Home Cooking and Willingness to Pay: Local Blueberry Pancake, Muffin, and Banana Bread Mixes in a Take-and-Bake Experiment

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Abstract

This article explores measurable factors that influence consumers' willingness to pay for locally produced blueberry mixes: Pancake mix, Muffin mix and Banana Bread mix. The innovative aspect of this study is the experiential take-and-bake experiment survey used in order to evaluate consumers' willingness to pay for the product. A survey, along with two of the three recipes – dry mixes to be combined with locally grown frozen fruit - was distributed to potential consumers at diverse locations of study. Participants were instructed to prepare the products at home, sample the prepared product and then evaluate the product and process. Sensory and preparation experience attributes for each recipe were considered as potential variables influencing overall WTP, including previous cooking experience for similar products, watching the Food Network, and related shopping choices. The post-preparation survey used a payment card approach to elicit WTP for each product tried as well as the hypothetical third product not tried. A total of 101 out of 102 participants (99.01%) completed the process and returned the survey. Average WTP for the blueberry pancake mix was $3.45, muffin mix $3.25, and the banana-blueberry bread $3.39. The estimate regression of Censored Tobit model of WTP suggests Trial of one product out of three is significant and Age of participant also is significant. The positive correlation of some variables estimate Trial, Baking of Blueberries Experience, Education, Income, Gender (Male), and Watching Food Network showed that these factors have positive effect on WTP for some products. The paper develops the WTP models and also examines the experience versus the hypothetical effects on stated WTP. The results provide some measure of market opportunity, suggest positioning strategies, and also suggest strong returns to home trial marketing incentives for these products.

Introduction

Recently, the World Bank reported that U.S value-added agriculture earned $198,562 million (World Bank, 2013). This sector is predicted to continue to grow after stagnation due to the economic crisis of 2008. In 2004, the U.S Department of Agriculture created a strategic plan for the next four years (USDA, 2014). One of the goals of this plan was *''the increase in agricultural opportunities by ensuring a robust safety net, creating new markets, and supporting a competitive agricultural system''.* By supporting a competitive agricultural system, the program is also designed for the development of value- added agriculture. Many aspects of

development are included in these programs such as quality and safety guarantees (Hu, Woods and Bastin 2009) and strengthening and expanding markets for American agriculture by improving the quality and variety of foods available to consumers (USDA, 2015). Also the USDA engaged in programs to support producers in promoting local and regional foods by grading and labeling. Value added strategies also allowed producers to capture a greater share of consumers' food budgets. This concept relies on consumers' expectations of products, including characteristics such as packaging, texture, color, and diversity.

The sale of agricultural products marketed through local markets has been increasing in recent years, from 6000 farmers market in 2010 to 8284 in 2014 (USDA,2014). Driven by this strong consumer demand, small scale producers, generally known as "local producers'', through producer organizations and cooperatives have taken advantage of this situation to not only increase their production but also extend it throughout the year. One of the strategies they have adopted is the development of value- added products. This confers on them the ability to maintain their presence in the market. Despite having generally higher per unit costs, local producers can successfully compete with large producers if they emphasize their product's unique characteristics or services as being grown and processed locally (King et al, 2010).

This study is of market prospectuses of three new value- added products including Blueberry: Blueberry Pancake Mix, Blueberry Muffin Mix and Blueberry Banana Bread Mix, conducted for the benefit of the Kentucky Blueberry Growers' Association. To simplify spelling, we are going to write Banana Bread Mix instead of Blueberry Banana Bread mix. The contribution of this research is to provide consumer perceptions of processed value-added local products. Only a few of past research studies in horticulture focused on processed products (Hu and al, 2012), while the majority of them focused on fresh items. The second contribution of this study is to provide a point of view of perceptions of semi processed products. The objective of this study is to determine whether consumer Willingness to Pay for Blueberry Muffin Mix will be based upon product characteristics and consumer socio-demographic characteristics.

It is important to note that the innovative part of this study is home cooking and evaluation of the product taken home by the survey taker. We have evidence that the results from this study will be useful for producers and marketing structures since each survey taker was

motivated to participate in this study and had two samples of product with him to cook then fill the form.

Background

As mentioned in the introduction, most previous studies on horticulture products have focused on fresh items. The lack of literature in this area made this research a little difficult. However, the only available study focusing on processed blueberry products was conducted by Hu et al in 2011. In that study, entitled: "Assessing Consumer Willingness to Pay for Value-Added Blueberry Products Using a Payment Card Survey," the impact of differing factors on consumers' willingness to buy three value added blueberry products was explored. They found that consumer demographic characteristics play important roles in determining their WTP.

Data and Survey

The complexity of the value added blueberry product study dictated the way that this study was conducted. A limited sample of blueberry pancake mix, blueberry muffin mix and banana bread mix was prepared by Kentucky blueberry growers associated with the Food System Innovation Office of the University of Kentucky. Due to the small number of samples of recipes prepared, and in order to be efficient, 102 persons were randomly selected in three different locations in Lexington, Kentucky: a food store, Good foods Café and Market, which is a grocery store; Panagia Pantovasilissa Greek Orthodox Church, which is involved in community fund raising, and University of Kentucky employees through the Food System Innovation Office of the University of Kentucky. A recruitment flyer preceded the distribution of the survey. A survey was distributed on a strictly volunteer basis in all three places on August 27, 2014. The survey contained the directions for completing the survey and instructions for cooking the product. Two out of three of the products were voluntarily distributed per each survey taken by researchers. Responders were given two weeks to complete the process and return the product. A recompense of $20 was handed to all volunteers who mailed in the completed survey. 101 out of 102 respondents returned the survey on time. This represents a 99.99% completion. The survey takers were asked to complete surveys for two out of three products.

The survey questionnaire was initially developed as a result of focus group discussions and was pre-tested prior to implementation. It contained three sections, each designed to be completed within 10 minutes by each respondent after cooking the product and eating it. Also, the instruction was given that the respondent should cook one product at a time per day, and then complete the survey. The first section collected information about the product's characteristics, such as frequency of purchasing fresh blueberries, previous experience of cooking blueberries products, watching The Food Channel, and overall cook turned out. The second asked questions about respondents' future intentions of buying or not buying the product. Finally, the last section collected information about respondents' household size, income, education level, gender and age. Respondents were aware that the survey would be used by Kentucky blueberry's growers to gain perspective in launching new products. The survey also encouraged participants to offer their honest opinions.

Table 1 describes Sample Statistical Characteristics of variables used in this study. A total of 9 variables, such as Gender (Male), Age, Income, Education, Blueberry Baking Experience, Watching the Food Network, and the location of respondent's recruitment were used to best determine Willingness to Pay for all three blueberry products. One needs to note that 93 of respondents out of 102 (91.17%) were willing to pay for Blueberry Pancake Mix included 17.3% of those who didn't try the product at home, 87 out 102 (85.29%) of overall sample had intention to buy Blueberry Muffin Mix included 20% of those who didn't try the product, and other 71 out of 102 (69.60%) of overall sample had the intention to buy Banana Bread Mix included (12.6%) who didn't try the product. The sample average income of respondents is $68,227.40, well above the national average of (U.S) $51,939.00 and of Kentucky income of $42,958, respectively in 2013 and 2014 (Census Bureau, 2015). 23.7% of respondents were recruited at the Good Foods Café and Market (GFC), which is well known in central Kentucky for promoting and selling locally branded products including agricultural goods. The average education of respondents was 15.8 years of study which is almost the equivalent of a bachelor's degree. This may be explained by the fact that the Lexington area is one of the higher ranked cities for education, with 40.1% of the population having a bachelor's degree and 88.6% of

population having a high school diploma (Census Bureau, 2015). The average age of the sample is 43.5; people who identify themselves as male were 19.8%.

Table1 Sample Statistical Characteristics

	Full Sample		Pancake Mix		Muffin Mix		Banana Bread Mix		Description
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
PLACE	0.237	0.427	0.23	0.42	0.25	0.43	0.211	0.411	Dummy variable; 1 for Good Food Coap
BBEXP	0.752	0.433	0.806	0.397	0.839	0.369	0.774	0.42	Dummy variable; 1 for consistent previous experience
FOODNET	0.752	0.433	0.376	0.487	0.379	0.488	0.45	0.5	Dummy variable; 1 for watching food channel
MALE	0.198	0.4	0.82	0.379	0.172	0.379	0.197	0.4	Dummy variable; 1 for male
AGE	43.5	13.09	42.9	13.12	43.62	12.58	42.63	11.7	Continuous variable; year of age
INCOME	68227.4	28098.24	68671.3	27872.67	67752.5	28219.28	69978.54	27769.48	Continuous variable; Annual household income before tax
EDU	15.8	3.039	17.51	2.5	17.27	2.626	17.33	2.5	Continuous variable; year of education
TRIAL	n/a	n/a	0.0827	0.379	0.804	0.398	0.774	0.42	Dummy variable; 1 for trial the product
WTP	n/a	n/a	3.45	1.747	3.257	2079	3.394	2.013	Continuous variable; amount willing to pay
Sample	101		93		87		71		

Methodology

To elicit a measure of consumer willingness to pay for products in the interest of the public and common good, researchers have used different approaches that best fit their data. The first intention of this study was to adopt an approach that was closed to our study. Because of the voluntary nature of the study design, we were unable to answer one question that we were trying to ask: what factor(s) impact consumer willingness to pay for three blueberry baking mixes. Also, after multiple tentative attempts to elicit consumer willingness to pay (WTP) by determining the dependent variable to be future intentions to buy the product, which is stated in the second section of the survey, we decided to adopt the approach of using a statistical model, which best describes the intent of this study. However, the data used in this study will be used in the future for further analysis.

Like this present study, similar previous studies have used a payment card approach to elicit willingness to pay. Cameron et al 1988 and Hu et al 2009 have used respectively, payment card and modified payment card approaches in these similar studies. The present study has used a payment card approach in order to capture consumer willingness to pay. Ordinary Least Square was recently used in a study by Samane et al 2014, to determine willingness to pay in a similar study. The nature of the data and sample size of this study dictated the choice of a Censored Tobit model to best elicit willingness to pay.

Assume the equation:

$$Y_i = \beta_0 + \beta_i X_i + \beta_{jj}\,\gamma + \varepsilon \qquad (1)$$

In the equation (1), Y represents the willingness to pay and X and γ respectively represent explanatory variables and demographics variables. When Y is ≤ 0 Using Ordinary Least regressions for this model may not capture the latent part of the WTP when the respondent may not express WTP as a negative value since it doesn't have that option. In this case the result may be misleading. To capture the intent of respondent even when it wasn't express, Censored Tobit is the best to elicit it. The Tobit model is a special case censored regression model, because the latent variable Y_i* cannot always be observed while the independent variable x_i is observable. A common variation of Tobit model is censoring in this case at a value Y_L different from zero:

$$Y_i = \begin{cases} y_i^* \ if \ y_i^* > y_L \\ y_i^* \ if \ y_i^* \leq y_L \end{cases} \qquad (2)$$

The Likelihood function for the Tobit model is defined below. First, we define an indicator function $I(y_j)$ where:

$$I(y_j) = \begin{cases} 0 \quad y_i^* \ if \ y_i^* > y_L \\ 1 \quad y_i^* \ if \ y_i^* \leq y_L \end{cases} \qquad (3)$$

We assume that Φ to be the standard normal cumulative distribution function and ϕ to be the standard normal probability density function. For the data set with N observations the Likelihood function for the equation (2) is:

$$L(\beta, \sigma) = \sum_{j=1}^{n} \left(\left(\frac{1}{\sigma}\phi\left(\frac{yj - Xj\beta}{\sigma}\right)\right)^{I(Yj)} \left(1 - \Phi\left(\left(\frac{Xj\beta - yl}{\sigma}\right)\right)^{1-I(yj)}\right.\right. \qquad (4)$$

In the equation (4), Yl represent WTP of all products either is greater than zero or equal or less than zero and X represents explanatory variables Place, Baking blueberries' products experience, Watch Food channel, Gender(Male), Age, Income, Education and the trial of Blueberries Mixes. We had used same model for all three products.

Results

Authors of this article still work on econometrics model. And will make entire paper available before the conference.

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