A Matter of Trust: How Trust Influence Organic Consumption

Sinne Smed[1], Laura M. Andersen[1], Niels Kærgård[1] & Carsten Daugbjerg[1,2]

[1] Deparment of Food and Resource Economics, University of Copenhagen, Denmark

[2] Crawford School of Public Policy, The Australian National University, Australia

Correspondence: Sinne Smed, Deparment of Food and Resource Economics, Rolighedsvej 25, 1958 Frederiskberg C, Denmark. Tel: 45-3533-6849. E-mail: ss@ifro.ku.dk

Abstract

This article shows that trust in the organic label as well as perceived positive health effects of consumption of organic products have positive causal effects on actual organic consumption. Furthermore perceived positive environmental effects and perceived better animal welfare related to organic production are found not to have no significant causual effect on actual behaviour, whereas concern for artificial additives and low price sensitivity have. Even when differences in time varying attitudes have been controlled for there is still a rather large heterogeneity in the organic purchasing behaviour. Part of this heterogeneity can be explained by differences in urbanisation or level of education, while income does not seem to have any effect when education has been controlled for. The data used is panel data for 830 households reporting actual purchases as well as stated preferences and attitudes in 2002 and again in 2007. The results point towards that the most efficient way of increasing organic consumption seems to be to continuously increasing the trust in the organic label and/or to document the positive health effects of organic food by e.g. focussing on measurable things such as a lower frequency of findings of pesticide residues in organic foods compared to conventional foods.

Keywords: Organic consumption, trust in organics, fixed effects, panel data

1. Introduction

Many organic products are referred to as credence products as some of the attributes they contain represent certain unobserved values to the purchaser because of the process by which they have been produced. When a product contains credence attributes, information about the content of product attributes is asymmetric (Giannakas, 2002; Darby & Karni, 1973; Albersmeier, Schultze, & Spiller, 2010), that is, consumers have no opportunities to control, taste or see whether the organic products they buy contain the expected characteristics (Nelson, 1970; Darby & Karni, 1973). Therefore consumers form individual perceptions about the characteristics contained in the organic products, and these perceptions may therefore vary between consumers. Labelling is one way of providing information for consumers to make them distinguish between products of varying quality when these variations are of a credence nature (Lohr, 1998). Hence eco-labels help consumers to distinguish the organic product from other products, and emphasize that the labelled products are of superior quality. This implies that the importance of eco-labels in promoting green consumption is their ability (or disability) to transmit these messages to consumers. Furthermore, the consumers will only prioritize the labelled products if they trust the messages the labels conveys (Hansen & Kull, 1994; Sønderskov & Daugbjerg, 2011; Janssen & Hamm, 2012). People who distrust the message might not consider labelled products as different from other products and they might even feel cheated and therefore prioritize unlabelled products. In most instances an ecolabelled product is more expensive than a comparable non-ecolabelled alternative because production costs are higher. To maintain a profitable green production the producer is therefore dependent on a price premium. Consumers' willingness to pay such a premium is strongly, and in most instances entirely, dependent upon whether they have confidence in the ecolabel as a guarantee to the consumer that the commodity is produced in an environmentally friendly and sustainable way, complying with the production rules, (Krystallis & Chryssohoidis, 2005). Thøgersen (2000) also shows in a cross national survey of consumers in Germany, UK, Ireland and Italy that high level of confidence in an ecolabel has a positive effect on the level of attention that the label achieves from consumers.

Denmark is one of the few countries where the organic certification and labelling system is governmental (ITF, 2005). The state organic label, the 'Ø' label[Note 1], was introduced in 1989 and is now the sole national organic label.

On the basis of the organic standards of the European Union, the government adopts the organic production standards and an agency under the Ministry of Food, Agriculture and Fisheries administers certification and carries out inspection of organic producers. The organic inspectors are government officials. The label is recognised by almost all Danish consumers (Andersen, 2009). Daugbjerg and Sønderskov (2012) show, in a comparative analysis of the relationship between organic farming policies and organic consumption in Denmark, Sweden, the UK and the US, that the level of confidence in organic labels has positive impact on organic consumption and contribute to explaining a comparatively high level of organic consumption in Denmark. The comparatively higher level of confidence in the organic label that can be observed in Denmark can be attributed to the fact that the label is governmental, but is also be influenced by the Danes' relatively high level of general trust in the public authorities (Sønderskov & Daugbjerg, 2011). The aim of this article is to analyse whether the observed increase in the demand for organic products during the last decade has, at least partly, been driven by increased trust in the organic label. The contribution of this article is that we use panel data at household level from 2002 and 2007, linking questionnaire data on attitudes with observed purchase behaviour. The panel dimension of our data allows us to control for individual heterogeneity and therefore we will be able to identify the causal impact of increased trust in the organic label on organic demand. The data also allows us to make a thorough description of the consumers and take into account the effect from a large number of socio-demographic characteristics as well as to some extent social capital. From a marketing perspective it is important to understand why consumers demand a certain level of organic food, what their motives are, what makes them change their consumption pattern and how the consumption of organic food can be influenced.

The article proceeds as follows; section 2 describes the development in trust and in organic consumption within the considered time period, section 3 accounts for the method applied, i.e. the theoretical and empirical models and the data, section 4 is devoted to a describtion of the estimation and the results and section 5 discusses and concludes.

2. The Organic Market in Denmark

From 1990 to 2009 the organic budget share in Denmark has increased considerably as illustrated in figure 1[Note 2]. Until 1993 the main driving forces behind the expansion of the organic market were government subsidies and advisory services to organic farmers during the period of conversion (Hamn & Michelsen, 1996). Around 1993 the supermarkets lowered prices by up to 15-20 per cent, increased supply considerably and engaged in heavy marketing activities for organic foods (Wier & Calverly, 2002). In the following years demand increased considerably as is seen in figure 1. Thus it seem reasonable to assume that while state intervention was the driving force behind the market until 1993, supply and demand interrelationships was the driving force after 1993 (Michelsen, Hamm, Wynen, & Roth, 1999). After a period of stagnation in the early 2000's the demand for organic demand has started to increase again. This might to some extend be due to that some of the larger discount chains started to have organic foods as part of their assortment as a way to differentiate themselves from other stores (Kledal, 2006; Noe, 2007). This marketing strategy was followed up by more aggressive campaigns by the ordinary supermarkets and as a result the organic shares increased in both discount chains and ordinary supermarkets (Andersen & Lund, 2011).

Source: Økologisk Landsforening, Markedsnotat 2010.
1990-2002 Based on numbers from GfK.
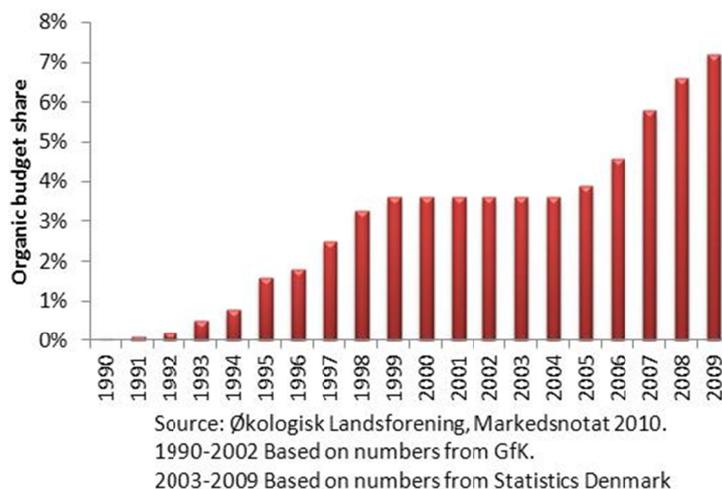2003-2009 Based on numbers from Statistics Denmark

Figure 1. Development in overall organic share from 1990 to 2009

Within the same period several information campaigns with the aim of increasing demand for organic foods were launched such as the large campaigns for organic dairy products in 2001 and 2002, several campaigns for organic fruits, vegetables and meat in 2003, 2004 and 2005. These were conducted by several supermarket chains. A large public campaign aimed at increasing consumer knowledge of the organic label and what it guarantees was undertaken in 2003. Finally public campaigns for organic meat were launched in 2004 and for organic potatoes in 2005. Combined these efforts might have led to more trust in the organic label and more knowledge about the organic production process.

3. Method

3.1 Theoretical Model

The level of trust in the organic label is important for consumers when deciding whether to purchase organics or not (Daugbjerg & Sønderskov, 2012; Vindigni, Janssen, & Jager, 2002; Hugner et al., 2007). Likewise consumers perception of organic production such as positive health effects from consumption, environmental improvements and increased animal welfare have a large influence of the level of organic purchases (Vindigni et al., 2002; Hugner et al., 2007). The environmental and the animal welfare attributes are sometimes described as '*public*', whereas health effects are considered '*private*' (e.g. in Wier, Andersen & Millock, 2005; Wier, Jensen, Andersen & Millock, 2008). Private goods are exclusive in the sense that only the person who eats the organic product will gain the potential health benefit, whereas public goods are non-exclusive in the sense that no one can be prevented from enjoying the potential improvements for environment and animal welfare. Private attributes of organic products have been found to be more important to consumers than public attributes (Wier et al., 2005, 2008; Andersen, 2011).

Other variables such as individual household's concern about GMO and artificial additives in food (Costa-Font, Gil, & Traill, 2008; Hugner et al., 2007), preference for food which is quick to prepare (Putnam, 1990; Jabs & Devine, 2006) or food which is produced in Denmark are also important factors that influence whether and to which extent organic foods are purchased. Both GMOs and pesticides are banned in organic production and therefore it is expected that organic foods are free of these. Thus we expect increasing concern about this to lead to an increased organic budget share. Consumers also often buy organic food because they expect it to be more natural (Brunsøe, Fjord, & Grunert, 2002) and we therefore expect the need for convenience in cooking to counteract the desire to purchase organic food. Also consumers that are more concerned about the general importance of health, environment and animal welfare when purchasing food are expected to have larger organic budget shares (Hugner et al., 2007). But even though people may be concerned about the environment, health and animal welfare consequences of the food they buy, they do not necessarily behave in correspondence with this because organic consumption is, just as purchases of conventional food, influenced by general attitudes generated by socio-demographic status (Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Smith, Huang, & Lin, 2009; Wandel & Bugge, 1997; O'Donovan & McCarthy, 2002; Sandalidou, Baourkis, & Siskos, 2002; Dettmann & Dimitri, 2010).

Generally, households within different social strata are expected to have differing degrees of access to organic food and different attitudes towards food in general (Hugner et al., 2007; Darmon & Drewnowski, 2008; Bugge & Almås, 2006), which implicitly will influence their preferences for organic food (for a review on personal determinant of organic food consumption see Aertsens, Verbeke, Mondelaers & van Huylenbroeck, 2009). Organic consumption varies with income and level of education. Organic food is generally more expensive, and households with identical attitudes towards food in general and organic food in particular, but varying levels of income, may therefore have different organic budget shares as a result of differences in their budget restrictions (Hughner et al., 2007). A higher level of education is often found to be related to higher organic budget shares (Aldanondo-Ochoa & Almansa-Sáez, 2009; Hughner et al., 2007). This could either be because the environmental problems which organic production aims at reducing are complex and therefore it requires larger cognitive capacity to process such complex information (Doorn & Verhoef, 2011) or because organic foods tends to be valued highly amongst individuals with higher levels of education, and hence contributes to a better social image and a better self-image (i.e. to higher extrinsic as well as intrinsic motivation as discussed in Benabou & Tirole, 2006; van Doorn & Verhoef, 2011; Aertsens et al., 2009). Furthermore the organic budget share varies with gender, age and having children in different age categories (Hugner et al., 2007).

Households living in the capital area or in urbanised municipalities potentially have easier access to organic foods, have higher education and higher income. They are less likely to have first-hand knowledge of the production methods which are used in the organic production and have less knowledge about conventional farming. They are therefore more likely to create perceptions about the characteristics inherent in organic foods. Easier access, more

economic and educational resources and strong perceptions might mean that urban citizens are more inclined to use the organic label as a rule of thumb when they purchase food. If the group of households who choose to use the organic label in this way is sufficiently large, it may lead to social pressure, which is found to have a large influence on organic consumption (Chen, 2007; Thøgersen, 2007; Dean, Raats, & Shepherd, 2008).

If we wish to identify the relationship between attitudes and consumption, we must control for the effect of the observed time invariant variables (e.g. socio-demographics and attitudes that do no change over time) as well as the unobserved heterogeneity. The latter is individual consumer preferences that influence the purchases of organic foods i.e. taste values, but which are not observed within our dataset. This can be done within a panel fixed effects model which averages out individual heterogeneity and only allows changes in explanatory variables to affect changes in the dependent variable. In a fixed effects model, the relationship between the dependent variable y_{it} and the dependent variables x_{it} can be described as:

$$y_{it} = a_i + x_{it}\beta + \varepsilon_{it} \qquad (1)$$

Where i represents household i, t is period t, ε_{it} is random noise and a_i is a household specific fixed effect (also known as a *unit* fixed effect, where the unit refers to the cross sectional unit, in this case a household). This model is similar to estimating an individual intercept for each unit in the model.

The fact that the fixed effect model identifies the effect of *changes* in explanatory variables means that the results are often interpreted as causal (see e.g. Angrist & Pischke, 2009). This is different from the standard cross sectional models which merely identify whether the level of explanatory variables are correlated with the levels of the dependent variable. In a subsequent model, the estimated household fixed effects can be regressed on time invariant variables as in Equation (2), giving us a better picture of the systematic variation in the heterogeneity, but not providing causal effects.

$$a_i = \gamma_0 + z_i\gamma + \upsilon_i \qquad (2)$$

According to Greene (2011), the estimator of a subsequent model coupled with the White (1980) robust covariance matrix is appropriate if the time-invariant variables are assumed to be exogenous in the subsequent model (in this case model 2) and therefore not correlated with unobserved effects which influence the fixed effects estimated in the first model.

3.2 Data

The data that we use in this article is from a consumer panel owned by GfK ConsumerTracking Scandinavia. This panel dataset consists of detailed weekly information from 2002 and 2007 about the quantity and value of purchased staples, including whether the purchases were organic or conventional, from more than 2500 households. Besides the purchase data, questionnaires about socio-demographic status, attitudes toward organic consumption and production, consumer values etc. were issued to the same panel once in 2002 and once in 2007[Note 3]. (For a description of the questionnaire in 2007 see Andersen, 2009). These questionnaires can be used to undertake more detailed studies of the underlying reasons for the households' organic purchases.

In the current article we construct the organic purchase share as the yearly amount spent on organic foods divided by the total amount spent on food within the same year, multiplied by 100 so that the potential values range from zero to 100. The trust variable is constructed as the sum of the respondents' answers to the following questions: "Organic foods are just a fashionable fad" and "I usually don't buy organic products because there is too much cheating with the organic label", both measured on a 5 point Lickert scale. In each question the respondents have the possibility of either "totally disagree," "partially disagree," "neither agree nor disagree," "partially agree" or "totally agree."[Note 4] Each question is measured on a scale from 0 to 4, where 2 represents neither agree nor disagree, and trust is then calculated as the sum of the two measures on a scale from 0 to 8. The key variables from the dataset used in the model are presented in Tables 1 and 2 below. From the questionnaires, we know how much importance the individual households give to avoiding artificial additives in food, to purchase food which is quick to prepare or food which is produced in Denmark.

As presented in Tables 1 and 2 below, the perception of organic production and the general concern about GMOs and pesticide residuess in food varies significantly over time for the individual households (75 per cent of the households change their level of trust in the organic label from 2002 to 2007, 78 per cent change their level of concern about GMOs or pesticide residues). Some general concerns when purchasing food also change over time (concern for artificial additives changes for 65 per cent of the households) whereas other concerns vary less over time (only 34 per cent change their consideration for animal welfare when purchasing food). The classical socio-demographics variables such as gender, age and education of main shopper are practically constant over time.

Table 1. Summary of variables which change significantly over time

Variable	Description		Range	Mean 2002	Mean 2007	% change[1]
Orgshare	Organic budget share		Potentially 0 to 100	4.21	5.71	97.95
T	Trend		0 = 2002, 1 = 2007	0.00	1.00	100.00
Trust	Constructed variable	See data section	0 to 8	3.88	4.42	74.70
Org_health	"I think that the rules regarding organic production are good enough to create improvements for…"	"…my and my family's health"	-2 = Totally disagr.	0.34	0.86	60.00
Org_environ		"…nature, e.g. wild animals and plants"	-1 = Disagree	0.51	1.26	68.43
			0 = Neither nor			
Org_animal_welf		"…animal welfare"	1 = Agree	0.52	1.25	66.51
			2 = Totally agree			
Imp_artif_add	Answer to the statement:	"… my food does not contain artificial additives"	0 = No importance	2.14	1.37	65.42
			1 = Minor import.			
Imp_low_p	"It is important for me whether..."	"…the price is low"	2 = Some import.	1.91	1.32	65.18
Imp_quick		"…the product is quick to prepare"	3 = Very important	1.57	0.87	67.35
Imp_prod_dk		"…the product is produced in Denmark"		2.04	1.61	56.63
Worry_GMO	Answer to the statement:	"…that food products may be genetically modified"	0 = Never	1.91	2.00	78.43
			1 = Seldom			
Worry_pest	"How often do you worry about..."	"…whether there are pesticides or medicine residues in food products"	2 = Once in a while	1.60	2.33	79.04
			3 = Often			
			4 = Very often			

[1] Share of households with change from 2002 to 2007 in this variable.

Source: Questionnaires and background data from GfK Consumer Tracking, 2002 and 2007.

Table 2. Summary of variables which are relatively stable over time

Variable	Description		Range	Mean	Std. dev	% change[1]
Imp_health	Answer to the statement: "It is important for me whether..."	"...the food I buy is healthy"	-1 = Disagree	0.77	22.53	22.53
			0 = Neither agree nor disagree			
			1 = Agree			
Imp_environ		"...the food I buy is environmentally friendly"	0 = No importance	1.31	31.45	31.45
			1 = Minor or some importance			
Imp_animal_welf		"...animal welfare has been taken into account when producing the food I buy"	2 = Very important	1.32	32.77	32.77
Male	The main shopper is male		0/1 dummy	0.27	0.447	7.59
Age	Age of main shopper[2]		Years	54.07	12.89	99.64
Rural	*Rural is the base category for urbanisation*		*0/1 dummy*	*0.35*	*0.477*	*3.37*
Urban	Living in an urban municipality		0/1 dummy	0.46	0.499	3.01
Capital	Living in the Capital area		0/1 dummy	0.19	0.395	1.33
	Highest level of education in the household:					
Low	*No or low education is the base category*		*0/1 dummy*	*0.22*	*0.415*	*9.40*
Voc	Vocational education		0/1 dummy	0.32	0.468	16.51
Short	Up to three years of higher education		0/1 dummy	0.20	0.398	13.98
Long	More than three years of higher education		0/1 dummy	0.26	0.438	8.07
Kids06	Children 0 – 6 years old in household		0/1 dummy	0.06	0.245	5.30
Kids714	Children 7 – 14 years old in household		0/1 dummy	0.11	0.310	10.12
Kids1520	Adolescents 15 – 20 years old in household		0/1 dummy	0.11	0.311	12.89
Inc_low	Household belongs to the lowest third of the OECD scaled income distribution.		0/1 dummy	0.34	0.473	13.86
Inc_middle	*Household belongs to the middle third of the income distribution.*		*0/1 dummy*	*0.32*	*0.466*	*26.99*
	This is the base category					
Inc_high	Household belongs to the highest third of the income distribution		0/1 dummy	0.34	0.476	18.43

[1] Share of households with change from 2002 to 2007 in this variable

[2] Age changes by a constant just as time, and can therefore not be included in the fixed effect model (model 1).

Source: Questionnaires and background data from GfK Consumer Tracking, 2002 and 2007.

3.3 Empirical Model

As described above some of the attitudinal variables are generally invariant over time, and the socio-demographics only vary very little from 2002 to 2007. We therefore first estimate a fixed effects model on the variables that change over time and average out the observed and unobserved heterogeneity, including the effects from the time invariant variables. In a second model we then estimate a standard OLS model on the household specific fixed effects, the $a_i's$ from (1), which are a result of the estimation of the fixed effects model. This means that we remove a lot of the heterogeneity in the first model, allowing us to get a better picture of the causal effects, and that the second model allows us to better investigate the heterogeneity, and thereby describe general patterns of organic consumption. The first part of the model contains only the time varying variables along with at time trend t which captures the part of the development in organic budget which is not caused by changes in attitudes. The empirical version of the fixed effect model (1) is presented in Equation (3), where $i \in \{1,…,830\}$ indicates household i and $t = 0$ indicates the year 2002 and $t = 1$ indicates the year 2007:

$$
\begin{aligned}
orgshare_{it} = &\; a_i + \beta_1 t + \beta_2 trust_{it} \\
&+ \beta_3 org\_health_{it} + \beta_4 org\_environ_{it} + \beta_5 org\_animal_{it} \\
&+ \beta_6 imp\_artif\_add_{it} + \beta_7 imp\_low\_p_{it} + \beta_8 imp\_quick_{it} + \beta_9 imp\_prod\_dk_{it} \\
&+ \beta_{10} worry\_GMO_{it} + \beta_{11} worry\_pest_{it} + \varepsilon_{it}
\end{aligned}
\tag{3}
$$

The variable $orgshare_{it}$ is the annual household specific organic budget share which is explained by a household specific fixed effect (a_i) which serves as an individual intercept for each household in the panel, a time trend t, and time varying variables. These variables describe household specific values of the perceptions of health effects (org_health_{it}), environmental effects ($org\_environ_{it}$) and animal welfare effects (org_animal_{it}) of organic products as well as general concerns when purchasing food such as the desire to avoid artificial additives ($imp\_artif\_add_{it}$), to be able to prepare the food quickly (imp_quick_{it}) and whether or not the food is produced in Denmark ($imp\_prod\_dk_{it}$). Finally two variables for the general worries related to food such as the fear of genetically modified organisms ($worry\_GMO_{it}$) or pesticide residues ($worry\_pest_{it}$) in food are included. The variables in model 1 are summarised in Table 1 above. Only variables which vary over time can be included in a fixed effects model[Note 5] and therefore the variables in Table 2 are not included in the model in Equation 3.

Based on the fixed effects model in the first stage we calculate household specific fixed effects (a_i) which measure the part of organic purchases which is not captured by the variables in the fixed effects model; hence the household specific fixed effects consists of observed and unobserved heterogeneity. We then estimate a simple OLS model using values of general attitudes toward health, environment and animal welfare when purchasing food as well as socio demographics to explore this heterogeneity in more detail. The empirical model is described in (4). The variables are defined in Table 2 above.

$$
\begin{aligned}
a_i = &\; \gamma_0 + \gamma_1 imp\_health_i + \gamma_2 imp\_environm_i + \gamma_3 imp\_animal\_welf_i \\
&+ \gamma_4 male_i + \gamma_5 age_i + \gamma_6 age\_sq_i \\
&+ \gamma_7 urban_i + \gamma_8 capital_i + \gamma_9 voc_i + \gamma_{10} short_i + \gamma_{11} long_i \\
&+ \gamma_{12} kids06_i + \gamma_{13} kids714_i + \gamma_{14} kids1520_i + \gamma_{15} inc\_low_i + \gamma_{16} inc\_high_i + \xi_i
\end{aligned}
\tag{4}
$$

4. Estimation and Results

As explained in the theory section above we first estimate a panel data model in order to identify causal effects of trust on organic consumption (model 1) and then model the estimated fixed effects by socio-demographics and invariant attitudes in the second stage (model 2).

4.1 Looking for Causal Effects, Estimation of Model 1

The organic budget share is measured on a yearly basis which means that the number of zeros is relatively low (101 out of 1660 observations, i.e. 6 per cent), and an estimation in which the zeros are deleted gives no change in the results so no zero adjustment is made in the final panel data model. A Breuch-Pagan test for heteroskedasticity gives BP = 102.24 and p-value < 2.2e-16, hence we have strong signs of heteroskedasticity. A Breuch-Godfrey test for second order serial correlation gives LM test = 193.39, and p-value < 2.2e-16, hence also serial correlation is present. Standard errors robust to serial correlation and heteroskedasticity are therefore calculated and presented in Table 3.

The results in Table 3 show that independent of observed changes in the attitudes, the organic budget share on average increased by 1.65 percentage points from 2002 to 2007 (the parameter on t). The average fixed effect[Note 6] is 1.79 which means that in 2002 the average organic budget share for a household in the base category (i.e. a household with the lowest level of trust in the organic label, no expected benefit from organic foods with respect to health, environment or animal welfare, no interest in artificial additives, low prices, convenience or origin of the food purchased and no tendency to worry about GMOs or pesticide residues) was 1.79. In 2007 a household in the same category was therefore expected to have an organic budget share of 3.44 per cent (the sum of the parameter on t and the average fixed effects). The average organic budget share for the control group therefore almost doubled from 2002 to 2007 due to factors not explained in the model.

The results in Table 3 also show that trust in the organic label has a significant positive effect on the organic budget share as do perceived positive health effects. However, perceived positive effects on environment or animal welfare have no significant effect on the organic budget share. The importance of a positive health perception of organic foods as a promoter for organic purchases corresponds with previous research findings (for a review see Aertsens, 2009). Many studies have found positive correlations between environmental concern and a positive attitude towards organic (Krystallis et al., 2008; Dreezens, Martijn, Tenbult, Kok, Vries, 2005; Lea & Worsley,

2005; Hughner et al., 2007), between the importance consumers attach to the environment and stated organic purchases (for a review see Aertsens et al., 2009 or Hughner et al., 2007) and finally between the perceived environmentally positive effects of organic production and stated purchase behaviour (Hughner et al., 2007; Magnusson, Arvola, Hursti, Aberg, & Sjoden, 2003; Pearson, Henryks & Jones, 2011) as well as a correlation between perceived animal welfare and organic purchases (Hughner et al., 2007). Two major issues might explain the difference between the literature and our results. Firstly our results are based on actual purchasing behaviour, not stated purchasing behaviour. Hence our analysis demonstrates that stated purchasing behaviour of organics foods is not necessary a valid measures for actual behaviour. Furthermore we consider the effect of a change in perceived positive environment effects of organic foods on a change in organic budget share for *individuals*, not the effect of consumers' general level of concern for the environment[Note 7] on organic consumption.

Table 3. Model 1, causal effects of attitudes on actual organic budget share

Variable	Description	Estimate	Std. Error	t-value	Pr(>|t|)	
T	Trend	1.65	0.388	4.255	0.000	***
Trust	Trust	0.28	0.101	2.763	0.006	**
	Expected positive effects from organics related to…					
org_health	…health	0.57	0.194	2.949	0.003	**
org_environ	…environment	0.09	0.305	0.292	0.770	
org_animal_welf	…animal welfare	-0.32	0.202	-1.582	0.114	
	Generally important when shopping food:					
imp_artif_add	Avoiding artificial additives	0.56	0.206	2.699	0.007	**
imp_low_p	Low price	-0.50	0.202	-2.495	0.013	*
imp_quick	Quick to prepare	0.19	0.192	0.974	0.330	
imp_prod_dk	Produced in Denmark	0.30	0.211	1.431	0.153	
	Worries about … in food consumed					
worry_GMO	Genetically Modified Organisms (GMO)	0.12	0.129	0.895	0.371	
worry_pest	Pesticide residues	-0.07	0.134	-0.499	0.618	
	R-Squared	*9.8%*				
	Adj. R-Squared	*4.8%*				

Fixed effects model explaining actual organic budget share in 2002 and 2007 at household level. Robust standard errors.

Balanced Panel: n=830, T=2, N=1660. The average fixed effect is 1.79.

Signif. codes: '***' 0.1% level, '**' 1% level, '*' 5% level, '.' 10% level.

Daugbjerg, Smed, Andersen and Schvartzman (2012) find that knowledge of the organic rules is an important factor producing trust in the organic label. To a large extend increased animal welfare and environemtnal friendliness are covered within these rules.

One might therefore expect the perceived public characteristics of organic foods, environmental friendliness and animal welfare to be reflected by trust in the organic label (and therefore to be insignificant in the econometric model) while the private characteristic health[Note 8] is expected to have direct influence on the organic budget share. But when we exclude the variable for general trust in the organic label (*Trust*) from the equation the perceived positive environmental or animal welfare effects still have no significant effect. This implies that we have a strong indication that the private motive, health, is more important for the level of organic consumption than the altruistic motives environment and animal welfare.

Concern about artificial additives, anther private motive, significantly increases the organic budget share and focus on low prices (i.e. price sensitivity) significantly decreases the organic budget share. Surprisingly, the concern for GMOs and for pesticide residues have no significant effect, so even though the absence of GMOs and pesticides

are key characteristics of organic products, they do not seem to be driving factors for the increase in consumption. In the literature it is found that consumers generally link organic foods to increased food safety in terms of an absence of GMOs and pesticide residues and to a lower degrees absence of artificial additives and preservatives (Yee, Yeung, & Morris, 2005; Canavari, Bazzani, Spadoni, & Regazzi, 2002; Honkanen, Verplanken, & Olsen, 2006), but the effect of food safety concern on the purchase of organic foods are mixed (Michaelidou & Hassan, 2008). In light of Michaelidou and Hassan's (2008) finding that concern about food safety issues are positively correlated with a positive attitude towards organic, but negatively correlated with purchase intentions, our results indicates that the effect of absence of GMOs and pesticide residues primarily works through confidence in the organic label. The rules underpinning the organic label guarantie that the organic product is produced without the use of GMOs and pesticides, hence if one has trust in the organic label one believes that the organic product is free of GMOs and pesticide residues. Concerning artificial additives the organic production rules are less clear about what is permitted and what is not permitted. This implies that consumers form perceptions about the content of additives in the organic product and the higher is the perception the higher is the organic budget share. This implies that we have another private motive which is important for the purchase of organic foods.

Preferences for nationally produced goods have no significant effect, so buying imported organic goods does not seem to conflict with the motives for purchasing organics. The desire for products which are quick to prepare was expected to have a negative effect on organic purchases because organic products are often perceived as more natural and therefore more difficult to prepare, but the results show that the desire for easy solutions have no significant effect. The fact that the demand for goods which are easy to prepare is not different among organic consumers compared to other consumers indicates that there might also be a market for semi-manufactured organic products.

4.2 Describing the Heterogeneity, Model 2

In order to achieve a better picture of the heterogeneity which is captured by the fixed effects in model 1 above we regress the derived fixed effects from (3) on explanatory variables measured in 2002, i.e. in the beginning of the period covered by the fixed effects estimation. The results from this model will tell us which type of households are most likely to purchase organics, but contrary to the fixed effects model this model will not tell us what can lead the households to consume more organics. The results are presented in Table 4 below. The base category in model 2 is a household with no general interest in health, environment and animal welfare when purchasing food (health = environ = animal_welf = 0), has a female shopper (male = 0) aged 20 years (age-20 = 0), living in a rural municipality (urban = capital = 0), having no further education (voc = short = long = 0), no children (kids06 = kids714 = kids1520 = 0) and an income in the lowest third of the income distribution (inc_middle = inc_high = 0). The intercept in Table 4 therefore indicates that households who are in the base category in both the fixed effects model (and therefore not particularly interested in organics) and the present model (and therefore not interested in health, environment or animal welfare in general) are expected to have an organic budget share which is not significantly different from zero.

There seems to be no correlation between being concern about health and animal welfare in general and the organic budget share. The reasons for the lack of significance might be that consumption of organic foods is only one aspect of healthy food consumption, which might also cover issues such as a diet low in fat and sugar and high in fruits and vegetables, and that a general concern for animal welfare can be fulfilled in other ways than by buying organic foods as many alternatives to organic food exists (examples are e.g. free range eggs or milk from pasture-based dairy farms). On the contrary, household that, to some extent, care about the environment have an organic budget share which is 2.16 percentage points higher and 4.32 percentage points higher if the environment is very important to the household. There are limited alternative means to improving the environment through food consumption than buying organic foods, which might explain the significance of this concern on the budget share of organics compared to concern about health and concern about animal welfare.

There is no significant difference between the organic budget share for households where the main shopper has no further education and households where s/he has a vocational education or a short higher education, but households with a long higher education have significantly higher budget shares (2.19 percentage points). Income has no significant effect in the model, but if education is left out of the model the dummy for having an income in the highest third of the population has a significant positive effect. Education and income are often positively correlated, and the results in this model suggest that the mixed relationship between income and organic purchases found in other studies (e.g. Hughner et al., 2007) might actually be a result of this correlation.

The gender of the main shopper has no significant effect but the age of the mains shopper has a significant effect on the organic budget share with a decreasing budget share until the age of 58 and then an increasing share.

Households living in an urban municipality or the capital area have higher organic budget shares than households in a rural municipality. Living in the capital area increases the organic budget share by 2.49 percentage points. The reason for these differences between urban and rural households might, as explained in section 3, be based on differences in general resources, availability of organic foods in supermarkets and social pressure.

Table 4. Model 2, cross sectional differences in organic budget share

		Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	Intercept	0.13	1.634	0.081	0.936	
	Generally important when purchasing food:					
Imp_Health	Health	0.40	0.441	0.918	0.359	
Imp_Environ	Environment	2.16	0.611	3.538	0.000	***
Imp_Animal_welf	Animal welfare	0.30	0.515	0.575	0.566	
	Socio demographics					
Male	Main shopper is male	-0.63	0.512	-1.240	0.215	
Age-20	Age in years, 20 is base	-0.22	0.102	-2.200	0.028	*
(Age-20)²	Age square/100	0.29	0.158	1.840	0.066	.
	Degree of urbanisation, rural municipality is control					
Urban	Urban municipality	1.49	0.541	2.763	0.006	**
Capital	Capital area	2.49	0.725	3.435	0.001	***
	Highest level of education in household, no further education is control					
Voc	Vocational education	-0.25	0.613	-0.413	0.680	
Short	Less than three years of higher education	0.34	0.801	0.428	0.669	
Long	More than three years of higher education	2.19	0.809	2.712	0.007	**
	Children in household, no children is control					
Kids06	Children 0 to 6 years in household	-1.24	1.093	-1.137	0.256	
Kids714	Children 7 to 14 years in household	2.03	0.985	2.062	0.039	*
Kids1520	Children 15 to 20 years in household	-0.84	0.733	-1.140	0.255	
	Income, middle 33% is control					
Inc_low	Lowest income tertile	0.26	0.623	0.412	0.681	
Inc_high	Highest income tertile	0.74	0.619	1.194	0.233	
	R-Squared	*8.3%*				
	Adj. R-Squared	*6.5%*				

OLS estimation on individual fixed effects from model 1, explained by household characteristics in 2002. Robust standard errors. Signif. codes: '***' 0.1% level, '**' 1% level, '*' 5% level, '.' 10% level.

Only children between 7 and 14 years influence the organic budget share, while the other two age categories have no significant effect. Households with children between 7 and 14 have an organic budget share which is 2.03 percentage points higher than households without children in this age category. We expected that the presence of young children would increase the concern for healthy food, but if this is the case, it again appears to be solved by other means than organic foods. A reason for the positive effect of children 7 to 14 years old could be the fact that these children attend school, and may be influenced there. If organics is presented as positive in school or amongst their school mates the children may bring this impression home and ask for organic products. When the children grow older and leave primary school they change their general focus and may become less interested in whether their food is organic or not. The positive effect of older children might also be related to the amount of energy required from parents to bring up the children. While the children are small the parents may not have the energy it requires to decide to buy organic foods and prepare it, or they may not have the economic resources even if they

wanted to. Teenage children may pose the same problems with regards to energy and monetary resources, whereas children 7 to 14 might represent a period of surplus.

5. Discussion and Conclusion

The aim of this article has been to investigate whether there is a causal relationship between trust in eco-labels and organic purchasing behaviour. The results from our panel data analysis show that an increase in trust in the organic label as well as an increase in the private goods attributes as perceived health effects as well as in the concern for artificial additives in foods will cause increases in actual organic purchasing behaviour. Increases in the level of the public goods attributes such as perceived environmental friendliness and perceived animal welfare will not cause an increase in the organic budget share. The reason for the observed difference in the effect of private versus public attributes can be based on that the private attributes are merely based on consumer perceptions of what is contained in the organic product whereas the public attributes are actually contained in the product and are guaranteed for by the organic label. Furthermore the answers to our questionnaires show that a significant part of the population worries about GMOs or pesticide residues, but surprisingly our findings showed that even though organic production prohibits the use of GMOs and pesticides, households who worry about these issues do not purchase more organics than those who do not. An explanation could be that these attributes to a large extent are guaranteed for by the organic label, hence if consumers have trust in the organic label they expect to get a product that are more environmentally and animal friendly and contains no GMOs and no pesticide residues compared to the conventional product. On the other hand the label does *not* guaranty that the organic product is healthier or is a product with no artificial additives and preservatives. This implies that consumers that perceive that the organic product is healthier and/or contain no artificial additives will attain a larger value to the organic products and hence purchase more than consumers that do not perceive the organic product to contain these attributes. This might explain the positive relationship between the perception of the private goods attributes and organic consumption.

The cross sectional model, model 2, shows on the other hand that concern for the environment is an important indicator of the *level* of organic purchase. Health concern and concern for animal welfare are not to the same extent determinants of the level of organic purchases as there is other ways of meeting these needs than purchasing organic foods. The results also show that the lower level of convenience in organic products apparently does not scare away the organic consumers, and that focus on nationality of origin is not a problem for organic consumers either. Further, the analysis confirms that households in urbanised municipalities, particularly in the capital area, have a significantly higher organic budget share, just as households with a higher education. This study also shows that having young or teenage children have no effect on organic purchasing behaviour, whereas having children between 7 and 14 increases the organic purchase share. Once education is included in the model income has no effect on organic purchases, so the budget restriction does not seem directly to be a problem in relation to purchasing organics.

So far, the marketing of organics has mainly focused on promoting organic production as better for the environment and as more natural. The results presented in this article indicate that this might not be the best way to increase the level of organic purchases as the most important factors in explaining the increase in the level of organic food consumption are increases in the level of trust in the organic label and in the perceived health effects of organic foods. Hence it would be more efficient to focus on these issues instead.

Concerning trust it is important that the consumers view the label as a guarantee of the compliance with the organic production rules and that the consumer trusts the organic producers. In Denmark there has been a recent and increasing focus on promoting individual organic farmers and their families for instance on milk cartons. This might help increase the trust in the farmers, and thereby also the general trust in the organic label. In the processing level it is important continuously to work on producing foods with a low level of artificial additives and preservatives, as consumers who find it important to avoid these have a higher budget share for organic foods. Concerning the perception of positive health effects of organic foods consumption, it has not been scientifically proved that organic food is healthier than conventional food. Therefore it is important that organic farmers and processors of organic foods continuously are cautious about not breaking this extended confidence in the organic produce by e.g. producing foods which might have adverse health effects as e.g. containing fungi or other natural contaminants. Another way of increasing the health perception of organic foods might be a stronger focus on the difference between organic and conventional foods in terms of measureable things as e.g. the higher frequency of findings of pesticide residues in concentional food or the absence of GMOs in organic foods. It might not be possible to prove that the lack of pesticide residues and GMOs leads to healthier food but many consumers may prefer to avoid these as a precautionary measure. Finally as the 7-14 year old seem to promote organic consumption in the households it might be preferable to target at least some of the generic advertising of organic products towards this age group.

In terms of using trust in the organic label to increase consumption of organic foods in other countries there are several things to consider. Firstly, the results might apply only to contries which has an intensively industrialised conventional agricultural sector. The industrialized efficient agriculture comes at a cost of intimacy and also to some extend environmental degradation. In particular, the environmental problems are and were caused by nitrate and pesticides in drinking water, veterinary drug residues in foods, eutrophication of marine and fresh water, and eutrophication and acidification of terrestrial ecosystems. For many consumers organic production is considered a solution to these problems (Horrigan, Lawrence, & Walker, 2002). Furthermore the consumer might feel separated from the food production process and might see organic foods as more natural, more intimate and less industrialized. This implies that there might be a positive relationship between the level of industrialisation of the agriculture sector and demand for organic foods. Hence in countries where the conventional agriculture is not considered to be a problem for the environment, the animal or human health or where the agriculture is less industrialized, the need for organic products as a solution may not be as high as in Western Europe. Therefore an increase in the level of trust in the organic label might not increase demand for organic products in these contries.

Another issue to consider is the effect of the state ownership of the organic label in Denmark and the Danes' high level of trust in public authorities – two factors shown to have a strong positive effect on trust in organic label (Sønderskov & Daugbjerg, 2011). It might be important to consider how to increase trust for labels that are not owned and controlled by the state as a conversion to a state label might *not* be a solution in countries where consumers have less confidence in public authorities than in Denmark. On the contrary it might be necessary to look for another trusted institution, e.g. some NGO or farmers organization, to quarantee for and control the organic label in these contries.

References

Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: a review. *British Food Journal, 111*(10), 1140-1167. http://dx.doi.org/10.1108/00070700910992961

Albersmeier, F., Schultze, H., & Spiller, A. (2010). System Dynamics in Food Quality Certifications: Development of an Audit Integrity System. *International Journal of Food System Dynamics, 1*, 69-81. Retrieved from www.centmapress.org

Aldanondo-Ochoa, A. M., & Almansa-Saez, C. (2009). The private provision of public environment: consumer preferences for organic production systems. *Land Use Policy, 26*, 669-82. http://dx.doi.org/10.1016/j.landusepol.2008.09.006

Andersen, L. M. (2009). *Documentation of CONCEPTS questionnaires*. Retrieved from http://orgprints.org/15741/1/15741.pdf

Andersen, L. M. (2011). Animal Welfare and Eggs – Cheap Talk or Money on the Counter? *Journal of Agricultural Economics, 62*(3), 565-584. http://dx.doi.org/10.1111/j.1477-9552.2011.00310.x

Andersen, L. M., & Lund, T. B. (2011). The development in organic consumption (In Danish). Udviklingen I det økologiske forbrug. Chapter 2. In G. Tveit, & P. Sandoe (Eds), *Økologiske fødevarer – hvor bevæger forbrugeren sig hen*. Center for bioetik og risikovurdering. (in Danish).

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton University Press, Princeton.

Benabou, R., & Tirole, J. (2006). Incentives and Prosocial Behavior. *American Economic Review, 96*(5), 1652-78. http://dx.doi.org/10.1257/aer.96.5.1652

Brunsøe, K., Fjord, T. A., & Grunert, K. G. (2002). *Consumers food choice and quality perception*. Working paper no. 7. Aarhus school of business, Aarhus, Denmark.

Bugge, A. B., & Almås, R. (2006). Domestic dinner – Representations and practices of a proper meal among young suburban mothers. *Journal of Consumer Culture, 6*(2), 203-228. http://dx.doi.org/10.1177/1469540506064744

Canavari, M., Bazzani, G. M., Spadoni, R., & Regazzi, D. (2002). Food safety and organic fruit demand in Italy: a survey. *British Food Journal, 104*(3), 220-232. http://dx.doi.org/10.1108/00070700210425688

Chen, M. F. (2007). Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: moderating effects of food-related personality traits. *Food Quality and Preference, 18*(7), 1008-21. http://dx.doi.org/10.1016/j.foodqual.2007.04.004

Costa-Font, M., Gil, J. M., & Traill, W. B. (2008). Consumer acceptance, valuation of and attitudes towards genetically modified food: Review and implications for food policy. *Food Policy, 33*(2), 99-111. http://dx.doi.org/10.1016/j.foodpol.2007.07.002

Darby, M. R., & Karni, E. (1973). Free competition and the optimal amount of fraud. *The journal of law and economics, 16*, 67-88.

Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? *American Journal of Clinical Nutrition, 87*, 1107-17.

Daugbjerg, C., & Sønderskov, K. M. (2012). Environmental Policy Performance Revisited: Designing Effective Policies for Green Markets. *Political Studies, 60*(2), 399-418. http://dx.doi.org/10.1111/j.1467-9248.2011.00910.x

Daugbjerg, C., Smed, S., Andersen, L.M., & Schvartzman, Y. (2012). *Buying OrganicEco-Labelled Produce? Knowledge of Production Rules, Trust in Labels and Organic Consumption*. Unpublished manuscript.

Dean, M., Raats, M. M., & Shepherd, R. (2008). Moral concerns and consumer choice of fresh and processed organic foods. *Journal of Applied Social Psychology, 38*(8), 2088-107. http://dx.doi.org/10.1086/466756

Dettmann, R. L., & Dimitri, C. (2010). Who's buying organic vegetables? Demographic characteristics of U.S. consumers. *Journal of Food Products Marketing, 16*(1), 79-91.

Doorn, J. van, & Verhoef, P. C. (2011). Willingness to pay for organic products: Differences between virtue and vice foods. *International Journal of Research in Marketing, 28*, 167-180. http://dx.doi.org/10.1016/j.ijresmar.2011.02.005

Dreezens, E., Martijn, C., Tenbult, P., Kok, G., & Vries, N. (2005). Food and values: An examination of values underlying attitudes toward genetically modified-and organically grown food products. *Appetite, 44*, 115-122. http://dx.doi.org/10.1016/j.appet.2004.07.003

Giannakas, K. (2002). Information asymmetries and consumption decisions in organic food product Markets. *Canadian Journal of Agricultural Economics, 50*, 35-50. http://dx.doi.org/10.1111/j.1744-7976.2002.tb00380.x

Greene, W. (2011). Fixed Effects Vector Decomposition: A Magical Solution to the Problem of Time-Invariant Variables in Fixed Effects Models? *Political Analysis, 19*, 135-146. http://dx.doi.org/10.1093/pan/mpq034

Hamm, U., & Michelsen, J. (1996). Organic Agriculture in a Market Economy. Perspectives from Germany and Denmark". In T. Østergaard (Ed.), *Fundamentals of Organic Agriculture - Proceedings from the 11th IFOAM International Scientific Conference*. August 11-15, 1996, Copenhagen.

Hansen, U., & Kull, S. (1994). Öko-Label als umweltbezogenes Informations instrument: Begründungszusammenhänge und Interessen. *Marketing ZVP, 16*, 265-273.

Honkanen, P., Verplanken, B., & Olsen, S. O. (2006). Ethical values and motives driving organic produce choice. *Journal of Consumer Behaviour, 5*(5), 420-431. http://dx.doi.org/10.1002/cb.190

Horrigan, L, Lawrence, R. S., & Walker, P. (2002). How sustainable agriculture can address the environmental and human health harms of industrial agriculture. *Environmental Health Perspective, 110*, 445-456. http://dx.doi.org/10.1289/ehp.02110445

Hughner, R. S., McDonagh, P., Prothero, A., Shultz, I. L. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer behavior, 6*(2-3), 94-110. http://dx.doi.org/10.1002/cb.210

ITF (International Task Force). (2005). *Strategy on Solutions for Harmonizing International Regulation of Organic Agriculture*: Background papers of the International Task Force on Harmonization and Equivalence in Organic Agriculture, volume 2. Retrieved May 23, 2011, from http://www.unctad.org/en/docs/ditcted200515_en.pdf

Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: An overview. *Appetite, 47*(2), 1996-204. http://dx.doi.org/10.1016/j.appet.2006.02.014

Janssen, M., & Hamm, U. (2012). Product labelling in the market for organic food: Consumer preferences and willingness-to-pay for different organic certification logos. *Food Quality and Preference, 25*, 9-22. http://dx.doi.org/10.1016/j.foodqual.2011.12.004

Kledal, P. R. (2006). *The Danish Organic Vegetable Chain*, FOI-report 182/2006. Retrieved from www.foi.dk/publications/reports

Krystallis, A., & Chryssohoidis, G. (2005). Consumers' willingness to pay for organic food: Factors that affect it and variation per organic product type. *British Food Journal, 107*(5), 320-343. http://dx.doi.org/10.1108/00070700510596901

Lea, E., & Worsley, T. (2005). Australians' organic food beliefs, demographics and values. *British Food Journal, 107*(11), 855-869. http://dx.doi.org/10.1108/00070700510629797

Lohr, L. (1998). Implications of Organic Certification for Market Structure and Trade. *American Journal of Agricultural Economics, 80*, 1125-1129. http://dx.doi.org/10.2307/1244216

Magnusson, M. K., Arvola, A., Hursti, U., Aberg, L., & Sjoden, P. (2003). Choice of organic food is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite, 40*(2), 109-117. http://dx.doi.org/10.1016/S0195-6663(03)00002-3

Michaelidou, N., & Hassan, L. M. (2008). The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies, 32*, 163-170. http://dx.doi.org/10.1111/j.1470-6431.2007.00619.x

Michelsen, J, Hamm, U., Wynen E., & Roth, E. (1999). The European Market for Organic Products: Growth and Development. Organic Farming in Europe. *Economics and Policy,* 7. Universität Hohenheim - Stuttgart Hohenheim

Nelson, P. (1970). Information and consumer behaviour. *Journal of Political Economy, 78*(2), 311-329. http://dx.doi.org/10.1086/259630

Niessen, J., & Hamm, U. (2008). Identifying the gap between stated and actual buying behaviour of organic products based on consumer panel data. *Cultivating the Future Based on Science: 2nd Conference of the International Society of Organic Agriculture Research ISOFAR*. Modena, Italy, June 18-20.

Noe, E. (2007). D4.5 *National Synthesis Report on Case Studies in Denmark: Thise Dairy, Fejø-Fruit*. COFAMI. Danish Institute of Agricultural Sciences. Copenhagen.

O'Donovan, P., & McCarthy, M. (2002). Irish consumer preference for organic meat. *British Food Journal, 104*(3/4/5), 353-370. http://dx.doi.org/10.1108/00070700210425778

Pearson, D., Henryks, J., & Jones, H. (2011). Organic food: What we know (and do not know) about consumers *Renewable Agriculture and Food Systems, 26*(2), 171-177. http://dx.doi.org/10.1017/S1742170510000499

Putnam, J. (1990). Food consumption, *National Food Review, 13*(3), 1. Academic Search Complete, EBSCO*host*, viewed 16 April 2012.

Sandalidou, E., Baourkis, G., & Siskos, Y. (2002). Customers' perspectives on the quality of organic olive oil in Greece: A satisfaction evaluation approach. *British Food Journal, 104*(3/4/5), 391-406. http://dx.doi.org/10.1108/00070700210425787

Smith, T. A., Huang, C. L., & Lin, B. H. (2009). Does price or income affect organic choice? Analysis of U.S. produce users. *Journal of Agricultural and Applied economics, 41*(3), 731-744.

Sønderskov, K. M., & Daugbjerg, C. (2011). The state and consumer confidence in eco-labeling: organic labeling in Denmark, Sweden, The United Kingdom and The United States. *Agriculture and Human Values, 28*, 507-517. http://dx.doi.org/10.1007/s10460-010-9295-5

Thøgersen, J. (2000). Psychological Determinants of Paying Attention to Eco-Labels in Purchase Decisions: Model Development and Multinational Validation. *Journal of Consumer Policy, 23*(3), 285-313. http://dx.doi.org/10.1023/A:1007122319675

Thøgersen, J. (2007). *The motivational roots of norms for environmentally responsible behavior*. Paper presented at Nordic Consumer Policy Research Conference, Helsinki.

Vindigni, G., Janssen, M. A., & Jager, W. (2002). Organic food consumption: A multi-theoretical framework of consumer decision making. *British Food Journal, 104*(8), 624-642. http://dx.doi.org/10.1108/00070700210425949

Wandel, M., & Bugge, A. (1997). Environmental concerns in consumer evaluation of food quality. *Food Quality and Preference, 8*(1), 19-26. http://dx.doi.org/10.1016/S0950-3293(96)00004-3

White, H. (1980). A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica, 48*, 817-38. http://dx.doi.org/10.2307/1912934

Wier, M., & Calverley, C. (2002), Market Perspectives for Organic Foods in Europe. *British Food Journal, 104*, 45-62.

Wier, M., Andersen, L. M., & Millock, K. (2005). Information provision, consumer perception and values - the case of organic foods. In S. Krarup, & C. S. Russell (Eds.), *Environment, Information and Consumer Behaviour* (pp. 161-178). Edward Elgar Publishing. http://dx.doi.org/10.1108/00070700210418749

Wier, M., Jensen, L. O., Andersen, L. M., & Millock, K. (2008). The character of demand in mature organic food markets: Great Britain and Denmark compared. *Food Policy, 33*, 406-21. http://dx.doi.org/10.1016/j.foodpol.2008.01.002

Wooldridge, J. (2009). *Introductory Econometrics – A modern approach*. Cengage, South Western.

Yee, W. M. S., Yeung, R. M. W., & Morris, J. (2005). Food safety: building consumer trust in livestock farmers for potential purchase behaviour. *British Food Journal, 107*, 841-854. http://dx.doi.org/10.1108/00070700510629788

Økologisk Landsforening. (2010). *Markedsnotat 2010*. Retrieved April 2012, from http://www.okologi.dk/media/777195/markedsnotat%20med%20forside%20-%20jun10.pdf

Note 1. Organic is translated to Økologisk in Danish, therefor the "Ø" label.

Note 2. In 2009 the total organic budget share was 7.2, but the budget share varies considerably between types of food e.g. the organic budget share was 35.0% for milk and 0.8% for chicken (Økologisk Landsforening, 2010).

Note 3. 830 of the consumers stay in the panel from 2002 to 2007 and answer all of the questions used in the panel data analysis.

Note 4. In 2007, both questions also had a 'don't know' option, which was used by 6 percent in the fashionable fad question and 12 percent in the cheating question. For both questions the 'don't know' category has been recoded to the middle category 'neither agree nor disagree'. For statistics on the answers see appendix A.

Note 5. In a fixed effects model all time invariant variables are removed. Variables with very little variation are hard to estimate since the standard errors becomes very high (Wooldridge, 2002).

Note 6. The nature of the fixed effects model is that it estimates an individual intercept for each household in the dataset. Hence the fixed effect presented here is the average for all households. We use the individual fixed effects as explanatory variable in the estimation sin model 2.

Note 7. We find a positive influence of the level of general concern for the environment in the second part of the model, in line with the literature.

Note 8. There is general consensus that it is not scientifically proven that organic food is healthier (Pearson et al, 2011), but in 2007, 54 per cent of the 830 households in our sample agree that that 'organic products are healthier for me and my family than conventional products.'

Appendix A: Variables that has been used in the construction of the trust variable

To what extent do you agree with the following statements about buying organic products?

	name	Label	Totally disagree	Partially disagree	Neither agree nor disagree	Partially agree	Totally agree	Don't know	Answ.	Answ.%
2002	q28_09	Organic foods are just a fashionable fad. Soon it'll be something else you have to buy	10.5	16.5	30.6	24.6	17.8		1581	98.3
	q28_13	I usually don't buy organic products because there is too much cheating with the organic label	18.8	22.8	37.1	14.7	6.6		1583	98.4
2007	q34_03	Organic foods are just a fashionable fad	35.8	17.6	23.8 (29.9)*	11.5	5.2	6.1 (0)	1997	98.8
	q34_04	I usually don't buy organic products because there is too much cheating with the organic label	21.8	16.3	25.6 (37.4)	16.0	8.6	11.8 (0)	2007	99.3

*: Numbers in brackets show the result after re-coding of 'don't know' answers in 2007.