

Article

# Factors Affecting Current and Future CSA Participation

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**Abstract:** Community Supported Agriculture (CSA) is one of the widely used direct marketing strategies for small- and midsized farmers. CSA programs are an important option for sustainable production and consumption. It helps growers generate income (improve financial security) and consumers obtain fresh local foods. Sustaining and growing CSA participation is critical in order to continue enjoying these benefits. We used a national online survey in conjunction with discrete choice models to investigate the impact of demographic characteristics, lifestyle preferences, and different information outlets on the probability that a consumer is or will become a CSA member. The results indicate that the factors affecting current and future CSA participation differ substantially. While none of the demographic characteristics has a significant impact on current CSA participation, some of them significantly affect the probability that a consumer will become a CSA member in the future. Lifestyle preferences have a significant impact on current and future CSA participation. Although none of the information outlets examined affect current CSA participation, word-of-mouth and online sources significantly influence the probability that a consumer will join a CSA program in the future. These findings may have important implications for policy makers' and CSA farm managers' efforts to sustain future CSA development.

**Keywords:** community-supported agriculture (CSA); direct marketing; local foods

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## 1. Introduction

Consumer preferences for food have drastically changed over the last decades. Besides the nutrients provided by food, consumers increasingly care about the impact of food production on the environment and society [1–3]. To satisfy the demand of this increasingly sophisticated group of consumers, producers more extensively utilize different forms of direct marketing, including farmers markets, on-farm sales, roadside sales, U-pick operations, and community-supported agriculture (CSA) [3–5]. Other than farmers markets, CSA has become one of the most widely used direct marketing strategies over the last twenty years to satisfy the increased demand for sustainable production and consumption [6–8]. The number of U.S. farms that market their products through CSA has increased from an estimated 500 farms in 1996 to more than 12,000 farms in 2012—approximately 0.6% of U.S. farms [9–13]. Under a CSA arrangement, consumers purchase “shares” of a farm’s expected yield before the planting period and obtain a portion of the produce later during the harvesting season [14–16]. The most common CSA agreements are: (i) subscription-based, a type that is farmer driven; and (ii) shareholder-based, a type that is primarily consumer driven [17].

The growth of the CSA marketing scheme can be explained by the multitude of benefits enjoyed by CSA consumers and producers alike. For instance, CSA improves the financial security of producers through advanced payments [15,18] and the elimination of the middleman [18–20]. Moreover,

consumers join CSA to obtain local produce for a healthier lifestyle, to reduce the negative impact on the environment, and to financially support local producers and the community [10,15,20,21]. As CSA arrangements become more popular, the model adapts to increase its customer base and further improve the experience of the members [7]. For instance, some CSA farm managers adopt alternative payment schemes (e.g., installment payments) and accept SNAP benefits (the USDA Supplemental Nutrition and Assistance Program for low-income families), thus increasing their potential customer base [22,23]. Furthermore, some CSA farms collaborate in marketing and distribution strategies to reduce the seasonality and limited product variety barriers [24].

The growing popularity of CSA marketing arrangements has triggered considerable research endeavors. A common theme of this literature includes efforts to identify the economic impact of CSA arrangements on consumers and producers. Brown and Miller [14] provide a comprehensive review of papers relevant to the aforementioned topic. Their findings indicate that CSA membership leads to healthier eating habits, and, in some cases, to lower cost for consumers. They also highlight the importance of the manager's experience and of different marketing options on the viability of CSA farms. A related strand of the literature focuses on the dietary/nutritional impacts of CSA [10,20,25]. The consensus of these studies is that CSA membership leads to improved diet and greater consumption of fresh produce.

Furthermore, a plethora of studies has examined the effect and influence of several factors on consumers' CSA participation and CSA membership satisfaction [12,22,26–28]. The majority of these studies indicate that CSA members are primarily female, middle aged, with higher education and income [5,22,29]. However, divergences remain. For instance, Kolodinsky and Pelch [9] and Onianwa et al. [30] found that income has no effect on consumers' interest in local foods. Zepeda and Li [19], and Peterson et al. [21] highlight that generally demographic characteristics do not have a statistically significant effect in predicting CSA membership. Among the large body of literature on CSA, only one study examined the factors affecting an individual's future CSA participation. Kolodinsky and Pelch [9] have shown that education level and lower cost per share have a positive and statistically significant impact on consumers' decision to join the CSA program in Vermont. However, identifying the factors that influence the probability an individual will join a CSA arrangement in the future, at the national level, is a relatively unexplored topic in the literature because the majority of the previous research focus on limited geographical areas.

As the competition for local food expenditures intensifies, it is important to secure the sustainability and future growth of CSA participation for both growers and consumers to enjoy the multiple benefits of CSA. Therefore, it is crucial to identify: (i) the types of consumers who are likely to participate in CSA arrangements in the future; (ii) the impact of different information outlets on the decision to participate in CSA arrangements; and (iii) aspects of CSA agreements that help retain current CSA members. The answers to these questions will provide valuable insights to farm managers in order to better understand CSA marketing, promote the sustainability of CSA marketing, retain current CSA members, and attract new CSA members. The present study aims to fill this void in research using a 2015 national online survey of regular grocery shoppers.

The present study contributes to the current literature by revealing more about the factors that influence a consumer's decision to join a CSA arrangement in the future. Rather than binary responses (Yes or No), we use multilevel response (Yes, Not Sure, or No) to capture the potential uncertainty in individuals' future participation in CSA. Most importantly, rather than using samples from a particular state or a small number of CSA farms, this study uses a national sample, thus helping us draw more general conclusions that may be applicable to a broader audience. The national sample also allows us to investigate the influence of region of residence on the probability that a consumer will join a CSA arrangement in the future.

## 2. Survey Design and Data Collection

An online survey was distributed by Survey Sampling International (SSI) to its national representative consumer panels in May 2015. SSI is a premier global provider of data solutions for consumer and

business-to-business survey research. SSI operates from 40 offices in 20 countries, reaching participants in 90+ sample countries via Internet, telephone, mobile/wireless and mixed-access offerings. For this study SSI used a quota sampling method by releasing the survey to its consumer panels in several rounds. After each round, the demographics of respondents who finished the survey were compared with the census data. If some of the demographics deviated too much from the census (e.g., too many females) in a round, the survey was released to a sample with the adjusted demographics (e.g., more males). This procedure continued until the quota was met and the demographics of the final sample were as close as possible to the national population. After removing respondents with missing values, there were 768 respondents in the final analysis. The sample size of 768 is sufficient for this study. Based on the formula that calculates the sample size, a sample size of 384 is good enough for a population of one billion, with 95% confidence interval and  $\pm 5\%$  marginal errors.

In the survey, respondents were asked about: (i) whether they were current CSA members (Yes, or No); (ii) whether they were planning to join a CSA program in the future; and (iii) the reasons for their being current CSA or non-CSA members. Demographic and lifestyle variables were also collected in the survey. Consumers' intention to join a CSA arrangement in the future was measured by their answers to the question, "Are you planning to join a CSA in the future?" Respondents were provided with three choices: (i) No; (ii) Not sure; and (iii) Yes. The verbal statement format was preferred over a Likert scale or probabilities option because it could be used even if responders were unable to fully differentiate among the probabilities [31,32]. Not including a "probably yes/no" option as a possible answer avoids the problem of the framing effect that refers to the difficulty of interpreting how responders distinguish between the middle responses [33]. Furthermore, this approach was preferred over a binary option (yes/no) approach because it could provide additional insights regarding consumers' intentions.

### 3. Empirical Framework

Because the responses to the question regarding current CSA membership or non-membership are dichotomous, a probit model was utilized to evaluate the impact of the selected explanatory variables on the probability that a survey respondent was a member of a CSA arrangement during the time of the survey. However, as the responses to the question regarding future CSA participation have more than two discrete outcomes, two models (ordered probit and multinomial probit) were used to examine the effect of selected explanatory variables on the probability that a consumer will join a CSA arrangement in the future. The ordered probit formulation assumes that the three responses ("No", "Not sure", and "Yes") indicate a willingness of future participation in CSA ranging from weak to strong. The multinomial probit model assumes that each of the three responses is a unique category, and there is no particular order in these responses. Including both models helped draw more robust conclusions regarding the impact of factors affecting an individual's participation in future CSA arrangements. Marginal effects were estimated for all the models to gain a more meaningful interpretation of the results.

Four groups of explanatory variables were examined in the study: demographic variables (age, gender, race, income, and education level), lifestyle variables (vegetarian, gym membership, hours spent cooking, frequency of recycling, grocery expenditures, and past CSA membership), information sources (web, word of mouth, news, and road signs), and regional variables (South, West, Midwest, and Northeast). Among demographics variables, age and income were treated as continuous variables; gender, race, and education were included as dummy variables, with male, non-Caucasian, and high school degree or less used as base category, respectively. Among lifestyle variables, vegetarian, gym membership, and past CSA membership were included as dummy variables, while all other variables were treated as continuous variables. All the information sources variables were treated as continuous variables. Regional variable was coded as dummy variable with Midwest region used as base category (Table 1). Following Zepeda and Li [19], Curtis [34], and Peterson et al. [21], our a priori expectation was that responders with a more active and environmentally friendly lifestyle would be more likely to join a CSA arrangement. In line with Bond et al. [4], we expected that consumers in western states would be more likely to participate in CSA arrangements. Considering the lack

of consistency in findings regarding demographic variables [19,21], our initial hypothesis was that demographic variables would not be helpful in explaining the likelihood of joining a CSA arrangement. The present section briefly discusses the econometric techniques used in the study.

**Table 1.** Description of the variables and summary statistics.

Variable	Description	Mean	Std. Dev.
<i>Demographic Variables</i>			
Age	Age of the respondent	43.08	18.2
Female	Dummy variable; female = 1	0.53	0.49
Caucasian	Dummy variable; Caucasian = 1	0.77	0.41
Income	Average annual household income (US\$1000)	61.45	41.8
High School	Dummy variable; high school graduate = 1	0.23	0.42
Some College	Dummy variable; Attended some college = 1	0.38	0.48
Graduate	Dummy variable; bachelor's degree or higher = 1	0.39	0.48
No. Children	Number of children < 18 years old in the household	1.79	1.11
<i>Lifestyle Variables</i>			
Vegetarian	Dummy variable; Vegetarian or vegan = 1	0.07	0.25
Gym	Dummy variable; Responder has gym membership = 1	0.28	0.45
Cook	Hours spent cooking in an average week	5.28	2.83
Expenditure	Grocery shopping expenditure (US\$100)	1.41	0.93
Health	Organic food has more health benefits: 0 = strongly disagree/disagree; 1 = neutral; 2 = agree/strongly agree	1.22	0.62
Ingredients	How important is the list of ingredients when you purchase food: 0 = not at all/somewhat unimportant; 1 = neither important/nor unimportant; 2 = somewhat important/very important	1.62	0.67
Environment	Production of food from CSA program has lower environmental impact: 0 = strongly disagree/disagree; 1 = neutral; 2 = agree/strongly agree	1.45	0.62
Chain Store	Money spent at major chain grocery store for grocery shopping	139.27	139.03
Recycle	How often do you recycle glass, newspaper, cans, and plastic (0 = never, 4 = always)	3.14	1.25
Past Member	Dummy variable; 1 if respondent was a CSA member in the past	0.06	0.25
<i>Information Sources</i>			
Web	Importance of website information in joining a CSA; 0 = not at all/somewhat unimportant; 1 = neither important/nor unimportant; 2 = somewhat important/very important	1.131	0.78
Word of Mouth	Importance of friends/family members in decision to join a CSA: 0 = not at all/somewhat unimportant; 1 = neither important/nor unimportant; 2 = somewhat important/very important	1.22	0.78
News	Importance of newspaper information in decision to join a CSA: 0 = not at all/somewhat unimportant; 1 = neither important/nor unimportant; 2 = somewhat important/very important	1.02	0.78
Road Signs	Importance of road sign information in decision to join a CSA: 0 = not at all/somewhat unimportant; 1 = neither important/nor unimportant; 2 = somewhat important/very important	1.09	0.77
<i>Region of Residence</i>			
Northeast	Dummy variable; 1 for responders who reside in the Northeastern states	0.20	0.39
Midwest	Dummy variable; 1 for responders who reside in the Midwestern states	0.21	0.41
South	Dummy variable; 1 for responders who reside in the Southern states	0.36	0.48
West	Dummy variable; 1 for responders who reside in the Western states	0.23	0.41
<i>Dependent Variables</i>			
Current CSA member	Dummy variable; 1 = respondent CSA member during survey	0.12	0.32
Plan to join a CSA	Are you planning to join a CSA in the future?; 0 = No, 1 = Not sure, 2 = Yes	0.67	0.7

### 3.1. Probit Model for Current CSA Participation

Assume a rational, utility-maximizing consumer, indexed by  $i$ , and let  $U_{i1}$  and  $U_{i0}$ , respectively, be the consumer's utility from participation or nonparticipation in a CSA arrangement. The utility-maximizing individual is a CSA member if

$$U_i^* = U_{i1} - U_{i0} > 0 \quad (1)$$

The latent variable  $U_i^*$  is defined as

$$U_i^* = X_i' \beta + \varepsilon_i \quad (2)$$

where  $X'$  is a vector of explanatory variables,  $\beta$  represents the coefficients associated with these variables, and  $\varepsilon$  is the error term following normal distribution. The observed dependent variable  $Y_i$  equals one if  $U_i^* > 0$ , or 0 if  $U_i^* \leq 0$  [35]. Under the probit formulation, the probability that the individual  $i$  is a CSA member is given by

$$P_i = \Phi(X_i' \beta) = \int_{-\infty}^{x' \beta} \varphi(z) dz \quad (3)$$

where  $\Phi()$  is the standard normal cumulative distribution function (CDF). The marginal effects are calculated as

$$\frac{\partial P_i}{\partial X_{ij}} = \varphi(X_i' \beta) \beta_j = \varphi(\Phi^{-1}(P_i)) \beta_j \quad (4)$$

### 3.2. Ordered Probit and Multinomial Probit Models for Future CSA Participation

If we assume that the three responses to the question regarding the willingness to participate in CSA in the future measure an intention from weak to strong, then the three discrete responses can be ordered as follows: no ( $y = 0$ ), not sure ( $y = 1$ ), and yes ( $y = 2$ ) [36,37]. Thus, an ordered probit formulation may be utilized. Following Cameron and Trivedi [35], we first introduced a latent variable  $y_i^*$ , defined as

$$y_i^* = X_i' \beta + \varepsilon_i \quad (5)$$

where  $\beta$  is a vector of parameters to be estimated,  $X$  is a vector of explanatory variables, and  $\varepsilon$  is the error term. The observed response categories ( $y$ ) that are tied to the latent variable satisfy the following model:

$$y_i = \begin{cases} 0, & \text{if } y_i^* \leq A_1 \\ 1, & \text{if } A_1 \leq y_i^* \leq A_2 \\ 2, & \text{if } y_i^* > A_2 \end{cases} \quad (6)$$

where  $A_1$  and  $A_2$  are unknown cutoff parameters to be estimated with  $\beta$ . The probability that consumer  $i$  will belong in group  $j$  [35] is given by

$$Prob(y_i = j) = F(A_j - X_i' \beta) - F(A_{j-1} - X_i' \beta) \quad (7)$$

The marginal effect of the  $r$ th explanatory variable is calculated as

$$\frac{\partial Prob(y_i = j)}{\partial X_{ir}} = \{F'(A_{j-1} - X_i' \beta) - F'(A_j - X_i' \beta)\} \beta_r \quad (8)$$

where  $F$  is the standard normal CDF.

The ordered probit model assumes that the responses are in ordinal scale and that the influence of explanatory variables remains consistent across the range of the dependent variable (the parallel regression assumption) [38]. Because the ordering of the responses to future CSA participation (No = 0, Not Sure = 1, Yes = 2) may be questioned as "crude", a likelihood ratio test was implemented to test for the parallel regression assumption [39,40]. If the assumption were rejected, other models such as multinomial probit models that do not have the parallel regression assumption would have to be considered [41,42].

Under a multinomial probit model, the probability of selecting alternative  $j$ , out of  $m$  possible options is given by

$$Pr(y_i = j) = \int_{-\infty}^{V_{j1}} \int_{-\infty}^{V_{j2}} \dots \int_{-\infty}^{V_{jM}} \Phi_{M-1}(\eta_{1j}, \eta_{2j}, \dots, \eta_{mj}) d\eta_{1j} d\eta_{2j} \dots d\eta_{mj} \quad (9)$$

where  $\Phi()$  stands for a  $M-1$ -variate normal distribution and  $\eta_{ji} = \varepsilon_j - \varepsilon_i$ .

#### 4. Results

Summary statistics for the sample are reported in Table 1. Among all participants, 53% were female, 77% were Caucasian, and the median age was 37 years old. These numbers compare favorably with the U.S. population demographics of 50.8% female, 77.4% Caucasian, and a median age of 35.3 years old [43]. Our sample is slightly biased toward higher income families. Specifically, the median household income for the sample is US\$62,500, compared to the US median of US\$53,657. Lastly, 46 responders (6%) were members of a CSA arrangement when the survey was conducted (Table 1).

A standard  $t$ -test for comparing means of variables with unequal variances was utilized to gauge differences in characteristics between CSA members and non-members (Table 2). In line with previous studies [12,44–47], our findings indicate that, on average, CSA members are younger, are more educated, and have higher incomes than do non-members. Furthermore, consistent with [34], our results highlight that CSA members spend more on grocery shopping and have more active lifestyles than do non-members. A potential explanation for the increased expenditures is that CSA members, in contrast to non-members, are more likely to eat more meals at home [19,34]. There was no significant difference between CSA members and non-members in race and time spent in cooking. With the exception of the Northeast, there was no difference between members and non-members (Table 2).

**Table 2.** Test of means, CSA members, and non-members.

Variable	CSA Member ( $n = 46$ )		Non-Member ( $n = 722$ )		Difference	$t$ -test <sup>a</sup>
	Mean	Std. Error	Mean	Std. Error		
<i>Demographic Variables</i>						
Age	32.95	10.95	43.73	18.47	10.78	6.38 **
Female	0.32	0.47	0.54	0.49	0.22	3.04 **
Caucasian	0.73	0.44	0.77	0.41	0.04	0.56
Income	76.56	47.30	60.48	41.27	−16.8	−2.25 *
High School	0.15	0.36	0.23	0.42	0.08	1.47
Some College	0.26	0.44	0.38	0.48	0.12	1.89
Graduate	0.58	0.49	0.37	0.48	−0.21	−2.78 **
Number of Children	2.5	1.11	1.75	1.09	−0.75	−4.46 **
<i>Lifestyle Variables</i>						
Vegetarian	0.26	0.44	0.054	0.22	−0.207	−3.13 **
Gym	0.73	0.44	0.25	0.43	−0.48	−7.20 ***
Cook	6.23	2.7	5.22	2.83	−1.011	−2.45 *
Expenditures	2.30	1.18	1.35	0.89	−0.951	−5.34 ***
Health	1.67	0.52	1.19	0.61	−0.48	−6.05 ***
Ingredients	1.47	0.80	1.63	0.66	0.16	1.27
Environment	1.67	0.63	1.43	0.62	−0.24	−2.49 *
Past CSA member	0.65	0.48	0.02	0.16	−0.623	−8.74 ***
Chain Store	222.08	156.03	134.00	136.30	−88.08	−3.74 ***
Recycle	3.54	0.78	3.11	1.27	−0.433	−3.48 ***
<i>Regional Variables</i>						
Northeast	0.34	0.48	0.18	0.39	−0.159	−2.2 *
Midwest	0.15	0.36	0.21	0.41	0.067	0.06
South	0.30	0.16	0.36	0.48	0.059	0.03
West	0.19	0.40	0.22	0.42	0.032	0.07

<sup>a</sup> Significance level in this column refers to the difference between non-members and CSA members. \*, \*\*, and \*\*\* represent significant at the 10%, 5%, and 1% significance levels, respectively.

A consistent theme within the CSA literature is that women constitute the majority of CSA members [5,12,48–51]. However, in line with the results of a recent Food Demand Survey,

which indicated that people who shopped at farmers markets were more likely to be male [52], males represent a larger percentage of CSA members in our sample (Table 2). A potential reason for this discrepancy lies in the sample selection. Specifically, the majority of the previous research focuses primarily on CSA members, whereas our survey focuses on a national representative sample of U.S. consumers who may or may not be CSA members. Alternatively, our findings may indicate a shift in the demographics of CSA members.

Table 3 reports summary statistics by responders' intention to join a CSA arrangement in the future. About 48% of the responders indicated that they were not interested in joining a CSA arrangement in the future, 40% were not sure, and 12% responded that they would join a CSA arrangement in the future. The results also show that the responders' intention for future CSA participation may vary by age, gender, income, education, number of children, lifestyle, and region. For instance, respondents who said "Yes" to the future CSA participation question seemed to have more children, were more likely to be vegetarian, and were more likely to live in the South. The impact of these variables will be further discussed when presenting the results of regression analysis.

**Table 3.** Summary statistics by responder's intention to join a CSA in the future.

Variable	Y = No (n = 367)		Y = Not Sure (n = 311)		Y = Yes (n = 90)	
	Mean	SD	Mean	SD	Mean	SD
<i>Demographic Variables</i>						
Age	46	18.78	42.63	17.98	32.74	12.45
Female	0.46	0.49	0.61	0.48	0.51	0.50
Caucasian	0.81	0.39	0.77	0.42	0.63	0.48
Income	65.40	42.00	55.87	39.74	64.60	46.01
High School	0.20	0.40	0.25	0.43	0.24	0.43
Some College	0.35	0.48	0.42	0.49	0.34	0.48
Graduate	0.44	0.49	0.32	0.46	0.41	0.49
Number of Children	1.67	1.04	1.78	1.11	2.3	1.21
<i>Lifestyle Variables</i>						
Vegetarian	0.03	0.18	0.07	0.26	0.18	0.38
Gym	0.26	0.44	0.22	0.41	0.55	0.49
Cook	4.84	2.81	5.65	2.80	5.83	2.84
Expenditures	1.32	0.87	1.37	0.89	1.92	1.15
Health	1.11	0.62	1.22	0.58	1.63	0.53
Ingredients	1.57	0.70	1.67	0.64	1.67	0.67
Environment	1.28	0.64	1.56	0.57	1.73	0.55
Past CSA member	0.04	0.20	0.019	0.13	0.32	0.47
Chain Store	131.13	129.98	135.09	143.17	186.95	151.92
Recycle	3.08	1.27	3.09	1.30	3.5	0.87
<i>Information Sources</i>						
Web	0.83	0.77	1.26	0.72	1.71	0.56
Word of mouth	0.93	0.79	1.39	0.70	1.79	0.48
News	0.77	0.74	1.17	0.73	1.58	0.70
Road Signs	0.86	0.79	1.20	0.68	1.6	0.59
<i>Regional Variables</i>						
Northeast	0.19	0.39	0.20	0.40	0.20	0.40
South	0.34	0.47	0.36	0.48	0.46	0.50
West	0.21	0.41	0.24	0.43	0.20	0.40
Midwest	0.25	0.43	0.19	0.39	0.14	0.35

#### 4.1. Reasons for Participation and Non-Participation in CSA

The importance of the various reasons in the respondents' decision on whether or not to participate in CSA is reported in Figures 1 and 2, respectively. Consistent with previous research [20,27,51], the findings indicate that: (i) supporting local farms; and (ii) purchasing organic foods are among the strongest motivations for joining a CSA. Specifically, more than 82% of the respondents indicated the aforementioned reasons as somewhat important or very important factors influencing their decisions. Conversely, approximately 39% of the survey respondents indicated that one of the main reasons for

not joining a CSA is their preference for farmers markets (Figure 2). This finding implies that other direct marketing schemes such as farmers markets may provide similar products and services as CSA, therefore reducing the need to join a CSA. It also highlights the importance of differentiating CSA from other direct marketing schemes for future CSA development. The limited variety and the cost of CSA membership were the second and third most important factors that discouraged survey respondents from CSA participation.

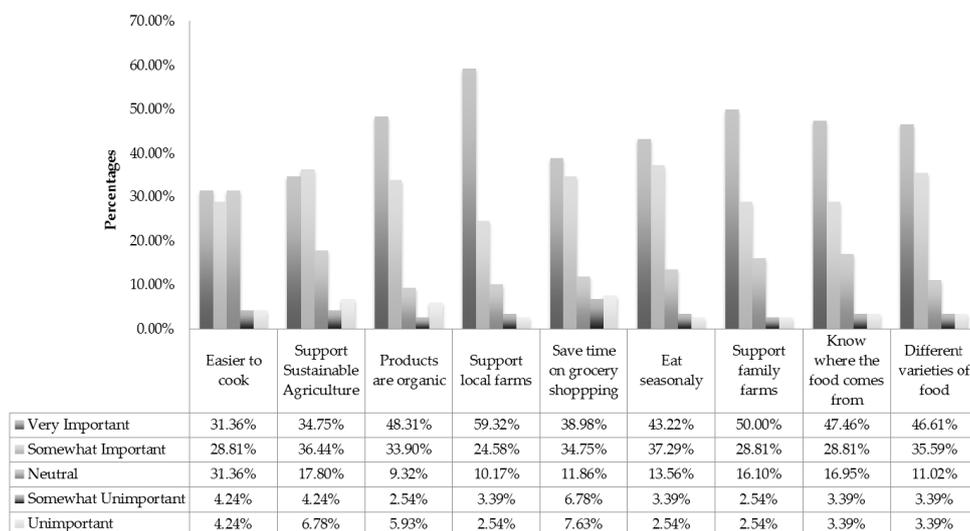


Figure 1. Most important reasons for Community Supported Agriculture (CSA) participation among CSA members and responders who plan to join CSA in the future.

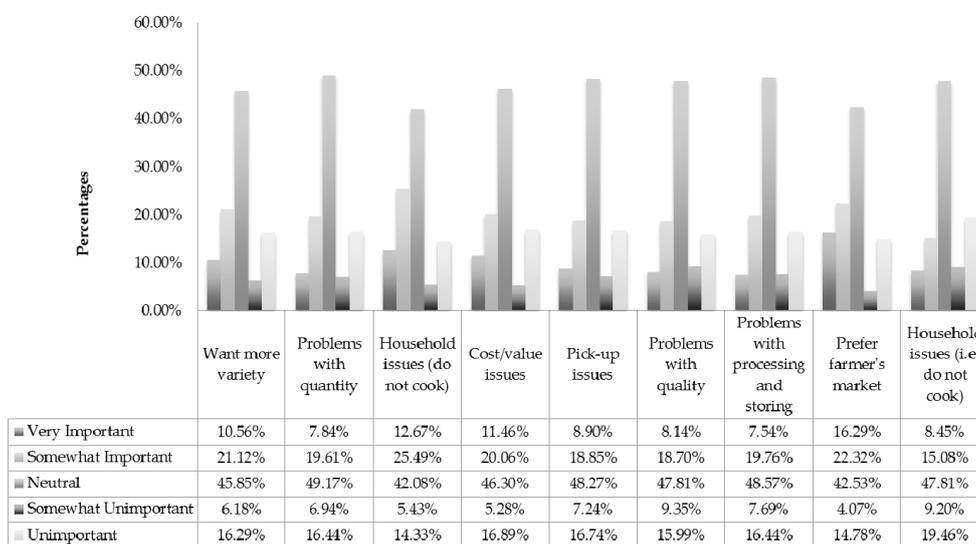


Figure 2. Most important reasons for not participating in a CSA arrangement.

#### 4.2. Factors Affecting Current CSA Participation

Table 4 reports the estimates of the coefficients and marginal effects for the probit model. The McFadden adjuster  $R^2$  is 0.37, and the model correctly classified 96% of the observations (8 observations were misclassified as yes, when the correct classification was no, and 22 observations were misclassified as no when the correct value was yes), indicating a good fit. Consistent with previous research [19,21], the demographic variables did not exert statistically significant effects on the probability that a respondent is a CSA member (Table 4). We selected the variables included in the

model based on previous studies. It is not uncommon for studies related to CSA marketing to have coefficients that are not significant. Furthermore, even the insignificant results can provide valuable information. For example, our findings provide further support for the argument that demographic variables are not a significant predictor to identify current CSA membership. However, we still need to include the demographics variables to avoid the model misspecification of “omission of relevant variables”.

**Table 4.** Probit estimation results and marginal effects.

Dependent Variable = CSA Member	Estimation Results		Marginal Effects	
	Coefficient	Std. Error	Coefficient	Std. Error
Constant	−4.625 ***	0.539		
<i>Demographic Variables</i>				
Age	−0.010	0.010	−0.0005	0.0006
Female	−0.168	0.244	−0.0093	0.0124
Caucasian	0.130	0.273	0.0068	0.0153
Income	−0.002	0.003	−0.0001	0.0001
Some College <sup>a</sup>	0.191	0.349	0.0106	0.0209
Graduate <sup>a</sup>	0.372	0.347	0.0214	0.0231
Number of Children	0.146	0.098	0.0079	0.0054
<i>Lifestyle Variables</i>				
Vegetarian	0.692 **	0.326	0.0498	0.0304
Gym	0.670 ***	0.244	0.0393 **	0.0182
Cook	0.064	0.047	0.0034	0.0025
Expenditures	0.289 **	0.117	0.0157 **	0.0063
Health	0.161	0.214	0.0087	0.0117
Ingredients	−0.258	0.169	−0.0141	0.0094
Environment	0.020	0.199	0.0010	0.0108
Past CSA member	1.791 ***	0.269	0.2271 ***	0.0614
Chain Store	0.000	0.001	0.000	0.0000
Recycle	0.258 *	0.144	0.0141 *	0.0081
<i>Information Sources</i>				
Web	0.038	0.200	0.0020	0.0109
Word of mouth	0.233	0.204	0.0127	0.0113
News	0.261	0.229	0.0143	0.0127
Road	−0.094	0.234	−0.0051	0.0127
<i>Regional Variables</i> <sup>b</sup>				
Northeast	0.183	0.359	0.0104	0.0220
South	−0.247	0.351	−0.0130	0.0166
West	−0.181	0.397	−0.0094	0.0191
Adjusted McFadden R <sup>2</sup>	0.37			
Percent Correctly Classified	96%			

<sup>a</sup> High school graduate is the base category. <sup>b</sup> Midwest is the base category. \*, \*\*, and \*\*\* represent significant at the 10%, 5%, and 1% significance levels, respectively.

Consistent with the findings of Kolodinsky and Pelch [9], our findings indicate that households that recycle more often are more likely to be CSA members (Table 4). A potential explanation for this finding is that CSA members are more likely to exhibit pro-ecological behavior [5]. A number of lifestyle variables had statistically significant and positive impacts on the probability that a survey respondent is a CSA member. For example, respondents who are members of fitness clubs are 4 percentage points more likely to participate in CSA (Table 4). These findings may help CSA managers design more efficient and targeted marketing strategies. However, it may be challenging and expensive to identify this type of health-conscious consumers [21,53]. Respondents who were CSA members in the past are

23 percentage points more likely to be current CSA members. This finding provides further support for the hypothesis that satisfaction substantially influences the probability of CSA membership [9,10,26].

Moreover, the findings indicate that consumers who spend more on grocery shopping are more likely to be CSA members. A potential explanation for this finding is that CSA members tend to eat more meals at home [34]. Contrary to the findings of [53], none of the regional variables had a statistically significant impact on the probability that a responder was a CSA member during the time of the survey.

#### 4.3. Factors Affecting Future CSA Participation

Tables 5 and 6 report the estimates of the coefficients and marginal effects for the ordered probit model. The McFadden adjusted  $R^2$  for the model is 0.14. Moreover, the threshold parameters are statistically different from each other (Table 5).

**Table 5.** Ordered probit estimation results of consumers' intention to join a CSA in the future.

Dependent Variable = Plan to Join a CSA	Coefficient	Std. Error
<i>Demographic Variables</i>		
Age	−0.001	0.003
Female	0.135	0.094
Caucasian	−0.126	0.111
Income	−0.002 *	0.001
Some College <sup>a</sup>	−0.081	0.117
Graduate <sup>a</sup>	−0.245 *	0.129
No. of Children	0.010	0.045
<i>Lifestyle Variables</i>		
Vegetarian	0.356 **	0.178
Gym	−0.006	0.106
Cook	0.026	0.016
Expenditures	0.070	0.053
Health	0.071	0.080
Ingredients	0.001	0.072
Environment	0.302 ***	0.078
Chain Store	0.000	0.000
Recycle	0.062 *	0.038
Current CSA Member	1.135 ***	0.209
<i>Information Sources</i>		
Web	0.186 **	0.081
Word of Mouth	0.349 ***	0.082
News	0.175 **	0.084
Road Signs	−0.053	0.089
<i>Regional Variables <sup>b</sup></i>		
Northeast	0.145	0.143
South	0.160	0.125
West	0.138	0.138
<i>Threshold Parameter</i>		
A1	1.518 ***	0.296
A2	3.098 ***	0.309
Adjusted McFadden $R^2$	0.144	

<sup>a</sup> High school graduate is the base category; <sup>b</sup> Midwest is the base category; \*, \*\*, and \*\*\* represent significant at the 10%, 5%, and 1% significance levels, respectively.

Consistent with previous research [9,21,54] and our initial hypothesis, most demographics such as age, gender, race, and the number of children did not have a statistically significant impact on the probability that a consumer will join a CSA (Table 5). The most discernable differences between the probit and ordered probit formulations are related to the impact of the income, education, and information variables. For example, the results in Table 5 indicate that responders with higher incomes are less likely to join a CSA arrangement in the future (Table 5). This finding is consistent with Zepeda and Li [19], who highlighted that more affluent consumers are less likely to buy local foods. A couple of reasons justify this result. First, households with higher incomes may eat out more

often than do households with lower incomes [19]. Second, higher income may translate to higher opportunity cost and busier schedules, leaving less time to visit a CSA farm [19]. Our results also indicate that, compared to high school graduates, obtaining a graduate degree translates to a lower probability of future CSA participation. More educated consumers are 3.1 percentage points less likely than their less educated counterparts to join a CSA in the future (Table 5). Potential explanations for this finding are that more educated consumers are more likely to have busier schedules [55] or do not value buying local products [56].

Consistent with the findings of the probit analysis, the marginal effects from the ordered probit indicate that respondents who are already CSA members are 27% more likely than are non-CSA members to participate in CSA in the future (Table 6). This finding further highlights the importance of having satisfied members. Consumers who consider CSA food production techniques better for the environment are approximately 4% more likely to join a CSA (Table 6). Consumers who identify themselves as non-vegetarian are 13% less likely to participate in a CSA, which is consistent with the fact that most CSA farms sell no or limited meat products (Table 6).

**Table 6.** Ordered probit marginal effects for the probability of joining CSA in the future.

Variable	Y = No		Y = Not Sure		Y = Yes	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
<i>Demographic Variables</i>						
Age	0.000	0.001	−0.000	0.001	−0.000	0.000
Female	−0.053	0.037	0.036	0.025	0.017	0.012
Caucasian	0.050	0.044	−0.033	0.028	−0.017	0.016
Income	0.001 *	0.000	−0.001 *	0.000	−0.000 *	0.000
Some College <sup>a</sup>	0.032	0.047	−0.022	0.032	−0.010	0.015
Graduate <sup>a</sup>	0.097 *	0.051	−0.067 *	0.036	−0.031 *	0.016
No. of Children	−0.004	0.018	0.003	0.012	0.001	0.006
<i>Lifestyle Variables</i>						
Vegetarian	−0.137 **	0.066	0.080 **	0.031	0.058	0.035
Gym	0.002	0.042	−0.002	0.028	−0.001	0.014
Cook	−0.010	0.006	0.007	0.004	0.003	0.002
Expenditures	−0.028	0.021	0.019	0.014	0.009	0.007
Health	−0.028	0.032	0.019	0.021	0.009	0.010
Ingredients	−0.000	0.029	0.000	0.019	0.000	0.009
Environment	−0.120 ***	0.031	0.081 ***	0.022	0.039 ***	0.011
Chain Store	−0.000	0.000	0.000	0.000	0.000	0.000
Recycle	−0.025 *	0.015	0.017 *	0.010	0.008 *	0.005
Current CSA Member	−0.369 ***	0.046	0.095 ***	0.035	0.274 ***	0.074
<i>Information Sources</i>						
Web	−0.074 **	0.032	0.050 **	0.022	0.024 **	0.011
Word of Mouth	−0.139 ***	0.033	0.094 ***	0.023	0.045 ***	0.011
News	−0.070 **	0.033	0.047 **	0.023	0.023 **	0.011
Road Signs	0.021	0.035	−0.014	0.024	−0.007	0.012
<i>Regional Variables <sup>b</sup></i>						
Northeast	−0.057	0.056	0.037	0.035	0.020	0.021
South	−0.063	0.049	0.042	0.032	0.021	0.018
West	−0.055	0.054	0.036	0.034	0.019	0.020

<sup>a</sup> High school graduate is the base category; <sup>b</sup> Midwest is the base category; \*, \*\*, and \*\*\* represent significant at the 10%, 5%, and 1% significance levels, respectively.

Regarding the impact of information sources on future CSA participation, the results highlight the importance of communication through family members/word of mouth for the probability of becoming a CSA member, which is in line with the findings of Kolodinsky and Pelch [9]. Specifically, respondents who place a higher value on this information source are approximately 4.5% more likely to join a CSA program in the future. Under the same token, respondents who place a higher importance on websites and newspapers are more likely to join a CSA by 2.3% (Table 6). On the other hand, advertising through road signs did not have a statistically significant impact. These results can provide

useful information to CSA managers as they design their marketing campaigns to maintain current memberships and attract new members.

As we discussed in the empirical framework section, the ordered probit model assumes parallel regression assumption. In this study, the likelihood ratio rejected the parallel regression assumption at the 1% significance level. Consequently, other models, such as the multinomial probit model, should be considered. The results of the multinomial probit model are reported in Table 7 (Marginal effects are not reported to save page space because the results from the multinomial probit and the ordered probit models are generally consistent.). The adjusted  $R^2$  for the model is 0.314, indicating a better fit compared to that of the ordered probit model. Overall, in line with the ordered probit findings, the results indicate that most demographic characteristics are a weak predictor of responders' intention to join a CSA arrangement in the future. Consumers, who are currently CSA members, are vegetarians, believe that CSA farm production has a lower environmental impact than does non-CSA production, and recycle more frequently, are more likely to participate in CSA arrangements in the future (Table 7). The results also indicate that the web and word of mouth are the most important information sources for respondents' future CSA participation (Table 7). The overall consistency in the results of the ordered probit and multinomial probit model indicates the robustness of our conclusions regarding factors affecting consumers' future CSA participation.

**Table 7.** Multinomial probit results for responders' intention to join a CSA in the future.

Variable	Not Sure vs. No		Yes vs. No	
	Coefficient	Std. Error	Coefficient	Std. Error
<i>Demographic Variables</i>				
Age	0.003	0.005	−0.013	0.008
Female	0.281 *	0.149	0.187	0.224
Caucasian	−0.009	0.183	−0.436 *	0.242
Income	−0.004 *	0.002	−0.002	0.003
Some College <sup>a</sup>	−0.023	0.189	−0.194	0.279
Graduate <sup>a</sup>	−0.323	0.206	−0.399	0.300
No. of Children	−0.017	0.075	0.117	0.097
<i>Lifestyle Variables</i>				
Vegetarian	0.003	0.316	0.694 *	0.382
Gym	0.281 *	0.171	0.223	0.231
Cook	−0.009	0.026	0.022	0.038
Expenditures	−0.004 *	0.087	0.106	0.118
Health	−0.023	0.129	0.322 *	0.193
Ingredients	−0.323	0.116	0.060	0.180
Environment	−0.017	0.123	0.465 **	0.190
Chain Store	0.003	0.001	−0.000	0.001
Recycle	0.281 *	0.059	0.263 **	0.105
Current CSA Member	−0.009	0.448	1.439 ***	0.373
<i>Information Sources</i>				
Web	0.202	0.131	0.513 ***	0.190
Word of Mouth	0.482 ***	0.131	0.669 ***	0.196
News	0.368 ***	0.137	0.146	0.182
Road Signs	−0.200	0.145	0.062	0.197
<i>Regional Variables <sup>b</sup></i>				
Northeast	0.381 *	0.228	0.154	0.359
South	0.084	0.199	0.424	0.305
West	0.308	0.216	0.154	0.352
Constant	−2.022 ***	0.462	−5.062 ***	0.799
Adjusted R <sup>2</sup>	0.314			

<sup>a</sup> High school graduate is the base category. <sup>b</sup> Midwest is the base category. \*, \*\*, and \*\*\* represent significant at the 10%, 5%, and 1% significance levels, respectively.

## 5. Conclusions

A plethora of empirical studies, using primarily region specific surveys, have examined the characteristics of CSA members, and investigated factors affecting CSA membership satisfaction [12,22,26–28]. However, as competition for local food expenditures intensifies, a better understanding of the factors that can increase consumers' future CSA participation is crucial for the continuous success of this direct marketing outlet. The present study tries to fill this gap using a national sample to gain a better understanding of the factors that influence consumers' decisions to join CSA.

Consistent with previous research endeavors [44–47], our results show that CSA members are younger, more educated, and with a higher income than non-members. Supporting local farms and purchasing organic foods are the primary motivations for consumers to join a CSA, which is in line with previous research [20,27,51]. Conversely, the ability to buy local foods from farmers' markets, the high CSA cost, and the limited variety are the main reasons for not joining a CSA. Furthermore, consumers who are more likely to join a CSA in the future appear to be younger, more educated and with a more active lifestyle (e.g., have a gym membership).

The results from a probit, an ordered probit, and a multinomial probit model further demonstrate the impact of consumers' demographic characteristics, lifestyle preferences, and information outlets on the probability of an individual's current and future CSA participation. Our results demonstrate that the factors affecting current and future CSA participation differ significantly. Despite the incompetence of all demographic characteristics in predicting the probability that a consumer is *currently* a CSA member, some of them such as income and education have a significant impact on the probability of the *future* CSA participation. Consumer lifestyle such as being a vegetarian, pro-environment perception of CSA, recycling behavior, and experience of being a CSA member have a statistically significant positive impact on both the probability that a consumer is currently a CSA member or will become a CSA member in the future. Moreover, although none of the information outlets examined in this study significantly affect an individual's current CSA participation, web and word-of-mouth sources significantly influence the probability that a consumer will join a CSA in the future. This highlights the importance of attracting new CSA members using the traditional word-of-mouth approach as well as using newer advertising media such as websites.

Overall, our findings indicate that, although CSA consumers appear to be a homogeneous group, there is a difference between the factors that determine current and future CSA membership. Furthermore, the results indicate that producers should question the effectiveness of traditional information outlets (e.g., news and road signs) on the probability of increased membership. To maintain CSA growth, strategies should concentrate on word-of-mouth information and attractive websites. A limitation of this study should be acknowledged. Specifically, the absence of time series data regarding CSA membership may have inhibited the estimation of individual-specific parameters. Further analysis should focus on the factors that increase loyalty among CSA members, similar to what has been investigated in [57]. Additional research can also be conducted to further identify the barriers for future CSA participation. Finally, it has been demonstrated that the structure of, and the reasons for, consumers to shop at the farmers markets differ significantly between the United States and Italy [58]. Therefore, it is necessary to extend our study by conducting national wide studies in other regions such as EU countries.

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