Consumers' Valuation for Craft Beer: Does the Localness of Inputs Matter?

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Abstract

Demand for local food is on the rise. There is empirical evidence that consumers are willing to pay a premium for locally-grown or locally processed food. Despite public and private investments in developing the hops industry in new production regions, mostly motivated by the local food movement, there is little evidence on consumer WTP for the localness of inputs. We investigate whether beer consumers put a premium on locally-grown hops and whether they treat localness of inputs as a complement or a substitute to localness of processing. Using an online choice experiment, we find that Indiana consumers are willing to pay a price premium for craft beer brewed in Indiana, as well as a positive, but smaller, premium for local hops. We also find that experience with the product is an important determinant of estimating how consumers value different attributes. In particular, experienced consumers have a high WTP for local attributes (both processing and origin of inputs) defined at the state level, but discount local attributes defined at the regional level. In addition, we find that average and inexperienced consumers view localness claims of the different supply chain stages as substitutes. These results are useful for the beer industry's marketing and pricing strategies and can inform transaction arrangements between hop growers and breweries.

1. Introduction

Marketing food as organic or local is a way to differentiate food products and target high value niche markets. Demand for local food is surging, with local food sales expected to increase from $12 billion in 2014 to $20 billion in 2020, resulting in 8.8% annual growth (USDA 2016 a). While the market for organic food continues to show strong growth (USDA 2016 b), there is emerging evidence that consumers value locally produced food to organic food. For example, James et al. (2009) found that consumers were willing to pay more for locally grown applesauce, compared to organic applesauce. Designating a product as locally processed from locally grown inputs can boost consumer demand for categories where raw inputs are traditionally not grown. However, little is known about consumers' willingness to pay (WTP) for the localness of inputs (locally grown), as opposed to the localness of the output (locally produced). In particular, these two levels of localness might be complementary or substitute in nature.

Such is the case for hops, an input for beer making. The cultivation of hops is concentrated (98%) in the Pacific Northwest (PNW) region of the U.S. However, American craft breweries, which have been growing on average 11% annually, use more than 50% of the hops produced in the U.S. (Brewers Association, 2015). With demand for craft beer surging nationwide, the supply of hops cannot keep pace (Geller 2016), which could lead to price increases and/or hop shortages. While growers in the PNW were able to increase hop production by 13% from 2012 to 2013 (NASS, 2013), further growth is constrained due to limited availability of land. This unique situation presents a rare opportunity for new growing regions to enter the hops market, such as the U.S. Midwest, which was previously known for hop production[1]. Advances in disease resistant hop varieties and pest management have improved yields, making hop production an attractive opportunity for Midwest farmers seeking to enter or diversify into high-value crops.

The craft beer industry was first able to differentiate itself from macro beer by offering more variety in terms of beer styles. As more and more craft breweries entered the market, they began differentiating themselves as local to compete with the larger, regional craft breweries, largely defining local beer as beer brewed locally. Craft beer has benefited significantly from the local food movement. To illustrate, a Nielsen (2015) study found that 45% of beer consumers consider localness to be an important attribute of the beer they consume. As the craft beer industry – and the locally brewed beer niche – reaches saturation, brewers seeking to differentiate their products have begun sourcing local inputs. However, due to the geographic concentration of the largest agricultural inputs involved in brewing beer – malted barley, followed by hops – local sourcing has been limited to ingredients such as fruit, nuts, coffee, honey, and flowers, among others, which constitute only a small fraction of inputs. For example, in Indiana, Bloomington Brewing Co. uses locally grown persimmon in their seasonal Persimmon Ale (Galanty 2016). As new hops growing regions emerge, the question that arises is whether brewers can capitalize on the evolving definition of local beer.

Despite public and private investments in developing the hops industry in new production regions such as the Northcentral and Northeastern U.S., there is limited evidence on consumer WTP for the localness of inputs (Hu et all. 2009, Meas et al. 2014). To elicit consumers'

[1] There was a sizeable hop industry in the Midwest in the early 1900s, but production was gradually relocated to the PNW's drier climate, which helped to reduce disease pressure.

preferences and WTP for local beer, we developed a stated preference choice experiment. To the best of our knowledge, this study is among the first to examine consumer WTP for localness of inputs, as well as the relationship between localness of ingredients and localness of outputs in processed food products, as the local food literature has focused on the localness of the final products. In particular, our study contributes to the local food literature by addressing consumer preferences for food products that are locally processed and use locally-sourced inputs. In addition, the results are informative to current breeding, farming, and postharvest technology initiatives that target the increased supply of local hops in alternative production regions.

2. Material and Methods

2.1 Experimental Procedures

We use an online choice experiment in our study. The product of interest is a six-pack of craft beer (72 oz). Craft beer was chosen due to its popularity as well as the recent emergence of new hop growing regions, particularly the U.S. Midwest. These developments present an opportunity for brewers to market their beer as locally brewed with locally-sourced hops. Indiana's craft beer scene has been growing in popularity. Furthermore, since the state is located in the Midwest, brewers have access to U.S. hops, Midwest hops, as well as hops produced in their state's own budding hops industry. These factors make Indiana a good case study to examine consumer WTP for local beer using varying geographic boundaries for "local", as well as the relationship between local processing (i.e. brewing) and locally-sourced inputs (i.e. hops).

Craft beer products differed across four attributes that were used to build the product profiles: brewing location, production location of hops, production method of hops, and price (see Table 1). The geographic focus of the study was Indiana. For brewing location, we used three levels: Indiana; within the Great Lakes region, outside of Indiana; and within the U.S., outside the Great Lakes region. We chose not to include imported beers as it was beyond the scope of our Indiana hops industry study. For production location of hops, there were four attribute levels: Indiana; within the Great Lakes region, outside of Indiana; within the U.S., outside the Great Lakes region; or left blank (i.e. no information provided). We included a "blank" level to reflect the fact that information on sourcing location of ingredients is typically not included on beer product labels and that consumers may be indifferent to localness of hops. In addition, we included a production method of hops attribute as consumers often confound positive attributes, such as organic, sustainable production, fair farm labor practices, animal welfare, among others, with local production (Darby et al 2008, Adjala et al 2015). The two-level production method attribute was specified as organic or left blank (i.e. no information provided), because while product labels are likely to indicate organic claims, they are unlikely to make claims about using conventionally produced or "not organic" ingredients.

There were five price levels to reflect the prices for the beer products. Data for the price attribute were collected from three grocery stores and three liquor stores across Indiana from February-March 2016. For each store, we surveyed the stores' entire inventory of both macro and craft beer offerings sold in six- or four-pack packages.[2] In total, 1,188 data points were

[2] To ensure that all prices were representative of the same volume, we converted all products to a 72 oz. offering (six 12 oz. bottles).

collected. Based on analysis of the dataset[3], the resulting price vector was $7.99, $9.99, $10.99, $12.99, and $16.99. As actual market prices can differ from respondent reference prices (Bazzani et al 2017), we corroborated the actual market price vector against respondent reference prices, which were collected during a pre-test phase of the study. The reference price data closely mirrored the actual market price vector; however, the former indicated a smaller lower bound of $6.99. To allow for more variation, we elected to use a price vector with a slightly larger price range: $6.99, $9.99, $10.99, $12.99, and $16.99. The attribute levels are delineated in Table 1.

Table 1: Attributes of Craft Beer

Product Attribute	**Levels**
Brewing location	Indiana
	Within the Great Lakes region, outside of Indiana
	Within the US, outside of the Great Lakes region
Location of hops production	Indiana
	Within the Great Lakes region, outside of Indiana
	Within the US, outside of the Great Lakes region
	(blank)
Production method of ingredients	Organic
	(blank)
Price ($)	6.99
	9.99
	10.99
	12.99
	16.99

The choice set design followed a Bayesian approach (Scarpa et al 2007), which involved three phases. In the first phase, we designed the choice set following a d-efficient design using priors equal to zero[4]. In the second phase, we conducted an online pre-test with 30 randomly selected respondents. Estimates from a Multinomial Logit Model were implemented as Bayesian priors to generate the final Bayesian D-efficient design. This design consisted of 24 choice sets, which were randomly divided into three blocks of eight choice sets each.

[3] Since the liquor stores carried a large selection of premium products the data were skewed towards the higher values. As a result, we used the values at the 10%, 25%, 50%, 75% and 90% percentiles, which were $7.99, $9.49, $10.49, $12.73, and $16.49, respectively. We elected to round the cent value up to the nearest $0.99 to minimize cognitive burden on subjects during the choice experiment and to be consistent with prices observed in the market place (74% of the price data points ended in $0.99, whereas 21% ended in $0.49).

[4] In this phase of the design we used priors equal to zero since very little information exists about how consumers value locally brewed beer or beer brewed with local hops

2.2 Data and Empirical Model

2.2.1 Data

The choice experiment was conducted online. The pretest phase of the study was completed in January 2017, and the final survey was conducted during March-April 2017. Participants were recruited online by Survey Sampling International (SSI), a survey panel company, and the survey was programmed in Qualtrics. Data were collected from 231 respondents[5].

Upon entering the survey, participants were asked a series of screening questions: "What is your age?" to determine if they were of legal drinking age[6]; and "Which of the following [alcoholic beverages] have you consumed in the past year?" to determine if they drank beer[7]. These screening questions[8] were structured in a way to enhance data quality by identifying and screening out "undesirable" respondents (Jones et al 2015). In addition, we included a "trap question" where the respondent was instructed to select a specific answer ("Please choose Important") to encourage careful reading of survey questions.

Following the screening and data quality questions, participants were presented with information regarding the attributes. Subjects were instructed to assume that the beer products were their preferred style of beer and that they were identical in all aspects, except for the four attributes. Participants were then randomly assigned to complete one of three blocks, each of which comprised of eight choice tasks. In each choice task, subjects were instructed to select their most preferred option, choosing between two craft beer products, as well as a third option to purchase neither of the products. A "none of these" option was included in each choice set to mimic a realistic shopping situation, as consumers always have the option to walk away from a purchase decision (Lusk 2004, Louviere 1988, Louviere et all 2000). To mitigate any possible order effects, the choice tasks, as well as the order of the product profiles, were presented in random order.

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[5] A total of 252 respondents completed the survey; however 21 respondents were removed for having chosen the "no buy" option for all eight choice tasks, which would have provided no information if included.

[6] Instead of asking respondents, "Are you 21 or older?", we phrased the question to be open ended so that respondents would reveal, rather than state, that they were of legal drinking age.

[7] Again, instead of asking respondents, "Do you drink beer?", we phrased the question to be open ended without giving any indications to the correct answer (i.e. beer). Respondents could also select wine, spirits, sparkling wine, hard cider without consequence. Following Jones et al (2015), we included aguardiente, rice wine, and grappa as "traps" to eliminate potentially fraudulent survey respondents. Since these three beverages are rare, those indicating they had consumed two or more of these beverages within the last year were screened out.

[8] We also asked respondents "Are you colorblind?" This study was part of a larger study, which included two other treatments that required respondents to not be colorblind. Although colorblindness would not have impacted the responses of participants of the treatment described in this article, we still posed the question to them to ensure homogeneity of samples across the three treatments.

Which of the following craft beer products do you prefer most? If neither option A nor option B meet your preferences, you should choose to opt-out by selecting option C. Select one.

	Option A	Option B	Option C
Brewing location	Indiana	Within the US, outside of the Great Lakes region	I would not choose Option A or Option B.
Location of hops production	Indiana	Within the US, outside of the Great Lakes region	
Production method of ingredients	Organic		
Price	$10.99	$6.99	
I prefer…	○	○	○

Figure 1. An Example of a Choice Set

Since our stated preference study could be subject to hypothetical bias, we included a cheap talk script and an opt-out reminder. Our cheap talk script was adapted from Silva et al (2011), which was designed to be generic, short, and neutral. It was generic in that it did not reference any specific product and was neutral in that it did not use words such as "overstate" or "higher" to avoid biasing responses. Our opt-out reminder was based on Ladenburg and Olsen's 2014 study, which recommends augmenting cheap talk scripts with a reminder for each choice task that participants may opt out or "walk away." The language used by Ladenburg and Olsen stated, "If both prices are higher than what you think your household will pay, you should choose the present situation (the opt-out)." Weary to bias participants towards the price attribute, we adapted the language to be neutral towards all of the attributes, as follows: "If neither option A nor option B meet your preferences, you should choose to opt-out by selecting option C."

Subsequent to the choice experiment, participants were asked a series of questions related to their beer preferences. We placed the beer preference questions after the choice experiment to avoid biasing subjects. Finally, the survey concluded with demographic questions.

2.2.2 Econometric Model

Multinomial logit models (MNL) and random parameter logit (RPL) models are commonly used for empirical analysis in CEs. However, the RPL models advance MNL models by allowing for heterogeneity in consumer preferences and taking into account the panel data structure, given that each respondent answers eight choice tasks (Train, 2003). We assume that taste preferences for craft beer attributes are heterogeneous. In addition, our experimental design consists of two product alternatives and a no buy option. For this reason, in our econometric analysis we further take in consideration the error component that accounts for the expected correlation between the

two product profiles which change for each choice task compared to the no buy option which remains constant throughout the choice experiment. This error component captures the variance stemming from the experimentally designed product profiles. Accordingly, in this study we use a RPL model with error component (RPL-EC) to estimate consumers' preferences for the craft beer attributes (Scarpa et al., 2005). In random utility models the utility function for individual *i* when choosing alternative *j* in choice task *t* is represented by:

$$U_{ijt} = \beta_0 Nobuy + \beta_1 Price_{ijt} + \beta_2 BrewIN_{ijt} + \beta_3 BrewGL_{ijt} + B_4 HopsIN_{ijt} + \beta_5 HopsGL_{ijt} + \beta_6 HopsUS_{ijt} + B_7 Organic_{ijt} + \eta_{ijt} + \in_{ijt} \quad (1)$$

where *Nobuy* is the alternative specific constant of the no buy option; *Price* is a continuous variable indicating the price for a six-pack of craft beer; *BrewIN, BrewGL, HopsIN, HopsGL, HopsUS*, and *Organic* are dummy-coded attribute level variables, where a value of 1 indicates they are present in option *j* and a value of 0 indicates otherwise; η_{ijt} is a zero-mean, normally distributed error component shared by the two hypothetical alternatives; $\in_{ijt}$ is an unobserved random error term.

3. Results

3.1 Descriptive Statistics

Descriptive statistics of the survey sample are presented in Table 2. In addition, since preferences and WTP estimates can vary based on a consumer's experience with the product (Adjala et al. 2015), we were interested to see the differences between craft drinkers and non-craft drinkers. We define craft drinkers as those who reported having consumed craft beer 2-3 times a month or more within the past year, and non-craft drinkers as those who reported drinking less than this amount. Overall, compared to the general population of Indiana, the sample is comprised of a larger proportion of middle-income households, is younger, more educated and more homogenous. As can be seen, the majority of household incomes are concentrated between $35,000-$99,000 (57.6%). In addition, 81.3% of respondents are younger than 59 years old. In terms of gender, males and females (50.8%) are represented almost equally. Regarding education, 79.7% of households have completed some level of higher education or more. Finally, 90% of the sample is white.

Compared to non-craft drinkers, sampled craft drinkers tend to be wealthier, with a larger portion of craft drinker respondents falling in the $35,000-$49,000, $50,000-$74,999, $100,000-$149,000, and above $150,000 household income ranges. Craft drinkers tend to be younger, with a larger portion of respondents reporting to be 21-49 years old. Females represent a smaller percentage of craft drinkers than non-craft drinkers. In terms of education, craft drinkers are more educated than non-craft drinkers, with a larger percentage having received bachelors and advanced degrees. Indiana craft drinkers are slightly less homogenous than the general Indiana population with a smaller portion identifying as white. Our craft drinker sample reflects similar demographic trends to 2014 craft beer consumer data from the Brewer's Association (Watson 2014), which indicated that those who had ever drank craft beer tended to be younger, male, wealthy, well-educated and white.

Table 2: Demographic Characteristics of Sample

	Indiana	Entire Survey Sample	Craft Drinkers[a]	Non Craft Drinkers
Number of respondents		231	132	99
Household income				
< $24,999	22.9%	13.4%	8%	20%
$25,000 - $34,999	11.3%	13.0%	11%	15%
$35,000 - $49,999	15.3%	14.3%	17%	11%
$50,000 - $74,999	19.3%	26.8%	30%	22%
$75,000 - $99,999	12.5%	16.5%	12%	22%
$100,000 - $149,999	11.9%	10.4%	14%	6%
> $150,000	6.9%	4.8%	7%	2%
Prefer not to answer		0.9%	1%	1%
Age*				
21-29	17.0%	16.0%	18%	13%
30-39	17.6%	27.7%	33%	20%
40-49	17.4%	19.0%	20%	17%
50-59	19.1%	18.6%	16%	22%
60-69	15.2%	12.6%	6%	21%
70-79	8.6%	5.6%	5%	6%
> 80	5.0%	0.4%	1%	0%
Female*	51.6%	50.8%	42%	61%
Education**				
Some high school or less	11.8%	1.7%	1%	3%
High school graduate (includes equivalency)	34.3%	18.6%	16%	22%
Some college, no degree or associate's degree	28.9%	35.1%	30%	42%
Bachelor's degree	16.0%	26.8%	33%	18%
Graduate or professional degree	9.0%	17.8%	20%	14%
White	79.9%	90.0%	88%	93%

Data source: U.S. Census Bureau, 2015 American Community Survey 1-Year Estimates
Notes: Unless otherwise noted, state statistics represent the general population of Indiana. Single asterisks represent Indiana residents 21 and over; however, since the closest available data was for 20+, a close approximation was calculated to determine statistics for 21+. Double asterisks are based on residents 25+, which may reflect a higher proportion of those with "some college, no degree or associate's degree", than data for 21+.

[a] Craft drinkers are those who reported having drank craft beer at least 2-3 times a month during the last year.

Table 3. Utility Function Parameter Estimates

	Craft Drinkers			Non Craft Drinkers		
Attribute	**RPL**	**RPL-EC**	**RPL-EC w/ interactions**	**RPL**	**RPL-EC**	**RPL-EC w/ interactions**
Brew Indiana	1.45 ***	1.57 ***	1.08 ***	1.25 ***	1.39 ***	1.54 ***
	(0.20)	(0.23)	(0.41)	(0.31)	(0.34)	(0.66)
Brew Great Lakes	0.35 *	0.38 **	-0.10	0.49 *	0.43	1.10 *
	(0.18)	(0.18)	(0.35)	(0.28)	(0.27)	(0.60)
Hops Indiana	0.54 **	0.54 *	0.35	-0.30	-0.46	0.01
	(0.27)	(0.33)	(0.38)	(0.33)	(0.43)	(0.51)
Hops Great Lakes	0.23	0.22	-0.10	-0.17	-0.34	-0.04
	(0.21)	(0.25)	(0.40)	(0.32)	(0.40)	(0.66)
Hops U.S.	0.48 ***	0.49 ***	0.02	0.54 *	0.61 **	0.49
	(0.18)	(0.18)	(0.29)	(0.29)	(0.29)	(0.46)
Hops Organic	-0.07	-0.04	0.00	-0.50 *	-0.60 *	-0.52
	(0.20)	(0.23)	(.02)	(0.27)	(0.34)	(0.35)
Price	-0.30 ***	-0.35 ***	-0.32 ***	-0.45 ***	-0.55 ***	-0.57 ***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)
No Buy	-4.24 ***	-5.43 ***	-5.24 ***	-5.95 ***	-8.00 ***	-8.02 ***
	(0.36)	(0.54)	(0.52)	(0.49)	(0.84)	(0.87)
Interaction Terms						
Brew Indiana x Hops Indiana			0.14			-0.73
			(0.46)			(0.72)
Brew Indiana x Hops Great Lakes			0.75			-0.03
			(0.51)			(0.75)
Brew Indiana x Hops U.S.			1.03 **			-0.12
			(0.49)			(0.71)
Brew Great Lakes x Hops Indiana			0.74			-1.28 *
			(0.46)			(0.74)
Brew Great Lakes x Hops Great Lakes			0.27			-1.20 *
			(0.45)			(0.70)

Brew Great Lakes x Hops U.S.			0.65			-0.07
			(0.46)			(0.72)
Summary Statistics						
N. of observations	396	396	396	297	297	297
N. of parameters	8	9	15	8	9	15
Log likelihood	-833.27	-807.01	-802.22	-565.48	-534.15	-529.79
AIC	1724.50	1686.00	1688.40	1189.00	1140.30	1143.60
AIC/N	1.63	1.60	1.60	1.50	1.44	1.44

Notes: Numbers in parenthesis are standard errors; ***, **, * indicate significance at 1%, 5% and 10% level

3.2 Estimation Results

Table 3 details the estimation results of both craft drinkers and non craft drinkers across three models: RPL, RPL-EC, and RPL-EC with interactions. The RPL models are the base model for each group and accommodate for unobservable preference heterogeneity in the sampled population; the RPL-EC model augments the RPL model by considering the error component associated with the no buy option. The RPL-EC model with interactions further builds on the RPL-EC model by including interaction terms for the brewing location and production location of hops attributes to evaluate whether these two levels of localness are substitute or complementary in nature.

For the craft drinkers, each model contains 3,168 (396x8) observations, which were collected from 132 subjects who completed eight choice tasks comprised of three alternatives each. Similarly, the non craft drinker models contain 297 observations from 99 individuals. Looking at the Cholesky matrix for the craft drinker models, the larger number of statistically significant estimates, indicates that there is correlation across the parameters; however, there are very few significant estimates for the non craft drinker models (results are available upon request). As can be seen from the summary statistics, the log likelihood function increases when moving from left to right across the models for both sample groups, suggesting that the RPL-EC with interactions model is a better fit of the data.

The discussion of the estimation results will focus on the RPL-EC with interactions model since it is has the best model fit. The baseline product for comparison is a six-pack (72 oz.) of craft beer that was brewed in the U.S., has no labeling regarding hops origin, and no labeling regarding production method of hops. As can be seen, the constant, which represents the no buy option, is negative and statistically significant at the 0.01 level, which indicates that the utility consumers gain from selecting to walk away is lower than if they elected to buy one of the alternative products. Similarly, the price variable is also negative and statistically significant at the 0.01 level, indicating that an increase in price decreases the utility, and hence the probability of purchase of the linked product. Looking at the other attributes, only the brewed in Indiana attribute is consistently positive and statistically significant at the 0.01 level across the three models, indicating robust estimations for this attribute level. Presented with a craft beer product brewed in Indiana, consumers' perceived utility will increase, along with the probability of purchase. No other main effects attributes are statistically significant under the craft drinker models. For the non craft drinker models, the brewed in Great Lakes region is also positive and statistically significant at the 0.1 level.

An examination of the interaction terms indicates that for craft drinkers, the perceived utility gained from craft beer that is labeled as brewed in Indiana and containing hops produced in the U.S. has a positive and statistically significant at the 0.05% level. For non craft drinkers, consumers perceive a decrease in utility for craft beer labeled as brewed in the Great Lakes region and containing Indiana hops or Great Lake hops, as indicated by the negative and statistically significant (at the 0.1 level) parameter estimates for these interaction terms.

Table 4. Mean WTP Estimates (USD/6-pack of craft beer (72 oz.))

	Entire Sample			Craft Drinkers			Non Craft Drinkers		
Attribute	**WTP**		**SE**	**WTP**		**SE**	**WTP**		**SE**
Brew Indiana	2.97	***	0.82	3.27	***	1.17	2.59	**	1.02
Brew Great Lakes	0.76		0.75	-0.22		1.09	2.06	**	1.03
Hops Indiana	0.43		0.74	1.00		1.12	0.27		0.91
Hops Great Lakes	-0.47		0.83	-0.35		1.21	0.12		1.02
Hops U.S.	0.43		0.60	0.09		0.90	0.77		0.82
Hops Organic	-0.49		0.49	-0.05		0.71	-0.84		0.6
Price	-1.00			-1.00			-1.00		
Interaction Effects									
Brew IN x Hops IN	-0.39		0.97	0.37		1.41	-1.32		1.22
Brew IN x Hops GL	1.33		1.04	2.28		1.57	-0.14		1.29
Brew IN x Hops U.S.	1.71	*	1.01	3.11	**	1.53	-0.12		1.23
Brew GL x Hops IN	0.21		0.95	2.13		1.45	-2.44	*	1.27
Brew GL x Hops GL	-0.48		0.92	0.74		1.37	-2.23	*	1.21
Brew GL x Hops U.S.	0.96		0.95	1.89		1.42	-0.16		1.24

Notes: ***, **, * indicate significance at 1%, 5% and 10% level

Marginal Willingness to Pay Estimates

The WTP measures are outlined in Table 4. Based on the results, craft beer products brewed in Indiana carry an economically and statistically significant premium over the baseline product (craft beer brewed in the U.S.). Consumers are willing to pay $2.97, $3.27, and $2.59 more (for the entire sample, craft drinkers, and non-craft drinkers, respectively) than the same product labeled as being brewed in the U.S. While the entire sample and non-craft drinkers valued craft products brewed in the Great Lakes region at a premium of $0.76 and $2.06, respectively, compared to U.S.-brewed beer, craft drinkers discounted products brewed regionally by -$0.22. Regarding origin of hops, consumers across all three samples indicated a positive WTP for hops produced in Indiana, with the craft drinker group valuing products containing Indiana hops $1.00 more than craft products with no labeling pertaining to hops origin. Products labeled as being made with hops produced in the Great Lakes region were valued less than products with no hops origin labeling for both the entire sample and craft drinkers (-$0.47 and -$0.35, respectively), while non-craft drinkers valued Great Lakes hops at a premium of $0.12. The results indicate support for labeling of U.S. origin hops, as all sample groups had a positive WTP of $0.43, $0.09, $0.77, respectively, compared to no labeling regarding hops origin. For craft beer made with organic hops, consumers across all three groups discounted organic labeling (between -$0.05 and -$0.84) compared to no information about production methods.

To examine whether localness of processing and localness of ingredients are substitutes or complements, we included interaction terms for each level of the brewing location and production location of hops attributes. These results are presented in Table 4. The results indicate that experience with the product is an important determinant of perceptions regarding

substitution and complementariness. As can be seen, craft drinkers value any combination of the localness attributes as complements. The premiums are economically significant for products labeled as being brewed in Indiana and containing hops produced in the U.S. ($3.11 per six-pack), and hops produced in the Great Lakes region ($2.28); as well as products brewed in the Great Lakes region and made with hops produced in Indiana ($2.13), hops produced in the Great Lakes region ($0.74), and hops produced in the U.S. ($1.89). The results corresponding to the attribute levels where the Great Lakes region is defined as the locale are particularly substantial given the negative WTP values for brewed in Great Lakes ($0.22) and hops produced in the same region ($0.35) among craft drinkers.

Looking at the sample as a whole, it is interesting to note the substitution effects between brewing location and hops origin, when the same geographic location is specified for both attributes. In particular, for the average consumer the discount in total WTP for craft beer brewed in Indiana and made with Indiana hops is $0.39, and for the same product brewed in the Great Lakes region and made with hops produced in the Great Lakes is $0.49.

We calculated the combinations of marginal WTP by summing the WTP estimate for the attribute-specific WTP, as well as the interaction effects WTP. The results indicate that the combination of attributes yielding the highest WTP is craft beer marketed as brewed in Indiana and made with U.S. hops, which was consistent across all sample groups. Looking at the entire sample, these two attribute levels combined together would be valued at a premium of $5.10 more. Conversely, craft beer labeled as brewed in Indiana and made with Indiana hops would have a premium of $3.01, instead of $3.40; and craft beer brewed in the Great Lakes region containing Great Lakes hops would have a premium of -$0.19, instead of $0.29.

4. Discussion & Conclusions

The local food movement has presented marketing opportunities for producers and food companies alike. As the definition of local food still remains largely undefined, there are numerous slants through which the designation can be posed and leveraged. Firms seeking to differentiate their products by introducing new local attributes need to understand what designations are most attractive to consumers and how these designations may compete or complement one another when bundled together. Using data from an online survey of Indiana beer drinkers, we estimated consumer WTP for various local attributes and compared them across sub-groups of the sample. We find that experience with the product is an important determinant of estimating how certain consumers value different attributes. In particular, craft drinkers have a high positive WTP for local attributes where Indiana is the place of origin, but a lower WTP when the origin is designated as Great Lakes region (exclusive of Indiana). This finding suggests that local beer has a stronger identity at the state level over the regional level. Interestingly, craft drinkers have a positive and economically significant marginal WTP when these local attributes are presented together.

This study is also first to examine the relationship, whether complementary or substitutive, between localness of processing and localness of inputs. Existing research on local food has largely focused on the localness of the final product. While we observe that craft drinkers value any combination of a locally brewed designation and a locally sourced inputs designation, the

average and the non-experienced consumer perceives these labels as substitutes when the geographic region is the same (i.e. beer brewed in Indiana made with Indiana hops and beer brewed in Great Lakes made with Great Lakes hops). This result suggests that, while these consumers value localness, they are indifferent as to the supply chain stage associated with this attribute. Alternatively, it might suggest a possible lack of awareness that these two aspects of the value chain are typically performed separate from one another and often in different locations. Furthermore, it could also suggest that when reading food labels, consumers might hone in on geographic information (i.e. Indiana, Great Lakes, U.S.) as opposed to information pertaining to the stage of the value chain performed in that region; thus, seeing, for example Indiana or Great Lakes listed twice in a local food label claim may confuse consumers or seem like redundant information.

We also find a discount for organic hops labeling across all three groups compared to no information about production method. A number of studies have found that consumers increasingly prefer local food claims over organic claims (Meas et al 2015). While this trend could also be used to interpret our results, it is peculiar that the WTP estimates for organic hops are negative, rather than simply being smaller than WTP estimates for local hops. Although consumers purchase organic food for a variety of reasons, including health-consciousness, it is possible that beer falls into a special category, where health-related claims are negatively valued by consumers. Discussions with industry stakeholders revealed anecdotal evidence of the latter.

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