hensher and Swait 2000):

$$WTP_k = -\frac{\beta_k}{\beta_{price}} \quad (5)$$

which measures the change in price associated with a unit increase in the respective attribute.

Data

Survey Design

A mailed survey was conducted on randomly selected residents in the states of Ohio and Kentucky, USA, during the months from October to December of 2008. With a mailing list purchased from Survey Sampling International, a total of 6,000 consumers, aged 18 and over, were sampled for a survey on their food shopping behaviors and their preferences in selecting blackberry jam products focused in the study. Owing to our interest in examining the effect of sub-state regional claims on the choice preference, the 6,000 questionnaires were distributed equally across six identified regions (three in each state) (Figure 1).

A total of 5,716 surveys were successfully distributed, and 1,972 were completed and returned, yielding a response rate of 34.5 per cent. The returned questionnaires produced a total of 1,883 eligible questionnaires for the study, based on the number of respondents having choice made in all three choice sets presented. Among the 1,883 eligible questionnaires, 150 were completed with the 'Would not purchase either product (most referred as status quo)' choice selected in all three sets. Some studies suggested that these respondents should be excluded (Burton et al. 2001). However, Loureiro and Umberger (2003) cautioned that such exclusion has a significant impact on the result of the design. Thus, our study included this group of respondents in our analysis.

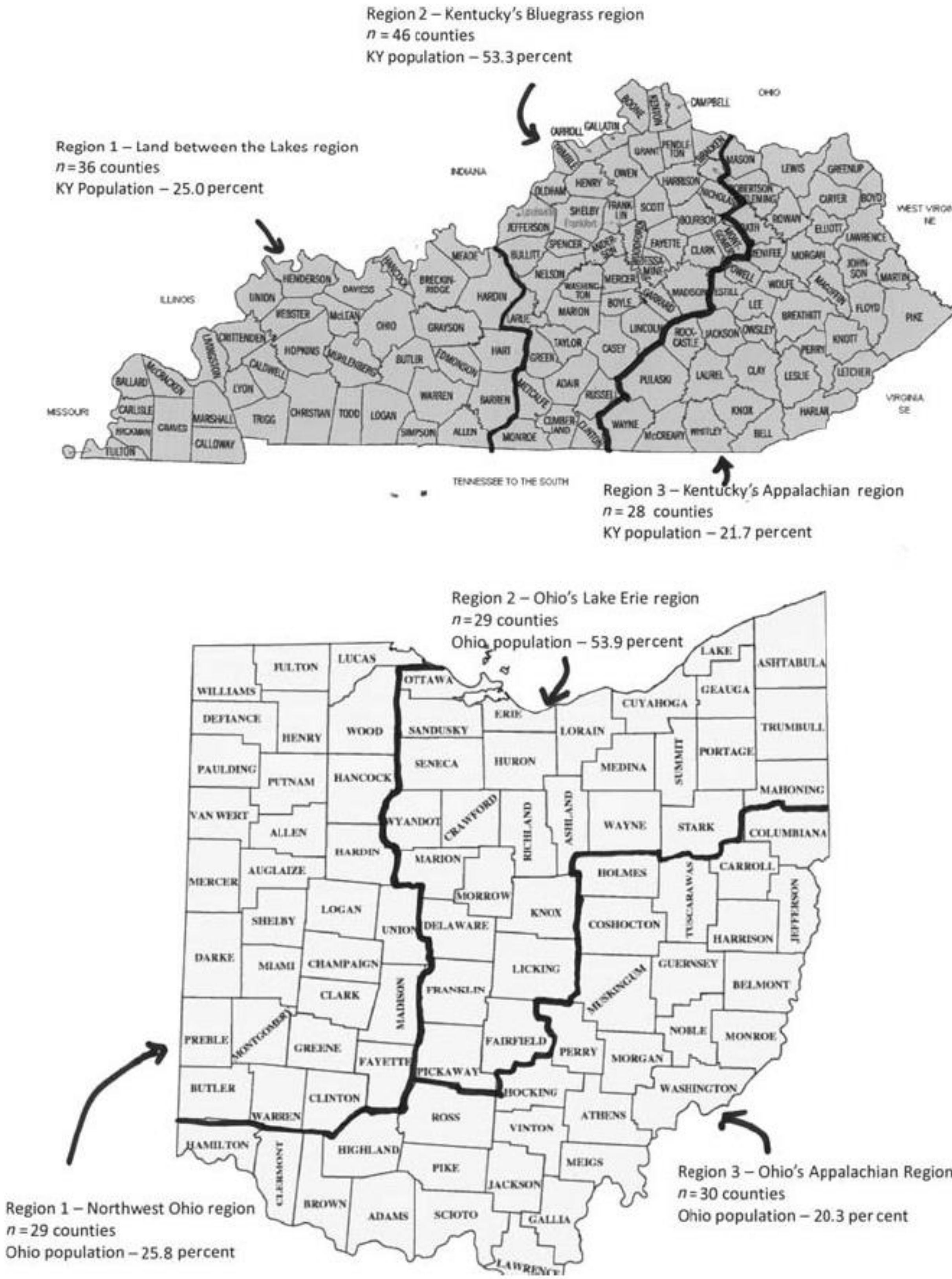

Figure 1. Regional Maps of Kentucky and Ohio

Table 1. Summary statistics of the sample's socio-demographic profiles

	Kentucky		Ohio	
	Sample	State	Sample	State
Number	912	4,286,107	971	11,530,508
Sex (%)				
Female	57.4	51.0	54.6	51.2
Race (%)				
White	95.7	88.84	93.5	84.0
Age (%)				
20 to 24 years	0.4	9.4	0.4	8.8
25 to 34 years	7.1	18.0	5.9	17.4
35 to 44 years	15.6	19.0	12.3	18.4
45 to 54 years	20.0	20.1	22.8	20.8
55 to 64 years	27.9	15.9	24.2	15.9
65 to 74 years	19.2	9.7	18.5	9.6
75 to 84 years	7.9	5.9	12.4	6.5
85 years and over	1.8	2.2	3.4	2.6
Educational attainment (%)*				
Less than 9th grade	4.8	8.3	0.7	3.5
9th to 12th grade, no diploma	7.2	10.7	5.2	9.2
High school graduate (includes equivalency)	31.7	34.5	28.5	35.8
Some college, no degree	21.3	19.6	21.8	20.2
Associate's degree	7.9	6.5	10.4	7.2
Bachelor's degree	13.7	12.2	19.3	15.3
Graduate or professional degree	13.5	8.2	14.2	8.8
Annual household income (%)**				
Less than $10,000	5.7	11.0	3.0	8.4
$10,000 to $14,999	7.3	7.5	5.1	6.0
$15,000 to $24,999	9.8	13.2	10.2	11.7
$25,000 to $34,999	15.5	12.0	11.3	11.5
$35,000 to $49,999	15.6	15.1	16.0	15.3
$50,000 to $74,999	20.9	17.6	22.9	19.5
$75,000 to $99,999	11.5	10.7	14.2	11.8
$100,000 to $149,999	10.8	8.6	11.4	10.2
$150,000 to $199,999	1.4	2.2	3.4	3.1
$200,000 or more	1.5	2.0	2.5	2.5
Mean household income (dollars)	57,423	55,285	67,782	61,475
Median household income (dollars)		40,807		46,838

Note: State population statistics are based on the 2007-2009 American Community Survey 3-Years Estimates
* Population 25 years and over
** In 2009 inflation-adjusted dollars

Table 1 compares the sample of eligible respondents against the 2007-2009 American Community Survey 3-Year Estimates, disaggregated at state level. The sample statistics show that the study somehow over-represented both female and white respondents in both states. With regard to age, generally the consumers under 44 years old were under-sampled, while those aged 55 and above were over-represented. However, the sample closely represented the population in terms of education attainment and income, with only exception of modestly higher percentage of respondents having a graduate degree and considerably less respondents in the lowest annual household income group. However, the sample can still be judged to be reasonably representative of the population.

Experimental Design

A Conjoint experiment was used to solicit consumer's preference. Consumers were asked to make a purchase choice in a hypothesized situation where two 12-ounce jars of blackberry jam with different attributes and prices were presented. In each choice situation, consumers were asked to indicate preference on one of the jars or unwillingness to purchase any (Figure 2).

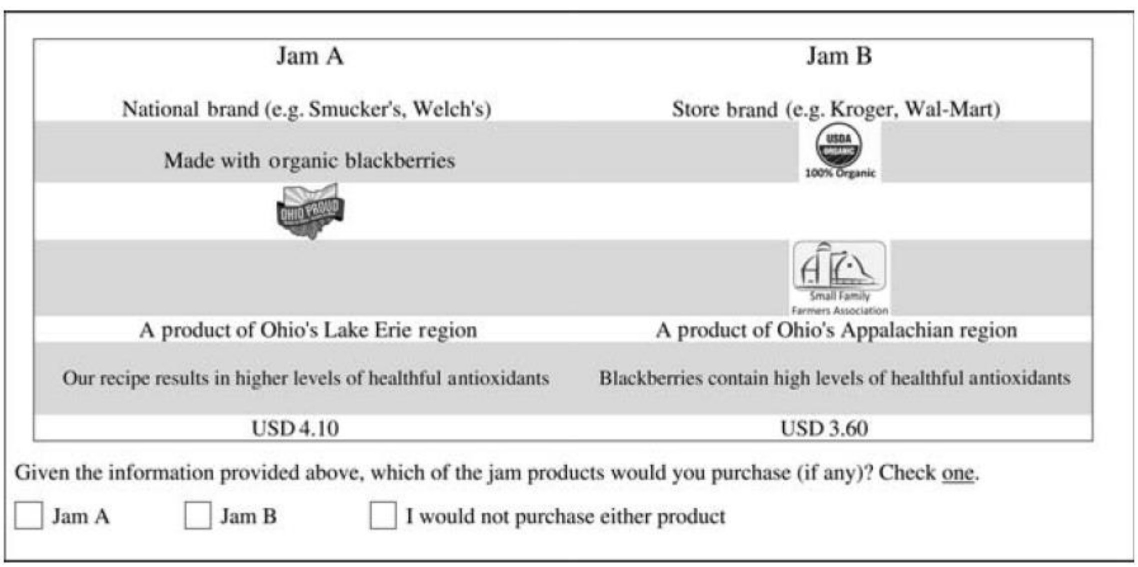

Figure 2. Experiment scenario and sample choice option

The two jars of blackberry jam were contrasted on seven attributes: brand, presence/absence of organic certification, nutritional claim, (fictitious) SFFA logo, *State Proud* logo, and multi-state or sub-state region of production, and purchase price. Five levels of price are determined, based on prices from local groceries and consultation with producers and marketing experts. Table 2 provides a list of the attributes and their respective considered levels. Based on the product attributes and their levels (3 brand descriptions × 4 organic certifications × 3 nutritionals claims × 2 SFFA levels × 2 *State Proud* levels × 5 regional claims × 5 price levels), a full factory design generated a total of 3,600 product profiles.

Table 2. Product attributes used in the conjoint experiment

Attribute	Level	Description
Brand	3	National brand
		Regional brand
		Store brand
Organic certification	4	100% organic
		At least 95% organic
		Made with organic ingredient
		[Blank]
Nutritional claim	3	Generic nutrition claim
		Firm-specific nutrition claim
		[Blank]
Small firm claim	2	Small family farm association (SFFA) logo
		[Blank]
State Proud logo	2	Ohio (or Kentucky) Proud logo
		[Blank]
Regional claim	5	Produced in Ohio Valley
		Produced in region A
		Produced in region B
		Produced in region C
		[Blank]
Price (US dollars per 12-ounce jar)	5	3.00, 3.25, 3.60, 4.10, 5.00

Two product profiles were paired; however, pairs containing all the same attributes except price were eliminated to improve efficiency of the design. Following Green and Srinivansan (1990)'s orthogonal fractional factorial design approach, each respondent was assigned three randomly selected pairs. In addition, variable printing techniques were use, which make each survey questionnaire unique in terms of the choice sets faced by each respondent. Finally, a total of 1,883×3=5,649 sets of observations were available for our analysis.

Results and Discussion

Part-worth Utility

Besides the seven attributes included in the experimental design, the study focuses on the potential substitution or complementarity between categories of attributes. The first group of interaction variables included those between organic and location (which was represented by *State Proud* logo and regional claims) attributes. On the other hand, *State Proud* logo and regional claims were independently designed in the experimental choices. Thus, it also allowed the test for their interaction in the model.

One of the many reasons consumers purchase organic and local food was to support local, small, family-own farms (Hughner et al. 2007). Furthermore, some view local food systems and small farms as synonymous (Hughes et al. 2007). Therefore, we were also interested in testing for the potential interaction between small family farm claim (represented by the SFFA logo) and organic and location claims.

Nonetheless, the last two categories of interaction variables were found to be highly insignificant and were therefore dropped and not reported in the final specification. Definition and summary statistics of the variables included in the final model are given in table 3.

Table 3. Summary statistics for variables (n=1,883)

Variable	Definition	Mean	Standard Deviation
Would not purchase	=1 if 'Would not purchase either product' is chosen	0.333	0.471
Price	Price in US dollars per 12-ounce jar	2.521	1.874
National brand [a]	=1 if displays a national brand	0.225	0.418
Regional brand [a]	=1 if displays a regional brand	0.219	0.414
100% organic	=1 if displays '100% organic' seal	0.168	0.374
At least 95% organic	=1 if displays 'At least 95% organic content' seal	0.166	0.372
Made with organic ingredient	=1 if labeled 'Made with organic blackberries'	0.168	0.374
Generic nutrition claim	=1 if displays a label 'Blackberries contain high levels of healthful antioxidants'	0.225	0.418
Firm-specific nutrition claim	=1 if displays a label 'Our recipe results in higher levels of healthful antioxidants'	0.221	0.415
Small family farm logo	=1 if displays a small family farm logo	0.333	0.471
State Proud logo	=1 if displays *State Proud* logo	0.331	0.470
Produced in Ohio Valley	=1 if labeled 'A product of Ohio Valley'	0.130	0.337
Produced in region A	=1 if labeled 'A product of region A'	0.135	0.342
Produced in region B	=1 if labeled 'A product of region B'	0.132	0.338
Produced in region C	=1 if labeled 'A product of region C'	0.135	0.342
Produced in my region	=1 if produced in the respondent's region	0.131	0.337
Interacting Variable			
100% organic *and* *State Proud* logo	=1 if displays '100% organic' seal *and* *State Proud* logo	0.084	0.277
At least 95% organic *and* *State Proud* logo	=1 if displays 'At least 95% organic content' seal *and* *State Proud* logo	0.084	0.277
Made with organic ingredient *and* *State Proud* logo	=1 if labeled 'Made with organic blackberries' *and* displays *State Proud* logo	0.080	0.272
100% organic *and* Produced in Ohio Valley	=1 if displays '100% organic' seal *and* labeled 'A product of Ohio Valley'	0.034	0.180
At least 95% organic *and* Produced in Ohio Valley	=1 if displays 'At least 95% organic content' seal *and* labeled 'A product of Ohio Valley'	0.032	0.176
Made with organic ingredient *and* Produced in Ohio Valley	=1 if labeled 'Made with organic blackberries' *and* 'A product of Ohio Valley'	0.034	0.180
100% organic *and* Produced in state region A	=1 if displays '100% organic' seal *and* labeled 'A product of region A'	0.034	0.181
100% organic *and* Produced in state region B	=1 if displays '100% organic' seal *and* labeled 'A product of region B'	0.033	0.178
100% organic *and* Produced in state region C	=1 if displays '100% organic' seal *and* labeled 'A product of region C'	0.034	0.180
At least 95% organic *and* Produced in state region A	=1 if displays 'At least 95% organic content' seal *and* labeled 'A product of region A'	0.035	0.183
At least 95% organic *and* Produced in state region B	=1 if displays 'At least 95% organic content' seal *and* labeled 'A product of region B'	0.031	0.174
At least 95% organic *and* Produced in state region C	=1 if displays 'At least 95% organic content' seal *and* labeled 'A product of region C'	0.035	0.183
Made with organic ingredient *and* Produced in state region A	=1 if labeled 'Made with organic blackberries' *and* 'A product of region A'	0.032	0.176
Made with organic ingredient *and* Produced in state region B	=1 if labeled 'Made with organic blackberries' *and* 'A product of region B'	0.034	0.182
Made with organic ingredient *and* Produced in state region C	=1 if labeled 'Made with organic blackberries' *and* 'A product of region C'	0.036	0.185

[a] Store brand was used as the reference group

For the ML model, all part-worth utility parameters were assumed to be random. Normal distribution was assumed for all other estimates except price. A negative price variable was used in the model instead of price and was restricted to be lognormally distributed. This is because theoretically the estimate for price variable was expected to be strictly negative, which means normal distribution cannot be assumed. However, using negative value of the price variable in the model reversed the expected coefficient estimate of price to be strictly positive. As a result, a lognormal distribution can be imposed on it (Hensher and William 2003).

Estimation results of the final specification of the CL and ML models are presented in table 4. Both CL and ML models gave highly significant estimation, based on McFadden's LRI statistics of 0.212 and 0.228, respectively (Louviere, Hensher and Swait 2000). The estimates in both models were also fairly consistent for most of the variables. Nonetheless, the study proceeds with more interpretation based on the ML model, as it generally revealed more information and the heterogeneity in consumer tastes.

A binary variable 'would not purchase' was included in the model, taking the value of one if option C 'would not purchase either product' was chosen in the choice set, and zero otherwise. This alternative represented the 'status quo' option, which can be used to interpret the tendency to accept the product in question (Burton et al. 2001). The results showed very consistent estimates in both models. In the ML model, the mean estimate of this variable was negative and highly significant. This implies that the survey respondents tended to purchase the blackberry jam presented. On the other hand, the estimated standard deviation was statistically insignificant, suggesting there was minimal variation with regard to such consumer tendency.

Table 4. Utility function parameter estimates

	CL		ML			
			Mean estimates		Standard Deviation Estimates	
Variable	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Would not purchase	-4.780 ***	0.175	-14.969 ***	2.359	0.074	4.945
Price (negative)			0.725 ***	0.099	0.825 ***	0.085
Price	-1.168 ***	0.036	-2.902 [a]		2.865 [a]	
National brand	0.586 ***	0.052	0.837 ***	0.103	0.113	1.999
Regional brand	-0.157 ***	0.053	-0.121	0.076	0.807 **	0.329
100% organic	0.008	0.149	0.465 **	0.203	0.010	4.191
At least 95% organic	-0.096	0.147	0.359 *	0.198	0.045	1.758
Made with organic ingredient	0.085	0.148	0.464 **	0.202	0.191	1.309
Generic nutrition claim	0.162 ***	0.052	0.228 ***	0.072	0.020	2.834
Firm-specific nutrition claim	0.150 ***	0.053	0.179 **	0.073	0.036	2.451
Small family farm logo	0.112 ***	0.043	0.186 ***	0.059	0.030	2.473
State Proud logo	0.008	0.085	0.231 **	0.114	0.064	1.419
Produced in Ohio valley	0.341 **	0.137	0.596 ***	0.186	0.182	0.603
Produced in region A	0.302 **	0.136	0.889 ***	0.191	0.051	1.037
Produced in region B	0.395 ***	0.135	0.815 ***	0.195	0.224	0.933
Produced in region C	0.296 **	0.138	0.771 ***	0.200	0.118	0.798
Produced in my region	0.040	0.058	-0.067	0.078	0.031	1.695
100% organic *and* *State Proud* logo	0.320 ***	0.120	0.351 **	0.162	0.049	1.669
At least 95% organic *and* *State Proud* logo	0.265 **	0.121	-0.080	0.159	0.065	1.090
Made with organic ingredient *and* *State Proud* logo	0.228 *	0.121	-0.041	0.162	0.312	0.632
100% organic *and* Produced in Ohio valley	-0.185	0.192	-0.508 *	0.261	0.116	1.239
At least 95% organic *and* Produced in Ohio valley	-0.015	0.192	-0.283	0.256	0.026	3.560
Made with organic ingredient *and* Produced in Ohio valley	-0.389 **	0.193	-0.513 **	0.259	0.062	3.225
100% organic *and* Produced in state region A	0.059	0.191	-0.473 *	0.256	0.020	2.609
100% organic *and* Produced in state region B	-0.125	0.190	-0.546 **	0.264	0.079	2.083
100% organic *and* Produced in state region C	0.099	0.191	-0.300	0.258	0.041	1.972
At least 95% organic *and* Produced in state region A	-0.105	0.189	-0.435 *	0.250	0.080	1.917
At least 95% organic *and* Produced in state region B	0.009	0.191	-0.209	0.259	0.002	4.231
At least 95% organic *and* Produced in state region C	0.099	0.191	-0.093	0.255	0.053	2.788
Made with organic ingredient *and* Produced in state region A	-0.165	0.193	-0.430 *	0.257	0.264	1.035
Made with organic ingredient *and* Produced in state region B	-0.197	0.189	-0.198	0.254	0.041	1.207
Made with organic ingredient *and* Produced in state region C	-0.049	0.190	-0.231	0.257	0.137	0.750
Number of respondents	1883		1883			
Number of observations	5649		5649			
Log-likelihood function	-4893		-4791			
McFadden's LRI	0.212		0.228			

* Significance at the 10% level; ** Significance at the 5% level; *** Significance at the 1% level.

[a] Derived from the mean and standard deviation estimates of $ln\,\beta_{-price}$; the corresponding estimates for β_{price} are therefore: Median= -2.065, Mean= -2.902, Standard deviation=2.865.

The mean (m) and standard deviation (s) estimates of the variable negative price were both highly significant. Note, however, that these two estimates were moments of the normal distribution of the log of coefficient ($\ln \beta_{-price}$). The corresponding median ($\exp(m)$), mean ($\exp(m + S^2/2)$) and standard deviation ($\sqrt{\exp(2m + s^2)\,[\exp(s^2) - 1]}$) were derived and reported and signs were modified accordingly. The estimate of this price measure showed that the higher the price was, the less likely the product will be selected.

Brand was considered at three levels: national (e.g. Smucker's, Welch's), regional (e.g. Windstone farm) and store brand (e.g. Kroger, Wal-mart). Store brand was used as the reference group. The results from both models show that consumers were more likely to choose blackberry jam labeled with a national brand than the jam with a store brand, with the mean estimate of the part-worth utility being positive and highly significant. The standard deviation, on the other hand, was found to be insignificant, suggesting that there was no difference among the sampled consumers in this preference.

The part-worth utility mean estimate for regional brand was insignificant, but the standard deviation was found significant. This suggests that there was mixed preference between the products with a regional and a perhaps more familiar store brand. While half of the respondents were likely to choose a regional branded product, the other 50% preferred that with a store brand. On one hand, this may be a result of low awareness of the considered regional brand among the surveyed consumers. On the other hand, this may imply that the effort to brand a product as regionally (or locally) produced based on commercial brand names alone may not be effective, as compared to a more explicit location logo or description such as those considered in the location attributes.

USDA ORGANIC 100% Organic	USDA ORGANIC
NOP organic seal with 100 per cent organic designation	NOP organic seal

Figure 3. Organic logos appearing in the conjoint experiment

In this study, organic attribute was considered at four levels. This attribute was represented by the National Organic Program (NOP) seal which was developed, implemented and administered by USDA. In the U.S., this program oversees production, handling and labeling standard of organic food. A lone NOP organic seal (without any description) can be used to label products containing at least 95% organic ingredients by volume (Figure 3). The highest level of organic content indication was represented by a NOP seal with the '100% organic' words. Also, a third organic level was represented by only the words 'made with organic blackberries' but without the NOP seal. The absence of organic labeling was used as the excluded level. Although many studies have compared the WTP for organic certification logos under different systems (Miran et al. 2012; Janssen and Hamm 2012), few known studies have investigated organic content claim at different levels, except that of Batte et al. (2007).

Organic logos not only support a credence claim of the product but also carry price premium (Golan, Kuchler and Mitchell 2001). So, as expected, all the part-worth utilities of the three organic variables were both positive and significant while their standard deviation estimates were insignificant. Compared with products having no organic information, those which were labeled 100% organic and 'made with organic blackberries' almost equally increased the likelihood of them being selected, while the lone NOP seal implying being at least 95% organic was comparatively less likely to influence consumer choice. These results could lead to two potential interpretations. First, it may suggest that consumer awareness of the NOP seal in the absence of reinforcing description may still be low. Second, a label with additional description may be even more effective than a logo itself, as shown that consumers were more likely to choose the jam ‘made with organic blackberries’ than the jar with a mere NOP seal.

Labels of nutritional claim were also included in the design because such kind of labels has been found to have significant effect on purchasing behavior (Teisl, Bockstael and Levy 2001). Two nutrition labels were presented as opposed to a no label situation. The first was a generic claim that labels ‘blackberries contain high level of antioxidants’. The other label indicated that ‘our recipe results in higher levels of healthful antioxidants,’ which is a firm-specific claim linked to the firm’s unique production process. The mean estimates of both labels showed high significance in both models, while the standard deviation estimates were highly insignificant (*p*-values were close to 1). This implies that all consumers positively valued nutritional claims, but they did not appreciate the firm-specific claim more than the generic claim.

A fictitious SFFA logo was also used to test whether respondents were more inclined towards products from small family farms. This attribute was represented by the presence or absence of the SFFA logo. Similarly, estimate in both CL and ML models were highly significant, and no heterogeneity in taste was detected in the ML model. This result again confirmed the preference consumers place on products from small family farms, as similar to what was suggested in previous work by Darby et al. (2008).

For local food claims, we identified producing state as one of the location attributes. Different wordings or logos have been invariably used to identify products at a state level (Onken and Bernard 2010). Among them, *State Proud* logos have been adopted in the states of Kentucky, Colorado and Ohio since 1990, 1991, and 1993, respectively. Like similar programs in other states, these programs have always been promoted and labeled as buying local. It is argued that, in addition to quality, purchasing products produced, grown, or raised in home state helps to keep money in the state's local economy (Ohio Department of Agriculture 2008, Colorado Department of Agriculture 2013, Kentucky Agriculture Department 2013).

The mean estimate of this variable was highly significant in the ML model. With insignificant standard deviation estimate, it showed that respondents all favored the blackberry jam produced in their home state. This finding again confirmed the usefulness of using state program initiatives in product marketing to influence consumers' purchasing behavior, as already shown by previous work such as that of Darby et al. (2008).

The second location attribute considered was a multi-state or sub-state regional claim. The former claimed the product as being produced in the Ohio Valley, an undefined region which could possibly include the following six states: Pennsylvania, West Virginia, Ohio, Kentucky, Indiana and Illinois (Ohio Valley Foodshed 2010 in Hu et al. 2012). Onken, Bernard and Pesek Jr (2011) also suggested that 'buy local' promotions be targeted at small geography areas such as county or state region. With this regard, the state regional claim was represented by three regions (Region A, B and C) identified in each state, approximated by their distinct cultural catchment areas and geographical characteristics.

Region A consists of the 36 western counties of Kentucky or the 29 northwest counties of Ohio. This region approximates the Corn Belt region of each state, and tends to be more rural and agriculture based, resided by 25 per cent and 26 per cent of the population in Kentucky and Ohio, respectively. Region B includes 46 counties in the central (Bluegrass) region of Kentucky or 29 counties of the north-central Ohio. These larger metropolitan areas of both states have over half of the Kentucky (53 per cent) and Ohio (54 per cent) populations. Region C approximates the Appalachian regions of either state (28 and 30 counties in Kentucky and Ohio, respectively).

This region is characterized by its low population density (22 per cent of Kentucky's and 20 per cent of Ohio's populations).

Unsurprisingly, the estimates for these multi- and sub-state regional claims were positive and highly significant. Indication of products as from Ohio Valley was also found to have positive influence on consumers' choice as opposed to no region indication. In the ML model, products labeled as being from region A were the most likely to be selected, followed by those claimed to be produced in region B and C.

Compared to Ohio Valley, the labeling of products as being produced in other state regions had even stronger effect, as all of the three part-worth utility estimates were comparatively higher. Note also that these regional claims of smaller geographical areas increased the likelihood that a product being selected even higher than the *State Proud* logo. These results imply that, although consumers accepted a larger location claim, they would still value much smaller regional definition of 'local'. Such finding was also consistent with the perceived shorter 'local' distance found by Hu et al. (2010) in their survey on Ohio consumers.

In addition to the two explicit location attributes designed in the choices, an interaction term was also later included in the model to test whether being a product made in the respondent's region of residence increased the likelihood of it being purchased. This was represented by a binary variable taking the value of 1 when the sub-state regional claim appearing on the product choice was the region where the respondents live. Surprisingly the part-worth utility estimate was highly insignificant and practically close to zero. This may suggest that consumers attached no higher value on products made in their own region. However, this result should be interpreted cautiously. Since the attribute was not explicitly described in the choices offered, there is reason to suspect that the result may be different should the attribute be clearly indicated in the choice design.

The interaction variables between organic and the two location attributes offered interesting results. As also shown in table 4, we found the presence of both 100 % organic and *State Proud* logo to complement each other. The part-worth utility estimate was positive and significant (*p*-value=0.03) with an insignificant standard deviation estimate in the ML models and was also consistent with the estimate in the CL model. However, although the interaction variables between other organic claims and *State Proud* logo were found to be insignificant in the ML model, the result in the CL model suggested otherwise. This estimates in the CL model indicated that these two levels of attributes together would boost higher likelihood of the product being accepted. Given the large part-worth utility estimates of the interaction variables as compared to those of the organic claims and *State Proud* logo, producers and marketers should consider offer products with both attributes in order to take advantage of their complementarity nature.

In contrast, the results from both models indicated that the co-presence of organic and Ohio Valley claim instead generated negative effect. This detrimental effect was so large that it offset the positive effect associated with one of the two attributes concerned. For this reason, producers or marketers would be better off considering marketing products with only any one of the two attributes. Doing so would avoid incurring extra labeling costs when extra benefits were not expected.

Less clear result was found with respect to organic and state region claims. While the CL model showed no significant substitution or complementarity pattern between the two attributes, the ML model indicated that they too together had some negative effect. Negative part-worth utility estimates were detected for the co-presence of certain organic and regional levels. In general, region A was found to be a substitute of all levels of the organic label, while the interaction between region B and 100% organic was also negative. Again the effect was likely large that it would offset the positive effect generated by the organic labels or state regional claims. Unlike with other two regions, the interaction of organic labels with region C was not significant. This may imply that consumers have a high value on products from the Appalachian region. In general, producers should be cautious with regard to marketing products as both organic and regionally local, as consumers may feel indifferent towards a locally branded product with added organic feature. Similar negative interaction effect between organic and locally grown tomatoes was also detected by Yue and Tong (2009) in Minnesota consumers.

Nonetheless, the finding obtained from the examination of interaction variables may not provide very solid evidence. As can be inferred from the mean statistic of the interaction variables in table 3, the numbers of observations in which the two labels examined for each interaction variable appear together in the choice were comparatively low. This may accounted for the insignificant estimates of some part-worth utility parameters.

Willingness to Pay

WTPs for considered attributes were calculated from equation (3), using the coefficients estimated in both the CL and ML models. The WTP measures translate the part-worth utility estimates into dollar values for each attribute level. Although price variable was treated as a random variable in the ML model estimation, the WTP derived for the ML model was based on the mean estimate of price. The corresponding WTP are presented in table 5.

Table 5. Mean WTP estimates (USD/12-ounce jar)

Variable	WTP CL	WTP ML
Would not purchase	-4.09	5.16
National brand	0.50	0.29
Regional brand	-0.13	0.00 [a]
100% organic	0.00 [a]	0.16
At least 95% organic	0.00 [a]	0.12
Made with organic ingredient	0.00 [a]	0.16
Generic nutrition claim	0.14	0.08
Firm-specific nutrition claim	0.13	0.06
Small family farm logo	0.10	0.06
State Proud logo	0.00 [a]	0.08
Produced in Ohio valley	0.29	0.21
Produced in region A	0.26	0.31
Produced in region B	0.34	0.28
Produced in region C	0.25	0.27
Produced in my region	0.00 [a]	0.00 [a]
100% organic *and* *State Proud* logo	0.27	0.12
At least 95% organic *and* *State Proud* logo	0.23	0.00 [a]
Made with organic ingredient *and* *State Proud* logo	0.20	0.00 [a]
100% organic *and* Produced in Ohio valley	0.00 [a]	-0.18
At least 95% organic *and* Produced in Ohio valley	0.00 [a]	0.00 [a]
Made with organic ingredient *and* Produced in Ohio valley	-0.33	-0.18
100% organic *and* Produced in state region A	0.00 [a]	-0.16
100% organic *and* Produced in state region B	0.00 [a]	-0.19
100% organic *and* Produced in state region C	0.00 [a]	0.00 [a]
At least 95% organic *and* Produced in state region A	0.00 [a]	-0.15 [a]
At least 95% organic *and* Produced in state region B	0.00 [a]	0.00 [a]
At least 95% organic *and* Produced in state region C	0.00 [a]	0.00 [a]
Made with organic ingredient *and* Produced in state region A	0.00 [a]	-0.15 [a]
Made with organic ingredient *and* Produced in state region B	0.00 [a]	0.00 [a]
Made with organic ingredient *and* Produced in state region C	0.00 [a]	0.00 [a]

[a] The part-worth utility estimate was not significantly different from zero.

Generally, depending on the attributes revealed by the labels and the model used, consumers were willing to pay between USD 0.06 and 0.50 more per jar for the blackberry jam. Based on the ML model, a jar of national branded jam would carry a premium of about USD 0.29 more than the same product presented with a store brand. In terms of other attributes, consumers were apparently willing to pay more for regionally produced blackberry jam (USD 0.27 to 0.31). Similar products from Ohio Valley would command a premium of USD 0.21 more per jar, as compared to products without production location indication, while a *State Proud* logo would increase the price by only 8 US cents. For organic blackberry jam, consumers were willing to pay from 12 to 16 US cents more per jar. This indicated lower level of WTP for organic attributes than local food claims. Again, this result is very consistent with the finding in recent literature, which has suggested that consumers attached higher value on locally grown/produced food products than their organic counterparts (Hu, Woods and Bastin 2009; Loureiro and Hine 2002; James, Rickard and Rossman 2009).

The study also gives evidence of complementarity and substitution between organic and local food claims. As revealed by the WTP measure, blackberry jam products labeled as 100% organic with a *State Proud* logo would boost an extra 12 US cents in addition to the 16 and 8 cents associated with each individually label. Conversely, jam that was 100% organic and marketed as from Ohio Valley would command USD 0.18 less than the combined premium of USD 0.16 and 0.21 attached to each individual label. Similarly, consumers would also discount the total amount they were willing to pay for a jar of jam labeled as both organic and produced regionally, by between 15 and 19 US cents.

On the other hand, testing of the interaction between the two location attributes (*State Proud* logo and Ohio Valley or state regions) and between SFFA logo and organic or local claims in the other model specifications showed no statistical significance. This finding suggests that the combination of any of these insignificantly interacting labels may be introduced onto a single product without the risk of the combined premium being discounted by consumers.

Summary and Conclusion

Understanding consumer preferences for relevant product attributes is key to production and marketing success. Firms engaged in product differentiation to provide higher value-added product must constantly seek for the attributes that are most attractive to consumers. Understanding WTP is also critical to profitable production and marketing decisions.

Using the survey data from Kentucky and Ohio, the study found that consumers generally were willing to pay more for a host of attribute labels attached to the blackberry jam product. When it came to product brand, it was revealed that consumers would prefer a more reputable and well-known national brand to either a regional or store brand and were willing to pay a significant amount of premium (29 US cents) for the product with a national brand. In addition, we found that consumers also attached extra values to products that were claimed to have positive nutritional values. Product from small family farm, which was represented by a (fictitious) SFFA logo, was also found to be more likely to be accepted by consumers.

Our study is also one of the first to test consumers' perception on labels indicating different levels of organic content. The result showed that organic certification was an important factor positively influencing consumers' choice, although the premium attached to each label was not as high as we had expected (USD 0.12 to 0.16 per jar). Interestingly, it was revealed that consumers were more likely to choose blackberry jam that was 100% organic or labeled as 'made with organic blackberries' than that with a lone NOP organic seal which implies at least 95% organic content. This finding holds very important implication for producers, marketers and the National Organic Program administrators. Producers and marketers should not only label their products with a NOP seal but should also attach extra description with it, in order to reinforce the message the label intends to deliver. On the other hand, information campaign should be run in order to raise the awareness of the NOP seal or the program administrators should consider incorporating a description with the seal.

Our finding on high consumer preferences on the labels signifying different levels of local production was unsurprising. Three levels of local production claims were considered: sub-state, state and multi-state. We found that, although consumers were willing to pay for products identified at all three levels, higher WTP was indicated for those products produced in smaller regions (27 to 31 US cents for sub-state regions as opposed to only 8 US cents for *State Proud* logo). However, the study also showed that consumers did not particularly favor products produced in the region of their own residence.

In addition to evaluating each single label, the study particularly extends to investigate the interacting effect between attributes. To our results, organic certification and *State Proud* program appeared to be complementary, while some state regional claims were found to be substitutes for organic labels. Most importantly, the complementary or substitution effect detected was quite large as compared to the effect of each concerned attribute. Nonetheless, we did not find any significant interacting effect between the two location attributes, neither that between small family farm logo and organic or local labels. Our finding regarding these interacting effects provides foundation for appropriate methods promoting local and organic food. Recognizing that not all labels generally perceived as desirable by consumers would work in sync, policy makers and producers could better target their promotion strategies. With properly focused product information, consumers may not need to engage in lengthy searching process and also avoid information overload.

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