Consumer Preferences for Locally Made Specialty Food Products Across Northern New England

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Does willingness to pay a premium for local specialty food products differ between consumers in Maine, New Hampshire, and Vermont? Two food categories are investigated: low-end ($5) and high-end ($20) products. Premia estimates are compared across states and across base prices within states using dichotomous choice contingent valuation methods. Results suggest that the three states of northern New England have many similarities, including comparable price premia for the lower-priced good. However, there is some evidence that the premium for the higher-priced good is greater for the pooled Vermont and Maine treatment than for the New Hampshire treatment. Vermont and New Hampshire residents are willing to pay a higher premium for a $20 than for a $5 food item, while the evidence suggests that Maine residents are not.

Key Words: local specialty foods, willingness to pay, contingent valuation

The states of northern New England—Maine, New Hampshire, and Vermont—often conjure images of lobsters, blueberries, and maple syrup for residents and visitors alike. Indeed, the distinct style of locally grown and produced specialty food items contributes to the economic vitality of the region. The governments of both Maine and Vermont and the citizens of New Hampshire have recognized these contributions and have correspondingly implemented marketing programs for locally labeled produce and specialty foods in an effort to improve the regional economy, increase local employment, and promote agriculture in the area.

The demand for specialty foods has been especially strong in recent years, and it is estimated that one in five U.S. households can be classified as a medium to heavy consumer of specialty food items (Kezis et al. 1997). However, very little research has been conducted to investigate state-made product preferences for items other than fresh produce, nor has extensive research been done to identify preferences for local goods in the New England region. As such, this paper extends the literature by investigating the preferences of northern New Englanders for locally produced specialty food products. Following Peat et al. (1990), we define a specialty food to be a value-added, premium-priced item that is distinguished in terms of one or more characteristics such as the quality of ingredients, sensory appeal, origin, presentation (including branding or packaging), and product formulation.

The objective of this paper is to address the question of whether northern New England residents express preferences that favor state-made specialty goods over imported substitute goods, and if so, what price premium can be supported. In the absence of well-defined local product differentiation in actual market data, the question of consumer willingness to pay (WTP) is addressed using the contingent valuation method. We treat the state of origin as the sole distinguishing quality attribute of an otherwise homogeneous good, and estimate the value of that attribute. The heterogeneity of consumer perceptions across states is discussed, and local price premia that consumers are willing to pay are estimated for both a

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relatively low and high priced specialty food. The premia are then tested for equivalence across states and across goods.

The paper proceeds as follows. The next section discusses local labeling programs and previous literature regarding preferences for locally grown goods. The model, based on a contingent valuation type question, is then described, followed by a brief discussion of the survey design. Basic survey results are then presented, including demographics and consumer perceptions of locally grown food products. Next, findings on consumer willingness to pay for local attributes are presented. The final section concludes and summarizes the results.

Review of Local Labeling Programs Research

Following the success of state-funded local labeling programs in states such as New Jersey ("Jersey Fresh") and Tennessee ("Tennessee Proud"), Govindasamy, Italia, and Thatch (1999) report that as many as 23 states have enacted their own local labeling and marketing campaigns in an effort to increase sales of locally grown or processed food. In addition, several studies find that consumer loyalty for local products is enhanced by awareness of local goods and state labeling and promotion programs (Wolfe and McKissick 2001, Govindasamy, Italia, and Thatch 1998, Jones, Batte, and Schnitkey 1990, Brooker and Eastwood 1989). This indicates that state labeling programs have the potential to successfully differentiate local goods and increase niche market sales if target consumers are exposed to promotional material.

Promotion of state-labeled produce and processed goods is found to take several forms, including labeling of goods, in-store display/signs, television advertising, and sampling (Wolfe and McKissick 2001, Govindasamy, Italia, and Thatch 1998, Thomas, Handcock, and Wolfe 2001). Two studies found that in-store taste tests and sampling were particularly effective methods of promoting local produce and processed foods (Wolfe and McKissick 2001, Kezis et al. 1997). Kuryllowicz (1990) reports that 70 percent of all customers in specialty food stores will accept a sample and that nearly one-fourth will buy the product after sampling. Regardless of the method of promotion, many studies, including Loureiro and Hine (2002), Govindasamy, Italia, and Thatch (1998), Brooker and Eastwood (1989), Wolfe and McKissick (2001), and Jekanowski, Williams, and Schiek (2000), indicate that informing consumers of the relatively high quality and freshness of local goods is the most effective way to advertise state-made or state-grown goods. By emphasizing the relative attributes of state-made or state-grown goods, consumers may be educated to differentiate between local goods and imports, and thus shift their preferences towards locally produced goods (Eastwood, Brooker, and Orr 1987).

Successful differentiation causes local brands to be more appealing, and may result in a price premium that can be measured as a consumer's additional willingness to pay (Jekanowski, Williams, and Schiek 2000). Several studies find that consumers are willing to pay a premium for fresh local produce,[1] and a few, including Govindasamy, Italia, and Thatch (1999) and Wolfe and McKissick (2001), query consumers about the approximate size of the premium they would support as a percentage over the base price. Loureiro and Hine (2002) extend the literature by using contingent valuation methods to quantify consumer additional willingness to pay for locally grown, organic, and GMO- (genetically modified organisms) free potatoes. We follow this lead and employ dichotomous choice contingent valuation methods to measure consumers' willingness to pay a price premium for the local quality attribute; however, we extend the literature by estimating price premiums for specialty goods, rather than for fresh local produce. In addition, we compare premia across sub regions of northern New England.

The Contingent Valuation (CV) Model

Following Hanemann (1984) and utilizing the models in Hanemann and Kanninen (1999), we now present the basic binary-choice utility mod-

[1] Survey responses collected by Loureiro and Hine (2002), Govindasamy, Italia, and Thatch (1999), Wolfe and McKissick (2001), Jekanowski, Williams, and Schiek (2000), Schupp and Dellenbarger (1993), Brooker et al. (1987), and Brooker and Eastwood (1989) indicate that consumers would be willing to pay a premium for locally produced fresh produce.

els used in this analysis to estimate consumer willingness to pay for local specialty goods. Suppose an individual n is faced with a choice between i (buying the local specialty food product) and j (the non-local specialty food product). Product j costs $\$A$ and product i costs $\$A + \$B$, where $\$B$ represents the potential price premium for the local good.

Individual n derives utility U_{in} by choosing alternative i and U_{jn} by choosing alternative j. Formally, consumer utilities U_{in} and U_{jn} can be represented through unobservable indirect utility functions as follows:

$$U_{in} = v(1,\ I_n - A - B,\ S_n) + e_{in} \tag{1}$$

$$U_{jn} = v(0,\ I_n - A,\ S_n) + e_{jn}\ , \tag{2}$$

where e_{in} and e_{jn} are assumed random components of U_{in} and U_{jn}, respectively. $\mathbf{S_n}$ represents a vector of observable socio-economic attributes of individual n that might affect her/his preferences, and I_n represents income.

To estimate the additional maximum willingness to pay for product i, the probability of individual n choosing alternative i is defined as

$$P_n(i) = \Pr(U_{in} \geq U_{jn}). \tag{3}$$

After substituting equations (1) and (2) into (3), we obtain

$$P_n(i) = \Pr\{e_{jn} - e_{in} \leq v(1,\ I_n - A - B,\ S_n) - v(0,\ I_n - A,\ S_n)\}. \tag{4}$$

The specific parameterization of the probability model described in (4) depends primarily on the functional form of the indirect utility function and the underlying distribution of the error terms. In this study, we examine two specifications, both of which assume a non-negative willingness to pay for the local attribute, constrained to be less than income (Hanemann and Kanninen 1999). Under the assumption that the error terms are logistically distributed, the multiplicative model admits the following function that describes the probability that individual n will choose alternative i:

$$P_n(i) = [1 + \exp(-\alpha S_n - \delta \ln(B))]^{-1}. \tag{5}$$

Equation (5) simply describes a standard logit model with the natural log of the bid amount as an independent variable, where α is a vector of parameters and δ is a parameter to be estimated. Note that the $\mathbf{S_n}$ can (and will, in the empirical estimation) include a constant term. Median individual willingness to pay for individual n can then be expressed as

$$WTP_n = \min\ (I_n\ ,\ \exp(-\alpha S_n/\delta)). \tag{6}$$

As can be seen from (6), this specification ensures that median willingness to pay is non-negative with a range of zero to I_n, inclusive.

Similarly, assuming that the error difference in (4) is a standard logistic and linear indirect utility functions, the probability that individual n chooses alternative i is expressed as the following standard logit model:

$$P_n(i) = [1 + \exp(-\alpha S_n - \delta B)]^{-1}\ , \tag{7}$$

with corresponding willingness to pay of

$$\begin{gathered} 0 \text{ if } \alpha S_n \leq 0, \\ WTP_n = I_n \text{ if } -\alpha S_n/\delta \geq I_n\ , \\ -\alpha S_n/\delta \text{ otherwise.} \end{gathered} \tag{8}$$

Note that the willingness to pay expression in (6) incorporates a probability spike such that willingness to pay never exceeds income, and the expression in (8) incorporates this and a similar spike at the theoretical minimum of zero. While it is included in the standard logistic, income is not included as a covariate in the linear model.

The Survey

During the spring of 2002, five focus groups were conducted across New Hampshire to identify key issues and characteristics of locally produced goods and services. From this information, a survey was designed and pre-tested on 300 individuals at the "Made in New Hampshire" Expo and around the state. In the summer of 2002, five hundred surveys were mailed to a representative sample of households across New Hampshire, using the series of mailings described in the Dill-

man Tailored Design Method (Dillman 2000).[2] The mailings included an announcement letter, followed one week later by a complete survey with a personalized cover letter and a $1 bill. Households that did not respond to the first survey were mailed a reminder postcard two weeks later, followed by a second survey. After accounting for undeliverables, we received 266 completed surveys, for an overall response rate of 59 percent. Following the success of the New Hampshire survey, additional funding was obtained, and the study was expanded to Maine and Vermont. During the winter of 2003, one thousand surveys were mailed to representative samples of Maine and Vermont (500 to each state). This resulted in 269 usable surveys from Maine and 261 from Vermont, corresponding to a response rate of 60 percent and 58 percent, respectively. The samples did not include out-of-state tourists because the overall goal of the research was to provide information to the "New Hampshire Made" program for use in in-state advertising. Obtaining data from out-of-state visitors to the three states was desirable, but the difficulties in obtaining a representative sample outweighed the benefits of including that segment for the time being.

The survey began with an identification of the preferences of the respondent towards the state of residence in general, followed by several Likert-scale questions regarding local and specialty shopping opinions.[3] Next, respondents were asked if they had purchased various locally produced goods and services in the previous 12 months, if they knew where to find these items, and if the locations were convenient to them. This was followed by a contingent valuation type question that asked about additional willingness to pay for a locally made specialty food item. Half of the surveys referred to a good priced at $5 per unit, while the other half were for a $20 per unit item. The values were chosen through consultation with the staff in the New Hampshire Made program (New Hampshire Stories, Inc.) and through a survey of prices of local specialty food products carried in local shops. The question posed to each individual was as follows:

> Let's say you want to buy a specialty food product (maple syrup, salsa, cookies, etc.) and saw two kinds in a store. Both were the same quality and cost $*A*.
>
> One was made in New Hampshire and one was made out of state. Which would you buy?
>
> ❒ either one, it doesn't matter
> ❒ the New Hampshire food
> ❒ the out of state food
>
> If the food product you chose above cost $ *B* more than the other one, would you still buy it?
>
> ❒ yes ❒ no

The bid values for "*B*" were filled in prior to the survey mailing, and ranged from $1 to $5 for both the $5 and $20 good. The pre-test surveys included a wide range of dollar amounts (from $1 to $20) to find the appropriate range to estimate the willingness to pay for a local product premium. After rounding to the nearest dollar, the ranges were approximately equal for the $5 and $20 food items and corresponded closely to Kanninen's (1995) suggestion that the bid distribution cover the 15th to the 85th percentile of the distribution. The last food question asked if the respondent had ever been unhappy with a local specialty food product. The survey finished with a request for socioeconomic information and room for general comments.

Demographics and Consumer Perceptions

Before describing the consumer perceptions and buying patterns, it is useful to know that the local branding programs in Maine, New Hampshire, and Vermont are quite different from one another. Maine products are marketed through the "Maine Made: America's Best" program (see http://www.mainemade.com), housed in the Maine Department of Economic and Community Development. In New Hampshire, local products and services are marketed through New Hampshire Stories, Inc., a non-profit membership organization, and the "New Hampshire's Own: A Product of Yankee Pride" slogan (see http://www.nhmade.com). The Vermont Department of Agriculture, Food and Markets manages the "Vermont Seal of Quality" (see http://www.vermontagriculture.com/aboutsoq.htm). The programs in Maine and Vermont are firmly established as they are operated by state agencies and have existed for more than a decade, whereas the New Hampshire

[2] The list of names and addresses for each state was purchased from Survey Sampling, Inc., of Fairfield, Connecticut.

[3] Respondents were asked to circle a number between 1 (strongly disagree) and 5 (strongly agree), or to choose "don't know."

program is relatively new, with much more modest state support.

Table 1 displays a comparison of the respondent demographics with the 2000 Census Bureau Data for the states of Maine, New Hampshire, and Vermont. While some statistics are not directly comparable (for example, only adults over 18 were sampled), some differences should be noted. Survey respondents from this study—as in the majority of mail survey research (Miller 1983)—generally have more education and higher annual income, and are more likely to be male. This is common for two reasons, but should be noted when extrapolating survey results to the general population. First, when sampling households, one is more likely to address the male head of household in the identification and mailing process, and second, individuals with lower levels of education may have difficulty with the reading and writing of a paper survey (Miller 1983).

Table 2 summarizes the results from the section of the survey that questioned knowledge and convenience of locally made agricultural and specialty food products. In order to compare results across states, statistical analysis of the percentage of those that answered "yes" was performed using simple paired t-tests.[4] Survey responses from the three states reveal differences in shopping patterns and perceptions of the markets that sell local food products. Of particular note is that the percentage of New Hampshire respondents who know where to purchase state-produced specialty food products or find it convenient to do so is significantly less than that of Maine and Vermont respondents in every category (at 5 percent or better). Residents of Maine and Vermont tend to have similar levels of purchasing behavior and knowledge of and perceptions of convenience of agricultural markets, at least at the 10 percent level of significance. Maine and Vermont differ from one another in their knowledge of and perception of convenience of local specialty food markets. This finding is not surprising given that both Maine and Vermont have relatively well established local good promotion programs that are housed within state agencies and funded by state revenues. Vermont's program is housed in its Agency of Agriculture, Food and Markets, which implies that Vermont has a stronger focus on agriculture and specialty foods, while Maine widens its focus to food and handcrafts. New Hampshire's local good promotion program and "New Hampshire's Own" also broadens their focus across food and handcrafts, and its slogan is comparatively new (established in the fall of 2002). New Hampshire's program is also supported by a private non-profit organization as opposed to a state program.

Willingness to Pay a Premium for Locally Produced Specialty Food Products

In order to estimate the price premium for locally produced specialty food, equations (5)–(8) were estimated for the homogeneous $5 and $20 specialty food product for each of the three states in northern New England. To be conservative, the binary-dependent variable was set to a value of one if and only if the respondent indicated that she or he would purchase the local good with the $1–$5 price premium, and set to zero otherwise. Tables 1 through 3 characterize the raw data used in the analysis.

The vector of socio-economic attributes, $\mathbf{S_n}$, used in the models include *Prolocal*, a sum of the Likert-scale questions that indicate that the respondent supports buying local goods, the respondent's age in years (*Age*), the education level in years (*Ed*), the number of household members under the age of 18 (*HHyoung*), the number of years residing in current state (*Howlong*), a Likert-scale response to the statement that farmers markets, a source of specialty food products, are hard to find (*Hardtofind*), and a function of the amount of money that the local product costs above the non-local food product of equal quality (*ln(Bid)* for the multiplicative model, *Bid* for the linear model). For the multiplicative model, the natural log of median household income (*ln(Inc)*) was included as well. Explanatory variables used in the analysis follow the model specified in Loureiro and Hine (2002).

For each good ($5 and $20) and each geographic stratification (Maine, New Hampshire, and Vermont), pooled likelihood ratio tests were performed to detect model differences across states. As seen in Table 4,[5] individual state results

[4] Paired t-tests were performed using the data analysis tool in Microsoft Excel. The paired t-tests used were "two samples, assuming unequal variances."

[5] Test results shown are for the multiplicative model. Results for the linear model are qualitatively equivalent, and are thus omitted here; they are available from the authors.

Table 1. Respondent Demographics

	Maine		New Hampshire		Vermont	
	Actual[a]	Survey	Actual[a]	Survey	Actual[a]	Survey
Median age	38.6	53	37.1	53	37.7	52
Highest level of education (in percentage of sample)						
Less than 9th grade	5.4	4.2	3.8	2.0	5.1	2.3
High school graduate	45.5	35.5	38.8	30.0	40.8	30.2
Associate's degree	26.3	19.8	28.7	20.0	24.7	17.8
Bachelor's degree	14.9	22.7	18.7	28.0	18.3	27.4
Graduate or professional degree	7.9	17.8	10.0	20.0	11.1	22.3
Median household income	$37,240	$54,958	$49,467	$71,606	$40,856	$59,687
Gender (percentage of sample)						
Male	48.7	56.9	49.2	63.1	49.0	69.2
Female	51.3	43.1	50.8	36.9	51.0	30.8
Average household size	2.39	2.6	2.53	2.7	2.44	2.5
Children (under 18) in household	0.58	0.6	0.64	0.7	0.61	0.6

[a] U.S. Census Bureau (2001).

Table 2. Comparing Consumer Perceptions of State-Made Food Products Across Northern New England

	Percentage that said "yes"		
	Maine	New Hampshire	Vermont
Have you purchased a state-grown *agricultural* product in the last 12 months? (fruit, vegetables, dairy, etc.)	94	91[a]	95
Do you know where to find state-grown *agricultural* products?	90	85[a]	93
Do you know where to find state-made *specialty foods*?	69[a]	52[a]	87[a]
Is it convenient to buy state-grown *agricultural* products?	72[a]	67[a]	79[a,b]
Is it convenient to buy state-made *specialty food* products?	52[a]	42[a]	72[a]
Have you ever been unhappy with a state *specialty food* product?	15[a]	4[a]	12[a,b]

[a] Statistically different from the other states at the 5 percent level.
[b] Not different from Maine at the 10 percent level.

Note: For each question, the survey specified the name of the state in which the respondent lived.

Table 3. Percentage of Survey Respondents Who Would Buy the Local Food Product

	Maine		New Hampshire		Vermont	
Base cost of food	$5	$20	$5	$20	$5	$20
Would buy local food	90.9	90.6	84.6	80.6	96.2	91.3
Would buy local food if $1 more	59.4	72.4	48.3	58.1	56.8	72.2
… if $2 more	40.0	40.0	16.7	40.0	29.2	44.0
… if $3 more	21.2	35.5	12.5	34.8	31.2	44.1
… if $4 more	11.8	18.2	15.2	25.8	24.2	19.4
… if $5 more	10.3	18.2	11.4	13.8	28.1	33.3

are not significantly different at the 5 percent level for the lower-priced good, nor are the results for Vermont and Maine for the $20 good. However, the null hypothesis of equivalence is rejected for New Hampshire versus the other two states for the more expensive good. Similarly, results are mixed with respect to testing equivalence between models for the $5 and $20 good

within a state, with the null hypothesis not rejected for Maine, but equivalence rejected for the other two states.

Table 5 provides additional details regarding coefficient differences between treatments. Reflecting the likelihood results reported in Table 4, two models for the $20 good (pooled Maine/Vermont and New Hampshire) are compared with each other and with the pooled $5 good through the use of dummy variables interacted with each of the explanatory variables in the multiplicative model. As such, significance of the coefficients on the interactions denotes a statistical difference between treatment coefficients. For the more expensive good, the marginal effects of education, number of children, and the difficulty of finding specialty foods are significantly more different for Maine/Vermont than for New Hampshire at the 5 percent level of significance. Model differences between the $5 and $20 good for Maine/Vermont are seen in the constant term and education, while individual coefficient differences for New Hampshire are not immediately apparent using this approach, although they jointly differ, as indicated by the test statistics reported in Table 4. For each of these models, coefficients relating to consumers' attitudes regarding local specialty food products (*Prolocal*) and the bid amount are not individually statistically significant—even at the 10 percent level.

Table 5 also includes a few Wald tests for dummy interactions among exogenous variables pertaining to the respondent (*Age, Education, HHyoung*) and among characteristics of the marketing program (*Howlong, Hardtofind*). This test is much like a standard F test in that it tests to see if variables are jointly different from zero. The results from the Wald tests are mixed. The $20 New Hampshire dummies model does well, with the respondent characteristic variables showing differences at the 5 percent level and the marketing program characteristics showing differences at the 10 percent level. The comparative $5 pooled dummy model does not fare as well—only the respondent variable Wald test passes at the 10 percent level. The $5 pooled dummy model that was run with the $20 New Hampshire coefficient model does not show any significance at even the 10 percent level. This indicates that both the respondent characteristics grouping and the marketing program grouping of variables are jointly not different from zero.

In light of these tests, model results are presented in Table 6 and Table 7 for the linear and multiplicative models, respectively. In each case, the proposed local price premium (*Bid* or *ln(Bid)*) is statistically significant at the 5 percent level and negatively correlated with the probability of purchasing the local good. Favorable attitudes towards local goods, as measured by *Prolocal*, are positively correlated with this probability, and are significant for each model. Both of these results are consistent with economic theory, and are of the signs expected *a priori*. On the other hand, age and length of residence are not significant (even at the 10 percent level) explanatory variables in any of the regressions. While the latter two results are not necessarily surprising, one would suspect that for normal goods, increases in income would increase the maximum price premium the typical respondent would be willing to pay for the local attribute. In this case, however, it may be that the income effects are small due to the fairly low price of the specialty goods under consideration, and thus cannot be identified statistically with the data available.

Table 4. Pooled Likelihood Ratio Tests

	No. of Restrictions	Test Stat. (Chi-Sq.)	Critical (Chi-Sq.)	Decision[a]
$5 Good				
All	18	21.2	28.9	Do Not Reject
ME–VT	9	11.6	16.9	Do Not Reject
ME–NH	9	9.2	16.9	Do Not Reject
VT–NH	9	11.2	16.9	Do Not Reject
$20 Good				
All	18	29.6	28.9	Reject
ME–VT	9	6.4	16.9	Do Not Reject
ME–NH	9	20.0	16.9	Reject
VT–NH	9	20.0	16.9	Reject
Within States				
ME	9	10.8	16.9	Do Not Reject
VT	9	22.6	16.9	Reject
NH	9	20.2	16.9	Reject

[a] Decisions are based on significance at the 5 percent level.

Notes: Null hypothesis**:** coefficients equivalent across treatments. Results reported are for the multiplicative model.

Table 5. Testing for Differences Between Models; Explanatory Variables of the Form $X'\beta+D_j*X'\gamma$

X	β $20 ME/VT Coefficient	γ $20 NH Dummies[a]	γ $5 Pooled Dummies[a]	β $20 NH Coefficient	γ $5 Pooled Dummies[a]
Constant	-9.27**	4.83	9.36**	-4.43	4.53
	(-3.12)[b]	(0.76)	(2.39)	(-.79)	(0.74)
Prolocal	.16**	0.04	0.01	.20**	-0.04
	(4.14)	(0.65)	(0.19)	(3.55)	(-0.53)
Age	0.00	0.02	-0.00	0.02	-0.02
	(0.09)	(0.65)	(-0.16)	(0.81)	(-0.79)
Ed	0.07	-0.27**	-0.21**	-.21*	0.06
	(1.18)	(-2.08)	(-2.71)	(-1.75)	(0.45)
HHyoung	0.13	-0.87**	-0.12	-.74**	0.75*
	(0.68)	(-2.08)	(-0.51)	(-1.99)	(1.89)
Howlong	-0.01	0.00	0.01	-0.00	0.01
	(-.81)	(0.18)	(1.21)	(-.27)	(0.66)
Hardtofind	-0.01	-0.53**	-0.16	-.54**	0.37
	(-.09)	(-2.04)	(-1.09)	(-2.32)	(1.46)
ln(Inc)	.47*	-0.03	-0.65*	0.44	-0.62
	(1.86)	(-0.06)	(-1.92)	(0.97)	(-1.22)
ln(Bid)	-1.42**	-0.58	0.07	-2.00**	0.64
	(-5.29)	(-0.97)	(0.20)	(-3.78)	(1.13)
		Wald Statistic Under H_0 for Dummy Interactions			
H_0: *Age* = *Ed* = *HHyoung* = 0		9.45**	7.71*		5.80
H_0: *Howlong* = *Hardtofind* = 0		4.66*	2.74		2.21

[a] Coefficients of interaction term between dummy for indicated treatment and explanatory variable.
[b] T-stats in parentheses.
Notes: * indicates significance at the 10 percent level. ** indicates significance at the 5 percent level.

Interestingly, the coefficient on education is negative and significant for the $5 good, and marginally negative and significant for the $20 good for New Hampshire, but positive and marginally significant for the $20 Maine/Vermont treatment in the linear model. This contrasts with the model of Loureiro and Hine (2002), who find a positive correlation between education and willingness to pay. However, Govindasamy, Italia, and Thatch (1998) and Jekanowski, Williams, and Schiek (2000) found that highly educated consumers were the least likely to purchase locally grown produce, which lends some support to our finding of a negative correlation between education and willingness to pay for state-produced goods. The authors of these studies offer the following explanations for the negative correlation. First, Govindasamy, Italia, and Thatch (1998) believe that the state's labeling and promotion program may have been more popular with young customers and those with less than a high school degree. Jekanowski, Williams, and Schiek (2000) find that educated consumers tend to be less susceptible to advertising and branding and hence less receptive to state marketing efforts. Other demographic characteristics are generally insignificant at the 5 percent level, although number of children (*HHyoung*) is negative and marginally significant for New Hampshire for the $20 good.

Of particular interest is the negative and significant coefficient on the variable indicating that farmers markets are difficult to find (*Hardtofind*) for the $20 New Hampshire specialty food good and the slightly weaker results for the $5 pooled treatment. One possible explanation is that search costs for New Hampshire consumers are incorporated into the premium value, thus eroding the willingness to pay for the local quality trait. These search costs could presumably be lowered through a promotional campaign designed to inform the average New Hampshire consumer of

Table 6. Additional Willingness to Pay: Linear Model

	$5 Pooled		$20 Maine/Vermont Pooled		$20 New Hampshire	
	Coefficient (t-stat)	Marg. Effect[a]	Coefficient (t-stat)	Marg. Effect[a]	Coefficient (t-stat)	Marg. Effect[a]
Constant	-1.37		-4.15**		1.13	
	(-1.16)		(-2.87)		(.46)	
Prolocal	.17**	.06**	.16**	.04**	.19**	.04**
	(5.27)	(5.54)	(4.09)	(4.17)	(3.44)	(3.44)
Age	.00	.00	-.00	-.00	.01	.00
	(.15)	(.15)	(-.23)	(-.23)	(.42)	(.42)
Ed	-.16**	-.03**	.10*	.02*	-.18	-.04
	(-3.30)	(-3.35)	(1.94)	(1.94)	(-1.62)	(-1.62)
HHyoung	.02	.00	.17	.04	-.58*	-.12*
	(.16)	(.16)	(.88)	(.88)	(-1.73)	(-1.76)
Howlong	(.01)	.00	-.01	-.00	-.01	-.00
	(.83)	(.83)	(-.71)	(-.71)	(-.63)	(-.64)
Hardtofind	-.17*	-.03*	-.01	-.00	-.55**	-.11**
	(-1.76)	(-1.77)	(-.11)	(-.11)	(-2.43)	(-2.44)
Bid	-.54**	-.09**	-.56**	-.13**	-.76**	-.16**
	(-5.83)	(-6.09)	(-5.11)	(-5.16)	(-3.77)	(-3.91)
N	413		260		123	
McFadden R^2	0.1669		0.1789		.3045	
LR Stat.	79.88		63.01		48.85	
Median WTP	.66		2.09**		1.91**	
95 percent C.I.[b]	0 to 1.30		1.36 to 2.78		.68 to 2.55	

[a] Marginal effects of a one-unit change in independent variable on probability of "yes" response, evaluated at sample means. Standard errors calculated using the delta method.
[b] Confidence interval.

Notes: * indicates significance at the 10 percent level. ** indicates significance at the 5 percent level.

the location of locally produced specialty goods, including farmers markets and other venues.

The key statistics to take away from these models are the median willingness to pay estimates.[6] For each model, median willingness to pay for the local attribute is defined as in equations (6) and (8), with $\mathbf{S_n}$ set at the sample mean. Confidence intervals were developed using the Krinsky-Robb method developed in Park, Loomis, and Creel (1991), in which model parameters are randomly sampled from the estimated distribution and median willingness to pay measures are calculated from these "new" parameters as described above. The resulting distribution of median willingness to pay can be considered an empirical approximation of the true distribution, and is used to create the 95 percent confidence intervals reported in Tables 6 and 7.[7]

Except for the $5 pooled good in the linear model, all of the price premia estimated are statistically significantly different from zero at the 5 percent level. The linear model underestimates the premium for the $5 good relative to the multiplicative model, but the converse is true for the $20 good. Point estimates tend to be of reasonable magnitude, with the premium of the $5 good between 32 percent and 60 percent of the higher-priced good. For the $20 good, estimates of the price premium for New Hampshire residents are 7 percent to 9 percent less than in the pooled Maine/Vermont treatment. Overall, premia are in

[6] Our choice of functional form restricts willingness to pay to be non-negative; however, over 99 percent of survey respondents responded that they would either prefer or be indifferent to the local good, suggesting that this is not a binding constraint. However, the linear model includes a probability spike at zero to account for indifference.

[7] In this study, we take 10,000 draws for each model using a Cholesky decomposition of the coefficients' variance-covariance matrix.

Table 7. Additional Willingness to Pay: Multiplicative Model

	$5 Pooled		$20 Maine/Vermont Pooled		$20 New Hampshire	
	Coefficient (t-stat)	Marg. Effect[a]	Coefficient (t-stat)	Marg. Effect[a]	Coefficient (t-stat)	Marg. Effect[a]
Constant	.09		-9.27**		-4.43	
	(.04)		(-3.12)		(-.79)	
Prolocal	.17**	.03**	.16**	.04**	.20**	.04**
	(5.24)	(5.53)	(4.14)	(4.22)	(3.55)	(3.52)
Age	-.00	-.00	.00	.00	.02	.00
	(-.13)	(-.13)	(.09)	(.09)	(.81)	(.81)
Ed	-.15**	-.02**	.07	.02	-.21*	-.04*
	(-2.67)	(-2.69)	(1.18)	(1.18)	(-1.75)	(-1.75)
HHyoung	.01	.00	.13	.03	-.74**	-.15**
	(.07)	(.07)	(.68)	(.68)	(-1.99)	(-2.05)
Howlong	.01	.00	-.01	-.00	-.00	-.00
	(.93)	(.93)	(-.81)	(-.81)	(-.27)	(-.27)
Hardtofind	-.18*	-.03*	-.01	-.00	-.54**	-.11**
	(-1.80)	(-1.82)	(-.09)	(-.09)	(-2.32)	(-2.31)
ln(*Inc*)	-.18	-.03	.47*	.11*	.44	.09
	(-.79)	(-.80)	(1.86)	(1.86)	(.97)	(.97)
ln(*Bid*)	-1.36**	-.23**	-1.42**	-.34**	-2.00**	-.41**
	(-6.28)	(-6.43)	(-5.29)	(-5.27)	(-3.78)	(-3.82)
N	413		260		123	
McFadden R^2	.1785		.1921		.3327	
LR Stat.	85.44**		67.67**		53.36**	
Median WTP	1.02**		1.84**		1.71**	
95 percent C.I.[b]	.66 to 1.31		1.37 to 2.26		1.04 to 2.20	

[a] Marginal effects of a one-unit change in independent variable on probability of "yes" response, evaluated at sample means. Standard errors calculated using the delta method.
[b] Confidence interval.

Notes: * indicates significance at the 10 percent level. ** indicates significance at the 5 percent level.

the range of 13 percent to 20 percent of the base price for the lower-priced good and 9 percent to 10 percent for the higher-priced good. The results suggest that the use of a state logo has the potential to successfully differentiate state-produced specialty food products from imported substitutes, allowing for the locally produced good to be priced slightly higher without significant loss in sales.

Moreover, based on the finding of price premia for locally produced specialty goods, an additional policy implication for all of the state labeling programs exists. Brooker and Eastwood (1989) found that just under two-thirds of survey respondents were willing to pay a slightly higher price to cover the labeling costs of the state logo program for tomatoes. Given that consumers in our study are willing to support a price premium to identify state-produced specialty foods, the state labeling programs of New Hampshire, Vermont, and Maine may be able to recoup some expenses through increasing prices of state-labeled products. This is a particularly useful finding for the organizers of the New Hampshire's Own program, which currently has the lowest level of funding of the three states.

While a comparison between point estimates is suggestive, it provides no statistical evidence for differences between estimated price premia. In order to formally test for these differences, the method of convolution was employed. In essence, the method of convolution is an empirical approach to obtain the approximate distribution of the difference between point estimates of two (independent) random variables.[8] Denoting these

[8] As noted in Poe, Severance-Lossin, and Welsh (1994), independence is not necessary to use the method, but the empirics are considerably simplified if the assumption holds. Here, the samples between states are obviously independent.

random variables WTP_i and WTP_j, the approach thus allows for hypothesis tests of the random variable ($WTP_i - WTP_j$) without resorting to an asymptotic assumption about the normality of the underlying distribution, which has been disputed in the literature, or without misstating the significance level of the test (Poe, Severance-Lossin, and Welsh 1994).[9] For an excellent discussion of the use and advantages of this method in contingent valuation analysis, the reader is referred to Poe, Severance-Lossin, and Welsh (1994).

Table 8 reports the results of equivalence hypothesis tests between estimated price premia (WTP) for models with statistically different coefficients, while Figures 1 and 2 show the estimated distributions of WTP (as such, the pooled \$5 good models and Maine-specific models are excluded). Despite a significantly different model structure, the estimated price premium for the relatively expensive specialty food cannot be distinguished between the New Hampshire and the pooled Maine/Vermont treatments, most likely due to a combination of the imprecision due to a relatively small sample size and a small difference in actual median values. However, examination of the figures reveals differences in the response functions between treatments, especially at high dollar amounts. More specifically, while the medians of the two distributions are relatively similar, the probability of a "yes" response to the dichotomous choice question is lower at (relatively) high bid amounts for the New Hampshire sample. Although there are slight differences in the "grand constant" estimates for the linear model, as shown by the probability of a "yes" at a bid of zero, the primary reason for this finding is the slope of the response function. This further supports the hypothesis that the more well established labeling programs impact the demand for higher priced locally produced goods by increasing the probability that a particular price premium is supported. Furthermore, the results in Table 8 suggest that for New Hampshire and Vermont, willingness to pay for local specialty foods is positively correlated with the base price of the good, or in other words, that the premium is proportional to the base price. Consumers in Maine, however, do not exhibit this pattern, as the model coefficients for this state cannot be distinguished between each type of good.

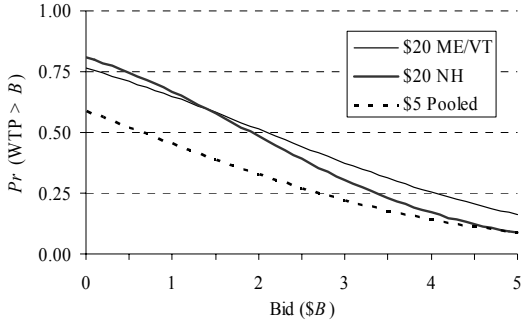

Figure 1. Estimated Willingness to Pay Distributions, Linear Model

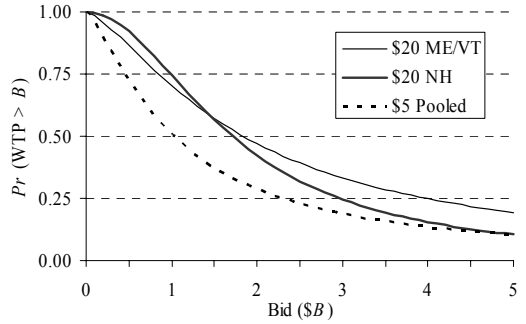

Figure 2. Estimated Willingness to Pay Distributions, Multiplicative Model

Table 8. Two-Tailed Probabilities: Method of Convolution Test for Equivalence of Median Price Premia Between and Within States

	Linear Model	Multiplicative Model
\$20 good		
ME/VT vs. NH	0.71	0.71
Within states		
VT	0.11	0.07
NH	0.04	0.03

Notes: Models were not significantly different for \$5 good and within Maine. Table reports $Pr(WTP_i = WTP_j)$.

[9] It should be noted that the asymptotic normality of the logit coefficients is exploited to obtain the estimate of the underlying distribution of WTP_i; however, this does not necessarily restrict this distribution to be normal.

Application and Conclusions

This paper uses survey data to examine northern New Englanders' knowledge of, and convenient access to, locally produced specialty food items, and to estimate the willingness to pay for the local quality trait. Maine and Vermont show similarities in buying patterns and perceived convenience of the market locations, while New Hampshire residents show a statistically lower level of purchases and perceived market convenience. Using dichotomous choice contingent valuation methods, we found that consumers of Maine, New Hampshire, and Vermont are willing to pay a small price premium for local specialty goods, and this premium generally increases with the base price of the good. While we were unable to statistically confirm that the median price premia differed across states, there is some evidence suggesting that different promotional programs affect the distribution of WTP for these goods, and the mean WTP amounts. In addition, model results suggest that convenient access to local specialty products can affect the premia, most likely through reducing transaction costs. A key factor influencing this finding may be that New Hampshire's state labeling and promotion program is much newer and smaller than those of Maine and Vermont. With more advertising and consumer education, it is expected that over time the differences between New Hampshire, Maine, and Vermont buying patterns and perceived market convenience will become smaller.

As the demand for specialty foods has been especially strong in recent years, state labeling programs have the opportunity to increase profits of local producers if they can effectively promote awareness and loyalty towards these goods. The results of this study should be useful in helping the state labeling and promotion programs of northern New England understand how specialty goods are perceived by residents and how to promote awareness and loyalty towards these locally produced specialty products. In addition, this paper serves as a demonstration of the contingent valuation method as a tool for deriving consumer willingness to pay measures.

In closing, much research is left to be done with regards to state-labeling programs and processed foods. Possible extensions of this work include identification of the target consumers of locally produced specialty good consumer and the characteristics that this group values in the specialty goods they purchase. In addition, it would be interesting to see if New Hampshire residents have changed their preferences since the launch of the "New Hampshire's Own" slogan and labeling program. Resampling New Hampshire residents was undertaken in the fall and winter of 2004.

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