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# The Biggest Bang for the Buck: Valuation of Various Components of a Regional Promotion Campaign by Participating Restaurants

Ran Xie, Olga Isengildina-Massa, and Carlos E. Carpio

This study examined how various components of the *Certified South Carolina* campaign are valued by participating restaurants. A choice experiment was conducted to estimate the average willingness to pay (WTP) for each campaign component using a mixed logit model. Three existing campaign components—Labeling, Multimedia Advertising, and the “Fresh on the Menu” program—were found to have a significant positive economic value. Results also revealed that the type of restaurant, the level of satisfaction with the campaign, and the factors motivating participation significantly affected restaurants’ WTP for the campaign components.

**Key Words:** choice experiment, mixed logit model, local food willingness to pay

**JEL Classifications:** C40, M31, M38

Government-funded advertising campaigns play an important role in agricultural and food policy around the world. In the United States, regional promotion programs have grown rapidly since the mid-1990s. The number of states conducting such programs increased from 23 to 43 between

1995 and 2006 (Patterson, 2006), and by 2010, all 50 states had such programs in place (Onken and Bernard, 2010). Previous studies evaluating regional promotion campaigns showed mixed evidence regarding campaign effectiveness (e.g., Carpio and Isengildina-Massa, 2010; Govindasamy et al., 2003; Patterson et al., 1999). Govindasamy et al. (2003) found that the *Jersey Fresh* program generated approximately \$32 of returns for fruit and vegetable growers for every dollar invested. In other words, the \$1.16 million campaign generated \$36.6 million in sales for New Jersey produce growers and a total economic impact for the state economy of \$63.2 million in 2000. Carpio and Isengildina-Massa (2010) concluded that the *Certified South Carolina* campaign generated a return on investment of 618% or a benefit–cost (producers benefit/state government expenses) ratio of 6.18 in 2007. In contrast, Patterson et al. (1999) found little evidence of an increase in local product sales resulting from the *Arizona Grown* campaign.

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Most previous studies analyze the impact of the locally grown campaigns focusing exclusively on benefits received by farmers (e.g., Carpio and Isengildina-Massa, 2010; Patterson et al., 1999). Although farmers tend to be the primary beneficiaries of such campaigns, their benefits extend far beyond and include consumers, restaurants, and farmers' markets as well as the secondary effects on the rest of the economy (Carpio and Isengildina-Massa, 2013; Govindasamy et al., 2003). To the best of our knowledge, no studies of the impact of such campaigns on local restaurants have been conducted to date. Ignoring these additional effects of locally grown campaigns would lead to an underestimation of their impact, especially in cases in which some of the campaign components focus exclusively on restaurants. Additionally, regional promotion campaigns have typically been analyzed as a whole, providing little guidance to policymakers about the value of separate campaign components. Given these limitations, the goals of the current study are twofold: 1) to examine the perceived economic value of various components of the *Certified South Carolina* campaign by the generally overlooked segment of participating restaurants; and 2) to explore the relationship between campaign valuation and characteristics of participating restaurants.

The *Certified South Carolina* campaign was launched on May 22, 2007, and was financed by special appropriations from the state legislature. The goal of the campaign was to increase consumer demand for the state-produced food products and increase agribusiness profitability. Annual campaign expenditures averaged approximately \$1.3 million during 2007–2010. Original campaign components included the design and distribution of labels and signage for “Certified South Carolina” products and advertisement of South Carolina food products on television, radio, magazines, newspapers, and billboards. The “Fresh on the Menu” component, which promotes local restaurants preparing dishes with “Certified South Carolina” products, was added in February 2008. To enroll into this free program, restaurants needed to complete an application form, pledging to offer a menu that includes at least

25% “Certified South Carolina” products such as fresh fruits, vegetables, meats, and seafood as available in season. Participating restaurants take advantage of the South Carolina Department of Agriculture’s (SCDA) multimedia advertising and branding efforts, including kits and artwork for logos and online, radio, magazine, newspaper, and billboard advertisement promotions. When it was first introduced in 2008, 180 restaurants signed up for the “Fresh on the Menu” program. By July 2010, when the data for this study were collected, the campaign membership had increased to 288 restaurants.

Because restaurants are not required to pay a participation fee for the campaign, this study used a choice-based conjoint analysis to determine the perceived economic value that participating restaurants place on each campaign component. The data generated from a discrete choice experiment were analyzed using a mixed logit model, allowing us to estimate participating restaurants’ average willingness to pay (WTP) for each of the campaign components, which represents their respective economic values (Holmes and Adamowicz, 2003). In addition to the average WTP estimates for each campaign component, we estimated individual level WTP values, which are in turn used as dependent variables in linear regression models to uncover how individual WTP for each component is affected by participating restaurants’ characteristics. The findings of this study could help policymakers and marketers determine which campaign components are more effective and could be used to guide future campaign fund allocations. In an environment of decreasing state and federal funding, it becomes increasingly important to have specific estimates of the effectiveness of alternative campaign investments.

## Data and Methods

### *Survey Approach*

The data used for estimation in this study were collected through a survey of the managers of 288 restaurants that participated in the South Carolina “Fresh on the Menu” in July 2010. The survey was administered through a combination

of Internet (Qualtrics) and mail<sup>1</sup> and included the entire population of participating restaurants. Every effort was made to obtain the highest possible response rate including the use of economic incentives, an invitation letter, and the shortest possible survey instruments pre-tested using focus groups; the use of the Dillman survey method (with two reminders after first [e-]mailing); and the use of a mail survey to complement online surveys. The survey generated 71 usable observations for a response rate of approximately 25%, which is relatively high compared with a 13.4% average response rate in a study of 199 online surveys conducted by Hamilton (2003).<sup>2</sup> To assess the representativeness of our sample, we compared the location of the restaurants in the population with that of the sample (location was the only known characteristic of the population). The proportion of restaurants from each region in the sample generally followed the corresponding proportion in the population except for one of ten regions considered: the Berkely-Charleston-Dorchester whose proportion in the sample (16.4%) was lower than the proportion in the population (30.9%).<sup>3</sup>

### Choice Experiment

Various methods are available to elicit and estimate preferences for products or services or the value of changes in the qualities of existing products. These methods include choice experiments (e.g., Adamowicz et al., 1998; Louviere, Hensher, and Swait, 2000), dichotomous choice

questions (e.g., Hanemann, Loomis, and Kanninen, 1991; Ready, Buzby, and Hu, 1996), and experimental auctions (e.g., List and Shogren, 1998; Lusk et al., 2001). Choice-based conjoint analysis or choice experiments (CE) have the advantage of closely mirroring typical choice experience—making one decision over several options—and allowing a researcher to estimate the tradeoffs between several competing product attributes (Lusk and Hudson, 2004). Additionally, CE are easier to organize with no requirement for laboratory sessions and the need of an actual product (which is not realistic in the context of this project). Several studies also prove that hypothetical responses to CE are very consistent with revealed preferences (e.g., Adamowicz et al., 1997; Carlsson and Martinsson, 2001).

CE are firmly rooted in the economic theory that the decision-making process can be viewed as a comparison of indirect utility functions and analyzed within the random utility framework (McFadden, 1974). The data obtained from CE can then be analyzed using discrete choice models and the results can be used to estimate WTP values for the various attributes of the good or product under study (Alfnes et al., 2006; Holmes and Adamowicz, 2003; Revelt and Train, 1998). In this study we use CE to examine restaurant managers' preferences for each of the attributes (components) of the *Certified South Carolina* campaign. Thus, restaurant managers are considered the consumers of the regional promotion campaign and choose the campaign profile (combination of various components) that allows them to reach the highest level of utility. Accordingly, the value of the campaign can be measured as the maximum amount of money restaurants would be willing to pay for a certain campaign profile. This approach allows us to estimate the economic value of the campaign, which is currently offered to participants free of charge.

To determine the perceived economic value of each component of the *Certified South Carolina* campaign, the CE design incorporated four attributes corresponding to the components of the existing campaign: 1) Labeling (LABEL), which provides labels for "Certified

<sup>1</sup> The results of this study were not statistically different across the two survey formats.

<sup>2</sup> Although the relationship between low response rates and low survey accuracy has been academically debated for a long time, several recent studies suggest a very weak or nonexistent relation between the two (Brick et al., 2003; Curtin et al., 2000; Holbrook, Krosnick, and Pfent, 2007; Keeter et al., 2000, 2006).

<sup>3</sup> A weighted maximum likelihood estimator was also used to explore the robustness of the results to the difference between the sampling and population proportions (Cameron and Trivedi, 2005). All the estimated coefficients were similar and had overlapping 95% confidence intervals except for the mean coefficient for SIGNAGE. This coefficient was significant in the model using weights.

South Carolina" products; 2) Point of Purchase Signage (SIGNAGE), which provides "Certified South Carolina" signs at food buying locations such as supermarkets, farmers markets, and roadside stands; 3) Multimedia Advertising (MULTI), which funds television, radio, magazine, newspaper, and billboard advertisements promoting "Certified South Carolina" products; and 4) the "Fresh on the Menu" component (FOTM), which promotes local restaurants preparing and selling menu items that include "Certified South Carolina" products in season. Each choice was associated with one of two payment methods (METHOD): membership fee or donation. These two options were selected because they are the most widely used methods for funding public and private programs that promote locally grown products. The payment amount was also added so that the WTP for each campaign component could be calculated. A pilot study of four randomly selected restaurants in the upstate region of South Carolina was conducted to determine the appropriate bid vector (following Ratcliffe, 2000). The payment levels (PAY) were identified as \$20, \$50, \$100, \$150, and \$200. The combination of all the attributes and levels resulted in a total of 160 ( $2^*2^*2^*2^*2^*5$ ) possible campaign profiles and a full factorial design consisting of 12,720 ( $C^2_{160}$ ) possible choices. However, it was not feasible to include such a large number of scenarios in a CE. Hence, a fractional factorial design was applied to choose 18 scenarios by comparing the D-Efficiency of each combination. Having 18 scenarios within a single survey was still considered excessive. Therefore, the design was blocked into three versions of the questionnaire where each respondent was offered six scenarios with trinary choices. A series of SAS Macro programs were used to first generate the campaign profiles and then to construct the CE used in this study. Figure 1 provides an example of one of the 18 scenarios. In each case, the manager of the restaurant was asked to choose from campaign A, B, or no campaign at all with two types of funding and five different funding levels. Having these options allowed the experimental design to fit an actual market situation without "forcing" a choice (Louviere, Hensher, and Swait, 2000).

#### *Average Willingness-to-Pay Estimation, Mixed Logit Model*

The econometric choice model used in this study is the random parameter/mixed logit model<sup>4</sup> developed by Revelt and Train (1998). The mixed logit model was chosen because it allows efficient estimation of repeated choices by the same respondent within choice-based conjoint experiments. Moreover, this model relaxes the restrictive assumptions of the conditional logit model (Revelt and Train, 1998).

Following Revelt and Train (1998), the random utility function of restaurant managers ( $U_{ni}$ ) is assumed to be comprised of a systematic ( $v_{ni}$ ) and a random ( $\varepsilon_{ni}$ ) component:

$$(1) \quad U_{ni} = v_{ni} + \varepsilon_{ni}, \quad i = 1, \dots, I, \quad i \in C, \text{ and} \\ n = 1, \dots, N,$$

where  $U_{ni}$  is the true but unobservable indirect utility of restaurant  $n$  associated with campaign profile  $i$ . A restaurant chooses alternative  $i$  from choice set  $C$  only if  $U_{ni} > U_{nj}$ , where  $n = 1, \dots, N$ , alternative  $i, j \in C$  and  $i \neq j$ . Accordingly, choices are made based on utility differences across alternatives and the probability of choosing  $i$  can be expressed as:

$$(2) \quad P(i|C) = P(U_{ni} > U_{nj}) \\ = P(v_{ni} + \varepsilon_{ni} > v_{nj} + \varepsilon_{nj}) \\ = P(v_{ni} - v_{nj} > \varepsilon_{nj} - \varepsilon_{ni}) \\ \forall i, j \in C, i \neq j, n = 1, \dots, N.$$

In this study, restaurant managers need to make six choices in a row, so choice situations are defined using the index  $t$  ( $t = 1, \dots, 6$ ). Moreover, the indirect utility that restaurant manager  $n$  expects to obtain from alternative  $i$  in choice situation  $t$  is assumed to be linear in parameters (Revelt and Train, 1998):

$$(3) \quad U_{nit} = \beta'_n x_{nit} + \varepsilon_{nit},$$

where coefficient vector  $\beta_n$  is the unobserved preference parameter associated with attribute  $x_{nit}$  for each  $n$  and varies in the population with density  $f(\beta_n|\theta)$ , in which  $\theta$  are the true

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<sup>4</sup> The results generated by applying a conditional logit model are available on request.

Scenario 1		
Campaign A	Components/Costs	Campaign B
Not included	<b>Labeling</b>	Included
Not included	<b>Point of Purchase Signage</b>	Not included
Not included	<b>Multimedia Advertising</b>	Not included
Included	<b>"Fresh on the Menu"</b>	Not included
Annual membership fee of \$20	<b>Funding</b>	Annual donation of \$100

If you were given three choices: Campaign A, Campaign B, or not having a campaign at all, which would you choose?

Campaign A

Campaign B

Not campaign at all

**Figure 1.** Example of One of the Scenarios from the Restaurant Survey

parameters of the distribution of  $\beta_n$  and  $\epsilon_{nit}$  is an unobserved random term that is independent and identically distributed extreme value independent of  $\beta_n$  and  $x_{nit}$ . Conditional on  $\beta_n$ , the probability that restaurant manager  $n$  chooses alternative  $i$  in period  $t$  is:

$$(4) \quad L_{nit} = \frac{e^{\beta_n x_{nit}}}{\sum_j e^{\beta_n x_{njt}}}.$$

Denote  $i_{(n,t)}$  as the campaign profile that restaurant manager  $n$  has chosen in period  $t$ , and let  $i_n = (i_{(n,1)}, \dots, i_{(n,T)})$  be restaurant manager  $n$ 's sequence of choices. Conditional on  $\beta_n$ , the probability of respondent  $n$ 's observed sequence of choices is:

$$(5) \quad P_n(i_n | \beta_n) = \prod_t L_{ni_{(n,t)}t}(\beta_n).$$

Because the  $\beta_n$ s are not observable, these conditional probabilities are integrated over all possible values of  $\beta$  as:

$$(6) \quad Q_n(i_n | \theta) = \int P_n(i_n | \beta) f(\beta | \theta) d\beta,$$

where  $Q_n(i_n | \theta)$  is the probability of restaurant  $n$ 's sequences of choices conditional on the parameters of the population distribution,  $f(\beta | \theta)$ .

The parameter vector  $\theta$  is estimated using the log-likelihood function:

$$(7) \quad \ln L(\theta) = \sum_{n=1}^N \ln Q_n(i_n | \theta).$$

Log-likelihood estimation procedures are used to estimate the parameters of the distribution of

$\beta_n$ . Because the integral in equation (6) cannot be calculated analytically, estimation of the population level parameters is carried out by using simulated maximum likelihood procedure following Revelt and Train (1998). The models were estimated using modified versions of Kenneth Train's Matlab programs, which are available online at <http://elsa.berkeley.edu/~train/software.html>. The estimation was carried out using 1000 random draws for each sampled respondent.

#### Individual Restaurant Managers' Willingness-to-Pay Estimation

To estimate the relationship between campaign components and participating restaurants' characteristics, individual restaurant managers' WTP for each campaign component had to be recovered, which required knowledge of the individual  $\beta_n$  parameters. Train (2003) showed that using Bayes' rule, the density of each  $\beta_n$  conditional on the individual's sequence  $(i_n)$  of choices and the population parameters  $(\theta)$ , is given by:

$$(8) \quad h(\beta_n | i_n, \theta) = \frac{P_n(i_n | \beta) * f(\beta | \theta)}{Q_n(i_n | \theta)},$$

and the simulated approximation to the individual's expected preference is:

$$(9) \quad \tilde{E}(\beta_n | i_n, \theta) = \frac{\sum_r \beta^r * P_n(i_n | \beta^r)}{\sum_r P_n(i_n | \beta^r)},$$

where  $\beta^r$  is the  $r$ -th draw from the population distribution  $f(\beta | \theta)$ , which is assumed as given,

and  $P_n(i_n | \beta')$  is the probability of restaurant managers  $n$ 's sequence of choices conditional on the  $r$ -th draw. Individual restaurant managers' WTP values were calculated using estimates of  $\beta_n$ . The estimated parameters  $\hat{\theta}$  were used instead of the population parameters  $\theta$ .

#### Factors Affecting Individual Willingness-to-Pay, Ordinary Least Squares Method

Four linear regression models estimated using the ordinary least squares (OLS) method<sup>5</sup> were used to explore how the individual WTP for each component is affected by participating restaurants' characteristics. Hence, the dependent variables in the regression models were the individual restaurant managers'  $WTP_{LABEL}$ ,  $WTP_{SIGNAGE}$ ,  $WTP_{MULTI}$ , and  $WTP_{FOTM}$ . The same set of explanatory variables was used in the four models and included: restaurant image (IMAGE), size of the restaurant (SIZE), motivation to join the *Certified South Carolina* campaign (MOTIVATION), and satisfaction with the campaign (SATISFACTION) (as described in Table 1). Because both the IMAGE and MOTIVATION variables had several categories, they were included into the models as a set of dummy variables with MOTIVATION category four (supporting South Carolina economy) and IMAGE category six (American cuisine) treated as base categories. The variable SIZE was recoded as small or big (base category) dummy variable by using \$500,000 as the cutoff point because more than half of all restaurant sales exceeded \$500,000. The following specification was used for the linear regressions:

$$(10) \quad \begin{aligned} WTP_k = & \alpha_k + \sum_{i=1}^4 \beta_{k,i} MOTIVATION \\ & + \beta_{k,5} SATISFACTION \\ & + \sum_{i=6}^{12} \beta_{k,i} IMAGE + \beta_{k,13} SIZE + \varepsilon_k \\ k = & LABEL, SIGNAGE, MULTI, FOTM. \end{aligned}$$

## Results

### Descriptive Analysis

Table 2 presents selected descriptive statistics of the participating restaurants. Almost all (94%) participating restaurants were locally owned. The largest response category for the image of participating restaurants was fine dining (30%) followed by American cuisine (23%). The average annual sales for year 2009 across all respondents was \$385,080<sup>6</sup> with approximately half of the restaurants having sales over \$500,000. The average participating restaurant manager was 47 years old, male, with a college degree. The most commonly mentioned motivation to participate in the campaign was to support the South Carolina economy (35%) (similar to the findings for consumers reported by Carpio and Isengildina-Massa [2009]) followed by a desire to increase sales by attracting customers interested in South Carolina products (26%) and to improve the quality of ingredients (because South Carolina products are believed to be of better quality) (21%). The most frequent way respondents learned about the *Certified South Carolina* campaign "Fresh on the Menu" program was through direct contact from the SCDA (27%) followed by the "Fresh on the Menu" web site (16%) and food service shows (14%).

Perceived impacts of restaurant participation in the *Certified South Carolina* campaign "Fresh on the Menu" program are described in Table 3. Approximately 38.1% of respondents reported that their sales increased during the last year as a result of the campaign, and the estimated average reported increase for this group was 16.2%. Approximately 31.7% of respondents indicated that the number of clientele visiting their restaurant increased by an average of 16.4%. Approximately 55.7% of the restaurants reported that the cost of participation was less than \$50. The cost was low because the restaurants were provided with promotional materials free of charge by the SCDA. Approximately

<sup>5</sup> Results of using OLS method are equivalent to the ones generated by Seemingly Unrelated Regression because the regressors on the right-hand side are exactly the same for all four equations.

<sup>6</sup> Because responses were given in the form of intervals, the means were calculated by applying a parametric approach following Bhat (1994) and Zapata et al. (2011).

**Table 1.** Description of Variables Included in the Ordinary Least Squares Method

Variable	Description	Category	Category Proportion
MOTIVATION	Which of the following reasons was the most important motivation for you to join the <i>Certified South Carolina</i> Campaign "Fresh on the Menu" Program?	1 = Improve the quality of ingredients because SC produces the better quality products 2 = Strong SC pride 3 = Increase the sales of my restaurant by attracting customers interested in SC products 4 = Support SC economy 5 = Reduce harmful environmental impact (carbon footprint)	20.69% 15.52% 27.59% 32.75% 3.45%
SATISFACTION	How would you rate your overall satisfaction with the campaign?	0 = Very dissatisfied 1 = Dissatisfied 2 = Neutral 3 = Satisfied 4 = Very satisfied	15.52% 12.07% 29.31% 18.97% 24.14%
IMAGE	How would you best describe the focus/image of your restaurant?	1 = Fine dining 2 = Fast food 3 = Family-oriented 4 = Bar and restaurant 5 = International cuisine 6 = American Cuisine 7 = Health-conscious 8 = Other, please specify	30.36% 1.79% 10.71% 5.36% 3.57% 21.43% 7.14% 19.64%
SIZE	Please describe the size of your restaurant business in 2009 in terms of total annual sales.	1 = \$1,000–9,999 2 = \$10,000–49,999 3 = \$50,000–99,999 4 = \$100,000–249,000 5 = \$250,000–499,000 6 = \$500,000 and over	3.64% 0.00% 5.45% 16.36% 23.64% 50.91%

Note: The response rate varies across questions with the minimum sample size of 55. SC, South Carolina.

36.5% of respondents believed that participating in the campaign had increased their ingredient costs by an average of 18%. On the other hand, approximately 11.1% of restaurants indicated that their ingredient costs had decreased by 9.6%. Whereas approximately 23% of the restaurants indicated their profitability increased by approximately 15.2%, only 3.28% of the restaurants reported an average of 5% decrease.<sup>7</sup>

#### *Average Value of Campaign Components*

In this study, the variables included in the vector  $x_{nit}$  of equation (3) were the campaign component variables, the method of payment, and the cost of the campaign. The campaign component variables LABEL, SIGNAGE, MULTI, and FOTM were introduced as dummy variables with the value of one if the component was included in the campaign and zero otherwise. The two methods of payment were also treated as dummy variables, where the payment through membership took the value of zero, and the method donation was coded as

<sup>7</sup>Results of three  $\chi^2$  tests indicate the perceived changes in profit and costs are independent, whereas the perceived changes in profit are related with the perceived changes in sales and clientele.

**Table 2.** Summary Statistics Describing the Characteristics of Restaurants Participating in the *Certified South Carolina* Campaign ‘Fresh on the Menu’ Program

Question	Category	Category Proportion	Mean	Standard Deviation
Which of the following reasons was the most important motivation for you to join the <i>Certified South Carolina</i> campaign “Fresh on the Menu” Program?	1 = Improve the quality of ingredients since South Carolina produces the better quality products 2 = Strong South Carolina pride 3 = Increase the sales of my restaurant by attracting customers interested in South Carolina products 4 = Support South Carolina economy 5 = Reduce harmful environmental impact (carbon footprint)	20.97% 14.52% 25.81% 35.48% 3.23%		
How did you learn about the campaign?	1 = Magazines 2 = Direct mailing 3 = Food service food show 4 = Direct contact from the SCDA 5 = Fresh on the Menu web site 6 = Other restaurants 7 = Other	3.20% 9.50% 14.30% 27.00% 15.90% 6.40% 23.80%		
How would you best describe the focus/image of your restaurant?	Fine dining Fast food Family-oriented Bar and restaurant International cuisine American cuisine Health-conscious Other	30.00% 1.67% 11.67% 5.00% 3.33% 23.33% 6.67% 18.33%		
Please describe the size of your restaurant business in 2009 in terms of total annual sales	\$1000–9999 \$10,000–49,999 \$50,000–99,999 \$100,000–249,000 \$250,000–499,000 \$500,000 and over	3.39% 5.08% 15.25% 23.73% 52.54%	\$385,080	\$22,860
How would you best describe the ownership of your restaurant?	Locally owned Franchise	93.55% 6.45%		
Age	18–20 years 21–30 years 31–40 years 41–50 years 51–60 years 61–69 years 70 years or older		47.03 years	1.47 years
		5.36% 19.64% 33.93% 28.57% 10.71% 1.79%		

**Table 2.** Continued

Question	Category	Category Proportion	Mean	Standard Deviation
Gender	Male	62.96%		
	Female	37.04%		
Highest level of education	High school diploma (including GED)	23.21%		
	College degree	53.57%		
	Postgraduate or professional degree	23.21%		

Note: The sample size for this table is different from the sample size in Table 1 and the minimum sample size is 54. Because responses were given in the form of intervals, the mean and standard deviation were calculated by applying the parametric approach following Bhat (1994) and Zapata et al. (2011). SCDA, South Carolina Department of Agriculture; GED, graduate equivalent diploma.

one. The estimation of the mixed logit model required assumptions for the distributions of the parameters corresponding to LABEL, SIGNAGE, MULTI, FOTM, METHOD, and PAY. The PAY coefficient was specified to be fixed to facilitate the estimation of the distribution of WTP (Hensher, Shore, and Train, 2005; Revelt and Train, 1998; Train, 2003), whereas the other coefficients were allowed to vary in the mixed logit model. Some authors (e.g., Hasing et al., 2012; Revelt and Train, 1999) have argued that a truncated normal distribution is a better assumption for dummy variable parameters, which also can be used to restrict the sign of the marginal effects in the model. However, this specification resulted in convergence difficulties and/or unreasonably high estimates for the standard deviations of the distributions; therefore, in the final specification of the mixed logit model, the normal distribution assumption was used for all coefficients related to noncost attributes.

Results of the mixed logit estimation shown in Table 4 indicate that the estimated mean coefficients of LABEL, MULTI, and FOTM are positive and significantly different from zero at the significance level of 0.05, suggesting that these campaign components are positively valued by participating restaurants. The economic value of each component is measured as the average WTP for all participating restaurants, which is computed by dividing the mean coefficient of the component of interest by the negative of the coefficient of the PAY

attribute. For example, the average value of LABEL in the *Certified South Carolina* campaign is obtained as  $-\hat{\theta}_{LABEL}/\hat{\theta}_{PAY}$ , where  $\hat{\theta}_{LABEL}$  is the estimated average scaled effect of LABEL on utility and  $-\hat{\theta}_{PAY}$  is the estimated marginal utility of money. The results reveal that the FOTM component has an average WTP across restaurants of \$217.14/year. This finding is not surprising given that restaurants are the most direct beneficiaries of this campaign component. The availability of multimedia advertising is also highly valued with an average WTP of \$198.44/year. Multimedia advertising sends positive messages about locally grown products to consumers with the goal of increasing consumer demand that would benefit all campaign participants. The relatively high WTP by restaurants for this campaign component supports the current campaign design where the majority of expenses is devoted to multimedia advertising.<sup>8</sup> On the other hand, restaurants usually do not benefit directly from the point of purchase signage, which explains why the mean coefficient for this variable is not statistically significant. The significant positive coefficient for METHOD indicates that restaurants prefer to participate in the *Certified*

<sup>8</sup>Another mixed logit model was tested by adding the interaction effect between MULTI and FOTM. Results indicate restaurants' WTP for having both the FOTM and MULTI components is \$374.6 (\$98.03 + \$116.81 + \$159.82), which is similar to the result of \$415.58 (\$198.44 + \$217.14) obtained in the model without the interaction effect.

**Table 3.** Summary Statistics Describing the Perceived Effects of Restaurant Participation in the *Certified South Carolina* Campaign ‘Fresh on the Menu’ Program

Question	Category	Category Proportion	Parametric Mean <sup>c</sup>	Standard Deviation
1. Please describe the costs of your participation in the <i>Certified South Carolina</i> Campaign ‘Fresh on the Menu’ Program in the last year.	\$0–49 \$50–99 \$100–249 \$250–499 \$500 and over	55.74% 13.11% 11.48% 11.48% 8.20%	\$129.42	\$21.49
2. How do you think the campaign affected your costs of purchasing ingredients and preparation in the last year? <sup>a</sup>	Increase Decrease Unsure No change	36.50% 11.10% 14.30% 38.10%		
2-1. What percentage increase in the costs of purchasing ingredients and food preparation? <sup>d</sup>	0–10% 11–20% 21–30% 41–50% 81–90%	36.84% 42.11% 10.53% 5.26% 5.26%	17.97%	4.31%
2-2. What percentage decrease in the costs of purchasing ingredients and food preparation? <sup>e</sup>	0–10% 11–20% 21–30%	71.43% 14.29% 14.29%	9.56%	2.88%
3. How do you think the campaign affected your total sales during the last year? <sup>a</sup>	Increase Decrease Unsure No change	38.10% 0.00% 38.10% 23.80%		
3-1. What percentage increase in total sales? <sup>d</sup>	0–10% 11–20% 21–30% 31–40% 41–50% 61–70%	43.48% 34.78% 8.7% 4.35% 4.35% 4.35%	16.19%	3.11%
4. How do you think the campaign affected the number of clientele visiting your restaurant in the last year? <sup>a</sup>	Increase Decrease Unsure No change	31.70% 0.00% 41.30% 27.00%		
4-1. What percentage increase in the number of clientele? <sup>d</sup>	0–10% 11–20% 21–30% 31–40% 51–60%	36.84% 36.84% 15.79% 5.26% 5.26%	16.41%	2.92%
5. How do you think the campaign affected the profitability of your restaurant in the last year? <sup>b</sup>	Increase Decrease Unsure No change	22.95% 3.28% 34.43% 39.34%		

**Table 3.** Continued

Question	Category	Category Proportion	Parametric Mean <sup>c</sup>	Standard Deviation
5-1. What percentage increase in profitability? <sup>d</sup>	0–10%	66.67%	15.2%	4.94%
	11–20%	8.33%		
	21–30%	8.33%		
	41–50%	8.33%		
	51–60%	8.33%		
5-2. What percentage decrease in profitability? <sup>e</sup>	0–10%	100%	5%	0%

<sup>a</sup> Sample size is 63.<sup>b</sup> Sample size is 61.<sup>c</sup> Because responses were given in the form of intervals, the parametric mean and standard deviation were calculated by applying the parametric approach following Bhat (1994) and Zapata et al. (2011).<sup>d</sup> Questions only asked to individuals who selected "increase" in questions 2, 3, 4 and 5, respectively.<sup>e</sup> Questions are responded to only by people who select "decrease" in questions 2 and 5, respectively.

*South Carolina* campaign by donating annually instead of paying a membership fee.<sup>9</sup> Following Holmes and Adamowicz's (2003) approach to calculating the compensating variation, our findings suggest that participating restaurants would be willing to pay an average annual membership fee of \$532.82 or a donation of \$613.43 to support a campaign that includes LABEL, MULTI, and FOTM components.

The standard deviation coefficients for LABEL, MULTI, and FOTM are significantly different from zero at the 0.05 significance level. These coefficients allow us to calculate the population shares that place either a positive or negative value on each attribute. For instance, the distribution of the coefficient of FOTM component has an estimated mean of 1.70 and an estimated standard deviation of 2.57, suggesting that 75% of respondents positively value this component within the *Certified South*

*Carolina* campaign. Based on this interpretation, 76% of respondents have a positive WTP for the MULTI component, and 70% of respondents have a positive WTP for the LABEL component of the *Certified South Carolina* campaign.

#### Factors Affecting Campaign Valuation

Table 5 reports the mean values of the individual level preference parameters ( $\beta_n$ ) estimated using equation (9). As shown in the table, the mean values of individual parameters are very similar to those found for population parameters.<sup>10</sup> As in the case of the population mean WTP, the individual restaurant WTP values for LABEL, SIGNAGE, MULTI, and FOTM were calculated dividing the estimated individual-level parameters for each component by the negative of the coefficient estimate for PAY. The boxplots shown in Figure 2 provide information about the distributional characteristics of these WTP values. Restaurant managers' WTP for signage was estimated in a very narrow range, between \$30.5 and \$54.3, whereas the WTP for the FOTM component had the largest dispersion, between -\$313.1 and \$687.3. Half of

<sup>9</sup> We checked the robustness of the mixed logit results by estimating models excluding, from one group at a time, individuals who responded "unsure" to questions 2, 3, 4, and 5 in Table 3. The sign, magnitude, and statistical significance of the mean coefficients were generally consistent across specifications except for the statistical significance of the mean coefficients corresponding to the METHOD attribute. This coefficient was only significant in one of the three alternative specifications. However, the samples used in the alternative specifications were significantly smaller than the original sample size.

<sup>10</sup> This finding is consistent with Train's (2003) suggestion that the mean of individual-specific parameters derived from a correctly specified model should mirror closely the population parameters.

**Table 4.** Mixed Logit Estimates

Attributes	Categories	Coefficient	Standard Error
LABEL	Mean coefficient	0.9174**	(0.3899)
	Standard deviation coefficient	1.7167***	(0.4742)
	Willingness to pay	\$117.24	
SIGNAGE	Mean coefficient	0.3275	(0.2609)
	Standard deviation coefficient	0.2451	(0.4853)
	Willingness to pay	\$41.85	
MULTI	Mean coefficient	1.5528***	(0.4295)
	Standard deviation coefficient	2.2200***	(0.4800)
	Willingness to pay	\$198.44	
FOTM	Mean coefficient	1.6991***	(0.4774)
	Standard deviation coefficient	2.5734***	(0.5360)
	Willingness to pay	\$217.14	
METHOD	Mean coefficient	0.6308**	(0.2994)
	Standard deviation coefficient	0.9213**	(0.4258)
	Willingness to pay	\$80.61	
PAY	Mean coefficient	-0.0078***	(0.0023)
Log likelihood		-262.0784	
Log likelihood from conditional logit (CL)		-317.192	
$\chi^2$ against CL		110.2272***	

Note: Single, double, and triple asterisks (\*, \*\*, \*\*\*) denote statistical significance at 10%, 5%, and 1% levels, respectively.

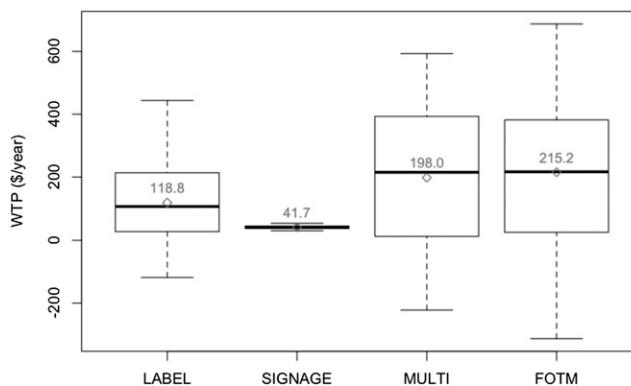
the observations fell into the range of \$28.7 to \$213.2 for Labeling, \$16.2 to \$390.4 for multimedia advertising and \$32.6 to \$380.1 for the FOTM component. In all cases, more than 75% of restaurants were willing to pay a positive amount of money for having these campaign components. The numbers inside the boxplots are the mean values of individual WTP for each variable; these values are close to the median of WTP estimates (the vertical line inside the box), suggesting that distributions are fairly symmetric. Furthermore, the mean values are consistent with the population mean WTP estimates (reported in a previous section).

The effects of participating restaurant characteristics on their individual WTP for campaign components reveal no significant difference in WTP for any component between big and small restaurants (SIZE) (Table 6). Restaurants' WTP for the LABEL component of the campaign is driven by their motivations and image. The coefficients of MOTIVATION2 (strong South Carolina pride) and MOTIVATION3 (increase the sales of my restaurant) are significant in the WTP<sub>LABEL</sub> equation, suggesting that, *ceteris paribus*, these motivations induce restaurants to pay more for the LABEL component of the campaign. Fast food restaurants and bars and restaurants are willing to pay \$124 and \$24 less, respectively, for the LABEL component relative to American cuisine restaurants.

Motivations also affect restaurants' WTP for the SIGNAGE component of the campaign with restaurants that are trying to improve the quality of their ingredients or increase sales willing to pay approximately \$6 more than the ones that joined the campaign to support the South Carolina economy. Fast food restaurants, fine dining restaurants, and health-conscious restaurants are willing to pay \$12, \$4, and \$3

**Table 5.** Comparison of Population Parameters and Means of Individual Parameters

Attributes	Population Parameters	Mean of Individual parameters
LABEL	0.9174	0.9391
SIGNAGE	0.3275	0.3297
MULTI	1.5528	1.5658
FOTM	1.6991	1.7016
METHOD	0.6308	0.6228



**Figure 2.** Box Plot of Willingness to Pay for LABEL, SIGNAGE, MULTI, and FOTM

more, respectively, for the SIGNAGE component relative to American cuisine restaurants.

Participating restaurants' WTP for the FOTM component is significantly affected by their motivations, satisfaction with the campaign, and image. For example, restaurants are willing to pay \$217 and \$204 more for the FOTM campaign if their motivations are to improve the quality of their ingredients and increase sales, respectively. The coefficient of the SATISFACTION variable suggests that restaurants are willing to pay \$71 more for having the FOTM component when their satisfaction increases by one unit (on a five-point scale shown in Table 1). At the same time, fine dining, family-oriented, and bar and restaurant types of restaurants are willing to pay \$262, \$299, and \$364 more, respectively, for this campaign component compared with American cuisine restaurants, holding everything else constant. This finding likely reflects differences in the preferences of restaurants' clientele<sup>11</sup> and the extent to which different types of restaurants use locally grown ingredients. Finally, none of the variables affect restaurant WTP for the MULTI component of the campaign. This result is not surprising given the very general nature of this component.

The intercepts in the linear models are the WTP values for a large American cuisine restaurant, which is motivated to participate in the campaign mainly to support the South Carolina

economy, but which is also dissatisfied with the campaign. Two of the intercepts are statistically different from zero ( $WTP_{SIGNAGE}$  and  $WTP_{FOTM}$  models). The estimated intercept value in the  $WTP_{FOTM}$  model of -\$267 provides another indication of the importance of this component because the "baseline" restaurant captured in the intercept has the lowest possible level of satisfaction.

Overall, these findings can help SCDA market the campaign to potential participants. For example, WTP for both FOTM and SIGNAGE components is significantly positively affected by the motivation to increase sales. Our finding showing that the sales of the participating restaurants were believed to increase by 16% as a result of campaign participation can serve as a strong marketing tool for campaign promotion.

## Summary and Conclusions

The first objective of this study was to estimate the perceived economic value of each of the four components of the *Certified South Carolina* campaign from the viewpoint of participating restaurants. A choice experiment was conducted as part of a restaurant manager survey to estimate average WTP for each campaign component using a mixed logit model. The four existing campaign components were treated as attributes in mixed logit model estimation, which also included the method of payment and the amount of payment for the campaign. Findings indicate that three existing campaign components—Labeling, Multimedia Advertising, and "Fresh on the

<sup>11</sup> For example, Carpio and Isengildina-Massa (2009) showed that consumer preferences for locally grown foods are affected by their age, income, and gender.

**Table 6.** The Effects of Participating Restaurant Characteristics on Their Individual WTP for Four Campaign Components

Variable	Category	WTP <sub>LABEL</sub>		WTP <sub>SIGNAGE</sub>		WTP <sub>MULTI</sub>		WTP <sub>FORM</sub>	
		Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Intercept		95.25	67.59	34.71***	2.35	130.23	122.14	-267.05**	125.57
MOTIVATION	1 = Improve the quality of ingredients	92.31	55.90	5.50***	1.94	-101.13	101.02	216.83**	103.85
	2 = Strong SC pride	164.22**	66.46	2.59	2.31	18.39	120.10	147.08	123.47
	3 = Increase the sales of my restaurant	155.22***	50.26	6.28***	1.74	98.08	90.83	203.79**	93.37
	5 = Reduce harmful environmental impact	-3.98	74.23	3.64	2.58	92.26	134.14	-170.10	137.90
SATISFACTION	Overall satisfaction with the campaign	1.53	16.67	-0.07	0.58	3.84	30.12	71.27**	30.97
IMAGE	1 = Fine dining	-111.38	55.11	4.21**	1.91	75.95	99.59	262.14**	102.39
	2 = Fast food	-124.44*	142.47	12.33**	4.94	-85.18	257.45	238.68	264.67
	3 = Family-oriented	-140.22	79.67	-0.25	2.76	-19.78	143.98	299.42**	148.01
	4 = Bar and restaurant	-23.75*	91.82	1.29	3.19	31.45	165.92	364.45***	170.57
	5 = International cuisine	20.70	106.69	-2.58	3.70	213.36	192.79	235.09	198.20
	7 = Health-conscious	9.45	90.49	2.70*	3.14	142.07	163.53	97.71	168.12
	8 = Others	-41.11	66.09	4.51	2.29	-71.33	119.43	282.63**	122.78
SIZE	1 = Small	-9.64	41.18	1.12	1.43	16.00	74.42	-30.54	76.51
<i>R</i> <sup>2</sup>		0.37	0.49	0.22	0.22	0.22	0.22	0.38	0.38

Note: Detailed variable description is shown in Table 1. Single, double, and triple asterisks (\*, \*\*, \*\*\*), denote statistical significance at 10%, 5%, and 1% levels, respectively. WTP, willingness to pay; SC, South Carolina.

Menu"—have a significant positive economic value for restaurants participating in the program. The estimated mean WTP for the components are \$117.24, \$198.44, and \$217.14 per year, respectively. These estimated WTP values could be used as a guide if a participation fee is imposed in the future.

The results suggest that restaurants prefer to participate in the *Certified South Carolina* campaign by donating annually instead of paying a membership fee. Nevertheless, participating restaurants are willing to pay an average membership fee of \$532.82 annually to support the campaign that includes Labeling, Multimedia Advertising, and "Fresh on the Menu" components.

This study also sheds light on the determinants of restaurants' WTP for the campaign. We found that restaurants' image, satisfaction with the campaign, and motivation for participation significantly affect their WTP for the "Fresh on the Menu," Signage, and Labeling campaign components. However, restaurants' size does not affect WTP for any component. These findings can help the SCDA marketing the campaign to potential participants.

Currently, the *Certified South Carolina* campaign is entirely funded by special appropriations from the state legislature. The economic value of the campaign demonstrated in this study may help government officials justify the expenditure of public funds on the operational costs associated with the campaign. Furthermore, our estimates of the economic value of each of the campaign components allow comparison of their relative benefits and provides information needed for possible reallocation of funds toward the most valued uses. Although our results reflect the view of participating restaurants only, the framework and survey instruments developed in this study can be applied to other program participants and beneficiaries (e.g., farmers, farmer's market vendors, grocery stores) to draw more general conclusions.

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