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Connecting Sensory Quality Characteristics and Local Designations to Willingness to Pay for Cheese at the Retail Level

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Abstract

This study links sensory analysis with consumer willingness to pay (WTP) for national, private label, and local brands of cheese at the retail level. Results indicate that a lesser-known local brand is rated the highest of four cheese brands for its sensory characteristics, but is not competitive with the other brands, in terms of consumer WTP, unless it has a state-sponsored designation (SSD). The competitiveness of a second local brand with high label recognition was aided when labeled “locally-produced,” but not by the SSD. Hence, local designations strengthen brands in general, but SSDs are best for lesser known, high quality products.

Keywords: cheese, choice experiments, local designations, sensory analysis, willingness to pay

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Introduction

A growing body of evidence suggests many American consumers seek out and are willing to pay more for locally-produced food products than non-local food products. For example, a recent national survey of retail food shoppers found that 86% of respondents believed it was either very important or somewhat important for retail food stores to carry local produce and other locally-produced packaged foods (National Grocers Association 2012). Food retailers are aware of consumers' interest in locally-produced food products and they are expanding the number of locally-produced food items they carry (USDA, AMS 2011; A. T. Kearney 2013; Bosworth, Bailey, and Curtis 2013; Onken, Bernard, and Pesek, Jr. 2011; Clifford 2010; Kroger 2012; Whole Foods 2012; Wild Oats Market 2012; Martinez et al. 2010).

While much of the initial interest in locally-produced food centered on fresh fruits and vegetables, there is evidence suggesting locally-produced packaged food items may be able compete with national brands and private labels (also known as store brands) at the retail level (Bosworth, Bailey, and Curtis 2013). The market for packaged food is different than for unpackaged fruits and vegetables. Packaged food markets are dominated by national brands owned primarily by large food manufacturers and private labels owned by food retailers while locally-produced packaged food items are typically produced by relatively small, local food manufacturers (Volpe 2011).

Developing, promoting, and executing a strategy for a national brand food product is a complex and expensive undertaking and advertising expenditures in the U. S. for food and candy products (mostly national brands) amounted to over \$6.5 billion USD in 2012 (Kantar Media 2014). National brands often aim at addressing markets large enough to take advantage of economies of scale in manufacturing, advertising, and distribution. National brands also strive to develop "brand equity," meaning the brand is recognizable and often associated with product quality (Liu and Sporleder 2007).¹

Packaged private label food products are also an important component of retail food markets and, while the market share for private label products is not publicly available, the consensus is that it is expanding. For example, the number of American consumers indicating they purchase private label products increased from 18% in 2000 to 27% in 2011 (NPD Group 2012; Volpe 2011). Private label sales typically have higher margins for retailers than national brand products suggesting retailers have an incentive to expand private label sales if possible (Sageworks Inc. 2012). Average price differences between private labels and national brands have also decreased over time (Hass and Weaver 2010; Volpe 2011). As a result, national brand food manufacturers are expected to aggressively seek and recapture market share they may be losing to private label food products (Steenkamp, Heerde, and Geyskens 2010).

Communicating the "quality" of a product, in the case of a national brand is critical to its overall market strategy (see Appleby et al. 2012), especially when competing with private labels as

¹Examples include Nestle or Kraft.

demonstrated by Hassan and Monier-Dilhan (2006). Defining product quality² for any brand depends heavily on this strategy including communicating different brand characteristics to consumers such as superior taste, nutrition, health claims, status, convenience, intrinsic characteristics (organic, natural, environmentally-friendly, animal-friendly, etc.) or a combination of these and many other possible product characteristics.

When it comes to labels or designations for locally-produced food products, one of the most obvious value-adding strategies being pursued is “localness”. At the retail level locally-produced food products must compete against national brands and private labels, which may have broad brand recognition and brand equity. Consequently, it becomes relevant to consider what other attributes or qualities locally-produced packaged food needs to have to compete effectively in a retail situation.

In this study, we consider how local designations on locally-produced packaged food items might make these products more competitive with national brands and private labels at a retail point of purchase. We also examine how local designations may or may not aid in market and brand development when the locally-produced food is of high or low quality in terms of its sensory characteristics. This is accomplished through blind sensory analysis of cheese products using national brands, private labels, and local brands with different local designations followed by choice experiments of willingness-to-pay (WTP) based on brand and type of local designation. As this study uses cheese as the basis for the analysis (a food product with taste often used as a market promotion strategy), selected sensory characteristics (taste, feel (texture), sight, and smell) are used to define product quality.

The results demonstrate that a lesser-known, but high quality local cheese product becomes more competitive with national brands and private labels, in terms of WTP, when a state-sponsored designation (SSD)³ is used in conjunction with the cheese brand. However, we also find that the SSD fails to enhance consumer WTP for an already well-known locally-produced cheese brand, but that a simple “Locally-Produced” designation does. The findings indicate that brand recognition interacts strongly with the SSD and that the SSD is likely best used with high quality locally-produced food products that have low brand recognition. While our results can only be used to draw inferences for consumer choices at a given point in time (i.e., are not proof of long-term sustainability of purchasing behavior), they demonstrate that local products are strengthened by local designations as they provide an important component in opening the door to possible long-term market development for local products.⁴

²No single definition of “food quality” exists because quality depends on the dimension or characteristic of a food product being evaluated at any given point in time. For example, dieticians would define food quality by its nutritional content and contribution to healthy lifestyles while others might define it by the characteristics listed in this paragraph. Judging “quality” for other products besides cheese might well involve evaluating different product characteristics than are used in this study. Ultimately, through their purchasing decisions consumers decide what quality is and the tradeoffs among the possible definitions of quality.

³In the case of this study, “Utah’s Own.” For explanation of Utah’s Own specifications and qualifications see www.utahsown.utah.gov.

⁴A thorough analysis of the long-term sustainability for local designations and market development would require following a consumer panel over a period of time to observe repeat purchases of local products based on local designations. The analysis presented here, while providing only information connecting WTP, local designations, and sensory characteristics at a given point in time, still provides evidence that the elements necessary for long-term

Data Collection and Methodology

Types of Local Designations Considered

SSDs for food products in the U.S. have proliferated during the past 10 years. In fact, every U.S. state has had a promotional program for its agricultural products at one time or another (Darby et al. 2008; Onken and Bernard 2010). SSDs offer only one of several possible strategies to communicate localness to consumers. For example, these manufacturers could simply promote their brand as being “local” or they could use a SSD or simply a “locally-produced” designation on their products. Local food manufacturers and retailers need to consider the “best” of these differing strategies when seeking to communicate to consumers due to the highly competitive nature of retail food markets and limited self-space available in retail stores (Bosworth, Bailey, and Curtis 2013; Clifford 2010; Kroger 2012; Whole Foods 2012; Wild Oats Market 2012).⁵

Most SSDs are managed by political entities in the U.S., such as state departments of agriculture. The political nature of these designations may make it more difficult for the public managing entities for SSDs to enforce quality standards on participants (Onken and Bernard 2010). Onken and Bernard suggested that better quality controls for locally-produced foods with SSDs would provide more value (utility) to consumers than if no quality controls were placed on these products. Jekanowski, Williams, and Schiek’s (2000) findings also supported this conclusion when they determined Indiana consumers had a strong willingness to purchase locally-produced foods, but that quality was an important factor in the purchase decision.

The political aspect of most American SSDs makes them quite different than geographic designations in the European Union (EU) such as Protected Designation of Origin (PDO) or Protected Geographical Designation (PGI). The reputation of PDOs and PGIs are built principally on the perceived quality of these products. Research indicates that these EU protections are recognized by consumers and are capable of adding value to food products (McCluskey and Loureiro 2003; Loureiro and McCluskey 2000; Galli et al. 2011)⁶. These EU designations, while geographically-based relating to production or process, do not attempt to define markets based on geographical locations as do SSDs. Contrast this to the recent intense interest in the U.S. and Europe in buying locally-produced foods, where the principal emphasis is the close proximity of production and consumption.

As the market for locally-produced food continues to grow and mature, the role played by SSDs and other local designations needs to be examined to address their connection to quality (in this case sensory quality). Understanding the connection between quality, brands, and local designations is critical if these designations hope to sustain local brands and other local market

market development based on local designations are present. These include consumer evaluation of product quality based on sensory characteristics and WTP based on local designations compared to national brands and private labels.

⁵A recent national survey of retail food shoppers indicated that 86% of respondents believed that it was either very important or somewhat important for retail food stores to carry local produce and other locally-produced packaged foods (National Grocers Association 2012).

⁶See Deselnuci et al. (2013) for an over view of geographically-identified food studies.

development efforts over time. This study examines the connection between the quality of locally-produced foods and the likelihood of promoting and sustaining a local brand over time.

This study was completed in cooperation with a food retailer and the Utah Department of Agriculture and Food (UDAF), the managing entity for the Utah's Own program (the SSD for the State of Utah). A survey was administered at five retail grocery stores located in northern Utah between Logan and Salt Lake City to a total of 334 shoppers during May and June, 2013. Survey respondents were selected on an intercept basis.⁷ As part of the interview administered during the survey, respondents participated in a blind sensory test of four different brands of cheddar cheese. They then completed the remainder of the survey without being informed which brand of cheese corresponded to the cheese samples in the blind sensory analysis.

Selection of Cheese for Analysis

Cheese was chosen as the target product for this study as it a well-known and well-understood product and a national brand, a private label, and local brands were available. Additionally, cheese has been used in EU studies to assess the impact of origin on consumer WTP (Galli et al. 2011; Bonnet and Simioni 2001). The four brands of cheddar cheese considered in this study included two locally-produced brands (Gossner's, and Cache Valley), a national brand (Tillamook), and a private label (Western Family). All four cheese brands were sold at each of the stores where the surveys were conducted and were all available in medium-sharp cheddar. Consequently, medium-sharp cheddar cheese was used for all four brands in the sensory test. Prices for a particular cheese brand can fluctuate independently of the other brands over short periods of time due to promotional activities affecting a single brand. As a result, respondents were expected to have had experience with prices varying singly or together. Given the nature of the choice experiment employed, this fact added to the realism of the choice experiment.

Survey, Sensory Evaluation, and Choice Experiment

The object of the sensory evaluation was to measure the perceived quality of different brands of cheddar cheese by respondents (Miller et al. 2008; Combris et al. 2005). Past research suggests state food product promotional programs will be effective only if the quality of the product is high (Jekanowski, Williams, and Schiek). High quality products with a Utah's Own designation would likely generate repeat purchases by consumers and build the reputation of the designation.

The samples for each cheese brand were identified to the respondent only as sample "A", "B", "C" or "D." The four samples were presented singly and in random order to the respondent who then tasted the individual samples. The respondent silently rated each cheese on a seven-point scale for *Taste*, *Texture*, *Odor* and *Overall Acceptability*. The respondent was also requested to provide a rank order for the samples.

⁷If the respondents completed the survey, they received an electronic coupon for a \$2 discount on private label cheese. There was a relatively high refusal rate. So, when the interviewers were not busy with people filling out the survey, most people passing the survey location were politely asked to participate. Consequently, while the intercepts were not random in the classical sense, individuals were not systematically excluded from the survey.

Following the sensory evaluation, the respondent was presented six choice sets which were the foundation of the WTP analysis presented in this study. The six choice sets constituted a conjoint design embedded in a choice experiment framework. A representative choice set presented to the respondents is found in Figure 1. Each choice set consisted of three alternatives: two different brands of cheese, at stated prices, and a “neither” alternative. By showing six choice sets, each respondent was offered choices between each possible combination of the brands in the study: (Western Family vs. Tillamook, Western Family vs. Gossners, Western Family vs. Cache Valley, Tillamook vs. Gossners, Tillamook vs. Cache Valley, and Gossners vs. Cache Valley). The order in which these choices were presented to respondents and the order of brand placement left to right were randomized and also randomly distributed across respondents. One quarter of the surveys were randomly assigned the “Utah’s Own” designation (Gossners and/or Cache Valley designated as being Utah’s Own) and one quarter were randomly assigned the “locally-produced” designation (Gossners and/or Cache Valley designated as being locally-produced).

Prices were also randomized across choices.⁸ The distribution of prices was chosen to be as realistic as possible. Consultation with the food retailer regarding pricing ranges across brands provided the price range for a two-pound block of cheese. Given that typical grocery store prices end in “9”, we rounded our randomized prices down to the nearest price ending in “9”. As a result, we randomly drew prices from a U[\$5.99, \$9.49] distribution for Tillamook, Gossners, and Cache Valley and a U[\$5.49, \$6.99] distribution for Western Family.⁹

Randomly assigning the local brands (Gossner’s and Cache Valley) to be shown with or without labels designating them as “Utah’s Own” or “Locally-Produced” resulted in the choice sets measuring WTP based on the actual brands and also based on the type of local designation the two local brands had. The other survey questions ascertained the respondent’s perceptions and familiarity with the Utah’s Own designation and their basic demographics such as age, gender, ethnicity, education level, income level, and household characteristics.

Taste Rankings and Choices

Respondents were asked following the sensory analysis to provide a ranking of the four cheeses against each other¹⁰ and Table 1 displays these rankings. The average rank of each cheese was calculated as the average placement in the rank order of the cheese (first, second, third, or fourth) weighted by the proportion of respondents that gave that cheese each ranking. The lower the average rank number the better the brand performed in the blind sensory test. Gossner’s ranked highest, on the average (2.25), followed by Cache Valley (2.50), then Tillamook (2.60), and finally Western Family (2.64). A brand that could carry the Utah’s Own label, Gossner’s in this case, was the highest-rated cheese in the sensory analysis.

⁸Randomizing prices in choice experiments is consistent with “best practices” in these types of analyses (e.g., Cameron and DeShazo (2013) and Taylor, Morrison, and Boyle (2010).

⁹The food retailer indicated that Western Family was typically priced lower than the other brands. Hence, the lower values for the extremes of the uniform distribution for Western Family compared to the other brands.

¹⁰The samples A, B, C, and D were placed in rank order from 1 (best) to 4 (worst) based on a survey question asking for “overall ranking” of the four samples.

Table 1. Summary of blind Sensory test rank order by cheese brand and percentage of times selected in choices provided in the Choice Experiment

	Ranked 1(%)	Ranked 2 (%)	Ranked 3 (%)	Ranked 4 (%)	Average Rank	Percentage of Times Selected In Choice Experiment
<i>Tillamook</i>	24.51	21.52	22.42	31.39	2.60	17.89
<i>Gossner's</i>	31.24	29.75	23.17	16.29	2.25	14.55
<i>Cache Valley</i>	23.92	24.81	28.10	23.02	2.50	21.87
<i>Western Family</i>	20.33	23.92	26.31	29.30	2.64	20.39
<i>Neither</i>						15.30

The sensory analysis also asked respondents to rate the “Overall Acceptability” of each of the cheeses. This response was for each cheese individually and was separate from the rank order of the four cheeses reported in Table 1. “Overall Acceptability” was measured on a seven-point scale, with one being “highly acceptable” and seven being “highly unacceptable.”¹¹ As will be described later, “Overall Acceptability” was used in the analysis to connect quality preferences to choices made in the choice experiment.

Table 1 also shows that, despite its high average rank in the blind sensory test, Gossner's was chosen the least often of any of the brands in the choice experiments. The low frequency of being chosen in the choice sets is likely due, at least in part, to low brand recognition for Gossner's. This is based on the fact that average prices in the choice sets were virtually the same for Gossner's, Tillamook, and Cache Valley, but Gossner's was chosen less often than either Tillamook or Cache Valley (Table 2). Almost 35% of respondents indicated they had never heard of the Gossner's brand before (Table 3). These facts imply that if the Utah's Own label “works,” in terms of inducing consumers to choose Gossner's, consumers may continue purchasing it because of its superior taste compared to the other three brands studied.

Table 2. Summary of price statistics for choices offered in Choice Experiment for a two-pound cheese package

Brand	Mean	Std. Dev.	Minimum	Maximum
<i>Price (Overall)</i>	\$7.24	\$1.24	\$4.59	\$9.49
<i>Tillamook</i>	\$7.72	\$1.00	\$5.99	\$9.49
<i>Gossner's</i>	\$7.72	\$1.00	\$5.99	\$9.49
<i>Cache Valley</i>	\$7.73	\$0.98	\$5.99	\$9.49
<i>Western Family</i>	\$5.79	\$0.69	\$4.59	\$6.99

The sensory perception is not the only characteristic that consumers consider when deciding whether or not to purchase a food product. Brand recognition may be just as important as the sensory perception in the consumer's decision. A recognized brand name conveys information to the consumer about a product's attributes. Price also plays a prominent role in the decision process because less expensive products are more likely to be chosen, all else equal.

¹¹This measure can be recovered through the use of principal components analysis on the acceptability of the taste, texture, and odor of each cheese. This result indicates that this variable does in fact measure the overall acceptability of each cheese for the respondent.

The effects of brand recognition and price can be seen in the private and national labels that were considered. The low-priced private label (Western Family) ranked lowest, on the average, of all brands in the blind sensory test. However, Western Family was the most frequently chosen brand in the choice experiment. This contradictory result can be explained by the price distributions used in the choice experiment (see Table 2). Lower average prices for Western Family in the choice sets together with high brand recognition,¹² likely contributed to the high frequency of Western Family being chosen in the choice sets despite its low ranking in the blind sensory test. The national brand, Tillamook, ranked almost as low as Western Family in terms of the results of the blind sensory test (Table 1).

These facts suggest that sensory rankings (quality) for these cheese brands do not closely align with brand recognition and selections in the choice sets (market acceptance). Bridging the gap between quality and market acceptance for high quality, but low-recognition brands such as Gossner's, might be aided by a local designation. That is, a local designation may boost consumer interest in a high-quality, lesser-known brand and, once tried, has a high probability of leading to repeat purchases of the brand (sustainability of the marketing effort). Table 3 shows that of those respondents that had made an initial purchase 23.0% of Gossner's purchasers and 32.6% of Cache Valley purchasers made a repeat purchase. These results indicate that local designations that induce an initial purchase may lead to a substantial number of repeat purchases. In contrast, the high number of repeat purchasers for Tillamook and Western Family are likely due to their high brand recognition and low price, respectively. The type of local designation may also be important as the signal each designation provides may be different for different respondents.

Table 3. Survey respondents' familiarity with cheese brands used in the analysis

Level of Familiarity	Gossners	Cache Valley	Western Family	Tillamook
Never heard of this brand before	34.6%	5.4%	6.0%	17.6%
Know about the brand but never purchased before	19.7%	14.9%	12.8%	24.2%
Bought the brand maybe once	35.2%	53.7%	36.7%	29.6%
Bought this brand several times	5.4%	17.9%	31.9%	19.7%
Buy this brand frequently	5.1%	8.1%	12.5%	9.0%
Probability of repeat purchase conditional on previous purchase	23.0%	32.6%	54.7%	49.2%

Table 4 presents summary statistics for respondent attributes. The statistics indicate the typical respondent to the survey was a white (86%) female (72%), between 26 and 35 years old (22%), with at least a bachelor's degree (29%). The typical respondent is responsible for making food purchases in the household (86%). The average household income was between \$50,001 and \$75,000 (29%) and the average household size was 3.67 individuals with 1.32 children.

Data obtained from the choice experiment and other questions in the survey are used in an econometric model described in the next section. The model estimates the effect of brand, local

¹²Ninety-four percent of survey participants had heard of the Western Family cheese brand before (Table 3).

designation, and respondent characteristics (demographics) on their WTP for a two-pound package of cheddar cheese purchased at a retail food store.

Table 4. Comparisons of U. S. Census demographics and the Utah shopper in-store survey participants

Category	2010 U. S. Census for Utah	In-Store Survey
Gender		
Female	49.8%	71.9%
Male	50.2%	28.1%
Race		
African-American	1.3%	0.3%
American Indian	1.5%	0.0%
Asian	2.2%	1.8%
Caucasian	80.1%	86.6%
Hawaiian/Pacific Islander	1.0%	0.0%
Hispanic	13.2%	7.5%
Middle Eastern		0.0%
Not on list		1.5%
Prefer not to answer		2.4%
Education		
High School Graduates	90.6%	98.5%
Bachelor's degree or higher	29.4%	38.6%
Age		
Persons Aged 65 or Above	9.2%	16.8%
Percent of Household under Age 18	31.2%	36.0% ^a
Household Characteristics		
Number in Household	3.04	3.67
Children in Household		1.32
Estimated Household Income	\$56,330	\$61,679 ^b

Source. U. S. Census. <http://quickfacts.census.gov/qfd/states/49000.html>.

^a Estimated by dividing respondents' indication of number of children in the household by their indication of total persons in the household (1.32/3.67). ^b Estimated as a weighted average of mid-points in the income price ranges in the survey.

Econometric Framework

As the analysis included two local brands and there are three separate ways to designate each local brand (brand only, brand with Utah's Own designation, and brand with locally-produced designation), survey respondents were assigned surveys in one of nine possible configurations: 1) no designation on either local brand, 2) a "Utah's Own" designation on both local brands, 3) a "Locally-Produced" designation on both local brands, 4) a "Utah's Own" designation on Gossner's and a "Locally-Produced" designation on Cache Valley, 5) a "Utah's Own" designation on Cache Valley and a "Locally Produced" designation on Gossner's, 6) a "Utah's Own" designation on Gossner's and no designation on Cache Valley, 7) a "Utah's Own"

designation on Cache Valley and no designation on Gossner's, 8) a "Locally-Produced" designation on Cache Valley and no designation on Gossner's, and finally, 9) a "Locally-Produced" designation on Gossner's and no designation on Cache Valley. Because these configurations were assigned randomly, each configuration makes up approximately 1/9 of the total number of surveys.

Our choice sets are simple, with only price and brand label attributes (see Figure 1). This simplicity, combined with the fact that tastes and preferences over cheese can vary across consumers, enables us to use prices that are, by design, orthogonal to the brand attributes without sacrificing realism or efficiency in estimation.

Conceptual Model to Analyze Choice Experiments

We used a standard random-utility framework as our conceptual model (Train 2003). Assuming that respondents make choices to maximize their utility, we model the unobserved or latent utility of respondent i from alternative j as a linear function of the attributes of the alternatives and an unobserved random component of utility:

$$(1) \quad u_{ij}^* = \beta \text{Price}_j + \delta X_j + \varepsilon_{ij}$$

Denoting the latent utility of respondent i for alternative j as u_{ij}^* , we interpret the coefficient β as marginal utility associated with paying for an alternative. The quantity X_j contains a vector of attributes describing alternative j and δ represents the vector of associated marginal increments to utility associated with each attribute. In this model, each alternative is described completely by a price and set of indicators for brand and designation. Note that both Price_j and the vector X_j are equal to zero for the "neither" alternative.

Random utility models can be estimated using maximum likelihood by assuming a distribution for the unobserved component of utility. We have analyzed the choices using a variety of different models. However, our preferred model for these results is an alternative-specific multinomial (ASM) probit model. This model assumes the latent errors are distributed jointly normal and has the advantage of being free from the independence of irrelevant alternatives assumption inherent in logit models. The probit-based model also permits us to employ an error structure allowing for cross-alternative heteroscedasticity and an unstructured cross-alternative correlation pattern. We also employ standard errors that are clustered at the respondent level to account for the repeated-choice nature of the data.

As a simple example, suppose there were two brands, Gossner's and Western Family (denoted "G" and "WF"), and one designation, *Utah's Own* (denoted UO) that varied the designation on Gossner's. The vector X_j would then consist of three variables: a constant for the omitted category (WF in this case), a dummy variable for Gossner's and a dummy variable for the interaction between Gossner's and the *Utah's Own* designation. Representative utility would then be modeled as:

$$(2) \quad u_{ij}^* = \beta \text{Price}_j + \delta_0 + \delta_1 G_j + \delta_2 UO_j * G_j + \varepsilon_{ij}$$

A test of the statistical significance of the parameter δ_2 indicates any meaningful difference to utility and choice probability when the *Utah's Own* designation was shown compared to simply being offered Gossner's with no designation.

Willingness to Pay

WTP for a particular alternative j can be estimated by solving for the price that would make the representative consumer with the indicated utility function indifferent between paying for alternative j at the stated price or not. Let this price be denoted Price_j^* and set utility equal to zero:

$$(3) \quad u_{ij}^* = \beta \text{Price}_j^* + \delta X_j = 0$$

Solving for Price_j^* yields:

$$(4) \quad \text{WTP for alternative } j = \text{Price}_j^* = \frac{\delta X_j}{-\beta}$$

For example, total WTP for the omitted category (WF) in the example above is:

$$(5) \quad \text{Price}_j^* = \frac{\delta_0}{-\beta}$$

While WTP for Gossner's (with the *Utah's Own* designation) would be:

$$(6) \quad \begin{aligned} \text{Price}_j^* &= \frac{\delta_0 + \delta_1 G_j + \delta_2 UO_j * G_j}{-\beta} \\ &= \frac{\delta_0 + \delta_1 + \delta_2}{-\beta} \end{aligned}$$

Note that marginal WTP is calculated by taking the derivative of Price_j^* with respect to a given characteristic. For example, marginal WTP for Gossner's, relative to Western Family is:

$$(7) \quad \frac{\partial \text{Price}_j^*}{\partial G} = \frac{\delta_1}{-\beta}$$

if the *Utah's Own* designation were zero (Gossner's presented in the choice without the *Utah's Own* designation) and

$$(8) \quad \frac{\partial \text{Price}_j^*}{\partial G} = \frac{\delta_1 + \delta_2}{-\beta}$$

if the *Utah's Own* designation were one. Similarly, marginal WTP for Gossner's with the *Utah's Own* designation, relative to Western Family without the designation, is:

$$(9) \frac{\partial \text{Price}^*}{\partial UO} \text{Marginal WTP for Utah's Own label} = \frac{\delta_2}{-\beta}$$

Finally, confidence intervals for WTP and marginal WTP can be calculated via the parametric bootstrap method, described by Krinsky and Robb (1986 and 1990), by taking a large number of draws from the estimated variance-covariance matrix of the parameter estimates. The means of this distribution are given by the parameter estimates and the covariance is given by the variance-covariance matrix of the parameter estimates. See Hole (2007) for a detailed discussion of how to construct confidence intervals for WTP estimates and Bosworth et al. (2009) for an applied example.

Results and Discussion

Construct Validity: Sensory Preferences Are Predictive of Hypothetical Choices

As the blind sensory analysis was conducted just prior to the choice experiment, the extent to which respondent preferences for different cheeses are predictive of choices made in the actual choice experiment can be tested. If actual preferences, as indicated in the sensory experiment, are strongly predictive of the hypothetical choices made in the survey, this result would provide a strong degree of construct validity for the choice experiment that was conducted. On the other hand, if the sensory data do not provide explanatory power, it is likely the experiment may suffer from a significant degree of hypothetical bias. We therefore model the probability that a given cheese is chosen as a simple function of the price of the cheese and the “Overall Acceptability” rating of the cheese in the sensory analysis. To avoid contaminating the results of these models with the influence of the local designations, we use only observations from those choice sets that did not include local designation labels.¹³

Table 5 compares three different functional forms of the same model. The first model is a conditional logit specification, the second is an ASM probit with a fixed correlation pattern, and the final specification is a fully-flexible ASM probit. All of the models are estimated with clustered standard errors clustered on each respondent. Table 5 shows that as the selected value for “Overall Acceptability” of the cheese in the blind sensory test decreases, the probability that cheese will be chosen in the choice experiment decreases. Because the respondents were shown brands only in the choice experiment and not in the sensory analysis, this result provides evidence that the choice experiment has substantial construct validity in the sense that the brands convey actual information about the relative quality of the cheeses in terms of its sensory characteristics. That is, the quality identified in the sensory analysis (as measured by “Overall Acceptability”) when labels were not provided, corresponded closely with the choices made in the choice experiment when brand names were provided. This result is robust to the different specifications for the model as indicated in Table 5.

¹³Excluding those observations where the cheeses were labeled with a local designation is important because these labels increase the probability that the cheese will be chosen in the choice set, but this increased probability is not due to observed consumer preferences for the cheese. We wish to isolate the effect of pre-existing consumer preferences on the probability that the cheese is chosen in the choice experiment. Subsequent models explore the effect of local designations on choice probabilities.

Table 5. Sensory information as a predictor of respondent choice.

Variable	Model		
	[1] Conditional Logit	[2] Fixed ASM Probit	[3] ASM Flexible Probit
<i>Price</i>	-0.598*** (0.0557)	-0.506*** (0.0589)	-0.518*** (0.0598)
<i>Overall</i>	0.179*** (0.0663)	0.150*** (0.0560)	0.154*** (0.0564)
<i>Acceptability</i>			
<i>Constant</i>	5.592*** (0.429)	4.713*** (0.462)	4.746*** (0.465)
Observations	3,727	3,727	3,727

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Because these results indicate that consumers make purchase decisions based on quality, if SSDs, such as Utah's Own, are designed to convey quality signals to consumers and not just production location, they are likely to be more effective than if quality is not a consideration in granting the designation. This supports the notion that combining locational designations with quality characteristics is likely more effective than when they are separated. In this respect, the findings support the concepts of PDO and PGI in the EU.

Table 6 indicates that only 27% of survey respondents view the Utah's Own designation as a signal of high quality. The highest positive perceptions of Utah's Own appear to be tied either identifying a locally-produced product or as helping the local economy and local farmers. While these are positive perceptions, they may or may not produce repeated purchases of products with the Utah's Own designation. But, if a perception of high quality is combined with the other positive aspects of purchasing a local product (e.g., helps the local economy and local farmers) the desired result of local designations in terms of expanding markets for local products is more likely be realized than if quality is not considered in issuing the local designation.

Table 6. Respondent perceptions of the Utah's Own Designation

Variable	Mean	St. Dev.	Min	Max
<i>High Quality</i>	0.271	0.444	0	1
<i>Same Quality</i>	0.237	0.426	0	1
<i>Low Quality</i>	0.024	0.153	0	1
<i>Locally Produced</i>	0.630	0.483	0	1
<i>Utah Product</i>	0.768	0.422	0	1
<i>Fresher Product</i>	0.531	0.499	0	1
<i>Expensive Product</i>	0.128	0.335	0	1
<i>Inexpensive Product</i>	0.147	0.354	0	1
<i>Environmentally Friendly</i>	0.097	0.296	0	1
<i>Helps Local Farmers</i>	0.757	0.429	0	1
<i>Helps Local Economy</i>	0.711	0.453	0	1

Local Designations Significantly Impact WTP

Table 7 presents the results of three ASM probit models which employ respondent-level clustered standard errors and allow for fully-flexible correlation patterns in the unobserved

errors. Table 8 presents the associated WTP measures for these models. The first model reported in Tables 7 and 8 indicates that brand effects exist in the data, because each brand has a statistically significant positive effect on the probability of selection (significant coefficient on each brand). We estimate average WTP for two-pound of Gossner's cheese to be \$8.67, for Cache Valley \$9.61, for Tillamook \$9.10, and for Western Family \$8.61 (Table 8). Notice that the WTP for Cache Valley is nearly a dollar more than it is for Western Family and their marginal WTP lies outside of the 95% confidence interval of the other cheese in both cases. This indicates that Cache Valley and Western Family likely have fundamentally different average WTP. The sensory results suggest this is because quality differences exist in the brands.

The second model in Table 7 is identical to the first model except it adds an interaction effect with a designation dummy variable on the two locally-produced brands (Gossner's and Western Family). This dummy variable was equal to 1 if either of the two types of designations was shown in the choice sets given to the respondent. The coefficient for both interaction term for "Any Designation" (Model 2 in Table 7) is positive and statistically significant providing evidence that SSDs do, on the average, increase the probability that consumers will purchase products with a local designation. WTP reported for Model 2 in Table 8 indicates that, on the average, a local designation adds about \$0.51 to the WTP for Gossner's and Cache Valley.

Table 7. Estimates of effectiveness of brands and designations

Variable	Conditional Logit	ASM Fixed Probit	ASM Flexible Probit
<i>Price</i>	-0.469*** (0.0614)	-0.475*** (0.0638)	-0.479*** (0.0636)
<i>Tillamook</i>	4.266*** (0.408)	4.315*** (0.426)	4.337*** (0.425)
<i>Western Family</i>	4.035*** (0.388)	4.081*** (0.405)	4.100*** (0.403)
<i>Gossner's</i>	4.064*** (0.395)	3.942*** (0.416)	3.960*** (0.416)
<i>*Utah's Own</i>	--	--	0.314** (0.159)
<i>*Locally Produced</i>	--	--	0.184 (0.156)
<i>*Any Designation</i>	--	0.247* (0.137)	--
<i>Cache Valley</i>	4.501*** (0.429)	4.389*** (0.416)	4.410*** (0.416)
<i>*Utah's Own</i>	--	--	0.156 (0.161)
<i>*Locally Produced</i>	--	--	0.328** (0.164)
<i>*Any Designation</i>	--	0.241* (0.145)	--
Observations	6,021	6,021	6,021

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The final model in Table 7 allows the designation effect to vary across the two different types of labels (“Utah’s Own” and “Locally-Produced”). Interestingly, the separate designations affect the two brands differently. The Utah’s Own label has a statistically significant positive effect on Gossner’s, but not on Cache Valley, while the locally-produced label has a statistically significant positive effect on Cache Valley, but not on Gossner’s. The reason behind this difference is unclear. However, it could be the result of differences in brand recognition and what the two local designations may or may not communicate to consumers.

The Cache Valley brand is the most recognized of the four cheese labels in the study (Table 3) and some respondents may connect the Cache Valley label to a geographic location, namely Cache Valley, Utah. The choice experiment results indicate that brand recognition is an important factor in respondent choices and WTP. Cache Valley’s strong brand recognition and connection to Utah may make the Utah’s Own designation redundant to some respondents. Other respondents may view “Locally-Produced,” in the case of a well-known product like Cache Valley, as new and useful information they had not previously associated with the brand.

Gossner’s is the least familiar brand in the survey being recognized by only about 65% of respondents (Table 3). On the other hand, almost 84% of respondents had some familiarity with the Utah’s Own designation. In the case of brands with low recognition, a SSD, in this case Utah’s Own, may act to a degree as a substitute for the brand in communicating quality in the minds of some respondents. In this respect, the Utah’s Own designation is a stronger branding signal than “locally-produced” if a brand is not well-known. This may be the result of promotional activities associated with the SSD. The SSD appears to be filling an information and trust gap for respondents who are not familiar with the Gossner’s brand that is not needed in the case of the well-known Cache Valley brand.

The final column in Table 8 shows that for Gossner’s to compete at the same price points as Cache Valley and Tillamook, it needs to have the Utah’s Own label. Given that Gossner’s was the highest rated cheese in the sensory analysis, the Utah’s Own designation appears to boost the credibility of Gossner’s label so that respondents regard it as the same quality as Cache Valley and Tillamook. Without the Utah’s Own designation, respondents WTP would have been less for Gossner’s compared to these other two brands. Gossner’s high quality would ensure that consumers drawn to Gossner’s by the Utah’s Own label might continue to purchase it.¹⁴

¹⁴Again, the analysis is only measuring WTP based on local designations at a given point in time. However, the results reported here indicate that elements necessary for repeat purchases of Gossner’s are present, i.e., high quality based on sensory characteristics and WTP.

Table 8. WTP measures for a two-pound cheese package with reported 95%

Variable	Conditional Logit	ASM Fixed Probit	ASM Flexible Probit
<i>Tillamook</i>	\$9.10 (\$8.46 - \$ 9.94)	\$9.08 (\$8.45 - \$9.86)	\$9.06 (\$8.45 - \$9.84)
<i>Western Family</i>	\$8.61 (\$8.05 - \$9.36)	\$8.59 (\$8.02 - \$9.37)	\$8.57 (\$8.00 - \$9.34)
<i>Gossner's</i>	\$8.67 (\$8.00 - \$9.50)	\$8.59 (\$8.02 - \$9.37)	\$8.27 (\$7.56 - \$9.13)
<i>*Utah's Own</i>			\$0.66 (-\$0.12 - \$1.17)
<i>*Locally Produced</i>			\$0.38 (-\$0.17 - \$0.94)
<i>*Any Designation</i>		\$0.52 (\$0.05 - \$0.99)	
<i>Cache Valley</i>	\$9.61 (\$8.94 - \$10.43)	\$9.23 (\$8.49 - \$10.21)	\$9.22 (\$8.49 - \$10.18)
<i>*Utah's Own</i>			\$0.33 (-\$0.30 - \$0.84)
<i>*Locally Produced</i>			\$0.68 (\$0.10 - \$1.20)
<i>*Any Designation</i>		\$0.51 (\$0.03 - \$0.94)	

Variation in Results by Respondent Characteristics

The data were also analyzed for the effects of respondent characteristics. Table 9 (see Appendix) reports the effect of respondent age, gender, and income on respondent choice and WTP. Brand is a significant determinant of WTP for both genders and all age groups. However, the local designations clearly appeal to respondents over the age of 56 but not to the other age groups and only for the Gossner's brand (significant estimated coefficients on Utah's Own and Locally-Produced only for Gossners and only for the 56+ age category (Table 9)). The Locally-Produced designation is effective on Gossner's for low income people and on Cache Valley for high income people. The effect on the high income group is large and very significant for Locally-Produced. Gossner's Utah's Own effect is significant for the middle income group.

The Utah's Own designation was found to have a positive effect on Gossner's for people who are familiar with the Utah's Own designation (Table 10, see Appendix). This was also true for those respondents who indicated they had previously purchased a Utah's Own product. The Locally-Produced designation is effective on both Gossner's and Cache Valley for those who have not purchased Utah's Own products before. Finally, perceptions of the impact of Utah's Own on local farmers and the local economy are very important (Table 10). The Utah's Own label has strong positive effects on both cheeses for those who believe it helps farmers and for those who believe it helps the local economy. However, the Utah's Own label actually has a negative effect on Cache Valley for those who believe it does not help local farmers. This is the only subgroup where the designations have a statistically significant negative effect and appears to be connected to respondents who are skeptical about the benefit of the Utah's Own designation to farmers.

These results suggested that brands are a critical component of cheese marketing because respondents' WTP was heavily influenced by brands. Local designations also have an important role to play for local brands, but the effects of different local designations are very brand specific. WTP for the least well-known of the brands, Gossner's, is clearly enhanced by Utah's Own for older female shoppers who are familiar with the Utah's Own program and who sympathize with the economic plight of local farmers. This provides a target audience and strategy for promoting Utah's Own for its managing entity, UDAF. The sensory results also indicated that many people who try Gossner's as a result of the Utah's Own designation will like the product and may become repeat purchasers. This suggests that the SSD is most effective when used on lesser-known, but high quality local products compared to better-known local brands or brands of low quality.

The well-known local product, Cache Valley, was not aided by the Utah's Own designation, probably because the Utah's Own designation may be somewhat redundant to many of the respondents. However, the Locally-Produced designation on Cache Valley did appeal, in terms of higher WTP, to older, high income, female respondents who saw the designation as helping the local economy (but not necessarily farmers). This result suggests that the Locally-Produced designation is important to this demographic; more so than the Utah's Own designation. This group may identify with the buy-local movement more than other respondents and the Locally-Produced designation appears to be an important signal to them.

Conclusions

The study results indicate that local brands were able to compete well, in terms of pricing, with the national brands and private labels, especially when local designations were appropriately applied. The locally-produced designation increased consumer WTP more than the state-sponsored designation for the well-known local brand, but not for the lesser-known brand. This suggests that consumers will react favorably to a simple locally-produced designation, especially when they are already familiar with the brand. This result is consistent with Deselnicu et al. (2013) where premiums for geographically-identified products were lower for products otherwise differentiated, such as through brands.

For SSDs connecting sensory quality to locally-produced products with low brand recognition or no separate differentiation strategy would likely be effective in increasing consumer WTP, as was the case in this study and also in Moschini, Menapace, and Pick (2008). However, the degree of impact on consumer WTP will likely be product specific, and thus exact extrapolations are not recommended. For example, Deselnicu et al. (2013) suggests that globally, origin identified fresh produce and meat tend to command the highest premiums, followed by cheese, with olive oils and lastly wine. Additionally, in order for the SSD to maintain its impact on product pricing, quality must also be maintained. As discussed in Menapace and Moschini (2012) minimum-quality standards set by the SSD may be integral to maintaining consumer confidence in the quality of SSD products.

Also, in this study the SSD appears to have a greater impact on older, mid-income females, looking to support local farmers. Products seeking to access this target market may find SSD

membership a potential benefit. Market and promotional decision makers should consider if this market corresponds to the strategy of pursuit.

Finally, this study examined consumer decision making in a realistic shopping experience, as data collection and sensory analysis was conducted in a retail grocery atmosphere. But, while the results provides convincing evidence of the connection between stated preferences and local designations at a point in time, the long-term effect of local designations on repeat purchases would require further study using information on purchases by a consumer panel over time.

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Appendix

For the first six questions, please base your answers on the type of cheese you USUALLY purchase in a 2 lb. package.

1 Which of the following products would you choose to purchase at the prices given?

Gossner's (Utah's Own)

Price: \$6.89

☐

Cache Valley (locally-produced)

Price \$6.29

☐

Neither

☐

2 Which of the following products would you choose to purchase at the prices given?

Western Family

Price: \$5.19

☐

Tillamook

Price \$8.99

☐

Neither

☐

3 Which of the following products would you choose to purchase at the prices given?

Gossner's (Utah's Own)

Price: \$7.99

☐

Western Family

Price \$6.69

☐

Neither

☐

4 Which of the following products would you choose to purchase at the prices given?

Cache Valley (locally produced)

Price: \$7.79

☐

Tillamook

Price \$6.49

☐

Neither

☐

5 Which of the following products would you choose to purchase at the prices given?

Tillamook

Price: \$7.29

☐

Gossner's (Utah's Own)

Price \$6.59

☐

Neither

☐

6 Which of the following products would you choose to purchase at the prices given?

Western Family

Price: \$6.89

☐

Cache Valley (locally-produced)

Price \$7.39

☐

Neither

☐

Figure 1. Representative choice set used for the store survey

Table 9. Variation in results by gender, age and income.

Variable	Females	Males	Age 18-35	Age 36-55	Age 56+	Low Income	Middle Income	High Income
<i>Price</i>	-0.472*** (0.0616)	-0.124 (0.0912)	-0.348*** (0.103)	-0.526*** (0.0964)	-0.526*** (0.104)	-0.395*** (0.0833)	-0.457*** (0.0940)	-0.752*** (0.130)
<i>Tillamook</i>	4.207*** (0.413)	2.346*** (0.482)	3.641*** (0.642)	4.782*** (0.680)	4.478*** (0.718)	3.551*** (0.518)	4.132*** (0.642)	6.844*** (0.984)
<i>Western Family</i>	4.109*** (0.372)	2.189*** (0.367)	3.630*** (0.636)	4.425*** (0.588)	4.065*** (0.613)	3.668*** (0.514)	3.968*** (0.588)	5.532*** (0.752)
<i>Gossner's</i>	3.731*** (0.387)	2.312*** (0.462)	3.473*** (0.623)	4.419*** (0.650)	3.860*** (0.636)	3.420*** (0.511)	3.673*** (0.596)	5.967*** (0.895)
<i>*Utah's Own</i>	0.357** (0.170)	0.0428 (0.0609)	0.0522 (0.190)	0.346 (0.233)	0.569** (0.255)	0.108 (0.192)	0.448* (0.242)	0.516 (0.319)
<i>*Locally Produced</i>	0.216 (0.164)	0.00525 (0.0560)	0.0990 (0.190)	-0.0513 (0.241)	0.522** (0.238)	0.346* (0.194)	0.0288 (0.220)	0.249 (0.352)
<i>Cache Valley</i>	4.045*** (0.405)	2.489*** (0.577)	3.708*** (0.665)	4.659*** (0.653)	4.754*** (0.755)	3.890*** (0.582)	4.230*** (0.656)	6.229*** (0.915)
<i>*Utah's Own</i>	0.350** (0.164)	-0.0902 (0.0755)	0.0182 (0.179)	0.219 (0.235)	0.234 (0.225)	0.163 (0.182)	-0.0253 (0.200)	0.528 (0.343)
<i>*Locally Produced</i>	0.614*** (0.172)	-0.0756 (0.0780)	0.333 (0.210)	0.372 (0.248)	0.210 (0.211)	0.126 (0.179)	0.152 (0.204)	1.203*** (0.387)
Observations	4,320	1,710	1,836	2,142	2,052	2,646	1,764	1,620

Statistically significant designation effects in bold.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Variation in results based on experience with and perceptions of Utah's Own designation.**Table 10.** Variation in results based on experience with and perceptions of Utah's Own designation.

Variable	Familiar With	Not Familiar	Have Purchased	Have Not Purchased	Helps Local Farmers	Doesn't Help Local Farmers	Helps Local Economy	Does Not Help Local Economy
<i>Price</i>	-0.335*** (0.0830)	-0.573*** (0.0815)	-0.374*** (0.0776)	-0.545*** (0.148)	-0.500*** (0.0683)	-0.371*** (0.0956)	-0.481*** (0.0715)	-0.445*** (0.0893)
<i>Tillamook</i>	3.516*** (0.527)	4.886*** (0.561)	3.861*** (0.504)	4.451*** (1.021)	4.588*** (0.466)	3.307*** (0.614)	4.394*** (0.486)	4.012*** (0.613)
<i>Western Family</i>	3.353*** (0.480)	4.579*** (0.493)	3.549*** (0.432)	4.260*** (0.915)	4.256*** (0.411)	3.319*** (0.570)	4.100*** (0.432)	3.878*** (0.548)
<i>Gossner's</i>	3.211*** (0.473)	4.494*** (0.540)	3.528*** (0.451)	3.751*** (0.910)	4.078*** (0.426)	3.325*** (0.622)	4.029*** (0.454)	3.627*** (0.585)
<i>*Utah's Own</i>	0.343** (0.163)	0.126 (0.215)	0.391** (0.160)	0.220 (0.403)	0.353** (0.159)	0.266 (0.234)	0.262* (0.151)	0.524* (0.284)
<i>*Locally Produced</i>	0.206 (0.149)	0.126 (0.206)	0.178 (0.141)	0.717* (0.407)	0.195 (0.157)	0.0761 (0.211)	0.158 (0.153)	0.188 (0.242)
<i>Cache Valley</i>	3.640*** (0.542)	4.901*** (0.574)	3.987*** (0.516)	3.988*** (0.964)	4.561*** (0.465)	3.767*** (0.704)	4.446*** (0.492)	4.182*** (0.638)
<i>*Utah's Own</i>	0.0407 (0.139)	0.243 (0.202)	-0.00858 (0.135)	0.395 (0.408)	0.330** (0.151)	-0.496* (0.264)	0.296** (0.145)	-0.359 (0.268)
<i>*Locally Produced</i>	0.253 (0.155)	0.328 (0.203)	0.192 (0.142)	1.011** (0.399)	0.350** (0.155)	0.0701 (0.223)	0.318** (0.152)	0.254 (0.249)
Observations	3,006	3,024	3,636	828	4,572	1,458	4,284	1,746

Statistically significant designation effects in bold.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1