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Consumer preferences for organically and locally produced apples

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ABSTRACT

This study investigates organic consumers' preferences for local production of apples. The analysis is based on a choice experiment among 637 Danish consumers used in combination with a principal component analysis of a set of opinion questions. The principal component analysis identifies two components of questions. Component 1 concerns benefits related to organic products while component 2 relates to positive features of locally produced products. When the components are included in analysis of data from the choice experiment a random parameter error component model suggests that respondents who recognize the benefits of organic products have relatively high preferences for both organically and locally produced apples. Respondents who, on the other hand, recognize the benefits of locally produced products have high preferences for domestically and locally produced apples but not for organic apples.

1. Introduction

Organic food sales are increasing around the world, particularly in the USA, Canada, and Europe. In Europe, the majority of the sales are occurring in the large economies (mainly Germany, France, the United Kingdom, and Italy), while the highest market share of organic food is found in Denmark followed by the alpine countries (Jensen, 2008; Willer, 2010).

There is a considerable literature which attempts to understand consumer perceptions of organic food and discusses the factors which determine organic food consumption (Aertens, Verbeke, Mondelaers, & Van Huylenbroeck, 2009). Socio-demographic factors, such as urbanization, income, education and gender have been identified as important correlates of organic consumption (Bellows, Onyango, Diamond, & Hallman, 2008; Jonas & Roosen, 2008; Monier et al., 2009), but there is also increasing acceptance that self-seeking interests are important when trying to understand the motives behind organic consumption (Aertens et al., 2009). Consumers with a high organic demand are more often convinced that organic products are healthier, better tasting, or more fresh than conventional products (Wier and Calverley, 2002). In addition to such private good attributes, organic food products also contain attributes which can be characterized as public goods, for example, lower use of pesticides and chemical fertilizers and improved conditions for animals involved in the production. A number of studies address the importance of such private and public good attributes in product perception or consumption (Aertens et al., 2009; Aldanondo-Ochoa & Almanza-Sáez, 2009; Fotopoulos, Krystallis, & Ness, 2003; Schifferstein & Ophuist, 1998), and several studies suggest that private good attributes, such as health and hedonic quality, contribute more to consumers' interest than public good attributes. On the other hand, the most often stated reason for not buying organic is the existence of considerable price premiums (Aertens et al., 2009; Gracia and de Magistris, 2008; Michaelidou & Hassan, 2010; Verhoef, 2005).

Today, there is an increasing trend that production of organic food can be characterized by large scale production, and large-scale retailers are becoming major players on the organic market in Denmark (Denver, Christensen, & Krarup, 2007), as well as in other countries with increasing demand for organic (Sahota, 2007). Large scale produced organic products have to fulfill the organic standards but may not necessarily be produced with additional principles, such as reduced food miles, environmentally friendly transportation or requests for fair trade. However, many consumers believe that the organic label is more comprehensive than it actually is and therefore attach such attributes to organic products (Andersen, 2009).

The international scientific literature in the field also suggests that many consumers are interested in locally produced food (see e.g. Carpio & Isengildina-Massa, 2009; Darby, Batte, Ernst, & Roe, 2008; Darby and Ernst, 2006; Giraud, Bond, & Bond, 2005; Hébert, 2011; Loureiro & Hine, 2002). There are various reasons for this positive consumer interest. Several studies indicate that local food is associated with higher perceived food quality (e.g. Carpio & Isengildina-Massa, 2009) as well as perceived increased freshness of the products (Darby et al., 2008; Roininen, Arvola, & Lähteenmäki,

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2006). Furthermore, short supply chains increase trustworthiness due to more direct communication between producers and consumers (Roininen et al., 2006).

Claims are also made that local food systems may have positive externalities, because they promote local jobs and help local business gaining market access (Carpio & Isengildina-Massa, 2009), and consumers may therefore feel that they support the local community when they purchase locally produced food (Bond, Thilmany, & Bond, 2008; Kuznesof, Tregear, and Moxey, 1997; Toler, Briggeman, Lusk, & Adams, 2009). In addition, local food production may also imply environmental benefits due to reduced 'food miles' (European Union – Committee of the Regions, 2011; Marsden & Smith, 2005).

Parts of the literature suggest that consumers may associate some of the same features with local food as with organic foods, for example environmental friendliness, animal welfare, and naturalness (Chambers, Lobb, Butler, Harvey, & Traill, 2007; Zepeda & Deal, 2009). But empirical studies also suggest some ambiguity with respect to the appeal of organic and local food to the consumers and, to the authors' knowledge, the interrelations between consumers' perceptions and demands with regard to organic and local foods have not been investigated quantitatively in the literature.

Against this backdrop, the main objective of the present study is to investigate the patterns in consumers' perception of organic and locally produced foods, respectively, and to examine the role of such perception in consumers' preferences for organic and local foods. This research objective is pursued by developing a methodology combining principal components analysis with econometric choice modeling as described in the next section. The methodology is demonstrated using Danish consumers' demand for organic and/or locally produced apples as a case. Apples is a group of products, where local conditions (climate, soil quality, etc.) influence the gastronomic quality, and in a Danish context, apples are often sold locally and/or as organic apples.

2. Methodology

The study addresses two aspects related to Danish consumers' demand for specific food varieties, such as organic or local products: the consumers' perception of the varieties, and their preference for the varieties, within a micro-economic utility framework. Based on an assumption of utility maximizing consumers, we consider the consumers' choice of apple varieties (organic, local, etc.) to depend positively on the consumers' perception of the different varieties, and negatively on the price. From this perspective, consumers' choice can be interpreted as a trade-off between product perception and price. This implies a higher relatively willingness to pay (WTP) for a certain variety (e.g. local), the more positively this variety is perceived, relative to the alternatives.

Product perception may be mediated by the consumers' values and norms, for example such that a positive perception of an organic variety's environmental impact will affect the consumption decision more strongly for a consumer who is concerned about the environment. Hence, some consumers may exhibit a high WTP for certain perceived characteristics, because they have strong opinions on these characteristics, and others have a lower WTP for these specific characteristics, but perhaps higher WTP for other perceived characteristics. One could imagine a continuous space of such values, norms and attitudes (perhaps correlated with observable values, such as age, family size, education, etc.) (e.g. Chamberlain, Kelley, & Hyde, 2013) or alternatively a segmentation, where consumers fall in different clusters with emphasis on certain sets of values, etc (Baker and Burnham, 2001).

2.1. Data

Data for the study were generated through an internet[2] questionnaire survey in a sample from Userneeds'[3] Danish online panel database in 2010. Panel members are recruited for market surveying by Userneeds in an attempt to obtain a representative sample of Danish consumers in the age range 18–65 years, in terms of gender, age, family structure, income and region. Hence, although apples are consumed on a regular basis by a vast majority of Danes, there were respondents who did not consume apples (about 5%).

The questionnaire was developed on the basis of insights from the above-mentioned literature and incorporated statements regarding respondents' perception of organic and locally produced apples (e.g. Roininen et al., 2006; Verhoef, 2005). Respondents were asked to declare their level of agreement with these statements (for example, "Organic products are more environmentally friendly") on a 5-point scale (fully disagree, partially disagree, neither agree nor disagree, partially agree, fully agree) – with the possibility to answer "don't know". The set of replies to statements reflecting perception of organic and locally produced food amounted to 14 variables, which could be expected to have an impact on consumers' preferences and hence their propensity to choose organic and/or local product varieties. The questionnaire was pilot tested on a smaller sample with 104 individuals prior to the final survey.

In order to address the respondents' propensity to choose organic and/or local product varieties, the questionnaire also included a hypothetical choice experiment, where participants were requested to make choices between different combinations of attributes in apples, assuming that these choices reflected their preferences for these combinations in a sequence of choice sessions. In each choice session, the respondent was asked to choose between three alternative apple varieties, of which "Apple A" and "Apple B" represented different levels of the attributes listed in Table 1, and "Apple C" represented a "status quo" reference (conventionally grown, imported from outside EU, mixed colour, sour taste and mealy texture at a price of 7 DKK/kg). The list of attributes beyond production method (organic, conventional) and geographic origin (local, Denmark, other EU country or outside EU), as well as the levels for these attributes, were determined on the basis of insights from Hampson et al. (2000). By varying the composition of products' attributes (e.g. with respect to type of production, region of origin, sensory attributes etc.) in the hypothetical choice settings, it is thus possible to generate data on the respondents' preferences for the different attributes in the apples.

In order to maximize the amount of information about respondents' preferences from the choice experiments, a D-efficient Bayesian updated fractional factorial experimental design resulting in 12 different choice sets in total was applied, using the software Ngene (Rose et al., 2009). The updated design was based on results from the pilot study with 104 respondents.

2.2. Statistical analysis

As some of the 14 variables reflecting perceptions of organic and locally produced apples were suspected to be mutually correlated, principal component analysis was used to aggregate these variables into a smaller number of orthogonal factors as a first step in the statistical analysis. Principal components analysis enables the identification of more general structures in consumers' product perception, and furthermore eliminates potential problems of multicollinearity. In particular, the number of components to be

[2] In 2010, 86 % of Danish households had access to the internet in their homes (Statistics Denmark, 2010).

[3] http://www.userneeds.dk.