



# Organic food and health concerns: a dietary approach using observed data



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## ABSTRACT

A number of studies based on stated behaviour suggest that consumption of organic food is part of a life style that involves healthy eating habits that go beyond shifting to organic varieties of the individual food products. However, so far no studies based on observed behaviour have addressed the relationship between organic purchases and diet composition. The aim of the present paper is to fill this gap using purchase data for a large sample of Danish households. Using a Tobit regression analysis, the diets of households with higher organic consumption were found to include more vegetables and fruits but less fat/confectionary and meat which is in accordance with the official Danish Dietary Recommendations. Moreover, higher organic budget shares were found among well-educated consumers in urban areas and clearly linked to a belief that organic products are healthier. No statistical relations were found between consumption of organic food and perceptions that organic production is more animal or environmentally friendly.

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## 1. Introduction

Stated preference studies suggest that organic consumption is an integrated part of a life style that involves a healthier diet. The aim of the paper is to investigate whether observed purchase data can be used to support and potentially shed new light on these findings. We have been inspired by the difficulties that earlier studies have encountered in establishing a clear health benefit of consuming organic food as opposed to non-organic food when using product-by-product comparisons. Instead, we suggest an approach that takes differences in the composition of diets into account (a diet-by-diet comparison). More specifically, we use adherence with the official Danish Dietary Recommendations as an approximation of a healthy diet and the size of the organic budget shares as an approximation of organic consumption. In these settings, we use a large data set covering almost 1,400 Danes' food purchases to investigate whether there is a positive correlation between following the official Danish Dietary Recommendations and the size of the organic budget shares. A more detailed account of the background is provided in Section 2. The data and econometric models

are presented in section 3, results are described in section 4 and subsequently discussed and concluded upon in section 5.

## 2. Background

The consumption of organic food in Denmark had a boom in the nineties when a major supermarket chain began to use an organic image as a marketing strategy and increased the supply and visibility of organic products. Today, a wide variety of organic products is available in most Danish supermarkets and discount stores at relatively low price premiums. Despite the introduction of the mandatory EU organic label in 2010, almost all organic products processed, packed or labelled under the control of the Danish authorities also carry the voluntary national label. With an organic consumption corresponding to around 8% of total food expenditures in 2013, Denmark is one of the countries with the highest organic demand per capita [1].

There is a considerable literature on consumer perceptions of organic food and of factors that affect organic food consumption. It is repeatedly found that higher levels of urbanization, income, and education have a positive effect on organic consumption. Furthermore, women typically purchase organic more often than men, while the relationship between age and the propensity to consume organic products is more complex [2–6].

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In Aertens et al. [7], it is concluded that self-seeking interests are more important than socio-demographic characteristics when trying to understand the motives behind organic consumption. Aertens et al. [7] apply an integrated framework that involves the theory of planned behaviour [8] as well as Schwartz's value theory [9]. Thereby, they include the importance of attitudes, norms, and perceived behavioural control as factors affecting purchase intentions and possibly actual purchases as well as the importance of universal values as drivers of behaviour. They find that health, which is related to the universal value security, is the strongest argument for purchasing organic food. People might associate organic products with enhanced health for a variety of reasons. Saba and Messina [10] find that people link increased health with absence of pesticides while Lee et al. [11] emphasise the importance of a firm belief of higher nutritional values in organic products. Despite the importance of health motives as a driver of organic consumption, it seems to be difficult to scientifically prove unambiguously that organic products are healthier than their non-organic counterparts [12–14]. Only, few studies stand out and find specific organic products to be more nutritious than their non-organic counterpart [15,16]. Next to health considerations, other private good attributes as the belief that organic food is fresher or better tasting than conventionally grown food have been found to significantly increase intentions to buy organic food [7,17].

Although private good attributes often are the most important drivers for many organic consumers, values are indeed also attached to public good attributes as environmentally and animal friendly production [4,6,7,18–22].

Existing studies on organic consumption using observed purchase data have focused on the explanatory power of socio-demographic characteristics and motives relating to perception of organic products. We find it fair to conclude that these factors only partly are able to explain demand for organic food. Instead, we suggest using observed purchase data to pursue findings from interview studies or stated preferences suggesting that preferences for organic food are positively correlated with a healthy living. Indeed, studies based on stated behaviour find that organic consumption interact with other life style choices concerning diet composition. Pelletier et al. [23] thus reveal a relation between a positive perception of organic food and stated intake of fruit and vegetables among students in the US. In a qualitative study Lund and Jensen [24] found that Danish consumers with high organic demand were more focused on a healthy diet. Their finding is supported by a survey of Danish consumers' stated purchases from 2010 which reports that the 25% of consumers with the lowest organic consumption consumed around twice as much meat as the 25% of consumers with the highest organic consumption<sup>1</sup>.

Empirical research indicates some discrepancy between stated behaviour and observed behaviour [25]. However, to the authors' knowledge no studies based on observed behaviour have been carried out to document the relation between healthy eating habits and organic consumption. Consequently, we test whether these findings based on consumers' stated preferences behaviour can be supported by an analysis using actual purchase data from a large panel of Danish consumers supplemented with data on attitudes and perception about food. This unique combination of data opens the possibility to include several important groups of food products which constitute a large part of the diet and control for variables essential for dietary choices. The official Danish Dietary Recommendations encourage a high intake of vegetables and fruit and discourage sugar and fat, particularly saturated fat from meat and dairy products [26]. In line with these recommendations, we

investigate whether increasing budget shares of organic foods can be linked to food categories with particular importance for the nutritional quality of consumers' diet. Four product groups are selected (fruit, vegetables, meat, and fat/confectionary) as they represent food for which there are relatively clear guidelines communicated to the population.

### 3. Method

#### 3.1. Data description

The analysis is based on data from GfK Consumertracking Scandinavia. Actual behaviour of Danish consumers is observed through purchase data for the period 2003–2007. The data consist of registrations of purchases of daily commodities made by a panel of around 1,400 Danish households. This data set includes daily registrations of purchases of a large variety of food types and cover approximately 80% of the total household grocery budget, while missing reports, restaurant meals, lunches in canteens, etc. account for the remaining 20% [27]. All purchases for the households are reported on a weekly basis by the main diary keeper in each household. The data provide multiple information concerning the products including price, quantity, store name, etc. Due to the scope of the present study we exclude products corresponding to a value of 18.5% of all reported purchases as no information concerning organic or non-organic production is provided<sup>2</sup>. Background socio-demographic characteristics are collected once a year. An important feature of the data is that a comprehensive questionnaire concerning attitudes and perception of food was answered by the panel members in 2007 (for more details see Andersen [28]). This makes it possible to analyse the relation between behaviour, household characteristics, and attitudes towards food.

Obvious risks of using purchase data to investigate organic consumption include that some products might mistakenly be categorized as organic (or vice versa) just as food purchased is not necessarily identical to food eaten. However, in Denmark almost all certified organic food is clearly labelled or purchased in organic specialty stores. The vast majority of the consumers recognize the organic label and many have a very positive perception of it. In particular, Janssen and Hamm [29] compare consumers' perceptions of organic logos in seven European countries and the results emphasize that the level of awareness and trust to the national logo is particularly high among Danes. Registration errors are therefore not considered to be a serious problem in the purchase data. Another potential bias in using purchase data to assess consumption behaviour is linked to food waste. Indeed, there is increasing awareness of food waste in primary production, in the retail sector, amongst households, canteens, etc. Studies have estimated that 20% of food budgets end up in garbage bins [30,31]. There is no indication that organic consumers are more likely to throw food away than other consumer groups. On the contrary, it has been suggested that promoting organic consumption might be a way of reducing food waste. Due to the organic price premiums, the purchase of organic food could be a more conscious choice which is likely to induce consumers to reduce waste<sup>3</sup>. At the same time, organic food products often have a shorter durability than the conventional versions which may pose a challenge for initiatives to reduce waste of organic food. Despite the importance of reducing food waste, the topic is not pursued in the present study. In the

<sup>2</sup> The fact that information about production method is not provided does not mean that no organic alternatives are available.

<sup>3</sup> <http://www.altinget.dk/artikel/oekologi-kan-minimere-madspild> [accessed on November 24 2013].

<sup>1</sup> FDB Analysis <http://fdb.dk/nyhed/%C3%B8kologiske-forbrugere-belaster-klimaet-mindre> [accessed on June 11 2012]

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