

MODELLING CONSUMERS' DEMAND FOR ORGANIC FOOD PRODUCTS: THE SWEDISH EXPERIENCE

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Abstract

This paper attempts to examine a few factors characterizing consumer preferences and behavior towards organic food products in the south of Sweden using a proportional odds model which captures the natural ordering of dependent variables and any inherent non-linearities. The findings show that consumer's choice for organic food depends on perceived benefits of organic food (environment, health, and quality) and consumer's perception and attitudes towards labelling system, message framing, and local origin. In addition, high willingness to pay and income level will increase the probability to buy organic food, while the cultural differences and socio-demographic characteristics have no effect on consumer behaviour and attitudes towards organic food products. Policy implications are offered.

Keywords: Consumer behavior, Proportional odds model, Organic food, Willingness to pay, Cultural background, Marketing strategy

JEL Classifications: D12, M31, Q13

1. Introduction

In consumer behavior literature, behaviouristic and neo-behaviouristic approaches are argued to describe consumer behavior (Jacoby, 2002; Solomon et al., 2006; Armstrong & Kotler, 2009). The former one is the stimulus-response paradigm in which external stimuli (e.g., a marketing stimulus) lead to consumer responses (e.g., purchase behavior). A consumer decision process that leads to consumer responses occurs according to certain consumer characteristics. The neo-behaviouristic approach adds another factor which is organism by assuming that there are intervening variables (e.g., attitudes, behavior intentions, cognitive process) and this can be directly or indirectly measured through indicators. Usually, the consumer decision-making process is a combination of need recognition, information search, evaluation alternatives, purchase decision, social and cultural environment.

The increasing environmental concerns about intensive production processes and increasing consumer demand for higher quality food products, and increasing consumer dissatisfaction with conventional food are important factors which make organic food products an interesting consumption option. The growth of the organic food product depends on consumer perception that the quality of organic food product is higher, the taste is better, and they are more environmental friendly than conventional food products (Brunso et al., 2002).

Organic agriculture production in the European Union (EU) is subject to a certain regulations since 1991. The aims are (i) to establish the requirements for agriculture products and foodstuffs bearing a reference to the production methods used in organic farming, (ii) to support the development of organic agriculture in the European Union, and (iii) to inform

consumers, and other actors in the food chain about the merits of organic farming. Thus, a clear understanding of consumers' choice and underlying motivations to purchase organic food products instead of conventional ones will assist EU policy makers as they formulate and implement the EU Action Plan on organic food and farming. Consequently, the purpose of this paper is to investigate consumer motivations to purchase organic food products that can inform the implementation of organic food policies for a particular European country using a model of consumer demand for organic food.

This study is focused on Swedish consumers. The paper analyzes consumers' choice, behavior, and their attitudes towards organic food products. In spite of attitudes, factors which can affect a consumer to make efforts based on inherent values and interests about organic foods need to be considered to realize the potential forces for organic buying decision. The organic food market in Sweden has grown continuously in the last decades. The sales of organic food products in Sweden are setting new records. In 2008, sales of organic food products were around 4.9 billion SEK and in 2014 this was around 8.8 billion SEK (Ekoweb, 2015). This implies that the organic food market has an increasing trend in Sweden.

For more than twenty years, the Swedish Society for Nature Conservation (SSNC) has been organizing activities which have contributed to increased consumer awareness about organic farming as well as policy changes that have contributed to more sustainable consumption patterns. The organization supports environment, consumer and farmer organizations to carry out campaigning activities oriented towards consumers, to raise awareness of these issues. In Sweden, KRAV (The Association for Control of Organic Production) was started in 1985 by four non-governmental organizations (NGOs) within the Swedish organic agriculture movement.

The organization attempts to create a credible labelling scheme for organic food, and to specify rules for organic production. The goal is also to monitor production, processing, and distribution, as well as to disseminate information about organic agriculture. During its early stage, it was mainly the Swedish Ecological Farmers that controlled the KRAV association. In 1990, KRAV was transformed into an economic association in order to achieve broader acceptance in society. This implied that several other interest groups became members of KRAV, for instance, social movement organizations, retailers, the food industry, and associations for organic as well as conventional agriculture. In the mid-1990s KRAV expanded quite substantially and its criteria have been developed and expanded continuously (Klintman & Boström, 2004).

The demand for organic food products has been extensively discussed by previous studies. Michaelidou & Hassan (2010) mention that consumers' motives to purchase organic products include social/cultural reasons (e.g., social image), economic reasons (e.g., price), product reasons (e.g., quality), and personal reasons (e.g., health and safety). In other words, concern for health, food safety, quality, freshness and taste, environmental protection, animal welfare, support for local economy, price or willingness to pay, product knowledge, income level, socio-demographic characteristics, local origin of organic food and its logo and labelling system have been identified as driving forces to the choice of organic foods (Torjusen et al., 2001; Hamm & Gronefeld, 2004; Durham & Andrade, 2005; Yiridoe, et al., 2005; Kuhar & Juvancic, 2005; Verhoef, 2005; Hughner et al., 2007; Schleenbecker & Hamm, 2013; Hemmerling et al., 2015).

Previous studies provide mixed and conflicting results about the most prominent motives related to organic food consumption. Furthermore, the results are sensitive to the sample chosen, the time period chosen, and the estimation techniques used. Thus, this study attempts to provide an additional empirical evidence on demand for organic food products in Sweden. In order to analyze the reasons behind this rather high demand for organic food in Sweden

and the effects of a number of factors that influence the probabilities of buying organic food products, we use a proportional odds model (Agresti, 2002, 2007).

The application of proportional odds model (POM) appropriately captures the natural ordering of dependent variables and any inherent non-linearities. This implies that not only is the effect of a regressor non-constant on the probability of a given attitude, but also its influence varies across different attitudes. This model, which is based on a constrained ordinal model, is considered the most popular ordinal model. It is shown that the POM has better statistical power than simple logistic regression (Capuano, 2012). However, the study uses survey data gathered from 220 consumers in Malmö (Sweden) in December 2014.

The paper is organized as follows: Section 2 lays out previous studies, Section 3 describes data, methodology is discussed in Section 4, the empirical results are presented in Section 5, and finally, conclusions and policy implications are given in Section 6.

2. Previous Studies

In order to select organic consumption motives for the present study, a number of several literature reviews were used to determine the most prominent motives related to organic food consumption. Yiridoe et al. (2005), Schleenbecker & Hamm (2013), and Hemmerling et al. (2015) discuss the following issues in their review articles to be the main reasons behind organic food consumption: (i) consumer awareness and knowledge about organic foods; (ii) consumers' attitudes, preferences and perceptions about animal welfare, environmental benefits, health and quality (taste and freshness) benefits; (iii) local origin of organic food and its logo and labelling system; (iv) income level and willingness to pay for organic food products; and (v) socio-demographic characteristics. The remaining of this section reviews some studies on the relationship between organic food demand and consumers' intentions and characteristics in more details.

Thompson (1998) concludes that demographic variables such as age, marital status, number and age of children and education are important variables in explaining consumer demand for organic food in US. Thompson & Kidwell (1998) investigate consumers' choices of organic and conventional produce in Arizona (US). Based on a discrete random utility choice model, they specify a two-equation probit model to estimate the choice of produce (organic versus conventional) and the choice of store. Their results indicate that the probability of buying organic foods depends on price levels, store choice, and consumers' demographic characteristics and education.

Blend & van Ravenswaay (1999) and Wessells et al. (1999) analyse US consumers' demand for eco-labelled apples and seafood, respectively. They use a logit and a double hurdle model, respectively. They find that factors affecting consumer demand are the price premium, environmental concerns and attitudes, and some demographics such as education and gender. Loureiro et al. (2001) documents US consumers' choice of eco-labelled, organic and regular apples using a multinomial logit based on the random utility choice model. They show that, apart from some socio-demographic characteristics, the factors affecting the probability of choosing organic apples are consumers' environmental and food safety attitudes.

Torjusen et al. (2001) consider the factors affecting the choice of organic food products for Norwegian consumers using a logistic regression analysis. They show that income is positively related to the probability of buying organic foods, while other socio-demographic characteristics are not statistically significant. Furthermore, some food attributes such as local produce and health aspects are statistically significant in explaining organic food choice. Millock et al. (2004) examine the effect of taste, freshness, health, environmental issues, and animal welfare on consumers' choice for organic foods (heavy consumer versus light/no consumer) in Denmark. They reveal that higher income, age and education level of

the consumer significantly increase the probability of being a heavy consumer of organic food and the presence of children does not have a significant impact on the probability of consuming organic food products. They conclude that the effect of environmental issues and animal welfare is smaller than the effect of other factors like taste, freshness, and health.

Gifford & Bernard (2004) use a consumer survey and Tobit analysis to determine the effect of message framing and other factors on self-reported organic food purchase likelihood. They conclude that negative framing, which emphasizes the possible negative consequences of conventional agricultural techniques, leads to a "boomerang effect" that result in lowered purchase likelihood of organic food by consumers with high trust in food safety. Furthermore, consumers with significantly higher purchase likelihood have high perceived risk from pesticides and high prior knowledge about organic methods. African-Americans and those with less than a high school education show lower purchase likelihood. Durham & Andrade (2005) use a two binary choice model (based on a discrete choice random utility framework) for organic fresh fruit and vegetables in Oregon (US). They conclude that the main reasons for organic food purchase are health, environment, price, and demographic factors.

Verhoef (2005) applies a discrete choice model (specified a probit and ordered probit model) to explain the choice and purchase frequency of organic meat in the Netherlands. His results display that economic and marketing variables have significant effects on both the choice and the frequency of purchasing organic meat while consumers' emotions, environmental considerations and socio-demographic characteristics only affect the frequency of purchase. Kuhar & Juvancic (2005) apply an ordered probit model to examine the main variables explaining the purchase frequency for organic and integrated fruit and vegetables in Slovenia. Their findings show that income and the availability of the product in the store largely determine the purchasing frequency of organic fruit and vegetables. In addition, taste, visual attractiveness, and consumers' environmental concerns are also factors explaining the frequency of purchasing organic fruit and vegetables.

Onyango et al. (2006) study factors behind consumers' choice of organic food in the US using a model based on Lancaster's theory integrated with the random utility discrete choice model. They conclude that females, younger and more educated people are more likely to buy organic foods, and food attributes such as naturalness, vegetarian and local production are important factors which increase consumers' probability of purchasing organic foods. Gracia & de Magistris (2008) specify a random utility discrete choice model and a bivariate probit model to analyze organic food consumer's demand in the south of Italy. They conclude that environmental, health, and knowledge on organic food products are most crucial factors promoting organic food demand. In their study, none of the socio-demographic characteristics have statistical impact on the probability of buying organic food.

Hjelmar (2011) uses evidence from 16 in-depth interviews with consumers in Denmark carried out in 2008–2009. On the basis of the analysis two broad concepts are suggested: convenience behaviors and reflexive practices. Convenience behaviors are characteristic of pragmatic organic consumers. This type of shopping behavior requires organic foods to be available in the local supermarket and clearly visible (preferably with an eco-label), and the price differential vis-à-vis conventional products have to be minimal. His analysis indicate that politically/ ethically minded consumers have reflexive practices when purchasing organic food products: health considerations, ethical considerations (animal welfare), political considerations (environmentalism) and quality considerations (taste) play an important part for these consumers. Reflexive shopping practices can be sparked by life events (e.g. having children), "shocking" news about conventional food products and similar events, and news capable of creating a "cognitive dissonance" among consumers. However, he concludes that the government needs to actively implement reforms and

promote activities which make organic products a convenient choice for the pragmatic oriented consumer if their market share is to increase substantially.

Vittersø & Tangeland (2015) assert that in spite of a major political effort to increase organic food consumption in Norway over the past 15 years, consumption has increased marginally. They therefore investigate this view of the consumer's influence and power to change the relations in developments of the present food system. Based on the results of two consumer surveys carried out in 2000 and 2013, they reveal that trust in the labelling system and the quality of organic food the perceptions had become more negative. Furthermore, more consumers saw no benefits from buying organic food in 2013 than in 2000. This implies that the political emphasis on the self-regulating consumer has shown little effect. However, they concludes that both the political tools and theoretical analyses to a greater extent must be turned away from a primary focus on the consumer towards identifying key economic and political conflicts of interest as important barriers to sustainable food consumption transition.

Loebnitz & Aschemann-Witzel (2016) explore Chinese consumer reactions to organic food labels and whether Chinese consumer inferences can be favorably influenced by communication efforts. They arrange an online experiment which studies the influence of the presence of organic labels as well as the influence of priming of environmental values on fruit and vegetable quality inferences. They find that Chinese consumers expect organic food to be more expensive and of a higher general quality compared to conventional food, but they do not find significantly higher health or taste inferences for organic products. When primed with environmental values, consumers with strong environmental values indicate higher quality and health inferences for organically labeled food. Their results reveal that further efforts are needed to strengthen communication of organic food quality, and that focus should be given to the target group with strong environmental values.

Finally, Teng & Lu (2016) examine the effect of consumption motives on behavioral intention related to organic food consumption under the mediating role of involvement as well as the moderating role of uncertainty. They collected data from organic food consumers in Taiwan via a questionnaire survey. Their study tests the overall model fit and hypotheses through structural equation modeling method. The results indicate that consumer involvement significantly mediates the effects of health consciousness and ecological motives on organic food purchase intention, but not applied to food safety concern.

3. Data

The sample was drawn from households in Malmö which is located in the south of Sweden. It can be considered a representative sample due to its economic and social indicators such as average income and demographic characteristics that are very close to the economic indicators for the rest of the country. Malmö is the third largest city and 42.5 % of the population has foreign background and the share of emigrants is 5.6 % (Statistics Sweden, 2013). The data for our variables was collected from responses to a questionnaire during December 2014. A number of representative supermarkets were chosen in the town areas. A systematic stochastic sample of 220 food shoppers was chosen outside these food outlets. The questionnaire was administered face to face if the randomly selected individuals were the main household food buyers and were consuming organic food products.

Respondents were asked questions about consumer's perception, attitude and behavior towards organic food products. Economic and socio-demographic characteristics were also included. The observations on our dependent variable take three different forms: heavy consumer of organic food (HEACON), medium consumer of (MEDCON), and light consumer of organic food (LIGCON). Heavy consumers, medium consumers, and light

consumers are defined as those who are purchasing organic food products more than once a week, once a week, once or twice a month, respectively.

The independent variables are: $X_1 = \text{QUALITY}$, which refers the consumer's perception that organic food products have in general higher quality than conventional food (1 if consumers agree, 0 otherwise); $X_2 = \text{HEALTH}$, which denotes the consumer's perception that organic food products are in general more beneficial than conventional food (1 if consumers agree, 0 otherwise); $X_3 = \text{ENVIRON}$, which shows the importance that consumers attach to the environmentally friendly attribute when purchasing organic products (1 if it is highly important, 0 otherwise); $X_4 = \text{FRAMPOS}$, which exhibits impact of message framing when the same choice is presented as a potential loss (negative framing) or a potential gain (positive framing), consumers can react very differently, i.e., with positive framing, the message explains benefits of buying a certain product as "safer and healthier" while others say the food was grown without "dangerous" pesticides (Gifford & Bernard, 2004), organic food packages present both positive and negative framing examples (1 if consumers prefer positive framing, 0 if they prefer negative framing); $X_5 = \text{ORIGIN}$, which presents the importance that consumers attach to the local origin of the product when purchasing (1 if it is important, 0 otherwise); $X_6 = \text{WTP}$, which shows consumers' willingness to pay some premium for organic food content (the magnitudes of the WTP premia); $X_7 = \text{WTPSQUARE}$, which is the square of WTP and measures any nonlinearities, consumers are not willing to pay above a certain level of price difference with conventional products (Buzby & Skees, 1994), therefore, an inverted U-shaped relationship would realistically account for the effects of price on the demand for organic products; $X_8 = \text{HIGHINCOME}$, which indicates the level of income among consumers (1 if they earn more than 18.000 SEK (2.000 Euros) per month, 0 otherwise), (according to Skatteverket, 2014, 50 percentile average taxable income in Sweden is around 18.000 SEK); $X_9 = \text{TRUST}$, which refers the consumer's perception that organic brand (logo) and organic labeled products are reliable (1 if they agree, 0 otherwise); $X_{10} = \text{EDUCATION}$, which denotes the level of education among consumers (1 if they have completed higher studies, 0 otherwise); $X_{11} = \text{AGE}$, which indicates age of respondent; $X_{12} = \text{CULTURE}$, which shows whether the respondent has a foreign background (1 if he/she has a foreign background, 0 otherwise); and finally, $X_{13} = \text{GENDER}$, which shows gender among consumers (1 if the respondent is female, 0 otherwise).

Table 1. Correlation matrix for the explanatory variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
X_2	.543											
X_3	.482	.452										
X_4	.396	.339	.402									
X_5	.275	.337	.310	.418								
X_6	.578	.648	.527	.322	.194							
X_7	-.298	-.320	-.277	-.101	-.120	.912						
X_8	.523	.511	.348	.337	.233	.608	.385					
X_9	-.387	-.356	.238	.354	.477	.326	.289	.146				
X_{10}	.163	.114	.315	.161	.239	.231	.277	.265	.278			
X_{11}	.145	.188	.353	.227	.085	.284	.029	.269	.119	.112		
X_{12}	.029	.024	.108	.136	.128	.131	.013	.171	.103	.095	.092	
X_{13}	.166	.139	.177	.065	.023	.037	.212	.028	.076	.073	.084	.055

The gender distribution across the sample was 55% female and 45% male and 20% of respondents aged from 20 to 29 years old; 35% aged from 30 to 44 years old; 28% aged from 45 to 59 years old; 17% aged from 60 to 80. With regard to the education and income variables, 35% of respondents had higher studies at university or college levels and 33% of respondents had a monthly income below 18.000 SEK (2.000 Euros). Around 30% of the respondents had a foreign background. Only 20% of respondents completely trusted organic food labelling. The share of heavy, medium, and light consumers was 50%, 33%, and 17%, respectively. The magnitudes of the WTP premia were ranged from 10% up to 125%. Table 1 reports correlation matrix for the explanatory variables.

4. Methodology

Since our response (the observations on our dependent variable) is a three-level ordinal variable, it is wise to consider the natural ordering to the response levels when modeling the effects of the explanatory variables on the consumer behavior (Agresti, 2002; 2007). Let:

$$\theta_1(x_i) = \pi_1(x_i), \tag{1}$$

and

$$\theta_2(x_i) = \pi_1(x_i) + \pi_2(x_i), \tag{2}$$

where $\pi_1(x_i)$ is the probability of being a heavy consumer of organic food (HEACON) at the i th setting of values of k explanatory variables $x_i = (x_{1i}, \dots, x_{ki})'$, while $\pi_2(x_i)$ and $\pi_3(x_i)$ are the probabilities of being a medium consumer of organic food (MEDCON) and being a low consumer of organic food (LIGCON), respectively. Thus, $\theta_1(x_i)$ and $\theta_2(x_i)$ represent cumulative probabilities: $\theta_1(x_i)$ is the probability of being a HEACON, and $\theta_2(x_i)$ is the probability of being MEDCON or even being a HEACON. Let us define the two cumulative logits:

$$\text{logit}[\theta_1(x_i)] = \log\left[\frac{\pi_1(x_i)}{\pi_2(x_i) + \pi_3(x_i)}\right], \tag{3}$$

and

$$\text{logit}[\theta_2(x_i)] = \log\left[\frac{\pi_1(x_i) + \pi_2(x_i)}{\pi_3(x_i)}\right]. \tag{4}$$

The first cumulative logit should be interpreted as the log odds of being a HEACON as compared with being a MEDCON or a LIGCON, and the second logit is the log odds of being a MEDCON or a HEACON as compared with a LIGCON. By assuming that the log odds are linear functions of the explanatory variables, we can write:

$$\text{logit}[\theta_j(x_i)] = \alpha_j + x_i' \beta_j \quad j=1,2. \tag{5}$$

We maximize the log of the likelihood function in order to obtain maximum likelihood estimates:

$$L = \prod_{i=1}^n [\pi_1(x_i)]^{d_{1i}} [\pi_2(x_i)]^{d_{2i}} [\pi_3(x_i)]^{d_{3i}}, \quad (6)$$

subject to equation (5), where

$$\begin{aligned} d_{hi} &= 1 && \text{if the } i\text{th individual gets the } h\text{th purchasing option} \\ & && i = 1, 2, \dots, n, \quad h = 1, 2, 3 \\ d_{hi} &= 0 && \text{otherwise.} \end{aligned}$$

However, this approach does not take into account the ordinal scale of the response variable. Thus, we suggest using the following, more parsimonious model:

$$\text{logit} [\theta_j(x_i)] = \alpha_j + x_i' \beta, \quad j=1,2. \quad (7)$$

Hence, the effect of an explanatory variable on the log odds of being a HEACON as compared with being a MEDCON or LIGCON is the same as the log odds of being a MEDCON or HEACON as compared with being a LIGCON. Furthermore, to better grasp the consequences implied by the restriction, let x_1 and x_2 be two different settings of the explanatory variables. Then, we have the following result:

$$\text{logit} [\theta_j(x_1)] - \text{logit} [\theta_j(x_2)] = (x_1' - x_2') \beta \quad j=1,2. \quad (8)$$

The log cumulative odds ratios are proportional to the distance between the values of the explanatory variables. This feature has also given the model its name as the proportional odds model. However, maximizing the log of the likelihood function given by equation (6) subject to the constraints in equation (7) yields the parameter estimates of α_j , α_2 , and β .

5. Estimation Results

This section reports estimation results from the proportional odds model set out in the previous section. Table 2 reveals the relative importance of the explanatory variables outlined before. Nine variables have been found to be statistically significant at conventional levels with expected signs. These are: QUALITY, ENVIRON, ORIGIN, HEALTH, WTP, WTPSQUARE, FRAMPOS, TRUST, and HIGHINCOME. The remaining variables were not significant at conventional levels. Our findings show that health, environmental, and quality benefit attributes of organic food determine the probability of being a heavy consumer versus a medium or light consumer of organic food. The effect of the health benefits on consumer choice of organic food is higher than the impact of the environmental and quality benefits. Thus, if consumers attach greater importance to the organic food product healthiness, quality and environmental benefits attributes when shopping, they are more likely to be a heavy consumer of organic foods.

The local origin variable of organic food is positive and statistically significant indicating the consumers which give more importance to the local origin of the food product when shopping are more likely to present higher levels of organic food purchases. The probability of buying organic food is also increasing with positive framing than negative one. Based on

prospect theory developed by Kahneman & Tversky (1979) and the literature reviewed about framing effects, it was hypothesized that both types of framing will increase likelihood of buying organic food products since they both offer new incentives to try organic.

Table 2. Parameter Estimates

Variable	Estimate	<i>p</i> -value
Constant 1	-6.380	0.009
Constant 2	-2.261	0.467
X ₁ = QUALITY	1.356	0.033
X ₂ = HEALTH	1.277	0.007
X ₃ = ENVIRON	1.435	0.009
X ₄ = FRAMPOS	0.457	0.074
X ₅ = ORIGIN	0.668	0.063
X ₆ = WTP	0.274	0.087
X ₇ = WTP SQUARE	-0.019	0.042
X ₈ = HIGHINCOME	1.520	0.013
X ₉ = TRUST	-0.166	0.095
X ₁₀ = EDUCATION	0.883	0.546
X ₁₁ = AGE	0.572	0.371
X ₁₂ = CULTURE	2.456	0.472
X ₁₃ = GENDER	0.236	0.218

Notes: Goodness of fit: score test with *p*-value = 0.412.

An important consideration is that the presence of a warning or negative message can boomerang, i.e., increase the desire to purchase the product that the warning is attempting to discourage. This phenomenon is called reactance, or more simply, the "Boomerang Effect" (Ringold, 2002). Ringold reviewed literature showing, for instance, that alcohol consumption may increase in response to warning labels or the raising of the drinking age, especially among certain individuals who highly value their autonomy or especially enjoy the behavior. Moreover, as Clee & Wicklund (1980) mention fear appeals in advertisement, if perceived as manipulative, could lead to reactance effects in consumers.

The trust variable is negative and statistically significant indicating that the probability of being a heavy consumer of organic food is lower for those who do not trust labelling system. Trust on organic logo and labeling significantly influences the probability of buying green food products. Uncertainty or lack of trust can be regarded as a state of possessing incomplete information regarding a matter (Vieira, 2008) and has been revealed negatively affecting consumers' purchase intention (Shiu et al., 2011). Previous studies indicate that insufficient information and low knowledge about organic labelling will increase consumers' difficulties to differentiate the credence attributes and standards from that of conventional foods (e.g., Janssen & Hamm, 2011). Thus, uncertainty regarding the true attributes of organic foods and skepticism about organic labels are identified to be harmful to consumer trust and hinder consumers from purchasing organic foods (Yiridoe et al., 2005; Nuttavuthisit & Thøgersen, 2015; Teng & Lu, 2016).

Income is found to be significant in buying organic food products and the probability of purchasing more organic food is higher for those who have higher income than 2.000 Euros per month. Thus, it seems that consumers with lower (higher) income are less (high) likely to be a heavy consumer of organic foods. This implies that organic food products are income elastic.

Finally, willingness to pay is positive and significant which shows that consumers' willingness to pay is not sensitive to price but the effect is non-linear. This means that

consumers are not willing to pay above a certain level of price difference with conventional products. However, education, cultural background, age, and gender do not play significant role in determining consumers' intentions and behavior towards organic food products.

Note that Table 2 shows parameter estimates and not odds ratios. For example, in the case of health and environmental benefits, the estimated odds ratios of being a heavy consumer versus a medium or light consumer of organic food are 3.58 and 4.20, respectively. The test for the proportional odds assumption, i.e., to test whether the model on equation (7) holds against the model set out in equation (5), we perform a score test. The resulting p value is 0.412, implying that we cannot reject the null hypothesis of the proportional odds assumption.

6. Conclusions and Policy Implications

This paper attempts to shed light on a number of determinants explaining consumers' behavior and attitude towards organic food products in Sweden. The novel contribution of this study stems from its used methodology which takes into account any non-linearity in consumers attitude and behavior. Based on the estimation of a proportional odds model, the results indicate that economic factors such as prices and household income influence the intensity of organic food consumption. The probability of purchasing organic food is increasing with income. High income consumers are more likely to increase their purchase of organic food products. Willingness to pay is significant and has a positive sign which shows that consumers' willingness to pay is not sensitive to price but the effect is non-linear. This implies that consumers are not willing to pay above a certain level of price difference with conventional products.

Health, quality, and environmental benefits do play a very important role in consumer behavior towards organic food products. Thus, the probability of being a heavy consumer of organic food is positively affected by the health, quality, and environmental benefits that consumer attach when shopping. The results also indicate that positive message framing is effective in encouraging and promoting organic food consumption as compared with negative message framing. Another important factors in predicting consumer behavior are local origin of organic food products and labelling system. The probability of buying organic food is not influenced by socio-demographic factors such as education, cultural background, gender, and age.

The policy implications and recommendations of our results imply that the EU and Swedish information and promotion campaign should focus on the health and environmental benefits of organic food products. In other words, they should provide consumers with some information about the fact that organic agriculture preserves the environment (because this production system has a less negative effect on the environment than conventional methods) and organic foods are healthier than conventional food products (because organic foods are free from chemicals). Greater knowledge of organic food products will encourage consumers to buy more organic food products. These goals cannot be achieved without involving consumers, producers, and farmers in processing of organic food products. This, in turn, will alleviate uncertainty (regarding the true attributes of organic foods) and skepticism about organic labels which have been identified to be harmful to consumer trust.

The main limitation of the study stems from the fact that it evaluates claimed purchase decisions instead of actual and real purchases. Future research on organic food products should consider actual purchase of organic foods.

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