The Organic Food Premium: A Local Assessment in the UK

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Abstract

The present study combines stated and revealed preferences in order to estimate the hypothetical bias of a sample of organic food consumers from Canterbury in the UK. It uses contingent valuation and hedonic pricing to compare stated and revealed preferences and employs the Almost Ideal Demand System to estimate the elasticity of organic products. The results show that the average price premium is fairly large (approximately 10%). They also demonstrate, crucially, that the size of this estimate is encouragingly similar whether a willingness-to-pay or hedonic pricing method is used. The estimated elasticity of organic products is on average above one, suggesting an elastic response to pricing policy in the present sample. Desirable next steps and potential policy applications for future research are also discussed.

JEL classification: C83, C90, D1, L81, Q18, Q21, Q51

Keywords: contingent valuation method (CVM), hedonic pricing method (HPM), convergent validity, behavioural gap, organic food, price premium, almost ideal demand system (AIDS)

1 Introduction

The primary objective of this paper is to analyse and understand what drives purchases of organic food and, based on a local study, assesses how much consumers from Canterbury, a city in the South East of England, are willing to pay for organic food products. In order to achieve this objective, the present paper combines hedonic methods with an analysis of personal attitudes towards the purchase of organic products and estimates price elasticities, all based on primary data. Studying existing organic markets in the UK allows us to understand real purchasing behaviour, but the insights are limited to current market conditions. Stated preference techniques allow us to explore potential new yet currently non-existent aspects of the market in a controlled, experimental way. By far the strongest criticism of stated preference techniques is the hypothetical bias derived from the hypothetical nature of the experiment (Cummings et al., 1986; Mitchell and Carson, 1989; Murphy et al., 2005; Carson and Groves, 2007; Loomis, 2014). The current study strives to address this problem, which is exacerbated by the well-documented gap between intention and behaviour and desirability bias related to organic products (Padel and Foster, 2005; Vermeir and Verbeke, 2006; Lusk and Norwood, 2009; Schuldt and Schwarz, 2010; Norwood and Lusk, 2011; Aschemann-Witzel and Niebuhr Aagaard, 2014), by collecting primary data on both real and hypothetical behaviour in Canterbury,UK.

Stated behaviour is analysed with the help of contingent valuation, while revealed behaviour is analysed with hedonic pricing methods. Traditionally, a combination of stated and revealed preference methods has been used as a validity test for stated preferences (Brookshire et al., 1982; Carson, 1996; Azevedo et al., 2003; Chang, Lusk and Norwood, 2009; Loomis, 2011; Vossler and Watson, 2013). More recently, the two methods have been combined in order to obtain other advantages, such as reduced collinearity among attributes and the joint estimation of a larger dataset, allowing for more powerful results (Adamowicz, 1994; Adamowicz et al., 1997; Brooks and Lusk, 2010; Dosman and Adamowicz, 2006; Axsen et al., 2009; Zuo et al., 2015). In the present study, the two methods are combined in order to estimate the potential hypothetical bias for organic products and to analyse personal attitudes towards the purchase of organic products using data from a case study in the UK.

Figures from the Soil Association Organic Market Report 2016 demonstrate that even though the organic market in the UK has been hit hard by the economic downturn, it now seems to be returning to growth, as more shoppers appear to be ready to pay the organic food premium. The organic market in the UK has grown by nearly 5% in 2016, and sales of organic products in supermarkets grew by 3.2% in the same year. Organic sales for independent retailers have grown by twice as much (7.5%), and box schemes and online sales have increased by 15.2%. The most impressive growth, however, has been observed in the catering sector, which has increased by 15.2%.[1] In 2017, whilst the non-organic market continued to decline, organic food and drink sales increased by 7.1% (Soil Association Organic Market Report, 2017). This

growth resonates with the global organic market trend, where most of the major markets showed double-digit growth rates and the global market for organic food was estimated to have reached 81.6 billion US dollars in 2015 (FiBL Media Release, 2017).[2] The worldwide growth of organic food consumption means that significant opportunities – both domestic and international – could be realized by the UK organic sector, especially in light of Brexit, the potential exit of the UK from the EU Common Agricultural Policy (CAP) and the redesign of the organic food sector in the UK.[3]

The present study attempts to validate the stated preference results with the help of revealed preferences collected from the same consumers. This is important because policy decisions based exclusively on stated preferences may not lead to the desired results. It may provide useful insights both for producers of organic products and retailers regarding which organic attributes are most valuable to UK consumers and where the emphasis should be placed, in terms of both production and retail advertising.

2 Relevant Literature

According to Loomis (2014), hypothetical bias in stated preference valuation surveys can be defined as the difference between what people indicate they would pay in the survey or interview (and herewith in a hypothetical situation) and what people would actually pay in a real situation. The simplest way to estimate this is to calculate the ratio between stated and revealed preferences. A plethora of studies exists that examine this ratio for different products using different methodologies. In a meta-analysis involving 28 valuation studies and yielding 83 observations, Murphy et al. (2005) demonstrated that even though it is generally believed that individuals overstate their willingness to pay (WTP) by a factor of 2-3, this factor is usually less. Murphy et al. (2005) found a ratio of stated to revealed preferences of 1.35.[4] In a meta-analysis involving 83 studies and 616 comparisons of contingent valuation with revealed preference estimates, Carson et al. (1996) found a ratio which is in fact lower than 1 (0.89), implying that stated preferences are actually lower than revealed ones.

Studies related to organic products either analyse only the willingness to pay for organic, its attributes and determinants, or examine the difference between stated and revealed preferences without quantifying it. Zander and Hamm (2010), Janssen and Hamm (2012) and Gerrard et al. (2013) represent more recent studies that analyse the WTP for organic products in the UK. Zander and Hamm (2010) use Information-Display-Matrices to analyse which attributes are most important to organic consumers and find that the attributes with the highest rank are “animal welfare” and “regional production” across five European countries, among which the UK was also considered. Janssen and Hamm (2012) use choice experiments accompanied by structured interviews in six European countries (including the UK) in order to analyse consumer preference and WTP for different organic certification logos. They find that very few consumers trust general

labelling with the prefix "organic" absent a certification logo. The highest price premiums were recorded for logos that were well-known and trusted, with perceived strict organic standards and a strict control system. Gerrard et al. (2013) perform a quantitative study with a WTP experiment and a consumer survey in the UK in order to estimate the WTP for different organic logos and find that among three different logos, the WTP for the EU organic logo was the lowest. UK consumers seem to trust and want to pay more for organic products certified by the Organic Farmers and Growers (OF&G) and the Soil Association in the UK.

Vermeir and Verbeke (2006) analyse the attitudes of young consumers with respect to organic dairy products in Belgium and find that social pressure influences intention to buy, while low perceived availability of organic products seems to deter these intentions. However, the study analyses the difference between attitudes towards consumption and behavioural intentions but not actual behaviour. Millock, Wier and Andersen (2004) analyse organic consumption in Denmark, one of the best practice countries with respect to organic products, and find that even though consumers state that they buy organic because of their non-use values, such as environmental friendliness and animal welfare, in reality they seem to buy them because of their use values, such as health and taste. This result is confirmed by many other studies that followed in different countries (Wier et al., 2008; Griffith and Nesheim, 2008, Tables 9-12; Aertsens et al., 2009). Aschemann-Witzel and Niebuhr-Aagard (2014) interview young consumers in Denmark at the point-of-sale with respect to the attitude-behavioural gap and primarily identify economic arguments for not buying organic. Young Danish consumers appear to justify their attitude-behavioural gap by arguing that they postpone organic purchases to later in life when they have greater economic resources. However, the authors note as a main limitation of their study that they can only provide insight into the possible why and how of issues emerging in in-store considerations but cannot quantify these. To the best of our knowledge, the only study related to the behavioural gap with respect to organic products in the UK is by Padel and Foster (2005). However, the authors primarily differentiate between regular and occasional consumers of organic products and analyse their motives for buying or not buying organic products but do not try to quantify the gap. The strength of the present study is that it has data on both stated and revealed preferences from the same consumers and that it actually quantifies the difference between the two.

Starting with the foundational contribution by Adamowicz (1994) and continuing to the more recent contributions by Blow et al. (2008), Griffith and Nesheim (2008), Griffith and Nesheim (2010) and Brooks and Lusk (2010), combinations of both stated and revealed preferences have been performed. In general, these studies combine revealed data, obtained from scanning purchases of households, with survey data. Blow et al. (2008) develop a non-parametric revealed preference method in order to estimate the WTP and apply it to organic milk sales in Denmark. They find that organic milk attracts a premium of about 1 DKK (Danish Krone) per litre. Griffith and Nesheim (2008) apply a similar methodology, but in contrast, they examine the entire basket of food products for which organic is a relevant characteristic (not just milk), rely on more

disaggregated data and impose fewer restrictions, which renders the model more tractable. They estimate lower and upper bounds on WTP for baskets of organic food and find hat in the aggregate, WTP for organic foods in England in 2004 was at least £114m, and that WTP for a change to a 100% organic economy was less than £10.9 bn. Comparing their results with the results of Blow et al. (2008), they find that the organic share of the milk market is much higher in Denmark than in Britain (23% compared to only 2.1%), but the price premium is comparable (20.4% on average in Denmark, not controlling for other characteristics, versus 16.1% in Britain).[5]

Much like Griffith and Nesheim (2008), Brooks and Lusk (2010) combine stated and revealed data in order to analyse preferences for organic and cloned milk in the US. They combine scanner data with online surveys and demonstrate that even though the US Food and Drug Administration claims that milk from cloned cows is as safe as that from conventionally bred cows, consumers are willing to pay large premiums to avoid milk from cloned cows. Their estimated WTP for organic versus nonorganic milk is $1.51 per gallon, which is approx. $0.4 per litre, while the WTP for non-cloned versus cloned milk is $4.71 per gallon, or $1.25 per litre.

Scanner data was not available to the researcher for the present study and the research budget only allowed for personal interviews to be performed on a group of consumers in Canterbury, UK. Personal interviews bring direct communication and can therefore provide a detailed understanding of specific aspects of the behaviour of individual consumers. In the present case, they additionally enabled a perfect match between stated and revealed preferences as they were obtained from the same consumers. In general, however, face to face interviews are arguably subject to a larger hypothetical bias. Scanner data allows for better coverage, larger samples, less human error and a richness of detailed data, but cannot always be tailored to specific requirements like personal interviews, suffers from attrition bias and tends to be very expensive (Einav et al., 2008; Leicester and Oldfield, 2009). There is also a sizable body of literature on non-hypothetical conjoint and non-hypothetical (or "real") choice experiments related to organic products that must be mentioned (for example, Chang, Lusk and Norwood, 2009; Lusk and Norwood, 2009; Norwood and Lusk, 2011). However, performing real experiments with food is difficult. Whitehead et al. (2008) provide a comprehensive assessment of the joint stated/revealed preference (SP/RP) literature but none of the studies mentioned actually strives to quantify the gap between SP/RP, unlike the present study which explicitly estimates this gap.[6]

3 Methodology

The present study combines contingent valuation with a hedonic pricing method, performs an external validity test and, finally, estimates elasticities for organic products. The theoretical underpinnings will only be summarised here, together with a brief introduction to the assumptions of the present study.

The contingent valuation method (CVM) is considered to be especially appropriate in the case of organic products, where in addition to the "classical non-use values" such as existence, bequest and option value, the wish to support local producers if organic is produced locally and to contribute to animal welfare may also be added.[7] Millock, Wier and Andersen (2004) and Wier et al. (2008) explicitly identify and quantify the existence, option and bequest values of organic products and also define altruistic and vicarious non-use values for organic products.[8] The main goal of CVM is to estimate via questionnaire the willingness to pay (WTP) of the consumer, a concept that finds its theoretical counterpart in the Hicksian measure "Equivalent Variation". After eliciting the WTP with the help of the questionnaire, usually this is next explained by various socioeconomic factors with the help of a linear regression of the form:

$$WTPz = ß_0 + ß_1 X_{1,z} + ß_2 X_{2,z} + ß_3 X_{3,z} + ß_4 X_{4,z} + ß_5 X_{5,z} + \ldots + \mu \qquad (1)$$

where μ is an error term with the usual properties (zero mean and constant variance), and X_1, X_2, ... are characteristics of the consumer z such as gender, age, education, income, number of children and other. The basic assumption behind the CVM is that respondents reveal the utility they derive from organic products within their stated WTP value. Revealed preferences are analysed with the help of the hedonic pricing method where the primary assumption is that goods are valued for their utility generating attributes and the observed market price is the sum of implicit prices paid for each quality attribute:

$$P_z = \alpha_0 + \alpha_1 b_{1,z} + \alpha_2 b_{2,z} + \alpha_3 b_{3,z} + \alpha_4 b_{4,z} + \alpha_5 b_{5,z} + \ldots + \nu \qquad (2)$$

where P_z is the price of the product paid by each consumer z, ν is a typical error term and b_1, b_2... are various attributes of the product such as the brand of the product, the quantity of the product, the shop where it has been purchased, or whether or not it is organic. In a competitive market, the marginal implicit price of any of these characteristics (e.g.$\partial P/\partial b_i$) represents a consumers' WTP for a marginal increase in that characteristic (Rosen, 1974). In our case, the attribute that we are interested in is "organic", markets are assumed to be competitive and both consumers and producers take prices as given.[9] Minimal additional assumptions are made which are common throughout the hedonic literature:

1. Utility depends on observable characteristics measured in the data and potentially on unobserved characteristics that are mean independent of the observed characteristics.

2. Consumers maximise utility, have complete knowledge of market environment and incur no search costs.

3. Producers maximise profits, and an equilibrium exits at the tangency point between the price acceptance function of the consumer and the opportunity function of the producer

(Rosen 1974).

4. The set of marketed products is rich enough to allow households to effectively bundle product characteristics.

Given the ongoing debate in the literature regarding the validity of the results using stated preferences, performing a validity test appears necessary.[10] The chosen test in the present case is the convergent (or external) validity test introduced by Brookshire et al. (1982) and refined by Pommerehne (1988). From the first-order condition of utility maximisation, the following equation can be derived:

$$C(U_z/U_x) = P'(Z) \tag{3}$$

implying that the marginal rate of substitution between organic food Z and the consumption good X, (U_z/U_x), valued at the cost C of the consumption good X is equal to the marginal costs for the organic good P'(Z) (see Appendix for the derivation of equation 3). From the second-order conditions, Brookshire et al. (1982) derive that in equilibrium the willingness to pay for an organic product should always be below the actual premium paid for it:

$$\text{WTP} \leq \Delta P'(Z) \tag{4}$$

The only condition being that the price gradient P(Z, F) must lie "below" the relevant indifference curve. Equation (4) provides the theoretical background for a comparison of the CVM with the HPM and serves as a test for the convergent validity of both measures.

Finally, the present dataset makes it possible to estimate both stated and revealed price elasticities. The "stated elasticity" is estimated using a question in the questionnaire about how consumers would react to a price change in organic products. The "revealed elasticity" is estimated using actual prices and actual quantities for the organic products purchased by our consumers. Initially, a Double-Log demand function is estimated (following Frisch, 1959):

$$\ln q_i = \alpha_0 + ß_1 \ln I_i + ß_2 \ln p_i + \varepsilon_i \tag{5}$$

where lnq is the quantity purchased in grams, InI is the natural logarithm of the household consumption expenditure (as a proxy for income), Inp_i is the natural logarithm of the price of the good and ε_i is an error term with the usual properties. The estimated coefficients $ß_1$ and $ß_2$ are the partial expenditure and price elasticities of demand, respectively. Results must be interpreted with care, because first, "stated elasticity" represents the price elasticity of spending, while "revealed elasticity" represents the price elasticity of demand. Second, the Double-Log estimation of demand provides only a very rough indication of the marginal effect of a price change on the quantity consumed. Due to this and other shortcomings, an Almost Ideal Demand System (AIDS)

a la Deaton and Muellbauer (1980), which has become common practice in such estimations (Fourmouzi et al., 2012), was also estimated. In this model, the demand equations for n goods can be expressed as a system of expenditure share equations:

$$w_i = \alpha_i + ß_i \log(Y/P) + \sum_j \gamma_{ij} \log P_j + \eta_i \qquad (6)$$

where i, j = 1,2, ...n, w_i is the expenditure share of good i, P_j is the price of good j, Y is the total expenditure, and P is an aggregate price index of the form:

$$log\, P = \sum j\, w_j\, log\, P_j \qquad (7)$$

and the slope coefficients of the model $ß_i$ and γ_{ij} are the expenditure and price effects on demand for the n goods.

4 Data and Questionnaire Design

The data were collected via questionnaire (see Appendix) on two different weekends in December 2013 in front of three different supermarkets in Canterbury: Marks & Spencer, Tesco and Waitrose. In the questionnaire, organic products were defined according to standards provided by the Soil Association, the most frequently encountered organic certification in the UK. A hypothetical scenario was constructed in which the price for organic products was decreased to the level of the average "comparable conventional product" and consumers were asked how their organic expenditures would change if the price premium would be zero. In order to estimate elasticities for stated preferences, the price was gradually decreased, and consumers were asked how their weekly consumption of organic products would change with each price change (in %). The chosen payment and bid vehicle is hence the price premium paid for the organic products, calculated as the difference between the price of the specific organic product and the average price paid in the shop for a "comparable conventional product". The "comparable conventional product" was chosen to be as similar as possible to the organic product with respect to size/quantity, appearance and package, except for the organic attribute.[11] Prices were obtained from the till receipts of the consumers and also from the websites of specific shops. Where more comparable conventional products were available, an average of their prices was calculated and compared to the price of the organic product. Following the best practice recommendation of the National Oceanic and Atmospheric Administration, face-to-face interviews were performed. Although hypothetical bias can be more significant in face-to-face interviews compared to Internet panels, problems related to non-response and representativeness are usually smaller (Lindhjem and Navrud, 2011). However, the main reason why face-to-face interviews were

chosen in the present study was because they could be performed by the author using her research budget, and this would not have covered access to scanner data. As mentioned previously, scanner data has many advantages but is also more expensive. The first version of the questionnaire was discussed with a focus group. The focus group consisted of six specialists from the University of Kent and 10 buyers of organic products. In the next step, the questionnaire was pretested in a pilot study.

Even though data was collected in front of three different supermarkets, the majority of surveys are from Waitrose customers. This was out of necessity, as more people from Waitrose were willing to answer our questionnaire, and it is of course a disadvantage, as usually consumers from Waitrose are wealthier. However, this is also a virtue, because mixing consumers in wrong proportions would imply the introduction of an incorrect weight to unobserved preferences, which would in turn diminish the strength of the work. Surprisingly, as can be seen from the descriptive statistics, our sample is a strong match to average UK statistics. A similar study in terms of data collection but very different in terms of purpose and empirical analysis was conducted by Krystallis and Chryssohoidis (2005) in Greece.

The number of collected questionnaires totalled 117, from which 104 valid surveys were used in the analysis. Thirteen surveys had to be discarded due to incomplete or inconsistent information. First, consumers were asked if they were willing to participate in the survey. Next, they were asked if they were willing to pay a premium for organic products. If the answer was "yes", the size of the premium was elicited. For this, premium intervals were constructed, and consumers were asked to "tick" the interval where their WTP lies. Midpoint averages were then used in order to calculate their WTP.[12] About 60% of the consumers stated that they were willing to pay an organic premium, but only 30% actually bought organic products.[13]

The questionnaire consisted of four major parts. The first and most demanding part was eliciting the revealed preferences. Every single food item the consumers bought was noted, together with the brand, quantity, price and organic attribute, using supermarket till receipts if necessary. In this way, very exact documentation of what consumers actually bought and paid for was obtained and could be compared to what consumers claimed that they wanted to purchase.

The second major part consisted of questions related to stated preferences and WTP for organic products, followed by questions aimed at eliciting the stated elasticity of organic products. Consumers were asked the following: If the price premium for organic products decreased by a specific percentage interval, how much more would they spend per week on organic products? The price premium was gradually decreased to zero, where the price for organic products was equal to the price for comparable conventional products.

The third part of the questionnaire contained questions related to personal attitudes towards

organic products and reasons for buying or not buying organic products. The advantage of the present dataset is that it allows for the analysis of how the given reasons impact both stated WTP and true consumption behaviour and for a comparison of the results.

The last part of the questionnaire sought to elicit socioeconomic information related to consumers. In addition to the typical socioeconomic characteristics, such as gender, age, income and others that have been previously found to significantly impact organic consumption, questions were asked about self-assessments of health and happiness. To our knowledge, organic consumption's relationship to any of these variables has not previously been analysed. The dataset also allows for the control of the stated weekly exercise and the stated number of daily consumed fruits and vegetables as measures for individual lifestyle, as lifestyle has been found to be correlated to organic consumption (Welsch, 2012).[14]

5 Empirical Results

Descriptive statistics regarding consumers and the organic products they have purchased can be found in Tables 1 and 2. Our typical consumer appears to be a mature, married woman with a college education living together with her partner in the household, with an average net monthly income of 2049.51 British Pounds (£), which is about the average income in the UK. She eats on average 2-3 fruits and vegetables per day, exercises on average between 1/2 and 1 hour per week, and considers herself to be quite healthy and happy. Typically, if there are any children, they have left home. Even though we do not claim representativeness, one can observe by comparison with the last column in Table 1 that the characteristics of the sample of respondents used in this study match relatively well with those of the UK as a whole, except that the sample consists of a larger share of women than is present in the UK population and of primary grocery shoppers, as typically is the case in studies related to food consumption (e.g., Brooks and Lusk, 2010).

[Table 1 near here]

Table 2 reveals that on average consumers bought around two (at most 10) organic items. The most commonly purchased organic products were milk, bananas, carrots and apples, which confirms the results obtained in the literature, according to which the most commonly purchased organic products are produce and dairy (e.g., Griffith and Nesheim, 2008; Fearne, 2008; Padel and Foster, 2005; USDA, 2015). These products are also the least expensive organic products in our sample. However, they are not the products with the lowest premium. The premium for organic products can indeed be negative, because organic products can become cheaper than conventional products when there are special offers. Additionally, before expiry, the prices of organic products are reduced, and they can become significantly cheaper than conventional products. However, our consumers do not seem to want to primarily buy these products with a negative premium.[15] The

products with the highest premium in the present sample are, with the exception of bananas, meat products.[16] Both chicken and beef (as categories) have premiums equal to or larger than 100%.

[Table 2 near here]

Table 3 sheds further light on the spending of consumers in different product categories. It reveals that the largest percentage of organic products bought per category is for milk/dairy. Spending in this category as a percentage of total spending on organic products is also highest. The next category with the largest spending as a percentage of total spending on organic products is meat, although the percentage of products purchase, after cereals, is the lowest. Organic produce has a lower percentage of total spending per category, but more than twice as many products are bought. Organic cereals are low in terms of the percentage of spending per category, but there are also fewer products bought. From Table 2, it can be observed that the most expensive organic products seem to be beef and chicken. Indeed, meat seems to be not only the most expensive organic product, but also the least bought. On average, our consumers seem to spend £3.84, or about 26% of their total purchases, on organic products, which is arguably more than usually found in the literature. For example, Griffith and Nesheim (2008) find a share of total expenditures on organic products of 1.4 % (Table 1, page 41); Wier et al. (2008) find an average organic budget share of 2.8% in the UK and 4.4% in Denmark (Table 1, page 410); and Griffith and Nesheim (2013) find a share of organic expenditures of 2.1%, with a substantial variation for UK consumers.[17] [18]

[Table 3 near here]

Table 4 shows an initial comparison between the average premium paid by consumers and their stated average WTP. The average WTP was calculated by taking the average of the stated premium in the questionnaire (question 2(iii)). This is of course a very rough aggregation which obscures the variations across products and across households in bounds on the WTP for the baskets of goods. In computing the WTP for an entire basked, the WTP would need to be defined in terms of the characteristics of all the goods in the basket. Griffith and Nesheim (2008) for example computed the WTP by defining common characteristics for all product categories (such as organic, brand, fascia, package size, time and region effects) and also in terms of category-specific characteristics (such as variety, flavour and origin). Unfortunately, this data was not available for the present study.

[Table 4 near here]

Even though people in our sample stated that they would be willing to pay on average a premium for organic products of about 13%, in reality they pay on average just 9%. This implies a gap

between the stated and revealed preferences of about 4%, and this gap is significantly different from zero.[19] The ratio between stated and revealed preferences is 1.42, which approaches the rate of 1.35 identified by Murphy at al. (2005). Therefore, we can indeed say that "people do not put their money where their mouths are" (Toma et al., 2011).

Nevertheless, the correlation between stated and revealed preferences is about 0.6 and is highly significant. This implies that in general people that state they are willing to pay a higher premium for organic products also pay a higher premium. They may not pay as much as they said they would, but consumers with a higher WTP also seem to pay more in the present sample. Therefore, despite a small but significant gap between stated and revealed preferences, the behaviour of the consumers seems to be consistent. A similar result was obtained by Brooks and Lusk (2010) when analysing the stated and revealed preferences for cloned milk in the US. The authors found that even if the hypothesis of equal SP and RP parameters could be rejected, the correlation between the two is positive and significant, which demonstrates that SP and RP choices are "clearly related".

5.1 Revealed Preferences Results (HPM) and Validity Test

Table 5 presents the results of the hedonic price regression described in equation (2), where the price paid for each specific product by each consumer is explained with the help of various attributes of the product, such as the shop where the product was purchased, the brand of the product, the organic attribute and the quantity bought.[20] Each of these attributes is supposed to determine the price that the consumers pay for the specific product. For example, consumers may be ready to pay a higher price in order to be able to purchase the product in the same shop where they also buy other products. The attribute that we are most interested in is "Organic".

[Table 5 near here]

Table 5 reveals that when controlling for specific product attributes, the organic coefficient is positive and significant (albeit only at 10%) and takes values identical or slightly larger than the average WTP of 13%. This means that consumers actually pay between 13-14% more for organic products when controlling for other factors. This also means that the validity test condition (4), namely, that the WTP has to be lower than or equal to the hedonic pricing gradient, is fulfilled. The stated WTP was on average 13.08, and the hedonic price gradient takes a value between 13% and 14%. According to the test developed by Brookshire et al. (1985), this means that "The empirical results provide evidence towards the validity of the survey methods". Additionally, this means that what we are capturing with our gap is not the consumer surplus, because if we control for other factors, the WTP becomes smaller than or equal to the actual price premium paid.[21]

The same table reveals that it is cheaper to buy at Tesco's as opposed to the luxury supermarket chain Waitrose, and indeed, buying the shop's own brand is cheaper. Since the price cannot be negative, we have tried various specifications that take only positive values.[22] The results were robust. Multicollinearity was not present, and we corrected for heteroscedasticity using robust standard errors. Additionally, a hedonic price regression for each product category has been estimated. Results are presented in Table 12 of the Appendix. The results seem to suggest that the organic attribute contributes most strongly to the price of the category "Meat", followed by the category "Produce". However, as the last row in the table reveals, the number of observations for cereals and meat is very low, and therefore the results must be interpreted with care. We have also tried to estimate the lower and upper bounds of the WTP, similar to Griffith and Nesheim (2008, 2010, 2013), with the average lower bound being close to the revealed WTP of 9% and the upper bound (assuming that all of the goods in the basket would be organic) of 51.9%. However, we capture just one shopping trip, and it is not clear that this reflects the consumption basket of the average consumer. Results are presented in Table 13 of the Appendix.

5.2 Explaining the Stated Willingness to Pay

After estimating the average willingness to pay for organic products (as being around 13% above conventional), in a second step, this WTP is usually explained using various consumer-specific characteristics. In addition to the usual characteristics such as gender, marital status, income, age, education, number of children and household members, a set of lifestyle-related variables such as the number of fruits and vegetables eaten per day, exercise, self-reported health and happiness, which may be related to organic consumption, was collected. Results are presented in Table 6.

[Table 6 near here]

Since the WTP cannot be lower than zero and is discrete, various specifications that accommodate for this have been used. The best results have been obtained with the Poisson regression, which assumes the response variable has a Poisson distribution. The Poisson distribution appears to be especially suited in the present case since it is a discrete probability distribution that takes values above zero, which is in general the case for the WTP variable. Additionally, the Negative Binomial and the Tobit regression have been employed as robustness tests, yielding on average similar results.

The WTP rises with the average premium paid, confirming that people who are willing to pay a higher price (premium) also pay one. The WTP for organic products is positively and significantly correlated with the quantity of organic products purchased, which seems intuitive. People who buy more organic products also want to pay more for them. However, the larger the total quantity of food bought, the lower the WTP for organic. The coefficient of total quantity bought is negative and highly significant. The more food people buy in general, the less they seem to be

willing to pay an organic premium. As opposed to other organic studies, which found that women behaved differently than men with respect to organic consumption and even sometimes ran separate regressions for women and men, we did not find that gender has a significant impact on the WTP. Surprisingly, age has a significantly negative impact on the WTP for organic products in the first specification. This negative impact was also identified by Arbindra et al. (2005) and Padel and Foster (2005). Given the result for age, the result for education is not surprising. A similar result related to age and education was obtained by Lockie et. al (2004). The number of children has a significantly negative impact on the WTP for organic products in the first specification. This may seem surprising, since people may want their children to have a healthy diet. However, at the same time, large families may lack the means to buy organic products. Tiffin and Arnoult (2010) found, for example, that "the presence of children in a household has a negative impact on dietary quality". Moreover, the result for children is not significant in the other two specifications. People with a higher income state that they are willing to pay a higher premium for organic food, and both health and happiness have a positive impact on the stated WTP in the first specification. In the next two, these effects are insignificant. Will the results hold when analysing actual behaviour?

The advantage of the present dataset is that it also allows us to analyse the impact of observed socioeconomic characteristics on actual/revealed behaviour. Total spending on organic products by each consumer has been calculated, and the impact of the previously described variables on it could also be analysed. Results are presented in Table 7.

[Table 7 near here]

It must be noted that we do not expect to find the same results as in the case of the stated WTP. Previous literature demonstrates that results differ when comparing stated with revealed behaviour. Millock, Weir and Andersen (2004), for example, reveal that even though people state that they buy organic products because of their non-use values, such as higher animal welfare and environmental friendliness, in reality they seem to buy them because of their use values, such as health and taste. The present results demonstrate that the impact of children on actual organic consumption is, if anything, positive, as we would expect. People with children usually are more cautious about their food intake and try to provide higher quality food for their children. A similar result for the positive impact of children and the negative impact of education on organic produce consumption was obtained by Thompson and Kidwell (1998). At the same time, even though people with higher incomes state that they want to pay more for organic products, it appears that people with lower incomes buy them. This is rather surprising. It could be expected that better-educated people with higher incomes spend more on organic products. This uncommon result may stem from the specificity of our sample and may also be related to age. We have in our sample mainly consumers from Waitrose, which is an upmarket retailer, more expensive and more commonly visited by wealthier consumers. One explanation might be that among wealthy consumers, those who are less wealthy (or less educated) spend more on organic products, and

this is why a negative coefficient for income (or education) is obtained in the present sample. The present results clearly reveal a discrepancy between the impact of various variables on stated and revealed preferences, and this result is also apparent in the extant literature. This discrepancy demonstrates the importance of collecting and interpreting not only stated, but also revealed preferences, and it underlines the importance of the present study. The stated number of fruits and vegetables consumed per day does, however, seem to positively affect organic spending. At least a portion of the fruits and vegetables consumed may be organic. Exercise seems to have a negative impact, suggesting that some compensation effect may be in place. Health and happiness no longer seem to have the same clear-cut impact on actual organic consumption as they did on stated WTP. However, as can be seen from the next table, consuming more produce does seem to impact positively and significantly on both self-reported health and happiness.

[Table 8 near here]

5.3 Reasons for Buying or Not Buying Organic Products

Part three of the questionnaire deals with personal attitudes towards organic products and addresses reasons for purchasing or not purchasing them. The catalogue of attitudes and reasons was constructed after consulting comprehensive literature reviews with respect to organic food (Yiridoe et al., 2005; Aersens et al., 2009; Hemmerling et al., 2015). This is a very important question that does not seem to have been sufficiently researched until now in the UK.[23] In terms of question type and structure, the questionnaire was comprised of Likert-scale types of questions, with five options ranging from "Strongly Disagree" to "Strongly Agree", to ascertain the reasons in support of buying organic, and from "Not a problem at all" to "A major obstacle to purchasing organic products" to ascertain the reasons in opposition to buying organic products. The reasons that supported the purchase of organic included both the typical use value reasons such as health, better taste, freshness, safety, and the typical non-use value reasons such as environment, animal welfare and support of local production if organic is local. The reasons that opposed the purchase of organic usually found in the literature are high price, limited range available, perishability, poor aesthetic appearance, difficult to identify as organic, difficult to find on the shelf, poor advertising and other. Results are presented in Figures 1 and 2.

[Figure 1 near here]

As can be observed in Figure 1, consumers stated that their main reasons for buying organic are, rather, non-use values such as environment and animal welfare. Habit formation also seems to play a major role. Only in fourth place comes a reason related to a use-value such as health.

Support of local production takes fifth place, and only then follow the other "classical" use value reasons such as better taste, safety and freshness. According to the stated reasons, non-use values seem to be the driving force behind the purchase of organic products. But are these the "true" reasons?

If we analyse the stated reasons for not buying organic products we can observe from Figure 2 that price seems to be by far the strongest barrier. The next largest impediment in purchasing organic is stated to be the limited range of organic products. The UK market has organic options for many animal products and vegetables. It is, however, true that within each choice set there are not many options. Therefore, this may be considered a legitimate reason for not buying organic, even if the price of organic products is equal to that of conventional products. "Poor advertising" is ranked as the next barrier against buying organic products. Indeed, both in the public media and in the shops, organic products are poorly advertised, if at all. Another reason identified by consumers as important in the opposition to buying organic products is their perishability. Consumers do not seem to like to purchase products that expire rapidly.[24] The next stated reason against buying organic is the organic label and the mistrust in it. Consumers feel that it is difficult to recognize organic products and to trust the organic label. Surprisingly, consumers do not acknowledge their habit of buying specific conventional products as a main barrier against buying organic, and they do not seem to believe that the appearance of organic products is poor.

[Figure 2 near here]

In the next step, we can again use the advantages of the present dataset to combine stated and revealed preferences in order to analyse how the mentioned reasons for and against buying organic affect actual organic consumption. Results are presented in Table 9.[25] Since the dependent variable – organic spending – is continuous but truncated at zero, we present the results of regressions that take this into account. Table 9 reveals that among the reasons for buying organic, the only ones that impact positively and significantly on organic spending are 'Health' and 'Taste', with 'Health' being stronger significant than 'Taste'. Much like the results obtained in the literature, we found that even though people want to be good citizens and state that they are concerned with the environment and animal welfare, when they are in front of the shelf, they decide to buy a product for purely "egoistic reasons", such as better health and better taste (Millock, Wier and Andersen, 2004; Verhoef, 2004; Wier et al., 2008).[26] However, in returning to the reasons against buying organic and their effects on actual organic spending, it can be observed that stated and revealed reasons are similar. The price was the main stated reason against buying organic, and it is also negatively and significantly affects organic spending. Another stated reason that has a significantly negative impact on organic spending is low availability, or the limited range, of organic products, followed by poor advertising and high perishability. Regarding the reasons against buying organic products, consumers seem to be more consistent. Therefore, these

reasons may deserve special political attention.

[Table 9 near here]

5.4 Elasticity Results

An important question concerned whether pricing policies could affect organic consumption. For this, we need to know how the demand for organic products would react to a price change, and therefore calculate the elasticity of demand. The "stated elasticity" was determined via the questionnaire by asking consumers the following question(s): "If the price of organic products decreased by 10% (10-20%, 20-30%, and > 30%), how much more would you spend on organic products per week?" The options were also given in percentages, and therefore, the "stated elasticity" of organic spending could easily be calculated for each consumer as the ratio between the two. Averages per consumer were calculated, and then an average absolute value of 1.34 was obtained for all consumers, which means that the stated demand for organic products is elastic in our sample, and that a decrease in price of 10% would lead to an increase in weekly spending for organic products of 13.4%. Therefore, if the price of organic products decreased, the stated demand would increase by more than the price decreases, and total sales revenues for the supermarket would increase.[27]

Additionally, the following question was asked: "How much more would you expect to spend per week for organic products if the prices of the organic products were the same as the prices for similar conventional products?" to which 50% of the consumers answered 30% or more, which was the highest percentage available. On average, consumers stated that they would spend 22.9% more for organic products per week if the price would decrease to the level of conventional products. Consumers therefore stated that they would react strongly to price policies, but is this also reflected their revealed behaviour?

Using the Double-Log estimation given by equation (5), a value of -0.63 was obtained for the price elasticity of organic products (coefficient ß$_2$ in equation 5), and a value of -0.11 was obtained for conventional products, which means that consumers would react six times stronger to a price change to organic products when compared with conventional products (Table 10).

[Table 10 near here]

However, as previously explained, results must be interpreted with care due to various shortcomings of the Double-Log estimation. Consequently, the AIDS estimation, which is now considered state of the art, has been employed. Data was aggregated in four food categories: milk/dairy, produce, meat and cereals (for organic and conventional), and the "quaids" command in Stata was used, as suggested by Poi (2012). Results are presented in Table 11 per product category and are averaged per food type (organic versus conventional).

[Table 11 near here]

The average expenditure elasticities for organic products were above one (1.09), with the second highest expenditure elasticity for organic meat (1.12). For conventional products, the average elasticity was below one (0.89), with the highest elasticity for conventional produce (1.39). This may suggest that when prices of organic products increase, consumers react elastically and switch to conventional products, and when prices of conventional products increase, they have no other products to substitute, and therefore their reaction is less elastic, with the exception of produce, which they may decide to buy less. Both the "stated" and the "revealed" elasticities for organic products suggest a strong response to a price reduction, and therefore, a potential strong effect of price policies. Similarly, even higher elasticity values have been obtained in other studies for organic products (Wier et al., 2001; Bernard and Bernard, 2009).

6 Conclusions

The present study combines hedonic methods with an analysis of personal attitudes towards the purchase of organic products in order to explain both stated and revealed behaviour with respect to these products. At the same time, the study estimated price elasticities based on primary data collected from a sample consisting of about 100 consumers in Canterbury, UK. Combining stated and revealed preferences is important because stated behaviour is often biased, and policy recommendations based exclusively upon stated preferences may not lead to the desired result. For example, the present results suggest that even though people in this sample state that they are willing to pay a price premium of about 13% for organic products, in reality they pay just 9%. Although this gap is not large and disappears after controlling for other factors, it represents an indicator that consumers in our sample are fairly restrictive in terms of the amount they will pay for organic products.

The results also suggest that even though people in the present sample state that they want to buy organic products because they are environmentally friendly and involve higher animal welfare, in reality they seem to buy them for their better taste and health.[28] These are the attributes that consumers seem to appreciate most when buying organic products, which suggests they could be emphasized more strongly in advertisements. The behaviour of our consumers is not always consistent, but special attention could be accorded to situations when this is nevertheless the case. Consumers were consistent with respect to their reasons for not buying organic products and these may deserve special attention. Price, limited range, poor advertising and high perishability appear to represent the main barriers against buying organic products when analysing both stated and revealed behaviour in the present sample. In particular, the price for meat seems to be too high, since only about 3% of the meat products bought are organic, and the premium for organic meat is among the highest.

Another result where consumers were consistent was with respect to their response to a price change in organic products. Fifty percent of consumers stated that they would spend 30% and more on organic products if their price were the same as that of conventional products. The elasticity, both stated and revealed, is higher for organic than for conventional products, suggesting a strong response to price changes, indicating that pricing policies may be effective in the present case.

One potential implication of the present study could be that price policies, together with a more intensive promotion of organic products for their health benefits and better taste, may represent a successful retail marketing strategy.[29] However, the present results must be tested in a larger sample before strong policy conclusions can be drawn.

7 Research Limitations and Future Perspective

The primary limitation of the present study is the sample size and its presumptive restricted representativeness, even though descriptive statistics closely match UK average statistics.[30] Another important shortcoming of the present study is the availability of characteristics common to all product categories, and characteristics specific to product categories. Having this data available would allow for a better aggregation of the WTP for purchases of organic products and the more accurate computation of the lower and upper bounds of WTP, similar to the studies of Griffith and Nesheim (2008, 20010, 2013). Market data with detailed characteristics is often collected and sold by private companies. However, this data was not available for the present study. Not having this data obscures the variation across products and across households in assessing the boundaries of WTP for purchases of organic products, and this phenomenon must be more carefully addressed in future studies. Future work might also consider choice experiments, including a truth-inducing mechanisms and/or "consequential purchasing" as a superior but also more challenging econometric approach. A joint estimation of both stated and revealed preferences, similar to the work of Adamowicz et al. (1994), or more recently Brooks and Lusk (2010), may result in a more efficient estimation and more robust results. Finally, a larger dataset would allow for a more representative sample from the UK, which would further allow for an analysis per shop, per gender, per product category, per season and per buyers/non-buyers to estimate the elasticity with a larger number of observations and to estimate lower and upper bounds of WTP based upon a more representative shopping basket. This may lead to stronger results and important additional insights into the organic consumption behaviour of residents in the UK.[31]

Notes

[1] Source:https://www.soilassociation.org/news/2016/organic-market-report-2016/
[2] Available at:http://www.fibl.org/en/media/media-archive/media-release/article/bio-waechst-weltweit - weiter-509-millionen-hektar-bioflaeche-biomarkt-ueber-80-milliarden-us-dollar.html
[3] http://ofgorganic.org/farm-minister-supports-uk-organic/
[4] Metastudies such as the ones by Little and Berrens (2004) and List and Gallet (2001) find higher ratios but they use also WTA studies and it is known that usually WTA>WTP.
[5] When we control for various characteristics we obtain for all organic products an average price premium between 13 and 14 % which similar to Griffith and Nesheim (2008).
[6] Even though Brooks and Lusk (2010) data would allow for a SP-RP comparison, this is not the main focus of the study.
[7] There is a growing body of literature that shows a potential trade-off between organic/local food consumption (see for ex. Loureiro and Hine 2002; Lusk and Briggeman 2009; Adams and Salois 2010; Gracia et al. 2014; Thong et al. 2015). For a study that finds that organic commands a premium even when the food is already local see Connolly and Klaiber (2014).
[8] Altruistic value refers to the utility derived from knowing that other people that value organic can buy it. Vicarious value refers to the utility derived from indirect consumption i.e. reading in the newspaper about local producers, looking at TV programs about organic etc.
[9] This is the basic assumption beyond the hedonic pricing model, however, the retail market is often oligopolistically structured.
[10] See debates in the Journal of Economic Perspectives from 1994 and 2012.
[11] Ideally, the conventional and the organic product would have been similar in more characteristics. Unfortunately, data for these characteristics was not available for the bought organic product.
[12] Interval regressions estimated similar results.
[13] The organic premium may exceed their WTP, or, more probable the desired organic products were not bought on the day.
[14] The Questionnaire can be found in the Appendix.
[15] Unfortunately, the least bought organic products could not be determined because too many products have been bought just once.
[16] The premium for bananas is not high because organic bananas are expensive but because conventional bananas are among the cheapest soft fruits costing half as much as for example apples.
[17] FiBL Organic statistics available at:http://www.fibl.org/en/themes/organic-farming-statistics.html
[18] This may also reflect the fact that most consumers come from Waitrose which is a supermarket with a high variety of organic products.
[19] Controlling for various factors reduces the gap.
[20] The basis for this regression is the revealed data collected in the first part of the questionnaire.
[21] In order to have a positive consumer surplus the WTP should have exceeded the prices paid. The fact that after controlling for various factors the WTP becomes equal or smaller than the prices paid proves that what we are capturing is not consumer surplus.
[22] Log-linear, Poisson, Negative Binomial, Double-Log and other.
[23] Exceptions are: Makatouni (2002), Baker (2004), Padel and Foster (2005), Fearne (2008), Griffith and Nesheim (2008, 2010, 2013).
[24] However, if the products shall be preservative-free, they may expire sooner.
[25] Results control for the quantity consumed and for various socio-economic factors.
[26] A disclaimer has to be made here for vegetarians or people eating low quantities of meat. They may value organic products for their animal welfare attribute, nevertheless, this may not be reflected in their

organic spending. Ideally, we would run the regressions per product category. Unfortunately, the number of observations per category was too low for such an analysis.

[27] Profits from organic products might nevertheless decrease as costs might exceed the revenues but a price reduction would lead to a disproportionate increase in consumption.

[28] Table 9 reveals that environmentally friendly production and animal welfare had no significant impact on actual organic spending.

[29] Price reductions without intensive advertisement may not be perceived by the consumers and may therefore, not be successful, as revealed by an experiment for organic products performed in Netherlands in 2006 (Bunte et al. 2010).

[30] As Table 1 reveals.

[31]However, such an analysis would also require significantly more funding.

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References

Adamowicz, Wiktor, Louviere, Jordan and Michael Williams. 1994. "Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities." Journal of Environmental Economics and Management 26: 271-292. https://doi.org/10.1006/jeem.1994.1017.

Adams, Damian and Matthew J. Salois. 2010. "Local versus organic: A turn in consumer preferences and willingness-to-pay." Renewable Agriculture and Food Systems 25(4): 331-341. doi:10.1017/S1742170510000219.

Aertsens, Joris, Wim Verbeke, Koen Mondelares, and Guido van Huylenbroeck. 2009. "Personal determinants of organic food consumption: a review." British Food Journal 111(10): 1140-1167. http://dx.doi.org/10.1108/00070700910992961.

Arbindra, P. Rimal, Wanki Moon, and Siva Balasubramanian. 2005. "Agro-biotechnology and organic food purchase in the United Kingdom." British Food Journal 107(2): 84-97. http://dx.doi.org/10.1108/00070700510579162.

Aschemann-Witzel, Jessica, and Emilie Marie Niebuhr-Aagaard. 2014. "Elaborating on the attitude-behaviour gap regarding organic products: young Danish consumers and in-store food choice." International Journal of Consumer Studies 38: 550-558. doi: 10.1111/ijcs.12115.

Azevedo, Christopher D., Joseph A. Herriges, and Catherine L. Kling. 2003. "Combining Revealed and Stated Preferences: Consistency Tests and Their Interpretations" American Journal of Agricultural Economics 85(3): 525-537. https://doi.org/10.1111/1467-8276.00453.

Baker, Susan, Keith E. Thompson, Julia Engelken, and Karen Huntley. 2004. "Mapping the values driving organic food choices Germany vs UK." European Journal of Marketing 38(8): 995-1012. doi:http://dx.doi.org/10.1108/03090560410539131.

Bernard, C. John, and Daria.J. Bernard. 2009. "What Is It About Organic Milk? An Experimental Analysis." American Journal of Agricultural Economics 91(3): 826-836. doi: 10.1111/j.1467-8276.2009.01258.x.

Blow, Laura, Martin Browning, and Ian Crawford. 2008. "Revealed Preference Analysis of Characteristics Models." Review of Economic Studies 75(2): 371-389. https://doi.org/10.1111/j.1467-937X.2008.00485.x.

Brookshire David S., Mark A. Thayer, William D. Schulze and Ralph C. D'Arge. 1982. "Valuing Public Goods: A Comparison of Survey and Hedonic Approaches." The American Economic Review 72(1): 165-177.

Brooks, Kathleen, and Jayson L. Lusk. 2010. "Stated and Revealed Preferences for Organic And Cloned Milk: Combining Choice Experiment and Social Scanner Data." American Journal of Agricultural Economics 92(4): 1229-1241. doi:10.1093/ajae/aaq054.

Bunte, Frank H. J., Michiel A. Van Gallen, W. Erno Kupier, and Gemma Tacken. 2010. "Limits to Growth in Organic Sales." De Economist 158(4):387-410. doi:10.1007/s10645-010-9152-3.

Carson, Richard T., Nicholas E. Flores, Kerry M. Martin, and Jennifer L. Wright. 1996. "Contingent Valuation and Revealed Preference Methodologies: Comparing the Estimates for Quasi-Public Goods." Land Economics 72(1): 80-99. http://www.jstor.org/stable/3147159.

Carson, Richard T., and Theodore Groves. 2007. "Incentive and informational properties of preference questions." Environmental and Resource Economics 37(1): 181-210. doi: 10.1007/s10640-007-9124-5.

Chang Jae Bong, Jayson L. Lusk, and Bailey Norwood. 2009. "How Closely Do Hypothetical Surveys and Laboratory Experiments Predict Field Behavior?" American Journal of Agricultural Economics 91(2): 518-534. doi:10.1111/j.1467-8276.2008.01242.x.

Connolly, Christina and H. Allen Klaiber. 2014. "Does Organic Command A Premium When The Food Is Already Local?" American Journal of Agricultural Economics 96(4): 1101-1116. doi:10.1093/ajae/aau030.

Cummings, Ronald G., David S. Brookshire, and William D. Schulze. 1986. Valuing Environmental Goods; A State of the Arts Assessment of the Contingent Valuation Method. Totowa, NJ: Rowman and Allanheld.

Deaton, Angus, and John Muellbauer. 1980. "An Almost Ideal Demand System." American Economic Review 70(3): 312-326. http://www.jstor.org/stable/1805222.

Einav, Liran, Ephraim Liebtag and Aviv Nevo. 2008. On the accuracy of Nielsen Homescan data. US Department of Agricultural Research Report 69, Washington, DC:USDA.

Fearne, Andrew. 2008. Organic fruit and vegetables who buys what and why and do we have a clue? Report commissioned by the Fresh Produce Consortium and the Fresh Produce Journal, for the Re:fresh Conference 2008. Canterbury, UK: dunhumby Academy of Consumer Research.

Gerrard, Catherine, Meike Janssen, Laurence Smith, Ulrich Hamm, and Susanne Padel. 2013. "UK consumer reactions to organic certification logos" British Food Journal 115(5): 727-742. doi:http://dx.doi.org/10.1108/00070701311331517.

Frisch, Ragnar. 1959. "A Complete Scheme for Computing All Direct and Cross Demand Elasticities in a Model with Many Sectors." Econometrica 27(2): 177-196. http://www.jstor.org/stable/1909441.

Fourmouzi, Vasiliki, Margarita Genius, and Peter Midmore. 2012. "The Demand for Organic and Conventional Produce in London, UK: A System Approach." Journal of Agricultural Economics 63(3): 677-693. doi: 10.1111/j.1477-9552.2012.00353.x.

Gracia, Azucena, Jesus Barreiro-Hurle, and Belinda Lopez-Galan. 2014. "Are Local and Organic Claims Complements or Substitutes? A Consumer Preferences Study for Eggs." Journal of Agricultural Economics 65 (1): 49–67. doi:10.1111/1477-9552.12036.

Griffith, Rachel, and Lars Nesheim. 2008. Household Willingness to Pay for Organic Products. CEPR Discussion Paper No. DP6905, Available at SSRN: http://www.cemmap.ac.uk/wps/cwp2410.pdf.

Griffith, Rachel, and Lars Nesheim. 2010. *Estimating household's willin*gness to pay. Cemmap Working Paper CWP24/10, Available at Cemmap: https://ssrn.com/abstract=1240215.

Griffith, Rachel, and Lars Nesheim. 2013. "Hedonic methods for baskets of goods." Economics Letters 120: 284-287. doi:https://doi.org/10.1016/j.econlet.2013.04.040.

Hemmerling, Sarah, Ulrich Hamm and Achim Spiller. 2015. "Consumption behaviour regarding organic food from a marketing perspective - a literature review." Organic Agriculture 5(4): 277-313.doi:10.1007/s13165-015-0109-3.

Janssen, Meike, and Ulrich Hamm. 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.doi::10.1016/j.foodqual.2011.12.004.

Krystallis, Athanasios and George Chryssohoidis. 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.

Leicester, Andrew and Zoe Oldfield. 2009. An analysis of consumer panel data. IFS Working Paper W09/09.

Lindhjem, Henrik, and Stale Navrud. 2011. “Using Internet in Stated Preference Surveys: A Review and Comparison of Survey Modes.” International Review of Environmental and Resource Economics 5, 309-351.

List, John. A., and Craig A. Gallet. 2001. “What Experimental Protocol Influence Disparities between Actual and Hypothetical Stated Values?” Environmental and Resource Economics 20 (3): 241-24.

Little, Joseph, and Robert Berrens. 2004. “Explaining Disparities between Actual and Hypothetical Stated Values: Further Investigation Using Meta-Analysis.” Economics Bulletin 3: 1-13.

Lockie, Stewart, Kirsten Lyons, Geoffrey Lawrence, and Janet Griece. 2001. “Choosing organics: a path analysis of factors underlying the selection of organic food among Australian consumers.” Apetite 43: 135-146. doi:10.1016/j.appet.2004.02.004

Loomis, John B. 2014. “Strategies for Overcoming Hypothetical Bias in Stated Preference Surveys.” Journal of Agricultural and Resource Economics 39(1): 34-46.

Loureiro, Maria L., and Susan Hine. 2002. “Discovering Niche Markets: A Comparison of Consumer Willingness to Pay for Local (Colorado Grown), Organic, and GMO-Free Products.” Journal of Agricultural and Applied Economics 34(3): 477-487. doi:10.1017/S1074070800009251.

Lusk, Jayson L. and Brian C. Briggeman. 2009. “Food Values.” American Journal of Agricultural Economics 91: 184-196. https://doi.org/10.1111/j.1467-8276.2008.01175.x.

Lusk, Jayson L. and F. Bailey Norwood. 2009. “Bridging the gap between laboratory experiments and naturally occurring markets: An inferred valuation method.” Journal of Environmental Economics and Management 58: 236-250.doi:10.1016/j.jeem.2008.12.003.

Makatouni, Aikaterini. 2002. “What motivates consumers to buy organic food in the UK?” British Food Journal 104(3/4/5): 345-352. doi: http://dx.doi.org/10.1108/00070700210425769.

Millock, Karin, Mette Wier, and Laura Morch Andersen. 2004. Consumer demand for organic

foods - attitudes, values and purchasing behaviour. archived at: http://orgprints.org/4754.

Mitchell, Robert Cameron, and Richard T. Carson. 1989. Using Survey to Value Public Goods: The Contingent Valuation Method. Baltimore, MD: John Hopkins Univ. Press for Resources for the Future.

Murphy, James J', P. Geoffrey Allen, Thomas H. Stevens, and Darryl Weatherhead D. 2005. "A Meta-Analysis of Hypothetical Bias in Stated Preference Valuation." Environmental and Resource Economics 30, 313-325.

Norwood, F. Bailey, and Jayson L. Lusk. 2011. "Social Desirability Bias in Real, Hypothetical and Inferred Valuation Experiments." American Journal of Agricultural Economics 93(2): 528-534. doi: 10.1093/ajae/aaq142.

Organic Food and Drink Market Assessment. 2012. Provided by http://www.reportlinker.com/report/.

Organic Trade Association. 2017. Industry Statistics and Projected Growth. Available at: http://www.ota.com/organic/mt/business.html

Padel, Susanne, and Caroline Foster. 2005. "Exploring the gap between attitudes and behaviour. Understanding why consumers buy or do not buy organic food." British Food Journal 107(8): 606-625.doi:10.1108/00070700510611002.

Poi Brian P. 2012. "Easy demand-system estimation with quaids." The Stata Journal 12(3): 433-446.

Pommerehne, Werner W. 1988. Measuring Environmental Benefits: A Comparison of Hedonic Technique and Contingent Valuation: Welfare and Efficiency in Public Economics." Springer Berlin Heidelberg: 363-400.

Rosen, Sherwin. 1974. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition." The Journal of Political Economy 82(1): 34-55.

Schuldt, Jonathon P. and Norbert Schwarz. 2010. "The 'organic' path to obesity? Organic claims influence calorie judgments and exercise recommendations." Judgment and Decision Making 5(3): 144-150.

Soil Association. 2013. Organic Market Report 2013. Bristol UK.

Soil Association. 2016. Organic Market Report 2016. Bristol UK.

Soil Association. 2017. Organic Market Report 2017. Bristol UK.

Meas, Thong, Wuyang Hu, Marvin T. Batte, Timothy A. Woods, and Stan Ernst. 2015. "Substitutes or Complements? Consumer Preference for Local and Organic Food Attributes." American Journal of Agricultural Economics 97 (4): 1044–1071. doi:10.1093/ajae/aau108.

Thompson Garry. D., and Julia Kidwell. 1998. "Explaining the Choice of Organic Produce: Cosmetic Defects, Prices, and Consumer Preferences." American Journal of Agricultural Economics 80: 277-287.

Toma, Luiza, Alistair McVittie, Carmen Hubbard, and Alistair W. Stott. 2011. "A Structural equation model of the factors influencing British consumer's behaviour toward animal welfare." Journal of Food Products Marketing 17: 261-278. http://dx.doi.org/10.1080/10454446.2011.548748.

Tiffin, Richard, and Matthieu Arooult. 2010. "The demand for a healthy diet: estimating the almost ideal demand system with infrequency of purchase." European Review of Agricultural Economics 37(4): 501-521.

United States Department of Agriculture (USDA) Economic Research Service. 2015. Organic Market Overview 2015. Available at: http://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/ organic-market-overview.aspx.

Vermeir, Iris and Wim Verbeke. 2006. "Sustainable Food Consumption: Exploring the Consumer 'Attitude - Behavioral Intention' Gap." Journal of Agricultural and Environmental Ethics 19: 169-194. doi: 10.1007/s10806-005-5485-3.

Welsch, Heinz. 2013. Organic Food and Human Health: Instrumental Variable Evidence, Oldenburg Discussion Papers in Economics, V-349-12, University of Oldenburg, D-26111 Oldenburg.

Whitehead, John C., Subhrendu K. Pattanayak, George L. Van Houtven, and Brett R. Gelso. 2008. "Combining Revealed And Stated Preference Data To Estimate The Nonmarket Value of Ecological Services: An Assessment of the State Of The Science." Journal of Economic Surveys 22(5): 872-908.doi: 10.1111/j.1467-6419.2008.00552.x

Wier, Mette, Lars Garn Hansen, and Sinne Smed. 2001. Explaining Demand for Organic Foods. MPRA Paper No. 48363.

Wier, Mette, Katherine O'Doherty Jensen, Laura Morch Andersen, and Katrin Millock. 2008. "The character of demand in mature organic food markets: Great Britain and Denmark compared." Food Policy 33: 406-421.doi:10.1016/j.foodpol.2008.01.002.

Yiridoe, Emmanuel K., Samuel Bonti-Ankomah, and Ralph C. Martin. 2005. "Comparison of consumer perceptions and preference toward organic versus conventionally produced foods: A review and update of the literature." Renewable Agriculture and Food Systems 20(4): 193-205. doi: 10.1079/RAF2005113.

Zander, Katrin and Ulrich Hamm. 2010. "Consumer Preferences for additional ethical attributes of organic food." Food Quality and Preference 21: 495-503. doi:10.1016/j.foodqual.2010.01.006.

Zuo, Alec, Sarah Ann Wheeler, Wiktor Adamowicz, Peter C. Boxall, and Darla Hatton-MacDonald. 2015. "Measuring Price Elasticities of Demand and Supply of Water Entitlements Based on Stated and Revealed Preference Data." American Journal of Agricultural Economics 98(1): 314-332. doi: 10.1093/ajae/aav022.

Appendix

Organic purchasing behaviour survey
For the Shop:……..

This questionnaire is part of a research project concerned with the market for organic products. The questionnaire should take no more than 10 minutes to complete. Your answers will be treated anonymously and as strictly confidential and will be used for research and academic purposes only.

The research project is aimed at evaluating your opinion of organic products found in the UK supermarkets. Organic products are in general valued for one or more of the following attributes: better taste, food safety, health, freshness, environment preservation, animal welfare, local production. The **Soil Association in the UK** defines organic food as 'food which is produced using environmentally and animal *friendly farming methods on organic farms…Artificial fertilisers are banned and* farmers develop fertile soil by rotating crops and using compost, manure and *clover…Organic animals enjoy the very highest welfare standards* – they are truly free range and have plenty of space and access to fields.' (http://www.soilassociation.org/whatisorganic).

More precisely the main aim of this study is to find out what would persuade you to buy more organic products. On this basis the questionnaire tries to find out your opinion of the quality and availability of the organic products in UK supermarkets and the price that you would be willing to pay for these organic products.
All the questions that are asked in the questionnaire are only in order to estimate statistics and to relate the variables in questions (like your perceived health and

happiness) to organic consumption. They are purely confidential and anonymous and will not be used for any other purposes!

If you also desire a copy of the final study, please provide an email address to which it can be sent. Your participation is greatly appreciated!

If you have any questions about our research on this area please contact:

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Lecturer at the School of Economics of the University of Kent

Part 1 Questions about Purchasing Behaviour and Product Characteristics

1 (i) Did you buy any of these four products today?

Milk/Dairy ☐ **Fruits** ☐ **Vegetables** ☐ **Meat (including chicken)** ☐
Cereals (including bread) ☐

1(ii) Please describe the following product characteristics:

	Product Name	Price (per unit)	Quantity (in total)	Shop own Brand?	Organic
Milk/Dairy					
Fruits					
Vegetables					
Meat					
Cereals					

Part 2 Questions about willingness to pay

(Please tick always just one box)

2(i) Are you willing to pay an 'organic premium' for organic products? The 'organic premium' is the price for organic products above the price of conventional products.

Yes ☐ No ☐

2(ii) If you answered 'No' to the previous question what price would induce you to answer 'Yes' (please tick always just one box).

lower by 10% than now ☐	10-20% lower than now ☐	20-30% lower than now ☐	More than 30% lower than now ☐	Equal to conventional products ☐

2(iii). If you answered 'Yes' to question 2(i) and you are willing to pay an 'organic premium' how large would this premium be (just hypothetical)?

0 - 10% ☐	Between 10 - 20% ☐	Between 20-30% ☐	More than 30% ☐

2(iv) If the price of organic products <u>decreased by 10%</u> than it is now how much more would you spend on organic products per week?

0 – 10% ☐	10 – 20% ☐	20 – 30% ☐	more 30% ☐

2(v) If the price of organic products <u>decreased by 10-20%</u> than it is now how much more would you spend on organic products per week?

0– 10% ☐	10 – 20% ☐	20 – 30% ☐	more 30% ☐

2(vi) If the price of organic products <u>decreased by 20-30%</u> than it is now how much more would you spend on organic products per week?

0– 10% ☐	10 – 20% ☐	20 – 30% ☐	more 30% ☐

2(vii) If the price of organic products <u>decreased by more than 30%</u> than it is now how much

more would you spend on organic products per week?

0– 10% ☐	10 – 20% ☐	20 – 30% ☐	more 30% ☐

2(viii) How much more would you expect to spend per week for organic products if the price of the organic products was <u>the same as the one of similar conventional products</u>?

<u>Part three – Personal attitudes towards organic products</u>

3(i). Please indicate the extent to which you agree/disagree with the following statements.

The reason I buy organic products is	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
i) Because organic is more healthy					
ii) Because organic products taste better					
iii) To support local organic producers.					
iv) Because organic is more environmentally friendly.					
v) Because of food safety					
vi) Because organic producers care more about animal welfare					
vii) Because organic products are fresher					
viii) Because I have bought organic before and was satisfied with it					

3(ii). Please indicate the extent to which the following <u>problems</u> prevent you from purchasing (more) organic products.

	Not a problem at all for me	Not a proble m	Not sure it is a problem or not	A minor obstacle to purchasing organic products	A major obstacle to purchasing organic products
i) Higher prices than conventional products.					
ii) It is difficult to know which product is organic.					
iii) There is a limited range (variety)					

iv) Because the organic label is difficult to trust					
v) Conventional food products look better					
vi) Conventional food products last longer					
vii) I have always bought conventional products and it is hard to change the habit of doing this.					
viii) I find it difficult to find the products in the shelf.					
ix) Organic products are not sufficiently advertised.					

Part four – Personal information

4(i). Gender **Male** ☐ **Female** ☐

4(ii). Age group

Under 20	21-40	41-60	61-80	Over 80
☐	☐	☐	☐	☐

4(iii). Which of the following qualifications do you have?

O levels	A levels	Further Education College	Diploma	University Degree
☐	☐	☐	☐	☐

4(iv). How many people live in your household?

1 Person	2 Persons	Three Persons	Four Persons	More than 4
☐	☐	☐	☐	☐

4(v). How many children under the age of 18 years do you have living with you?

0	1	2	3	4 or more
☐	☐	☐	☐	☐

4(vi). Regarding your net monthly income, which of the following applies?

Under 500 ☐	501-1000 ☐	1001-2000 ☐	2001-3000 ☐	3001-4000 ☐	More than 4000 ☐

4(vii) <u>Marital Status</u> : Married (or cohabitating) ☐ **Single** ☐

4(viii) How many <u>fruits and vegetables</u> do you eat per day?

None ☐	1 ☐	2 ☐	3 ☐	4 ☐	5 or more ☐

4(ix) How much <u>exercise/sports</u> (even a quick walk) do you do <u>per week</u>?

None ☐	less than 30 minutes ☐	between 1/2 and 1 hour ☐	1-2 hours ☐	2-3 hours ☐	4 hours or more ☐

4(xiv) How is your <u>health</u> in general given your age?

Very bad ☐	Bad ☐	Fair ☐	Good ☐	Very good ☐

4(xv) All things considered, how <u>satisfied</u> are you with your life as a whole these days?

Very dissatisfied  ☐	Dissatisfied  ☐	OK  ☐	Satisfied  ☐	Very satisfied  ☐

Utility Maximisation

$$\max U(Z, F, X) \quad \textbf{(8)}$$

s.t.

$$Y - CX - P(Z, F) = 0 \quad (9)$$

$$L = U(Z, F, X) + \lambda[Y - CX - P(Z, F)] \quad (10)$$

$$\frac{dL}{dZ} = U_z - \lambda P'(Z) = 0 \quad (11)$$

$$U_z = \lambda P'(Z) \quad (12)$$

$$\frac{dL}{dX} = U_x - \lambda C = 0 \quad (13)$$

$$U_x = \lambda C \quad (14)$$

Dividing 12 by 14 yields:

$$\frac{U_z}{U_x} = \frac{P'(Z)}{C} \quad (15)$$

which is equivalent to (3).

where: U=Utility, F=Food Consumption, Z=Organic Attribute, X=Consumption of a Composite Commodity, C=Price of Composite Commodity, P=price of Food (P'(Z)>0), Y=household income

[Table 12 near here]

[Table 13 near here]

Tables and Figures

Table 1: Descriptive Statistics Consumers

Variable	Mean	Mode	Median	UK Statistic*
Gender (Prop of Women)	0.64	1		51%
Age (years)	46	50	50	44.5
Net Income/month (£)	2050	1500	1500	2208
Household Members (nos)	2.76	2	2	2.3
Child < 18 at home	0.44	0	0	2 (mode)
Education	3.28	4	4	35% higher degree
(3=College, 5=University Degree)				
Marital Status (Proportion Married)	0.63	1		63%
Fruits and Veg.(no per day	2-3	≥ 5	4	4 **
Exercise (hrs per week)	1/2-1	2-3	1-	< 2
Healthy	4.1	4	4	68.3% mostly to
(1=Very bad health to 5=Very good health)				completely satisfied with health
Happy	4.3	5	4	77% med-high life satisfaction
(1=Very dissatisfied to 5=Very satisfied)				(rank 7 out of 10)

*Office for National Statistics, 2011 Census, means where not else indicated
** Personal Well-being in the UK, 2012/13 UCL Study available at: Personal Well-being in the UK, 2012/13 UCL Study

Table 2: Descriptive Statistics Organic Products Consumed

No. of Org Prod bought per Person*	Av=2.29	Max=10	Min=1
Most Bought Organic Products			
Least Expensive Organic Products	Milk 50%	Bananas 20%	Carrots & Apples 12% each
Products with Lowest Premium	Milk Yoghurt (-37%)	Bananas Muesli (-35%)	Carrots & Potatoes Bacon (-33%)
Organic Products with Highest Premium	Bananas (140%)	Chicken (138%)	Beef (100%)
Most Expensive Organic Products	Beef	Chicken	Raspberries
Total Organic Spending (TOS) per person (£)	Av=3.84	Min=0	Max=100
TOS as % of Income	Av=0.34	Min=0	Max=5.14
TOS as % of Total Spending	Av=26	Min=0	Max=100

Note: *among the ones who bought organic

Table 3: Organic Spending per Product

Category	% of Organic Products bought/Category	% of Spending on Organic Products/Category
Milk/Dairy	10	45.0
Fruit & Veg	6.7	30.2
Meat	2.8	32
Cereals	1.9	8.9

Table 4: Comparison of revealed (average premium paid) with stated (WTP) preferences

	Premium Paid	**WTP**
	9.19	13.08
Gap	-3.88 **	Ratio SP/RP=1.42
	(0.03)	
Pearson Correlation	0.59 ***	
	(< 0.001)	
Standard Deviation	18.93	21.07
Zero Bids	59 (56%)	31 (30 %)
Observations (truncated at 5%)	104	104

***significant at 1% ,** significant at 5%, *significant at 10 % level.

Table 5: Hedonic Price Regression. Dependent Variable: LogPrice (for Log-linear) or Price

Model	Log-linear (Robust StdErrors)			Poisson			Negative Binomial		
Variable	Coeff	StdE	T-Value	Coeff	StdE	Z-Value	Coeff	StdE	Z-Value
Constant	0.72***	0.11	6.64	0.93***	0.13	7.24	0.93***	0.14	6.41
Quantity	0.00	0.00	1.18	0.00	0.00	0.54	0.00	0.00	0.55
Organic	0.13*	0.08	1.72	0.14*	0.09	1.64	0.14*	0.09	1.56
Brand	-0.14*	0.07	-1.94	-0.07	0.09	-0.81	-0.07	0.1	-0.74
(Shop Own) Shop	-0.29***	0.09	-3.11	-0.32***	0.1	-3.08	-0.32***	0.12	-2.73
(Tesco)									
Adj R^2	0.06			Pseudo R^2	0.02		Pseudo R^2:	0.02	
Observations	379’			379			379		

***, **, * = significant at 1%, 5%, 10 % level.

’: no. of obs > no of respondents because one person typically bought more than one product

Table 6: WTP Regression. Dependent Variable: Stated WTP

Model (WTP)	Poisson			Tobit			Negative Binomial		
Variable	Coeff	StdE	T-Value	Coeff	StdE	T-Value	Coeff	StdE	Z-Value
Constant	1.48***	0.31	4.80	-4.35	19.49	-0.22	0.81	1.10	0.75
Ave Premium Paid	0.03***	0.00	21.64	0.64***	0.13	4.74	0.02***	0.008	2.52
Quantity Organic	0.00***	0.00	13.04	0.00***	0.00	3.77	0.00***	0.00	2.88
Quantity Total	-0.00***	0.00	-7.72	-0.00**	0.00	-1.92	-0.00**	0.00	2.31
Gender (Woman=1)	-0.04	0.08	-0.52	4.49	5.33	-0.84	0.11	0.35	0.32
Age	-0.15***	0.04	-3.79	-3.54	2.61	-1.35	-0.20	0.16	-1.31
Education	-0.18***	0.03	-6.29	-2.99*	1.89	-1.58	-0.25*	0.13	-1.95
Children	-0.12***	0.06	-2.06	-0.91	3.83	-0.24	0.06	0.27	0.23
Income	0.14***	0.03	4.75	2.21	1.93	1.14	0.21	0.12	1.65
Married	0.11	0.09	1.25	-0.25	5.72	-0.04	-0.10	0.36	-0.28
Fruits and Vegs	-0.00	0.03	-0.14	-0.71	2.24	-0.32	0.01	0.16	0.06
Exercise	-0.23	0.03	-0.95	-0.49	1.66	-0.29	-0.05	0.10	-0.50
Health	0.09**	0.05	1.94	0.32	3.03	0.10	0.07	0.21	0.35
Happy	0.22***	0.05	4.10	4.57	3.51	1.30	0.42	0.26	1.61
Goodness of Fit	Pseudo R^2	0.49		Pseudo R^2:	0.08		Pseudo R^2:	0.05	
Observations	91			91			91		

***, **, * = significant at 1%, 5%, 10 % level. As before (and in subsequent tables)

Table 7: WTP Regression. Dependent Variable: Revealed WTP (Actual Organic Spending)

	Poisson			Tobit			Negative Binomial		
Variable	Coeff	StdE	T-Value	Coeff	StdE	T-Value	Coeff	StdE	Z-Value
Constant	-0.39	0.66	0.60	-17.20	10.02	-0.95	-0.31	1.84	0.17
Quantity Organic	0.00***	0.00	14.73	0.00***	0.00	5.19	0.00***	0.00	5.15
Quantity Total	-0.00***	0.00	-6.50	-0.00**	0.00	-2.01	-0.00*	0.00	1.57
Gender (Woman=1)	-0.93	0.16	-0.58	-1.69	4.48	-0.38	-0.16	0.46	-0.37
Age	0.19***	0.08	-2.56	-0.04	2.26	-0.02	-0.22	0.25	-0.88
Education	-0.26***	0.06	-4.38	-1.19	1.68	-0.71	-0.11*	0.16	-0.68
Children	0.26***	0.11	2.27	1.73	3.12	0.56	0.02	0.32	0.07
Income	-0.49***	0.07	-6.89	-2.17	1.85	1.17	-0.42**	0.19	-2.19
Married	0.21	0.18	1.14	-0.13	4.96	-0.03	0.22	0.53	0.42
Fruits and Vegs	0.22	0.05	3.49	4.11**	1.91	0.62***	0.20	3.07	0.06
Exercise	-0.40***	0.05	-8.71	-3.67**	1.43	-2.57	-0.21*	0.14	-1.57
Health	0.41***	0.09	4.15	2.89	2.81	1.03	0.15	0.28	0.53
Happy	0.13	0.11	1.21	4.57	3.51	1.29	0.04	0.27	0.14
Goodness of Fit	Pseudo R^2	0.59		Pseudo R^2:	0.12		Pseudo R^2:	0.16	
Observations	92			92			92		

***, **, * = significant at 1%, 5%, 10 % level.

Table 8: Food Categories. Dependent Var.: Log(Health)/Log/(Happy)

Impact on Health	Coeff	StdE	Z-Value
Fruit and Veg	0.01***	0.003	3.95
Meat	0.007**	0.003	2.53
Cereals	0.02	0.02	1.03
Milk/Dairy	0.003	0.008	0.45
Impact on Happiness	**Coeff**	**StdE**	**Z-Value**
Fruit and Veg	0.006**	0.002	2.83
Cereals	0.03*	0.02	1.79
Milk/Dairy	0.006	0.005	1.16
Meat	0.002	0.002	0.90

Figure 1: Stated reasons **for** buying organic products

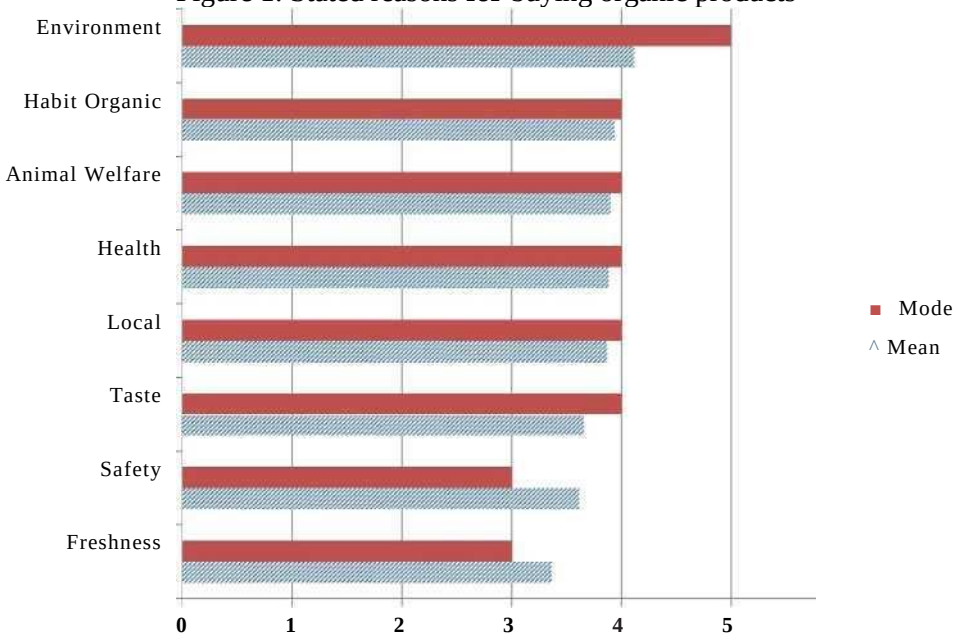

Figure 2: Stated reasons **against** buying organic products

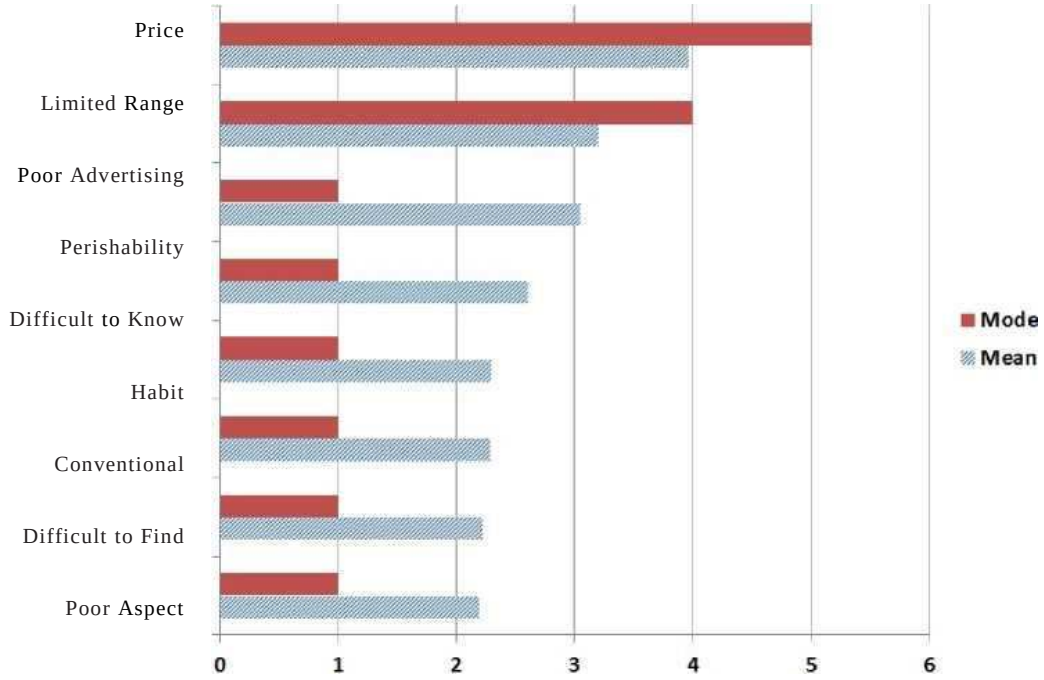

Table 9: *"Revealed" reasons* **pro/contra** buying organic. Dep. Var.: Organic Spending

	Poisson			Tobit			Negative Binomial		
Variable	Coeff	StdE	T-Value	Coeff	StdE	T-Value	Coeff	StdE	Z-Value
Constant	-3.11**	1.32	-2.35	-37.02	31.19	-1.19	-2.92	3.25	-0.89
Health	1 54***	0.15	10.21	6.60*	3.59	1.83	1 10***	0.42	2.65
Taste	0.21**	0.99	2.10	2.28	3.17	0.72	0.19	0.31	0.62
Environment	0.23	0.19	1.26	3.55	4.92	0.72	0.48	0.53	0.90
Animal Welfare	-0.16	0.14	-1.14	0.03	4.11	0.01	-0.17	0.54	-0.32
Freshness	-0.75***	0.10	-7.85	-3.12	2.67	-1.17	-0.67*	0.35	-1.93
Local Support	-0.18*	0.09	-1.93	-1.00	3.36	-0.30	0.03	0.43	0.07
Safety	-0.54**	0.11	-4.88	-3.77	3.21	-1.17	-0.40	0.38	-1.06
Habit	-0.32**	0.12	-2.56	-2.02	3.46	-0.58	-0.00	0.41	-0.00
Price	-0.23***	0.08	-2.73	-2.18	2.12	-1.02	0.26	0.24	-1.07
Limited Range	-0.36***	0.09	-3.96	-1.57	2.40	-0.65	-0.15	0.24	-0.60
Poor Advertisement	-0.18***	0.06	-2.88	-1.52	2.04	-0.75	-0.17	0.23	-0.73
Perishability	-0.20***	0.07	-2.96	-2.96	2.31	-1.28	-0.44*	0.28	-1.57
Difficult to Know	0.35***	0.08	4.57	0.62	2.67	0.23 0.27	0.28	0.98	
Habit Conventional	0.27***	0.08	3.58	1.23	2.31	0.53	0.26	0.27	0.97
Difficult to Find	0.47***	0.06	7.58	5.04**	2.07	2.44	0.48**	0.24	1.97
Poor Looks	0.05	0.07	0.76	1.28	2.14	0.60	0.89	0.24	0.38
Pseudo R^2	0.54			0.07		0.13			
Observations	86			86		86			

***, **, * = significant at 1%, 5%, 10 % level.

Table 10: Double-Log Elasticity Results for Organic and Conventional Dependent Variable: Log Quantity

Variable	Coeff	StdE	T-Value
	Organic		
Constant	1.12*	0.64	1.76
LogIncome	0 24***	0.07	3.32
LogPrice	-0.63***	0.65	9.68
Adj R^2	0.48		
Observations	118		
	Conventional		
Constant	5.01***	0.44	11.50
LogIncome	0.09*	0.05	1.70
LogPrice	-0 11***	0.03	-3.43
Adj R^2	0.05		
Observations	257		

***, **, * = significant at 1%, 5%, 10 % level.

Table 11: AIDS Expenditure Elasticities for Organic and Conventional

Expenditure Category	Mean	Std. Dev.
	Organic	
Milk/Dairy	0.93	0.22
Produce	1.10	0.15
Meat	1.12	0.16
Cereals	1.19	0.19
Organic Average Elasticity	1.09	
	Conventional	
Milk/Dairy	0.57	0.66
Produce	1.39	0.53
Meat	1.12	0.16
Cereals	0.47	0.35
Conventional Average Elasticity	0.89	

Table 12: Hedonic Price Regression/Product Category. Dependent Variable: LogPrice

Product Categ	Cereals		Meat		Milk/Dairy		Produce	
Variable	Coeff	T-Value	Coeff	T-Value	Coeff	T-Value	Coeff	T-Value
Constant	0.70**	2.46	0.91***	3.77	0.49**	2.49	0.37***	2.89
Quantity	0.00**	2.16	0.00**	2.67	0.00*	1.70	0.00**	2.02
Organic	-0.10	-0.78	0.52***	2.97	0.01	0.08	0.17**	2.09
Brand (Shop Own)	-0.19	-1.09	-0.15	-0.70	-0.29***	-2.77	-0.13	-1.39
Shop (Tesco)	-0.68***	-6.86	0.08	0.40	-0.15	-1.04	-0.11	-1.11
R^2	0.28		0.31		0.12		0.09	
Observations	30 (7.94%)		47 (12.43%)		95 (25.13%)		206 (54.50%)	

***, **, * = significant at 1%, 5%, 10 % level.

Table 13: Lower and Upper Bound/ person/ consumption basket

	Lower Bound	Upper Bound
Mean	8.91	51.92
Std Error	1.84	2.73
Median	0	49.54
Mode	0	43.41
Min	-24.69	0
Max	100.81	190.83
Count	105	105

Note: the lower bound is not identical to the numbers in Tables 2 and 4 because here we have averages / person / consumption basket.