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Digging deeper:
How do different types of organic consumers influence the increasing organic market share?

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The purpose of this paper is to investigate how sub markets with different degrees of maturity develop during a period of general organic growth, and how different consumer segments behave on these sub markets. The paper uses actual purchasing behaviour of six consumer segments with different attitudes towards food in general and organic production and products in particular. The data is from the Danish market for organic foods, which is one of the most mature markets in the world.

The segmentation splits consumers into a positive and a non-positive half, each half consisting of three different segments. The estimations show that the development in general organic consumption varies between segments, and that their behaviour varies between sub markets. The positive half of the population has driven the overall growth in organic budget share at the Danish market over the period 2005 to 2007, while the other half have not changed their consumption significantly. The results indicate that for the most dedicated organic consumers, the organic budget share may be approaching a saturation point for some types of food, but also identifies other types of food which still have a growing organic budget share, even among the most dedicated consumers.

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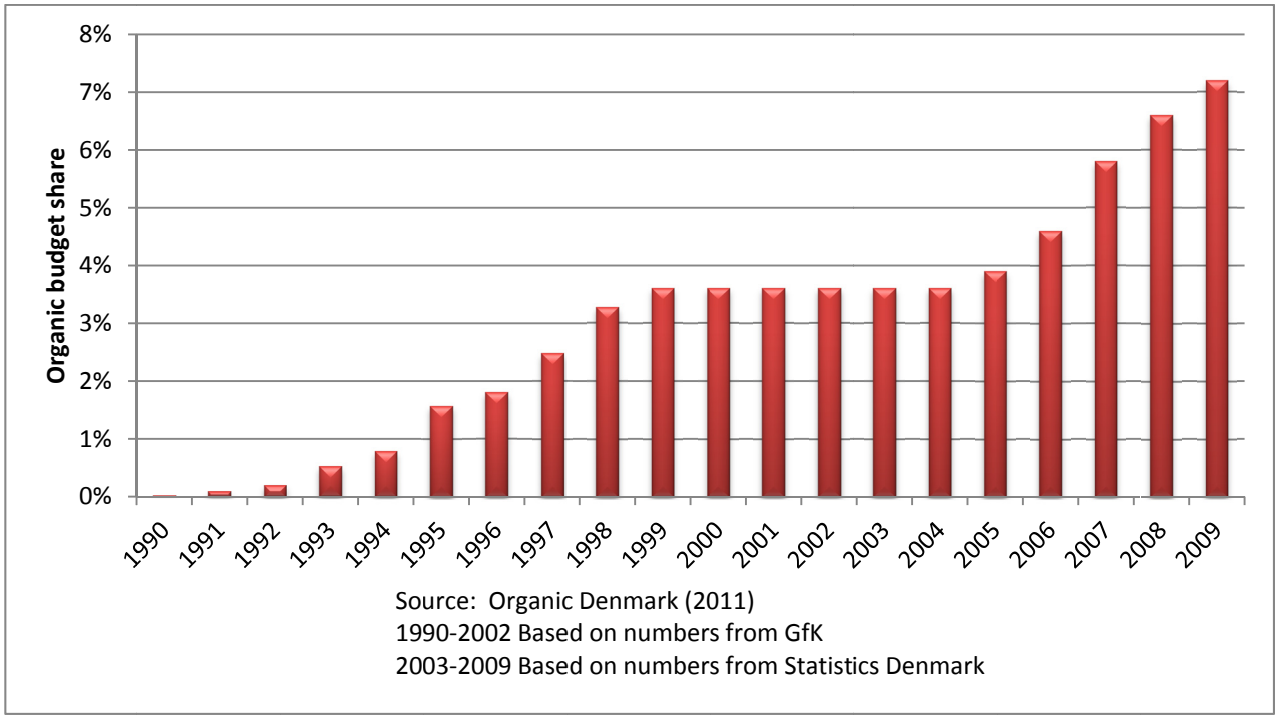
The combination of attitudes and actual behaviour for a large number of consumers is new, and the results provide a valuable contribution to the ongoing investigation of organic consumers, and provide new nuances to the understanding of the latest organic growth.

Key Words: organic budget shares, organic consumers, consumer segments, latent class analysis, demand

1 Introduction

Consumption of organic foods has had an increasing trend, and as a result of this, sales have more than doubled between 2000 and 2008 in many countries (Willier and Yuseffi 2001; Padel et al. 2009). The Danish market distinguishes itself by having one of the highest organic market shares in Europe (Schaack and Willer, 2010; Torjusen et al., 2004), and by having a very large share of organic purchases made in mainstream retail outlets (over 80 percent, Schaer 2009). As presented in Figure 1, the Danish organic market started growing seriously back in 1990. From 1990 to 1999 the general organic budget share increased from 0.03 percent to 3.6 percent. After this, the market stagnated until 2005 where a new period of growth was initiated. The result is that in 2009, the general Danish organic market share was 7.2 percent (Organic Denmark, 2011). The high market share, combined with the long history of integration into the mainstream retail outlets, means that Denmark is a relatively mature organic market, where many consumers regularly purchase organic products.

Figure 1 Organic budget shares in Denmark, 1990 to 2009



Even a relatively mature market such as the Danish one has differences in maturity between product groups. In Denmark, products such as milk and eggs have had a very high organic budget share for many years, whereas products like fruit and vegetables had relatively low organic budget shares in the beginning of 2005. It is therefore possible to investigate how sub markets with different degrees of maturity develop during a period of general organic growth, and in this paper it is also possible to investigate how different consumer segments behave on these sub markets. This may be relevant to many other countries that have a less developed organic market, but hope to reach a higher degree of maturity.

This paper utilises a unique combination of actual purchase data from more than 1,000 households over a three year period, combined with questionnaire data for the same households. In Lund et al. (unpublished), the questionnaire data has been used to identify six different consumer segments among the respondents, each with different combinations of attitudes towards food in general, organic foods in particular and organic food production. In the present paper, the market data has been used to calculate organic budget shares at household level both in general and for specific types of food. These organic budget shares are then linked to the attitudes at household level. This paper analyse the last period of growth in Figure 1

using data from a balanced panel of households during the years 2005 to 2007 and the results presented identify behavioural differences between consumer segments who are driven by different sets of motives in their purchasing. Knowledge about these different consumer segments may be of utmost importance to both producers and retailers when designing their future marketing strategies.

In the remainder of the paper, the data used in the paper and the segmentation which has been performed on the data, will be presented in the Material and Methods section, and the Results section will present both the estimated segments, the general consumption patterns of these segments, the overall development in organic budget share for the different segments and the overall development in the organic budget share for different commodity groups (types of food). Finally, the results section also presents the differences in development in organic budget shares for different commodities for each of the six segments.

2 Material and Methods

This section presents the data used in the paper, introduces the segmentation which has been performed on these data, and provides technical details about the estimations performed on the consumption of the segments.

2.1 Data

The data used in this paper is from an unbalanced panel of Danish households. The households report their daily purchase of food to the market research company *GfK ConsumerTracking Scandinavia* (GfK), typically for several years.[3] Households report price and quantity of all food purchased, and for each item it is also recorded whether the product was organic or conventional. During the period 2005 to 2007 GfK recorded purchases from more than 2,500 households per year.[4] This paper uses purchase data from a balanced subsample during the period 2005 to 2007, covering 1,055 households, each reporting for at least 6 weeks

[3] The GfK data has previously been used to study the effect of the Swan label indicating environmentally friendly production (Bjørner et al. 2004), differences in dietary health (Smed, 2008; Smed and Jensen, 2004) and consumption of organic foods (Andersen, forthcoming; Andersen, 2008; Wier et al., 2005; Wier et al., 2008).
[4] For more on GfK ConsumerTracking Scandinavia data see Andersen 2006 and Smed 2008.

during each of the 12 quarters, and each included in the segmentation in Lund et al. (unpublished). The balanced nature of the data means that the estimated changes over time can be ascribed to actual changes in household behaviour, not to changes in data composition. The reported organic status of all goods allows us to examine consumption of organic food products both in general and for specific commodity groups.

The households in the panel not only report purchases on a daily basis, but also provide information about socio demographics such as income, education and family composition through a yearly questionnaire to GfK. In Lund et al. (unpublished) this has been used to investigate socio demographic differences between segments. Apart from the data collected by GfK, most of those households who participated in the panel in 2007 and 2008 answered a comprehensive questionnaire on attitudes toward organics and food in general.[5]

2.2 Methods

In this subsection we provide a brief description of the method used for segmentation and a more detailed description of the estimations of the relationship between the segments and the actual consumption. The segmentation is described in detail in Lund et al. (unpublished).

2.2.1 Segmentation

We expect household purchases of organic foods to be at least partly determined by their values in general and their perception of organic foods in particular. Previous studies of the Danish consumers have indicated that there are six different consumer segments (Lund et al., unpublished), some of which are positive towards organic products and production, others indifferent and yet others negative. We expect these consumer segments to have different purchasing patterns with regards to organic budget share. As part of a large project on consumption of organic foods (CONCEPTS), we have therefore used the questionnaire data to perform a Latent Class Analysis (McCutcheon, 1987; Vermunt, 1997a and 1997b) on the 1,361 households who answered the relevant questions both in 2007 and 2008 (Lund et al.,

[5] The questionnaires were issued by researchers as part of the large project on consumption of organic foods (CONCEPTS) which is described in footnote 1. For documentation of the questionnaires see Andersen (2009).

unpublished). The observations from 2007 and 2008 are treated as independent, and each of the households therefore enter as two independent households in the latent class analysis. The model is estimated without imposing any restrictions. Once the segmentation is done it is possible to investigate the segments separately in 2007 and in 2008. As presented in Lund et al. (unpublished), we have estimated models with 1 to 9 segments, and based on the Bayesian information criterion (BIC) six segments is the optimal number given the data. This confirms the theoretical results. The six resulting segments are labelled '*Convinced*', '*Positive and Food Involved*', '*Positive and Convenient*', '*Product Focused*', '*Indifferent*' and '*Sceptics*', and will be described in the result section.

2.2.2 Combining attitudes and actual purchases

The combination of data on attitudes and consumption for the individual households allows us to examine differences in actual consumption for the different segments for different types of food and the development of this consumption over time. For each individual, the Latent Class Analysis produces a set of probabilities of belonging to the six different segments. These probabilities are often used to determine the most likely segment for each household, which is then often used as the result of the analysis, ignoring the probability of belonging to other segments. However, virtually all households combine opinions from different segments. One can be 70 percent '*Convinced*', but still have elements of both '*Positive and Convenient*' and '*Product Focused*'. This paper differs from most other applications of the latent class model, by using the estimated probabilities for each of the six segments instead of only the most likely segment. This allows us to examine how a household would behave if it was e.g. 100 percent '*Convinced*' or 100 percent *'Sceptic'*.[6]

2.2.2.1 Empirical consumption patterns on the organic market

In section 3.2, we investigate how the different segments distribute their organic food budget on the nine different commodity groups milk, vegetables, fruit, eggs, meat, curdled milk, butter products and other

[6] In Lund et al. (unpublished) we use the most likely segment for a sociological analysis, and use population data from Statistics Denmark to weigh the individual households to make the sample more representative of the Danish population. In this paper we focus on differences between types of consumers, and therefore use segment probabilities instead of most likely segment, and disregard the weighting used in Lund et al.

products. This is done by splitting each purchase[7] into six different purchases, each weighted by the household specific probabilities of belonging to the different segments. This allows us to investigate how households would distribute their purchases if they belonged to a specific segment with 100 percent certainty.

2.2.2.2 Tobit estimations on development of organic budget shares over time

For each household we have calculated the overall organic budget share as well as the budget shares for specific commodity groups. We expect the organic budget share to vary between the different consumer segments, and the relationship between the probability of belonging to a particular segment and the quarterly household specific organic budget shares has therefore been investigated. The quarterly organic budget share is zero for a large proportion of the observations, and the relationship is therefore estimated using Tobit models with two sided censoring (at 0 and 100 percent). This type of model takes into account that some households who do not buy organics may be close to doing so, while others may be very far from buying organic products. The model makes it possible to calculate not only the traditional organic budget share, but also the expected probability of participating in the organic market and the expected organic budget share for households which choose to participate. The traditional organic budget share also includes households who do not buy organic, and is therefore always smaller than the organic budget share given participation (unless the probability of participation is 100 percent). The total organic budget share can be calculated as the product of the probability of participating and the organic budget share given participation.

In section 3.3.1 we investigate the development in the general organic budget share for each segment:

$$orgsh_{ti} = \sum_{s=1}^{6} \left(\beta_s^p p_{si} + \beta_s^t t_{si} \right) + \varepsilon_{ti}, \quad orgsh_{it} \in [0,100], \quad \varepsilon_{ti} \sim N(0,\sigma) \tag{1}$$

[7] Purchases are registered at the most detailed level possible, which means that a purchase by definition belongs to one and only one of the nine commodity groups.

where $orgsh_{ti}$ is the organic budget share for household i at time t, p_{si} is the household specific probability of belonging to segment s, t_{si} is the segment specific trend which is calculated by multiplying the standard trend t with the probability of belonging to segment s: $t_{si} = p_{si}t$, and σ is the estimated variance of the normally distributed error term ε_{ti}. This means that β_s^t measures the trend for a household which belongs to segment s with probability 100 percent, and that β_s^p can be interpreted as a constant term for households which belong to segment s with probability 100 percent.

In section 3.3.2, the general development in organic budget share is investigated for each commodity group, ignoring the segments, using the model:

$$orgsh_{ti}^c = \beta_{c0} + \beta_c^t t + \varepsilon_{cti}, \quad orgsh_{ti}^c \in [0,100], \quad \varepsilon_{cti} \sim N\left(0, \sigma^c\right), \quad c = 1,...,9 \tag{2}$$

where $orgsh_{ti}^c$ is the commodity specific organic budget share for commodity group c, t is a general time trend and σ^c is the estimated variance of the normally distributed error term ε_{cti}.

Finally the development in organic budget share is investigated for each commodity group for each segment in section 3.3.3, again using the Tobit model presented in equation (1), now using the commodity specific organic budget shares instead of the general organic budget shares. The model leads to nine separate estimations, one for each commodity group:

$$orgsh_{ti}^c = \sum_{s=1}^{6}\left(\beta_{cs}^p p_{si} + \beta_{cs}^t t_{si}\right) + \xi_{cti}, \quad orgsh_{ti}^c \in [0,100], \quad \xi_{cti} \sim N\left(0, \sigma^{cs}\right), \quad c = 1,...,9 \tag{3}$$

3 Results

The results of the Latent Class Analysis indicate that the population can be divided into two overall types. One half of the population is positive towards organic, and purchased 86 percent of all organic products in 2007, the other half is either indifferent or negative and only purchased 14 percent of all organic products. The positive half of the population can be further divided into three different segments with varying

attitudes toward organics and foods in general. This section presents the differences in attitudes, consumption patterns and development in organic budget shares between the segments. By definition, the attitudes towards food in general and organic food in particular vary between the segments. The differences are given by the Latent Class Analysis, and the results of this analysis will be described briefly in the following (section 3.1). The data on observed purchases allows us to describe differences in consumption patterns for the segments with regards to organic food consumption, and to investigate the development of organic budget shares. This section presents both the descriptive statistics on consumption patterns (section 3.2) and the estimated development in organic budget shares. The development in organic budget share is estimated both in general for the six different segments (section 3.3.1) and in general for different commodity groups with varying degrees of maturity (section 3.3.2), and not least within different commodity groups for the each of the segments (section 3.3.3).

3.1 Attitudinal differences between segments

The '*Convinced*' segment (14 percent of the population) is very involved in organics and in the world around them. It is important to them that their purchases have as little negative impact as possible, both on the environment, future generations and on the workers producing the products. The result is that their organic budget share is significantly higher than for any of the other segments. The other two positive segments are slightly less enthusiastic about organics. The '*Positive and Food Involved*' segment (24 percent) is positive towards organics, but values food quality above organic production, and may therefore without hesitation buy conventional products if they believe that the quality of the conventional version is better. However, they often associate organic products with quality, and they therefore have a relatively high organic budget share. The '*Positive and Convenient*' segment (13 percent) is not interested in food and cooking, but is interested in organics, at least if the price is not too high. Their organic budget share is approximately of the same size as the budget share for the '*Positive and Food Involved*' segment.

The negative or indifferent half of the population can also be divided into three segments. The '*Product Focused*' segment (27 percent) is almost as interested in food and cooking as the '*Positive and Food*

Involved' segment, but they do not to the same extent associate organics with quality, and have a relatively low organic budget share. The '*Indifferent*' segment (9 percent) is indifferent to food, cooking and organics and they therefore very rarely buy organic products. The '*Sceptic*' segment (13 percent) is negative towards the concepts of organic production, but just like the '*Product Focused*' and the '*Indifferent*' segments, they still buy organic products, either by accident or because the conventional version is out of stock.[8]

3.2 Differences in consumption patterns

This subsection classifies all types of food into nine commodity groups and compares the consumption pattern of food in general to the consumption pattern of organic food, and compares the organic consumption patterns for the different segments. This reveals interesting differences between segments with a high degree of involvement in organics and segments with a lower degree of involvement. Figure 2 and Figure 3 show the distribution of the 2007 consumption for the 1,055 households which are both part of the segmentation and have reported purchases for at least six weeks per quarter during the years 2005 to 2007. The eight groups milk, vegetables, fruit, eggs, meat, curdled milk products, cheese and butter products constitute more than 75 percent of the organic consumption (Figure 3). The remaining products are in the group 'others'. There is considerable variation in how households allocate their expenditure on food in general and on organic foods. Milk is for example only five percent of the total food budget (Figure 2), but because of the high organic budget share it constitutes 21 percent of the total budget for organic foods. All in all, it means that the group 'other' represents 43 percent of total food consumption, but only 23 percent of the organic food consumption.

[8] For more about the CONCEPTS segments, see Lund et al. (unpublished).

Figure 2 Distribution of general food expenditure

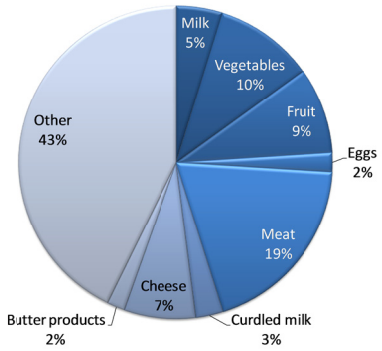
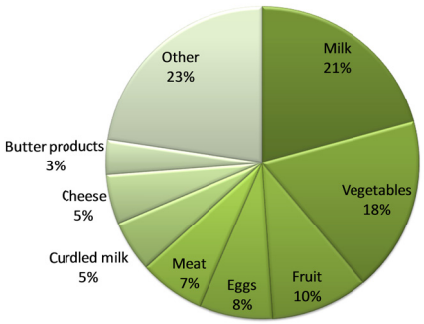


Figure 3 Distribution of organic foods expenditure



Own calculation on data from GfK ConsumerTracking Scandinavia on consumption of food products in 2007. Only the 1,055 households who report purchases for at least 6 weeks each quarter during 2005 to 2007, and who have also been part of the CONCEPTS segmentation.

The consumption patterns not only vary between general food expenditure and organic food expenditure, but also between the different consumer segments. Table 1 repeats the numbers for the whole organic market presented in Figure 3, together with similar numbers for the six different segments.[9]

Table 1 Distribution of organic food budget for segments and total, 2007.[10] All values are %

	Con-vinced	Positive and Food Involved	Positive and Con-venient	Product Focused	In-different	Sceptics	*All segments*
Milk	16	21	25	28	29	23	*21*
Vegetables	20	19	14	15	15	13	*18*
Fruit	13	9	11	6	7	5	*10*
Eggs	7	8	7	9	8	15	*8*
Meat	8	7	6	5	3	4	*7*
Curdled milk	4	6	6	6	6	4	*5*
Cheese	5	5	5	7	6	8	*5*
Butter products	4	4	3	3	2	5	*4*
Other	23	23	23	22	24	23	*23*
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Own calculation on data from GfK ConsumerTracking Scandinavia on consumption of organic food products from 2007.

Only the 1,055 households who report purchases for at least 6 weeks each quarter during 2005 to 2007, and who have also been part of the CONCEPTS segmentation. The observed purchases are weighted by the probabilities of belonging to the different segments to show how the distribution would be if a household was e.g. 100 percent convinced.

[9] As can be seen in Table A in Appendix A, the distribution of the total food budget only varies a little between the segments.

[10] Note that this is shares of total organic consumption, *not* organic budget shares.

Table 1 illustrates how the well established organic products such as milk and eggs constitute a larger share of the organic market for the three indifferent or negative segments than for the three positive segments, whereas the opposite is the case for the less mature products such as vegetables and fruit. This means that if the three negative or indifferent segments choose to purchase organic products, they are more likely to purchase mature organic products. The negative or indifferent segments are less likely to spend time looking for organic products, and less likely to accept differences in quality, which fits well with the fact that the mature products are likely to be easier to find in the stores, and less likely to have a lower quality compared to the conventional versions.

The '*Positive and Convenient*' segment differs from the two other positive segments in that milk has the largest share of the organic market for this particular segment. In Denmark, organic milk is not homogenized (except the 0.5% mini milk), but otherwise there are no major quality differences between organic and conventional milk. In addition to this, organic milk is easy to identify at the cold counter. Milk is therefore one of the easiest organic products to find, and perhaps also one of the easier products to decide to buy. This fits well with the fact that the '*Positive and Convenient*' segment spends a larger share of their organic budget on milk than the two other positive and less convenient segments. The '*Convinced*' segment distinguishes itself from the '*Positive and Food Involved*' segment by spending a larger share of their organic budget on organic fruit, and a smaller share on milk.[11]

3.3 Development in organic market shares

As mentioned in the materials and methods section, the relationship between the probability of belonging to a given segment and the quarterly organic budget shares at household level is estimated using a Tobit model with two sided censoring (at 0 and 100 percent). This model makes it possible to calculate not only

[11] The 'Sceptics' stand out with a very high share of organic eggs in their consumption of organic foods. In the CONCEPT questionnaire we have asked the household to which extent they consider animal welfare when they purchase eggs, and together with the 'Indifferent' segment, the 'Sceptic' have the lowest level of concern for animal welfare. The 'Sceptic' segment has a very low organic budget share and therefore also a very small organic budget, which may lead to spurious results and thereby explain this contra intuitive result.

the traditional organic budget share, but also the expected probability of participating in the organic market and the expected organic budget share for households which choose to participate.

3.3.1 Differences in development between segments

The results of the Tobit model using only the probability of belonging to the different segments and segment specific trends (see equation (1) in the Materials and Method section) are presented in Table 2. The R^2 value is 21 percent[12] which is very high when modelling behaviour at household level, and it is definitely higher than the R^2 of 0.5 percent which can be obtained in a model using only a common trend and an intercept. All three positive segments have significant positive trends in their organic budget share. The trend is biggest for the '*Convinced*' segment which also had the highest organic budget share in the beginning of 2005 (13.0 percent, see Table 2). The three negative or indifferent segments also have positive trends, but they are not significantly different from zero, and are therefore excluded from the model. The result is that the three positive segments not only have the highest organic budget shares, and therefore buy the majority of the organic products which are being sold, but also has been responsible for most of the growth, as they are the only ones with significant positive trends.

[12] The R^2 value is calculated as the squared correlation between the expected and the observed value of the quarterly organic budget share (Wooldridge 2009).

Table 2 Estimated behaviour on the general organic market for different segments. First quarter of 2005 and last quarter of 2007. All values are %

		Con-vinced	Positive and Food Involved	Positive and Con-venient	Product Focused	In-different	Sceptics
2005	Probability of participation	90	69	71	46	40	40
	Organic budget share given particip.	14.5	9.9	10.2	7.5	7.0	7.0
	Organic budget share, all purchases	**13.0**	**6.9**	**7.3**	**3.4**	**2.9**	**2.8**
2007	Probability of participation	97	80	84	46	40	40
	Organic budget share given particip.	18.9	11.6	12.5	7.5	7.0	7.0
	Organic budget share, all purchases	**18.3**	**9.2**	**10.5**	**3.4**	**2.9**	**2.8**

Tobit estimation on quarterly organic budget shares for 1,055 households from the GfK ConsumerTracking Scandinavia panel from 2005 to 2007. See equation (1) in the materials and methods section. Number of observations: 12.660, R^2 21%.

'Probability of participation' shows how likely it is that a household has purchased at least one organic product during a quarter.

'Organic budget share given participation' gives the estimated organic budget share for households participating in the organic market.

'Organic budget share, all purchases' shows the total estimated organic budget, including households not participating in the organic market.

Table 2 shows not only the estimated organic budget shares for different segments, but also the processes that lead to the total organic budget shares ('organic budget share, all purchases' in the table). The high organic budget shares for the three positive segments is driven not only by the fact that participating households in these positive segments have a higher organic budget share than participating households among the indifferent or negative segments, but also to a very large extent by the fact that the probability of participating is higher among the positive segments.

By the end of 2007, the total organic budget share for the '*Positive and Convenient*' segment (10.5 percent, Table 2) was more than three times higher than the share for the '*Product Focused*' (3.4 percent). Table 3 shows what would have happened if the '*Product Focused*' had instead had the same probability of participation or the same organic budget share given participation as the '*Positive and Convenient*'. The result is that if the probability of participation was increased to 84 percent instead of 46 percent, the organic budget share would have been 6.2 percent instead of 3.4 percent, and if instead the organic budget share given participation was 12.5 percent instead of 7.5 percent, the organic budget share would have been 5.7 percent.

Table 3 The effect of the probability of participation and the organic budget share given participation

		Probability of participation	Organic budget share given participation	Organic budget share all purchases
Estimated values, last quarter of 2007	'Positive and Convenient'	84	12.5	10.5
	'Product Focused'	46	7.5	3.4
Changing values for the 'Product Focused' to correspond to the 'Positive and Convenient'	Increasing the *probability of participation*	*84*	7.5	*6.2*
	Increasing the *organic budget share given participation*	46	*12.5*	*5.7*

Source: Numbers from Table 2

This illustrates that there are two ways of increasing the total organic budget share; increasing probability of participation and increasing the organic budget share given participation, and both are important. Table 2 also illustrates that even for the most dedicated segment (the '*Convinced*') the organic growth is still partly driven by an increased probability of participation, but also that this probability soon reaches 100 percent for this most dedicated segment, and that further increase for this segment therefore must come from increased budget shares among participants. Further increase in the general organic budget share could also be obtained by increasing the probability of participation among the other segments. For the '*Positive and Food Involved*' and the '*Positive and Convenient*' there is still some room for attracting new participants, and for the three negative or indifferent segments there is a large share who are still not participating. However, these non-participants may be more difficult to attract than consumers in the three positive segments.

3.3.2 Differences in development between commodity groups

As mentioned above, the level of maturity of the organic market varies between commodity groups. Some commodity groups have long had a well established high organic budget share (e.g. milk and eggs) while others are less mature (e.g. fruit and vegetables). Table 4 shows the estimated organic budget share for all commodity groups in the first quarter of 2005 and the last quarter of 2007, for the nine commodity groups presented in Figure 2 and Figure 3, except for the group 'others' (see equation (2) in the Materials and Methods section). Aside from cheese, all nine groups had a positive trend in organic budget share in the

period 2005 to 2007. The trend for cheese was also positive, but not significantly different from zero, and therefore excluded from the model.

The results confirm that milk and eggs were already well established in the beginning of 2005 with total budget shares of 26 and 18 percent, whereas fruit and vegetables were less mature with organic budget shares of 6 and 3 percent. The maturity of milk and eggs is also confirmed by the low relative change in total organic budget share (an increase from 26 to 28 percent for milk corresponds to an absolute change of 2 percentage points and a relative change of 8 percent, whereas an increase from 6 to 8 percent or vegetables also corresponds to an absolute change of 2 percentage points, but a relative change of 33 percent).

Table 4 Estimated general behaviour within different commodity groups. First quarter of 2005 and last quarter of 2007. All values are %

		Milk	Vege-tables	Fruit	Eggs	Meat	Curd-led milk	Cheese	Butter pro-ducts
2005	Probability of participation	50	32	15	31	8	17	23	13
	Organic budget share given particip.	52	18	20	59	14	37	18	62
	Organic budget share, all purchases	**26**	**6**	**3**	**18**	**1**	**6**	**4**	**8**
2007	Probability of participation	53	41	27	36	13	30	23	17
	Organic budget share given particip.	53	20	23	61	16	43	18	64
	Organic budget share, all purchases	**28**	**8**	**6**	**22**	**2**	**13**	**4**	**11**
N		*12,220*	*12,532*	*12,468*	*11,093*	*12,410*	*11,093*	*12,275*	*11,361*
R^2		*0.07%*	*0.30%*	*0.46%*	*0.20%*	*0.27%*	*0.73%*	*0.08%*	*0.16%*

Separate Tobit estimations on quarterly organic budget shares for different commodity groups for 1,055 households from the GfK ConsumerTracking Scandinavia panel from 2005 to 2007. See equation (2) in the materials and methods section. N is the number of observations used in each estimation, R^2 is the squared correlation between the expected and the observed value of the quarterly organic budget share.

'Probability of participation' shows how likely it is that a household has purchased at least one organic product from this commodity group during a quarter.

'Organic budget share given participation' gives the estimated organic budget share for households participating in the organic market.

'Organic budget share, all purchases' shows the total estimated organic budget, including households not participating in the organic market for this commodity group.

As in Table 2, the results in Table 4 show not only the estimated organic budget shares for different commodities, but also the processes which lead to the total organic budget shares. When an organic budget share increases, it may partly be because new households start buying organic, and partly because the households who are already participating start to buy more. As an example, the high organic budget share for eggs is to a very large extent due to the strong dedication of households that buy organic eggs. By the beginning of 2005, the organic budget share for households which participated in the market for organic eggs was 61 percent. Households which participated in the market for organic butter products were actually even more dedicated (the organic budget share given participation was 62 percent), but they were fewer in numbers, and the total organic budget share was therefore significantly lower for butter products (8 percent) than for eggs (18 percent). Milk has the highest total organic budget share because the participating households are very loyal and at the same time they constitute a large part of the population.

Vegetables and fruit have relatively low organic budget shares even among participants (20 and 23 percent by the end of 2007). This might be related to the fact that the general perception of the quality of organic products also varies between commodity groups. Table 5 shows the general perceived differences between conventional and organic fruit, vegetables, meat and milk. It is clear that organic fruit and vegetables are more likely to be perceived as lower quality compared to meat and milk, but also that on average the quality of the organic version is perceived as higher than the quality of the conventional version. This might be the reason for the relatively low organic budget shares for vegetables and fruit. The organic budget share is higher for vegetables than for fruit, even though Table 5 indicates no major differences in the perceived quality. This might indicate that quality is less important for vegetables which will often be processed before eating, than for fruit which is more often eaten raw, and where the visual component of quality may also be more important. For fruit the choice between fresh Danish fruit and less fresh imported organic fruit may also be a reason for the relatively low organic budget share, and perhaps this competition may be less important for vegetables if freshness is not quite as important for this type of food. The low organic budget share for meat does not seem to be related to quality differences, and is more likely a result of high absolute price differences between the organic and the conventional version.

Table 5 Perceived differences in quality of conventional and organic products.
Only households who have tried the organic version. All values are %

	Fruit	Vegetables	Meat	Milk
Conventional products have the highest quality	15	14	6	7
No difference between conventional and organic	39	37	44	38
Organic products have the highest quality	46	48	50	55
Number of households who have tried the organic version of this type of food	*902*	*925*	*830*	*912*

Source: Answers to the CONCEPTS questionnaire (Andersen 2009). Only the 1,055 households who report purchases for at least 6 weeks each quarter during 2005 to 2007, and who have also been part of the CONCEPTS segmentation.

Table 4 also shows considerable variation in the development of probability of participation, i.e. in how many new consumers have started buying organic versions of different commodities. The probability of participation has increased very much for fruit and vegetables (from 15 to 27 percent for fruit and from 32

to 41 percent for vegetables), but less for e.g. milk and eggs. For fruit, the large increase in the probability of buying organic, combined with a moderate increase in organic budget share for participating households (from 20 to 23 percent) meant that the overall organic budget share doubled from three to six percent. This illustrates that for less mature organic commodity groups, increased participation is an important factor.

Organic budget shares have mainly grown for curdled milk products, fruit, meat and vegetables. By the end of 2007, meat still had the lowest organic budget share, but relatively speaking, the increase in the organic budget share has been very high. The very mature commodity groups milk and eggs have also increased, but their increase has been relatively lower than for the less mature commodity groups. The question is whether this pattern of consumption can be found for all of the different segments, or if the development in consumption varies between segments. As an example, it is interesting to know whether e.g. milk and eggs have reached a saturation point for some segments and therefore may be expected to have a lover growth in the future.

3.3.3 Differences in commodity specific development between segments

This subsection presents the results of the estimations of the segment specific trends for each commodity group. Table 6 provides an overview of the significant commodity specific trends for the different segments, and Figure 4 shows the resulting estimated levels in the last quarter of 2007 (both from the model presented in equation (3) in the Materials and Methods section). Table 6 illustrates that there are significant differences in which segments have changed behaviour for the different commodity groups.[13] Milk and eggs had the highest organic budget shares in the beginning of 2005, and a relatively low growth from 2005 to 2007 (Table 4) and as shown in Table 6, only the '*Positive and Food Involved*' had an increasing trend for milk, while only the '*Positive and Food Involved*' and the '*Product Focused*' had increasing trends for eggs. This confirms that the most mature organic commodity groups milk and eggs are

[13] If the R square values in Table 5 are compared with the ones in Table 4 above, it is clear that including segments in the estimation improves the explanatory power. When the development in organic budget share is estimated for each commodity group ignoring the segments, the R square values are between 0.00 and 0.73 percent, when the segments are included, the R square values lies between 5 and 25 percent.

approaching a saturation point, and that further increase in these groups may be difficult to achieve. On the other hand the results in Table 6 also identify emerging organic commodity groups. As can be seen in Table 4, vegetables, fruit and curdled milk all started from a relatively low organic budget share in the beginning of 2005, and from Table 6 it is clear that these groups have had a growing trend in many of the segments. Meat also started from a very low level, but here only the three positive segments have positive trends, so this product still requires a certain level of dedication, perhaps because the absolute price differences between conventional and organic are relatively high.

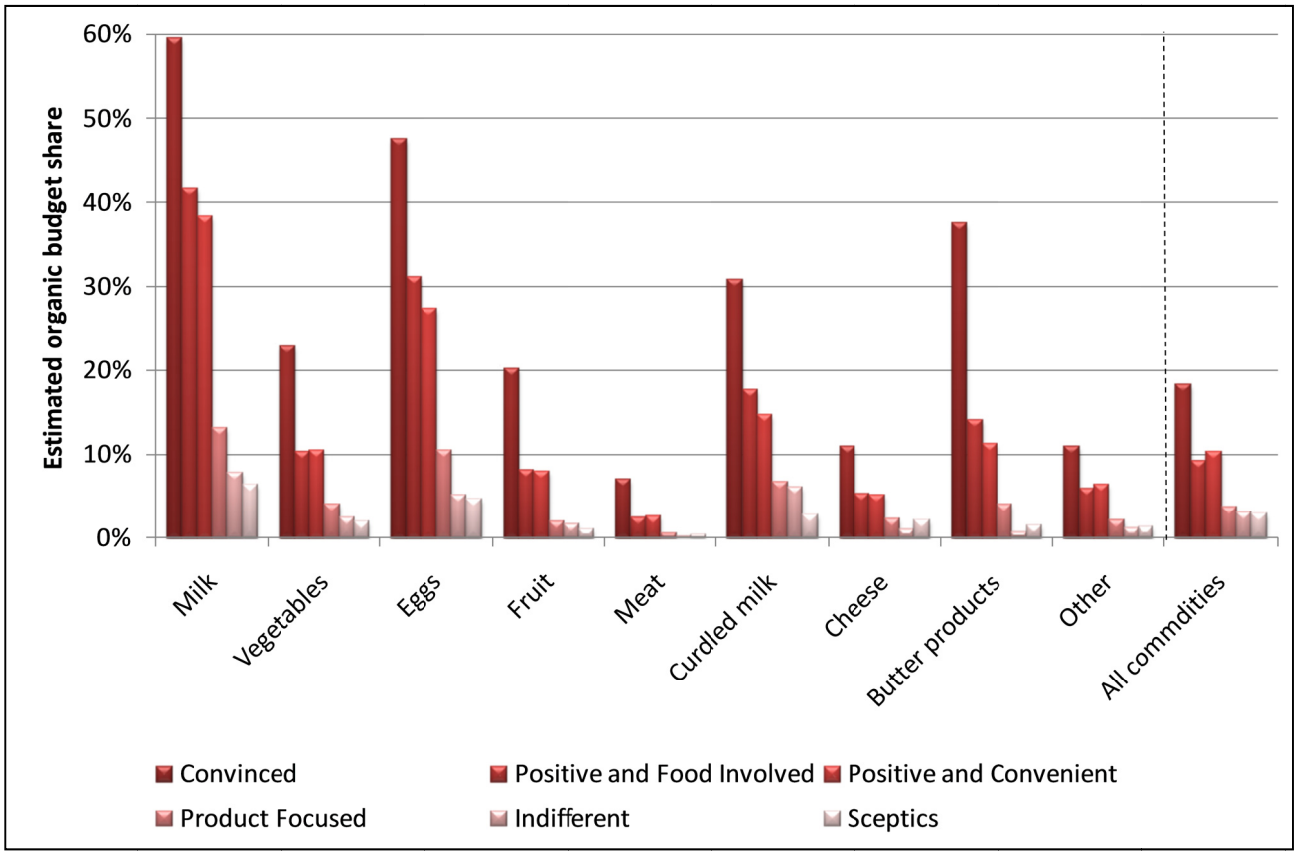
Table 6 Estimates significant trends for different commodity groups for the six segments

	Milk	Vege-tables	Fruit	Eggs	Meat	Curdled milk	Butter pro-ducts	Other
Convinced		+	+		+	+	+	+
Positive and Food Involved	+	+	+	+	+	+		+
Positive and Convenient		+	+		+	+		+
Product Focused		+	+	+		+	+	+
Indifferent			+			+		
Sceptics						+		
N	*12,220*	*12,532*	*12,468*	*11,093*	*12,410*	*11,093*	*11,361*	*12,660*
R^2	*25%*	*12%*	*11%*	*16%*	*5%*	*9%*	*12%*	*13%*

Separate Tobit estimations on quarterly organic budget shares for different commodity groups for 1,055 households from the GfK ConsumerTracking Scandinavia panel from 2005 to 2007 See equation (3) in the materials and methods section. N is the number of observations used in each estimation, R^2 is the squared correlation between the expected and the observed value of the quarterly organic budget share for each estimation. No significant trends for cheese, which is therefore excluded from the table.

Even though none of the three negative segments generally had a significant positive trend (Table 2), the results in Table 6 shows that the '*Product Focused*' segment had increasing trends for many commodity groups and that even the '*Sceptic*' segments started to buy more organic curdled milk products. However, it is also clear from Figure 4 that the resulting organic budget shares are not particularly high compared to the three positive segments.

Figure 4 Estimated organic budget shares for commodity groups per segment, last quarter of 2007



Separate Tobit estimations on quarterly organic budget shares for different commodity groups for 1,055 households from the GfK ConsumerTracking Scandinavia panel from 2005 to 2007. See equation (3) in the materials and methods section.

It is obvious from Figure 4 that the '*Convinced*' segment has the highest organic budget share in all commodity groups, but also that the organic budget share varies a great deal between commodity groups, even for the '*Convinced*' segment. Milk and eggs have the highest organic share for all segments, but curdled milk and butter products are also relatively high. The monetary contribution from these commodity groups is however not very big, because they only constitute a relatively small share of the total food budget (as illustrated in Figure 2 and Figure 3). Fruit and vegetables on the other hand play an important role in the total food budget, so even though the organic budget share is still modest for these commodity groups, they also play an important role in the organic food budget (Figure 3 and Table 1). In terms of increasing the overall organic budget share for the entire food market, it would therefore be extremely interesting to increase the organic budget shares for fruit and vegetables.

4 Discussion and Conclusion

The results presented in this paper show that attitudes towards foods in general and organic foods in particular (represented by the segments used in this paper) is closely related to consumer's consumption of organic foods. The results on development in organic budget share over time for the different segments emphasizes that the general increase to a large extent has been driven by the three positive consumer segments, whereas the three negative segments have remained at a relatively low level of organic consumption. The results for different commodity groups indicate that for the most dedicated organic consumers, the organic growth has almost peaked for milk and eggs, but that there is still potential in the other commodity groups, especially fruits and vegetables. When it comes to the less dedicated segments it is still possible to attract new organic consumers, even for the most mature commodity groups.

Organic fruit and vegetables constitute a significant share of the total food budget, and still had a relatively low organic budget share in 2007. This means that fruit and vegetables play a very important role in the future development of the organic budget share for the entire food market. The organic budget share is lower for fruit than for vegetables, even though the quality of organic fruit and vegetables are perceived to be very similar. Further research into which dimensions of quality are important for different types of food, and the extent to which local conventionally produced food competes with imported organic food might solve this mystery.

If the organic market in Denmark is to be developed even further, it is important to maintain focus on attracting new consumers, and on focusing on types of food which represent large shares of the overall budget for food, e.g. fruit and vegetables. Further research into the perceived differences in quality of organic versus conventional products for different commodity groups, and the impact of these perceived quality differences on the choice between organic and conventional foods may also contribute to the development.

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Appendix A

Table A Distribution of total food budget for segments and total, 2007

	Con-vinced	Positive and Food Involved	Positive and Con-venient	Product Focused	In-different	Sceptics	*Total*
Milk	4	4	6	5	5	5	*5*
Vegetables	12	11	10	10	8	9	*10*
Fruit	9	9	10	9	9	8	*9*
Eggs	2	2	2	2	2	2	*2*
Meat	18	19	18	20	19	20	*19*
Curdled milk	3	3	3	3	3	3	*3*
Cheese	7	7	7	7	8	8	*7*
Butter products	2	2	2	2	2	2	*2*
Other	43	42	42	43	45	43	*43*
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Own calculation on data from GfK ConsumerTracking Scandinavia on consumption of food products from 2007.

Only the 1,055 households who report purchases for at least 6 weeks each quarter during 2005 to 2007, and who have also been part of the CONCEPTS segmentation. The observed purchases are weighted by the probabilities of belonging to the different segments to show how the distribution would be if a household was e.g. 100 percent convinced.