Consumers' willingness-to-pay for sustainable food products: the case of organically and locally grown almonds in Spain

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A B S T R A C T

Organically and locally grown products have positive environmental impacts due to the reduction in the greenhouse emissions required for their production. This paper contributes to this research stream by investigating consumers' preferences and their willingness to pay for almonds that have different sustainable labels: distance claims (100 km, 800 km, and 2000 km) and the organic logo established by the European Union. To achieve the objective, consumers participated in a non-hypothetical choice experiment; latent class modeling was employed to identify distinct patterns of valuation. The results suggest that consumers were willing to pay a positive price premium for locally grown (traveled the shortest distance) and organically produced almonds, whereas they were not willing to pay a price premium for almonds that have traveled longer distances. Moreover, the findings show that consumer preferences for these claims were heterogeneous, with three consumer segments identified as: "conventional consumers", "short distance consumers", and "sustainable consumers". Overall results confirm the results of previous studies because Spanish consumers were willing to pay a premium price for those almonds that are organically and locally produced, and, therefore, generate fewer greenhouse gases emissions. The findings of this study added scientific value to scholars of sustainable consumer behavior because of the use of Real Choice Experiment. Since no-hypothetical evaluation method simulates real markets with real products and a transaction of money, real choice experiment provides better approximations of true willingness to pay for organic and local almonds. Therefore real choice modeling eliminates hypothetical and social bias.

The results of this study contribute to insights in the promotion of sustainable consumption among citizens by policy makers. In this regard, promotional and educational campaigns could drive different segments of consumers to increase their knowledge on the benefits of reduction of the quantity of GHG emissions required for organic and locally grown production.

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1. Introduction

Currently, the number of people interested in sustainable consumption has increased tremendously, particularly in developed countries (de-Magistris et al., 2012). The issue of sustainability in food consumption is stressed in Agenda 21, which declares that unsustainable consumption and production patterns are the main causes of global environmental deterioration (Pack, 2007). Agenda 21 postulates that sustainable development could result in advancements in the areas of economic growth, social progress, and environmental protection (UNDSD, 2006; Pack, 2007).

Sustainable consumption can also be the result of a decision-making process that considers not only consumers' individual needs (related to taste, price, and convenience) but also attitudes towards social responsibility (environment and fair trade), sustainable labels and sustainable food production (Vermeir and Verbeke, 2006; Hartikainen et al., 2014). Sustainable products are perceived by individuals as higher quality, with higher social and economic values, and higher environmental sustainability (Forbes et al., 2009; Biswas and Roy, 2015; Maniatis, 2015); in addition, they are perceived as being more resource and energy efficient (Sirieix et al., 2008).

Sustainable consumption refers to consumption patterns that are economically, socially, and environmentally compatible within all areas of the food system, from food production, processing, and distribution to the food purchases of consumers and to waste

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disposal (Pack, 2007). Approximately 25% of total greenhouse (GHG) emissions are from goods that travel thousands of kilometers for final consumption or that are used as inputs in several production processes along the way (Cadarso et al., 2010; López et al., 2015). Currently, empirical evidence has shown that, with the increase of stages of production in global value chains, international transport has become more important as a source of pollution and energy consumed (Amate and Gonzáles De Molina, 2013; López et al., 2015).

However, local food supply chains with fewer stages between the producer and the end consumer are described as a means of promoting more sustainable consumption systems (Sirieix et al., 2007; Berruto and Busato, 2009) because they reduce environmental impacts, for example reducing energy consumption or GHG emissions in terms of the distance that the food products travel from production to consumption marketplaces. To illustrate, Blanke and Burdick (2005) report that locally grown apples are more energy efficient than those ones imported from New Zealand. These results are in agreement with Sim et al. (2007) who find that apples produced in the U.K. have less environmental impact than those imported from foreign countries (e.g. Italy, Chile or Brazil). Likewise, Keyes et al. (2015) in their study on apple production conclude that the short distances of transportation have a less environmental impact than long distances, but transport by freight ship is environmentally preferable than transport truck delivery in long distance. Conversely, the study conducted by Payen et al. (2015) reports that imported tomatoes from Southern Morocco to French market have less environmental impact than locally grown tomatoes although the energy used to export tomatoes is lower for the Moroccan export tomato. Finally, Rothwell et al. (2016) indicate a better environmental impact of locally grown lettuce compared to de-localized lettuce.

Similarly, the consumption of organic food has been considered environmentally sustainable because it has been proven scientifically that is better for certain environmental impacts (Cerutti et al., 2011; Abeliotis et al., 2013; Van der Werf and Salou, 2015) such as the reduction of the quantity of GHG emissions required for organic production. In this regard, a large number of studies compare organic and conventional farming systems (Flessa et al., 2002; Van der Werf et al., 2007; Venkat, 2012; Knudsen et al., 2014; Schader et al., 2014; He et al., 2016; Foteinis and Chatzisymeon, 2016). To illustrate, Flessa et al. (2002) and Venkat (2012) find that conversion from conventional to organic system offers significant GHG emissions reduction. Van der Werf et al. (2007) report that the GHG emissions from organic pig production are lower than from a conventional pig production farm. In the same line, Knudsen et al. (2014) indicate that the average greenhouse gas emissions per hectare in the organic arable crop rotation systems are lower than the conventional system. Schader et al. (2014) demonstrate that organic dairy production mitigated the GHG emissions to approximately 20% less than the GHG emissions for conventional dairy farming. Conversely, He et al. (2016) point out that organic production of tomatoes in China shows positive environmental impact only associated to the reduction of fertilizers and pesticides. Finally, Foteinis and Chatzisymeon (2016) indicate that organic cultivation of lettuce provides lower quantity of CO_2 emissions in comparison to conventional ones (e.g. 11% and 15% respectively).

Thus, overall results indicate that food products produced locally and grown organically are two suitable examples of sustainable food products.

The objective of this study is to contribute to the debate on consumers' preferences for sustainable food products by examining those related to the reduction of GHG emissions: organically and locally grown almonds, which are identified by a label on the product. For the locally grown attribute, a label indicating the distance in kilometers between the production and consumption areas is used. For organic foods, EU Regulation 271/2010 established that products should be labeled with the "Euro Leaf", which symbolizes the union of Europe and nature (the stars on European flag and green and stylized leaf).

To achieve the objective, a real choice experiment (RCE) has been used to elicit responses concerning preferences with the greatest veracity possible. Actually, it has been shown that studies based on stated preferences are likely to be subject not only to hypothetical bias but also to social desirability influences because of the environmental nature of the good to be valued (Kemp et al., 2010). Therefore, the added value of this paper is also the use of a real valuation method that has the advantage to simulate a real market and then, to mitigate the hypothetical and social bias because it includes both real products and an incentive compatible mechanism.

The remainder of this article is organized as follows: Section 2 presents the experimental choice design, procedures, data gathering, and the model specification. Section 3 describes the results and discussion. The final section presents conclusions, and the implications of this study are discussed.

2. Materials and methods

To assess consumers' preferences for different sustainable claims (distances and organic), an RCE, which includes both real products and an incentive-compatible mechanism, was used (Loomis et al., 2009; Gracia and de-Magistris, 2013; de-Magistris et al., 2013). Generally, RCE is characterized by the inclusion of several options comprising the same product with different attributes and prices, with the subject selecting the alternative that best reflects his/her preferences (Van Loo et al., 2011). The advantage of using the RCE is that the task requested of respondents is similar to the purchase decision that people encounter when buying goods in the stores. Indeed, the willingness-to-pay (WTP) values obtained by RCE represent the best approximation of the true preferences corresponding to real payments in the market for a good frequently bought and memorized previously by consumers (Chang et al., 2009; Marette et al., 2008).

Several studies have examined consumers' willingness to pay for sustainable food products and services; however, these did not use a real choice experiment (RCE). Shuai et al. (2014) examined the willingness to pay for low-carbon products with carbon labels among Chinese consumers using a hypothetical experiment. The authors found that the willingness to pay for low-carbon was positively correlated with age and education of participants. Motoshita et al. (2015) investigated the impact of information on carbon dioxide emissions on choice for daily food products and drinks using a hypothetical choice experiment (CE). The authors found that Japanese consumers showed preferences for low GHG emissions, paying a price premium for them when the information associated with CO_2 was provided in the product. Sun et al. (2016) applied a Contingent Valuation Method to estimate the WTP for reducing air pollution in the urban areas of China. The findings indicated that approximately 90% of the citizens were willing to pay for reducing air pollution. Finally, Vecchio and Annunziata (2015) analyzed consumers' willingness to pay for three sustainability labels (fair trade, rainforest alliance and, carbon footprint) using an experimental auction approach. The researchers note that gender, age and, income showed positive and statistically significant effects on WTP.

2.1. Choice set design

The implementation of the choice experiment consists of selecting the product and then its attributes and levels. Almonds