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Product labelling in the market for organic food: Consumer preferences and willingness-to-pay for different organic certification logos

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ABSTRACT

Product labelling with organic certification logos is a tool for signalling consumers that a product is a certified organic product. In many European countries, several different organic labelling schemes exist in the market. The aim of this paper is to elicit whether consumers prefer certain organic labelling schemes over others, to give recommendations for market actors in the organic sector. By means of choice experiments and structured interviews with 2441 consumers of organic food in six European countries, consumer preferences and willingness-to-pay (WTP) for different organic logos were analysed. The results of the random parameter logit models showed that the WTP differed considerably between the tested logos. Consumer perceptions of organic labelling schemes turned out to be of subjective nature and in many cases not based on objective knowledge. We conclude that it is advisable to label organic products with well-known organic certification logos that consumers trust. Organisations owning an organic labelling scheme should put effort into measures for increasing consumer awareness of the logo and forming consumer perceptions and attitudes regarding the underlying scheme in terms of standards and control regime.

1. Introduction

In the market for organic food, consumer trust is a delicate issue since consumers are not able to verify whether a product is an organic product, not even after consumption. Organic products must be produced according to organic principles, which refer to the production process rather than to the end-product (Jahn, Schramm, & Spiller, 2005). In information economics, product attributes like these are called credence attributes. Unlike search attributes (e.g. price, colour) and experience attributes (e.g. taste, durability) which consumers can evaluate prior and after consumption respectively, credence attributes involve a high level of uncertainty from the consumer perspective (Darby & Karni, 1973). Consumer trust in the product integrity of credence goods is of crucial importance, in particular if the credence attribute entails a price premium, as is the case with organic food (Golan, Kuchler, & Mitchell, 2001). An instrument to gain consumer trust in credence goods is third-party certification of the supply-side (Roe & Sheldon, 2007). Organic certification has a long tradition in many European countries. Product labelling with organic certification logos is used to signal consumers at the point-of-sale that a product is a certified organic product.

In the European Union (EU), only those products can be labelled and sold as organic[1] food which comply with the principles of organic production, certification and labelling of Regulation (EC) No. 834/2007 (and respective implementing regulations). Since July 2010, all prepacked organic products produced and sold in the EU must be labelled with the new mandatory EU logo (Regulation (EC) No. 834/2007).[2] The new logo replaced the old voluntary EU logo. Besides the EU logo, there are several other voluntary organic certification logos in many European countries, which are owned by different kinds of organisations. These can be differentiated into governmental logos on the one hand and logos of private organisations on the other hand. Governmental logos are found in some but not in all European countries (e.g. Danish 'Ø' logo, German 'Bio-Siegel'). Private organisations with own organic certification logos are farmers' and organic sector associations (e.g. Demeter, Bio Suisse, Soil Association), control bodies (e.g. Ecocert) and other private organisations.

Organic certification logos target the final consumer (Jahn et al., 2005). From a marketing perspective, the variety of different organic logos in the market raises the question whether consumers prefer products with certain organic certification logos over others. Furthermore, it is of interest how consumer preferences are

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[1] This also refers to the respective translated terms of 'organic' in the different EU languages, such as 'Bio', 'Öko', 'biologico', 'eco', and 'øko'.

[2] A transition period is granted until 2012 (Regulation (EU) No. 271/2010).

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influenced by consumer perceptions and attitudes regarding organic labelling schemes. These questions are not only relevant for organisations owning an organic labelling scheme but also for producers, processors and retailers in the organic market. For the supply side, it is important to know which organic certification logos are most effective on product packages and in marketing communication measures. Since all organic products must now be labelled with the mandatory EU logo, other organic logos can only be used additionally. Space on product packages is, however, often limited in particular on the front side. Furthermore, some organic certification logos are based directly on the mandatory principles of Regulation (EC) No. 834/2007 (e.g. EU logo, German Bio-Siegel), while other organic logos indicate that additional requirements regarding the production and/or control process going beyond the mandatory EU principles are met (e.g. Demeter, Danish 'Ø'). Fulfilling further requirements might involve more effort for producers and processors. Knowing which organic logos are preferred by consumers might thus be useful for suppliers to decide upon whether they should seek certification according to another organic scheme in addition to the mandatory certification according to Regulation (EC) No. 834/2007.

To the author's knowledge, little scientific evidence exists regarding consumer preferences for different organic certification logos in Europe. While several studies investigated the price premium that consumers were willing to pay for organic food, most of these studies either used a single organic logo or the word 'organic' to distinguish organic from conventional products (see e.g. Hoogland, de Boer, & Boersema, 2007; Napolitano et al., 2010; Scarpa & Thiene, 2007). A study of consumer preferences in the United States found that consumers were willing to pay a higher price premium for the USDA organic logo than for a generic organic label (Van Loo, Caputo, Nayga, Meullenet, & Ricke, 2011). A study with focus group discussions conducted by the authors of this study suggested that European consumers might prefer certain organic certification logos over others (Janssen & Hamm, 2011a). However, the qualitative study did not allow for any quantitative analysis.

The objective of this contribution was to investigate consumer preferences and willingness-to-pay for different organic certification logos in six European countries to give recommendations for market actors in the organic sector. By means of choice experiments and structured interviews it was determined whether and which organic certification logos were preferred by consumers. Furthermore, it was analysed how the logo choice was influenced by consumer perceptions and attitudes regarding the tested logos. In addition, it was investigated whether consumer preferences for organic logos differed across varying levels of consumers' buying frequency of organic food.

The contribution is organised as follows: In Section 2, the theoretical framework of product labelling in credence good markets is discussed with reference to third-party certification and organic logos. In Section 3, the survey design and the econometric model of choice analysis are outlined. In Section 4, the results of the model estimations are presented and discussed. In Section 5, recommendations for market actors in the organic sector are made and conclusions are drawn for product labelling in credence goods markets.

2. Product labelling in credence good markets

Credence good markets like the market for organic food feature a high degree of information asymmetry, since consumers are not able to verify whether or not a product was produced according to the promised characteristics (Darby & Karni, 1973). Due to the uneven distribution of information between the supply side and the consumer side, credence good markets are prone to fraud and opportunistic behaviour in the supply chain and might thus suffer from a lack of consumer trust (Darby & Karni, 1973). One way to overcome the dilemma of information asymmetry is product labelling based on third-party certification (Roe & Sheldon, 2007). Neutral certifiers, which are accredited by competent authorities, guarantee regular inspections of the processes within the supply chain and ensure compliance with the respective production standards (Jahn et al., 2005). Organic labelling schemes usually have an own logo which certified producers and processors can use to label their products, so that consumers are able to identify certified products at the point-of-sale (Golan et al., 2001; Roe & Sheldon, 2007).

The underlying assumption of third-party certification is that consumers have greater trust in independent certifiers than in private producers and processors (Albersmeier, Schulze, & Spiller, 2010). However, with regard to organic food, several studies found that some consumers were sceptical about the integrity of organic products, which prevented them from buying more organic food (Aarset et al., 2004; Aertsens, Verbeke, Mondelaers, & van Huylenbroeck, 2009; Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Krystallis, Vassallo, & Chryssohoidis, 2008; Lea & Worsley, 2005; Padel & Foster, 2005). Several authors suggest that consumer trust in the underlying scheme is the prerequisite for third-party certification to diminish the dilemma of information asymmetry in the producer–consumer relationship (Albersmeier et al., 2010; Golan et al., 2001; Jahn et al., 2005; Naspetti & Zanoli, 2005). Our contribution investigates this aspect in the context of organic certification logos. At the point-of-sale, organic certification is signalled to consumers by product labelling, either just with a generic label (i.e. the prefix 'organic') or with additional organic certification logos. We elicit whether certain organic certification logos are more successful than others in overcoming the dilemma of information asymmetry inherent in credence goods.

3. Methods

To analyse consumer preferences and willingness-to-pay (WTP) for different organic certification logos, choice experiments accompanied by structured interviews were conducted with 2441 consumers of organic food in the six European countries Czech Republic (CZ), Denmark (DK), Germany (DE), Italy (IT), Switzerland (CH) and United Kingdom (UK). The data was analysed with random parameter logit models. The quantitative study was preceded by a qualitative study with focus group discussions conducted in the same countries by the authors of this study and their partner organisations, in which consumer perceptions and attitudes regarding organic labelling schemes were explored (Janssen & Hamm, 2011a). The qualitative results were used for the survey design and model specification of the present quantitative study.

3.1. Survey design

3.1.1. Sampling

Data was collected face-to-face in February and March 2010 after a pre-test with 15 participants per country. In each country, around 400 consumers of organic food took part in the study. The choice experiments and interviews were conducted at two kinds of shops/locations: (1) conventional supermarkets and/or shopping centres and (2) specialised organic food shops. The shares of choice experiments conducted at each kind of shop

Fig. 1. Set-up of the choice experiments (Example from Germany).

approximately reflected the market share of that kind of shop in the respective country.[3] The participants were recruited on the spot based on quota sampling for age and gender using a structured screening questionnaire. The country-specific quotas for the two age groups ('18–44' and '45–75 years') reflected the shares of these groups in the total population. The quota for the share of the younger age group ranged from 43% in Italy to 60% in the Czech Republic. Regarding gender, the quotas reflected the buying behaviour of households in each country. The quota for the share of women ranged from 60% in the UK to 70% in Italy. To ensure that the results are relevant for the organic market, the target group were consumers who regularly buy the tested kinds of products (apples and eggs) in organic quality, which is why two screening questions were used: First, participants had to be responsible for the food purchase in their household; second, they had to buy organic apples and eggs at least once a month (based on self-assessment).

3.1.2. Choice experiments

Choice experiments can be used to determine what consumers are willing to pay for different product attributes (Gao & Schroeder, 2009). In choice experiments, participants are asked to make a choice out of a set of different product alternatives (Lusk & Schroeder, 2004). One advantage of this method is that choice experiments are more similar to a real buying situation compared to other methods for analysing WTP (e.g. contingent valuation, auctions) (Breidert, Hahsler, & Reutterer, 2006). Choice experiments are based on Random Utility Theory (Thurstone, 1987) postulating that an individual who makes a choice among different alternatives strives to maximise utility. The individual thus chooses the one alternative that provides him/her with the highest utility (Louviere, Hensher, & Swait, 2000; McFadden, 1974). In accordance with Lancaster's Consumer Theory (Lancaster, 1966), it is assumed that the utility of a product stems from the different product attributes.

In the present study, the choice experiments were conducted with two different kinds of products: organic apples and eggs. These two products were chosen since they fulfil the following criteria. Firstly, it was intended to investigate both a plant and an animal product. Secondly, many consumers regularly buy apples and eggs. Thirdly, these products are available from domestic production in the study countries and they are widely available in organic quality. Fourthly, they can be sold as non-branded products.[4]

The procedure of the choice experiments was as follows. The recruited participants were asked to make buying decisions for apples and eggs. They were shown two choice sets of apples and two choice sets of eggs, with each choice set consisting of four product alternatives. The four product alternatives within a choice set looked identical but were marked with different organic labels and prices. In each study country, four different organic labels and price levels were tested. Unlike in other studies with choice experiments (e.g. Lockshin, Jarvis, d'Hauteville, & Perrouty, 2006; Loureiro & Umberger, 2007; Lusk & Schroeder, 2004), the participants were shown *real* organic apples and eggs instead of images or descriptions of products (see Fig. 1). The products were offered on a table with the four alternatives within a choice set arranged side by side. The products were labelled with price tags. Besides the price and the organic label, other typical product information, which was identical across the alternatives, was displayed (apples: variety, domestic origin; eggs: egg size, domestic origin).

From each choice set, the participants should choose the product that they wished to buy. In addition, they were also free to refrain from buying any of the offered alternatives ("no-buy option"). The no-buy option was included to make the buying decision more realistic. Previous studies showed that forced choice might lead to biased results (Dhar & Simonson, 2003). To reduce the hypothetical bias the participants were instructed that they would have to pay for the chosen products just like in a real shop (Lusk & Schroeder, 2004).

The choice experiments were designed as so-called labelled experiments. That means the four tested organic labels were present in each choice set, however the price levels varied. The experimental design for the systematic variation of the price levels across the four labels was based on an orthogonal fractional factorial design resulting in 16 different choice sets for apples and eggs respectively (developed with the software package SPSS). The

[3] The share of choice experiments conducted at conventional supermarkets were 87% in CH, 50% in CZ, 75% in DE, 100% in DK, 50% in IT and 75% in UK (the remaining share was conducted at specialised organic food shops). It has to be kept in mind that many consumers are frequent customers of different kinds of shops. Even in Denmark and Switzerland where (almost) all choice experiments were conducted at conventional supermarkets, more than 40% of the participants stated to (also) buy at organic food shops.

[4] In the present research, it was not desired to investigate consumer preferences for brands. Existing organic brands are often related to particular organic certification logos, so that consumers might have been confused when being presented with non-existing combinations of brands and organic certification logos. This aspect is further discussed in the final section.

Table 1
Organic logos tested in the choice experiments.

Country	Label 1	Label 2	Label 3	Label 4
CH	Bio Suisse[a]	Fake logo[b]	Demeter[c]	Generic labelling with the prefix 'organic'[g] without logo
CZ	Old EU logo	Governmental logo	Demeter[c]	
DE	Old EU logo	Governmental logo	Demeter[c]	
DK	Old EU logo	Governmental logo	Demeter[c]	
IT	Old EU logo	CCPB[d]	Demeter[c]	
UK	Old EU logo	Soil Association[e]	OF&G[f]	

[a] Umbrella organisation of Suisse famers' associations.
[b] Referring to the Suisse governmental organic regulation.
[c] International farmers' association.
[d] CCPB = Certificazione e controllo prodotti biologici. Italian control body.
[e] Soil Association = British organic sector organisation.
[f] OF&G = Organic Farmers & Growers. British control body.
[g] 'Bio', 'Öko', 'biologico', 'øko', respectively.

sample was divided into eight blocks, so that the participants of each block were only shown two of the total 16 choice sets for apples and two for eggs.

The selection of organic logos used in the experiments (see Table 1) was based on the consideration that different kinds of organic certification logos should be tested: (1) EU logo, (2) governmental logos, (3) private logos, (4) prefix 'organic' without a logo. Please note that the old voluntary EU logo was used in the experiments since the survey was conducted prior to the introduction of the new mandatory EU logo. In each country, only those logos were included which existed in the market and could be used on domestic products. The only exception was Switzerland, where only two common Swiss organic certification logos were found in the market at the time of writing (Bio Suisse and Demeter). To have a similar experimental design with four product stimuli per choice set in each study country, a fake logo was created referring to the Swiss organic regulation. Due to the absence of a governmental logo in Italy and the UK, a second private logo was included here.

Four different price levels were tested. The relative price levels were the same in all countries: 0.8, 1.0, 1.2, and 1.4. The absolute prices used in the experiments (Table 2) were based on the average market price of organic apples/eggs in the respective survey regions one month before the experiments were conducted (the average market price equals price level 1.0).

Table 2
Prices in the choice experiments.[a]

Product	Price levels	CH	CZ	DE	DK	IT[b]			UK
						Ancona	Bari	Milano	
Apples	0.8	3.18 €	1.36 €	2.19 €	2.04 €	2.33 €	2.14 €	2.58 €	2.23 €
	1.0	3.96 €	1.69 €	2.69 €	2.55 €	2.91 €	2.68 €	3.22 €	2.79 €
	1.2	4.75 €	2.03 €	3.19 €	3.06 €	3.49 €	3.22 €	3.86 €	3.36 €
	1.4	5.54 €	2.37 €	3.79 €	3.57 €	4.07 €	3.75 €	4.51 €	3.92 €
Eggs	0.8	2.70 €	1.45 €	1.49 €	2.42 €	1.81 €	1.97 €	1.77 €	1.94 €
	1.0	3.38 €	1.81 €	1.89 €	3.02 €	2.26 €	2.46 €	2.21 €	2.39 €
	1.2	4.07 €	2.17 €	2.29 €	3.63 €	2.71 €	2.95 €	2.65 €	2.91 €
	1.4	4.75 €	2.54 €	2.69 €	4.23 €	3.16 €	3.44 €	3.09 €	3.36 €

[a] Prices in Euro are based on the exchange rates by the European Central Bank, Quarter 1, 2010. The prices refer to 1 kg of apples and six eggs respectively.
[b] In Italy, the market prices for organic apples and eggs differed considerably between the three cities where the survey was conducted so that different absolute prices were used in the three cities.

In the present study, it was aimed that the experimental set-up was similar to a real buying situation. For this reason, real products were used. This procedure required relatively complicated logistics, since more space and materials were needed compared to choice experiments with product images or descriptions which are typically based on paper-and-pencil or computer-assisted questionnaires. The number of choice tasks per person was therefore lower than in most other studies with choice experiments. Another disadvantage was that slight variations in the appearance of the offered apples and eggs could not be entirely ruled out. Much effort was made to choose identical looking products, but unprocessed products like apples and eggs are hardly ever completely uniform. However, these drawbacks were seen to be outweighed by the advantages of the use of real products. The chosen procedure resulted in a choice task which was similar to a buying situation in a food shop, in that the participants could see, touch and smell the products before they made their choice. In this respect, the experimental set-up with real products was less artificial than a set-up with product images or descriptions. It is assumed that a more realistic experimental set-up increases validity. Yet the authors do not know of any empirical study that has investigated this particular question.

3.1.3. Structured interviews

In the structured face-to-face interviews conducted after the choice experiments, data were collected on factors that were hypothesised to influence consumer preferences and WTP for organic certification logos.

3.1.3.1. Consumer attitudes towards the tested logos. It was hypothesised that a consumer's preference for an organic certification logo is influenced by the way he/she perceives and evaluates the logo and the underlying scheme. The preceding qualitative study suggested that consumer attitudes towards an organic certification logo were related to a number of elements, particularly trust in the logo, credibility of the logo, and perceptions of the underlying standards and control system. Moreover, logo awareness acted as a prerequisite for being able to evaluate a certification logo and the underlying scheme. In accordance with the literature (Solomon, Bamossy, Askegaard, & Hogg, 2006), it was thus revealed that an attitude towards an organic certification logo was composed of affective (trust, credibility) and cognitive elements (logo recognition, perceptions of standards and control), both closely intertwined. It was therefore decided to use a multi-item battery for measuring consumer perceptions and attitudes towards each of the tested logos. The items are presented in Table 3.

Each item was phrased as a seven-point semantic differential scale with opposite pairs of phrases at the endpoints and a neutral midpoint. In addition, a "don't know" category was included. The pre-test showed that many participants did not have sufficient experience with some of the tested logos to form a judgement, so that they refused to answer the items on trust, credibility, organic standards and the control system for those logos that were unfamiliar to them. This reaction seems plausible given that no further background information on the tested logos was provided in the choice experiments. Also the preceding focus group study showed that consumers had difficulties evaluating organic logos that they did not know. In such a case, the literature suggests to include a "don't know" category (Aaker, Kumar, Day, & Leone, 2010, p. 254). In the present study, the "don't know" answers were not regarded as a loss of information but rather a more meaningful way of measurement and an interesting insight as such – even though this procedure suffers from potential limitations regarding the applicable methods of data analysis (downscaling of quasimetric data). An alternative approach would have been to inform the participants about the tested logos in the beginning of the interviews. However, this procedure would have been at odds with the aims of the present study, since at the point-of-purchase organic logos are often displayed on product packages and price tags without any further background information.

3.1.3.2. Buying frequency of organic food. It was hypothesised that the extent to which a consumer buys organic food influences his/her preferences for organic certification logos. More frequent buyers of organic food were expected to be more familiar with organic logos that are mainly found in specialised organic food shops. Many conventional supermarket chains have their own organic brands and often do not prominently display voluntary organic certification logos. In the structured interviews, the participants were therefore asked to estimate their organic budget share (i.e. the share of organic products in the total expenditure for food and beverages) by means of ten answer categories (0–10%, 11–20%, 31–40%, etc., 91–100%).

Finally, the following socio-demographic characteristics were collected: gender, age, household size, level of education and net household income.

Table 3
Label ratings in the interviews.

Items	Interview question	Answer categories
Awareness	Please rate each of the labels on the following scale.	Scale from 1 to 7 with: 1 = This label is completely unknown to me. 7 = This label is well-known to me.
Trust	Please rate each of the labels on the following scale.	Scale from 1 to 7 with: 1 = I completely trust this label. 7 = I do not trust this label at all. Additional category "don't know"
Credibility	Please rate each of the labels on the following scale.	Scale from 1 to 7 with: 1 = This label does not stand for real organic products. 7 = This label stands for real organic products. Additional category "don't know"
Organic standards	How strict are the organic standards behind the label?	Scale from 1 to 7 with: 1 = below average 4 = average 7 = above average Additional category "don't know"
Control system	How strict is the control system behind the label?	Scale from 1 to 7 with: 1 = below average 4 = average 7 = above average Additional category "don't know"

3.2. Econometric models

3.2.1. Basic RPL models and WTP (Model 1)

The data collected in the choice experiments were analysed with random parameter logit (RPL) models (also called mixed logit models). RPL models represent a generalised form of traditional multinomial logit (MNL) models. In MNL models, the utility of choosing alternative i out of a choice set of J alternatives is composed of the observed utility V_i and the random error term ε_i which captures the unobserved utility. In our case, the observed utility depends on the product attribute *PRICE* with the associated β_{PRICE} coefficient and an alternative specific constant (ASC_i) representing the logo coefficient. The utility function is linear in parameters:

$$\begin{aligned} U_{label1} &= V_{label1} + \varepsilon_{label1} = ASC_{label1} + \beta_{PRICE} PRICE + \varepsilon_{label1} \\ U_{label2} &= V_{label2} + \varepsilon_{label2} = ASC_{label2} + \beta_{PRICE} PRICE + \varepsilon_{label2} \\ U_{label3} &= V_{label3} + \varepsilon_{label3} = ASC_{label3} + \beta_{PRICE} PRICE + \varepsilon_{label3} \\ U_{label4} &= V_{label4} + \varepsilon_{label4} = \beta_{PRICE} PRICE + \varepsilon_{label4} \\ U_{No-buy} &= V_{No-buy} + \varepsilon_{No-buy} = ASC_{No-buy} + \varepsilon_{No-buy} \end{aligned} \quad (1)$$

Based on the utility functions, the probability (*Prob*) that alternative i is chosen out of a choice set of J alternatives is given by:

$$Prob_i = \frac{\exp V_i}{\sum_j^J \exp V_j} \quad (2)$$

Unlike the utility functions, the probability functions are not linear in parameters. This has to be kept in mind when interpreting the model estimates for the β coefficients and *ASCs*.

The mean WTP for a logo was based on Model 1 which included only product-related parameters (unlike Model 2 and 3 below). The mean WTP was calculated by dividing the logo coefficient by the price coefficient, as suggested by Lusk and Schroeder (2004):

$$WTP_i = -ASC_i / \beta_{PRICE} \quad (3)$$

This WTP measure provides the *additional* WTP for apples/eggs with a certain logo compared to organic apples/eggs without a logo, since we defined the *ASCs* in relation to the alternative without a logo (=label 4) in the above utility functions. The WTP was based on relative price levels (0.8, 1.0, 1.2, and 1.4) in order to make the WTP measures comparable across the study countries. The values of the WTP measures provide the WTP in percent of price level 1.0 which equals the average market price.

Unlike traditional MNL models which assume the random error terms to be independently and identically distributed across the alternatives, RPL models are more flexible and allow for preference heterogeneity (Hensher & Greene, 2003). While MNL models estimate parameters that are fixed in the population, the estimated coefficients in RPL models can vary across individuals (Hensher & Greene, 2003). For these so-called random parameters both the mean and the standard deviation are estimated according to a predetermined probability distribution. For each parameter, it can be determined whether the parameter is random or fix by checking whether the model provides a significant estimate of the standard deviation. A significant standard deviation suggests the parameter is random, a non-significant standard deviation suggests the parameter is fix in the population (Hensher, Rose, & Greene, 2005). Regarding the probability distribution of a random parameter, the researcher has to make an assumption about the shape of the distribution (e.g. normal, lognormal, uniform, triangular) (Hensher & Greene, 2003).

During the process of RPL model specification, we checked all *ASCs* for a significant standard deviation to determine whether they were random or fix. We assumed the random *ASCs* to be normally distributed. The generic price coefficient was estimated as a fix parameter, since random price parameters often result in an overestimation of the WTP. This is due to the fact that the price parameter is the denominator in the WTP calculation, i.e. below average values of the price coefficient cause disproportionally high WTP measures compared to above average values. One way to solve this problem is to keep the price coefficient fix; then the WTP follows the same distribution as the nominator (Layton & Brown, 2000; Revelt & Train, 1998; Rigby, Balcombe, & Burton, 2009).[5]

3.2.2. RPL models with logo attitude scale (Model 2)

Consumer perceptions and attitudes regarding the tested organic logos were integrated into the RPL models as follows to connect the choice experiment data with data on underlying reasons "why" (see Section 3.1.3 for the underlying hypothesis and measurement items). The items on consumer perceptions and attitudes were measured on a seven-point semantic differential scale with an additional "don't know" category. Due to the inclusion of the "don't know" category, the original data was not quasi-metric but nominal scaled with eight categories. It was therefore necessary to transform the data into a quasi-metric or dichotomous format so that the items could be integrated into the RPL models. One way would have been to treat the "don't know" answers as missing values and exclude those participants from the sample. However, the results showed that the shares of "don't know" answers for the items on trust, credibility, organic standards and the control system were relatively high for at least one label per country (between 37% in Denmark and 76% in the Czech Republic). This effect was observed for the labels with a low average rating regarding label awareness, i.e. these labels were unknown to many participants. Excluding those participants from the sample who answered "don't know" for some labels was therefore not seen as the right approach, since the reduced sample would have been biased towards participants with a relatively good knowledge on organic logos.

Instead, the following procedure was done. The focus group study had suggested that consumers trusted and preferred those organic logos that they knew well and where they perceived the underlying organic standards and control regimes as strict. It was thus assumed that preferences for a logo might be explained by the extent to which a participant rated this logo *high* on the perception and attitude items. It was therefore decided to transform the rating data into dichotomous variables which equalled 'one' in case of a high rating (the two highest scores 6 and 7) and 'zero' otherwise (scores 1–5 and "don't know" answers).[6] The five dichotomous items for one logo were then tested for reliability by means of Cronbach's alpha to determine whether summated scales could be created.[7] With one exception, the summated scales for each logo exhibited Cronbach's alpha values of greater than 0.7 suggesting a good reliability (Hair, Black, Babin, & Anderson, 2010, S. 125).[8] A summated scale for each logo was calculated which equalled the sum of the five dummy-coded items. The scales could thus take on whole numbers between zero and five. Finally, RPL models based on the following utility function including a parameter for the

[5] A new kind of models called 'WTP space' was recently developed to overcome the problem of implausible WTP distributions in RPL models. However, WTP space models are not yet available in commercial software packages.

[6] Please note that the authors do *not* suggest that medium ratings, low ratings and "don't know" mean the same thing. Rather, these answer categories have in common that they do *not* mean a high rating, and this was seen essential in the present case. In general, it would have been desirable to have quasimetric data instead of "simplified" dichotomous data. However, as explained above, it was necessary to include the "don't know" answer category.

[7] For dichotomous variables, Cronbach's alpha is equivalent to the Kuder–Richardson coefficient (Cortina, 1993).

[8] The only exception was the scale for label 2 in Denmark with a Cronbach's alpha of 0.625, which is still acceptable for exploratory research (Hair et al., 2010, p. 125).

Table 4
Description of the sample: Socio-demographic characteristics.

		CH	CZ	DE	DK	IT	UK
	N	397	400	405	401	427	411
Gender	*N*	395	400	405	401	427	411
	Female (%)	61.5	65.8	65.7	71.0	70.3	71.0
	Male (%)	38.5	34.2	34.3	29.0	29.7	29.0
Age	*N*	397	400	405	401	427	411
	18–44 years (%)	47.1	61.0	50.1	46.6	42.4	51.8
	45–75 years (%)	52.9	39.0	49.9	53.4	57.6	48.2
	Mean age in years	45.1	40.3	44.1	46.3	46.2	45.6
Education[a]	*N*	394	400	398	401	427	411
	No formal qualification (%)	0.3	2.8	0.0	3.0	0.0	5.6
	GCSE[b] (%)	35.8	8.5	25.1	2.7	1.6	12.4
	A level[c] (%)	29.7	49.3	33.2	32.4	11.0	15.8
	College or university degree (%)	34.3	39.5	41.7	61.8	87.4	66.2
Household size	*N*	396	400	396	401	426	410
	Mean	2.4	2.8	2.5	2.5	2.8	2.7
Household net income (monthly)	*N*	377	393	379	400	426	406
	<600 € (%)	6.6	33.1	12.1	3.8	4.9	4.9
	600 € to <1200 € (%)	11.7	47.1	17.9	12.0	14.3	10.6
	1200 € to <1800 € (%)	9.8	14.0	18.7	9.3	21.4	10.3
	1800 € to <2400 € (%)	9.3	3.6	13.2	13.0	16.7	14.5
	2400 € to <3000 € (%)	12.2		11.3	12.5	13.1	10.8
	3000 € to <3600 € (%)	13.5		8.7	10.3	10.1	12.1
	3600 € to <4200 € (%)	9.5	2.3[d]	8.4	7.3	5.4	6.9
	4200 € to <4800 € (%)	7.7		1.8	8.8	4.9	9.4
	4800 € to <5400 € (%)	6.4		2.9	10.8	2.3	4.7
	5400 € or more (%)	13.3		4.7	12.5	6.8	15.8

[a] The listed categories are taken from the UK questionnaire. Equivalent terms were used in the other countries.
[b] General Certificate of Secondary Education (appr. 10 years of school).
[c] Approximately 12 years of school.
[d] In CZ, the following income categories were used in the interviews: <300 €; 300 € to <600 €; 600 € to <900 €; 900 € to <1200 €; 1200 € to <1500 €; 1500 € to <1800 €; 1800 € to <2100 €; 2100 € to <2400 €; 2400 € to <2700 €; 2700 € or more.

Table 5
Description of the sample: buying behaviour for organic food.

		Share of participants in%					
		CH	CZ	DE	DK	IT	UK
Organic budget share of the participants[a]	⩽50%	56.3	85.3	49.5	47.9	55.3	63.2
	>50%	43.7	14.8	50.5	52.1	44.7	36.8
	Total	100.0	100.0	100.0	100.0	100.0	100.0
	N	396	400	388	401	421	410

[a] Share of organic products in consumers' total expenditure for food and beverages in %.

attitude scale (*AttitudeScale*) were estimated (the procedure was adapted from Louviere et al. (2000, S. 295f):

$$U_i = V_i + \varepsilon_i = ASC_i + \beta_{PRICE} PRICE + \beta_{AScale} AttitudeScale + \varepsilon_i \quad (4)$$

3.2.3. RPL models with 'Organic budget share' (Model 3)

For random parameters it is possible to reveal whether other variables (called covariates, e.g. characteristics of the consumer) cause a systematic variation around the mean (Hensher et al., 2005). This is done by estimating interaction terms between covariates and random parameters. A significant interaction term indicates that the covariate causes a systematic variation around the mean of the random parameter. In this case the covariate (partly) explains the heterogeneity in preference. In our case, it was tested whether the observed heterogeneity in preference for some logos was related to the consumers' buying frequency of organic food (see Section 3.1.2 for the underlying hypothesis). The variable 'organic budget share' was therefore integrated into the basic RPL models (Model 1) as a covariate and it was tested whether it caused a systematic variation around the mean of the random *ASCs*. In a step-wise process, we estimated interaction terms with all random *ASCs*. Non-significant interaction terms were excluded and the model was re-estimated as suggested in the literature (Hensher et al., 2005).

3.3. Description of the sample

The socio-demographic characteristics of the sample are presented in Table 4. In all countries, the age and gender quotas (see Section 3.1.1) were fulfilled with a deviation of less than three percentage points. The level of education was generally high in the sample, in particular in Italy. However, this result is in accordance with previous studies suggesting that the share of people with a college or university degree is, on average, higher among consumers of organic food compared to the rest of the population (Wier, O'Doherty Jensen, Andersen, & Millock, 2008; Zander & Hamm, 2010). In all countries, the mean household size was slightly above average compared to the population.

Table 5 contains information about participants' stated buying behaviour for organic food. The share of participants who estimated their organic budget share (i.e. the share of organic products in their total expenditure for food and beverages) to be above 50%

was the highest in Denmark and Germany (with around half of the participants ascribing themselves to that group) and the lowest in the Czech Republic (15%).

4. Results and discussion

Separate RPL models were estimated for apples and eggs with the software package NLOGIT 4.0. The models were estimated by simulated maximum likelihood using Halton draws with 2000 replications.[9] The final RPL model estimates are shown Table 6. All models are statistically significant at the 99.99% confidence level (Chi-square statistics). The model fits vary across the countries with the highest model fits observed in Denmark and the lowest in Italy. In all sets of models, the egg model has a Log Likelihood function value closer to zero compared to the apple model, suggesting the egg models have a better fit. One explanation could be that in the choice experiments, slight variations in the look of the apples could not be completely ruled out whereas the eggs looked very much alike. In all models, the price coefficient is significant and of the expected negative sign.

4.1. Willingness-to-pay for different organic logos

Table 7 shows the additional WTP for products with a certain organic logo compared to similar products labelled with the prefix 'organic' without a logo. The values of the WTP measures provide the WTP in percent of price level 1.0 (price level 1.0 equals the average market price). The *ASCs* of several logos have a significant standard deviation around the mean and were estimated as random parameters resulting in heterogeneity in the WTP for these logos.

A significant positive additional mean WTP[10] was observed for almost all logos, even for the fake logo tested in Switzerland. That means consumers clearly preferred products labelled with organic logos over organic products without a logo. However, the price premium that consumers were willing to pay differed considerably between the tested logos. In Switzerland, the Czech Republic, Denmark and Italy there was *one* logo with a considerably higher WTP compared to the other logos. Those were the Bio Suisse logo in Switzerland, the Czech and Danish governmental logos and the EU logo in Italy. In Germany and the UK, there were *two* logos with a relatively high WTP, namely the logo of the farmers' association Demeter and the governmental logo in Germany and the logos of the Soil Association and the certification body 'Organic Farmers & Growers' in the UK.

A comparison of the WTP for different kinds of logos across the countries revealed the following picture:

- *Old EU logo:* The WTP for the old EU logo was relatively low or equal to zero in the Czech Republic, Germany, Denmark and the UK. In contrast, the old EU logo had the highest WTP of all logos tested in Italy.
- *Governmental logos:* In the Czech Republic and Denmark, the governmental logo featured the highest WTP of all tested logos. In Germany, the WTP for the governmental logo and the Demeter logo were both equally high for apples; for eggs the WTP for the governmental logo was slightly lower than for the Demeter logo.
- *Private logos (logos of farmers' and organic sector associations, umbrella organisations and certification bodies):* In Switzerland and the UK, the highest WTP was observed for a private logo. However, both countries do not have a governmental logo and the old EU logo was not commonly used. The Demeter logo featured a high WTP only in Germany, whereas in the Czech Republic, Denmark, Italy and Switzerland, the WTP for the Demeter logo was considerably lower than for the logo with the highest WTP.

The results for apples and eggs were relatively similar in all countries except for Germany, where the WTP for the three logos was considerably higher for eggs than for apples. Similarly, in Switzerland the additional WTP for the Bio Suisse logo was higher for eggs than for apples. An explanation for the German and Swiss results could be the lower absolute prices for eggs than for apples in the experiments, so that the absolute price difference between the tested price levels was lower for eggs.

4.2. Factors influencing consumer preferences for organic logos

4.2.1. Attitudes regarding organic logos

The RPL model estimates (Table 6, Model 2) show that the logo attitude scale has a significant coefficient with a positive sign in all models. Thus, a higher rating of an organic logo in terms of awareness, trust, credibility, standards and control system increased the probability that this logo was chosen.

The results of the logo ratings are shown in Fig. 2, to allow further insights into the relation between these measures and the observed WTP. A considerable share of participants knew organic products without a logo but the great majority did not find these products trustworthy and credible, which was why products with a certification logo were mostly preferred (Fig. 2). This result corresponds with the so-called unfolding theory in the literature suggesting that consumers infer from the absence of a label that the product does not possess the respective attributes (Golan et al., 2001, p. 129). As mentioned in the introduction, a study from the United States also found that consumers clearly preferred the USDA logo over products with the prefix 'organic' (Van Loo et al., 2011).

Furthermore, the present findings illustrate that logo awareness alone might not sufficiently explain consumer preferences for organic certification logos; consumer perceptions and attitudes regarding the scheme behind the logo also play an important role. In Germany, the governmental logo was known to a greater share of participants than the Demeter logo, but the Demeter logo got higher ratings regarding standards and control, explaining why the WTP for the Demeter logo equalled or slightly exceeded the WTP for the governmental logo. In the UK, the Soil Association logo was known by a larger share of people than the OF&G logo and also the other ratings were higher. However, this fact was *not* reflected in the WTP measures. The interviewers reported that several participants commented on the appealing design of the OF&G logo, which might have influenced the logo choice. This aspect was not explicitly investigated in our study but it might be worth exploring in the UK.

Our results further show that consumer perceptions of what stands behind an organic certification logo are of subjective nature and in many cases not based on objective facts. For instance in Germany, consumer perceptions of the governmental logo, the old EU logo, and organic products without a logo were very different, even though the three labels indicate exactly the same, namely organic production according to Regulation (EC) No. 834/2007. Similarly, in Italy the WTP for the old EU logo was much higher than for products without a logo. Discrepancies between consumer perceptions and objective knowledge are a well-documented phenomenon in the literature (Alba & Hutchinson, 2000). Several studies found that consumers have a low level of factual knowledge about organic production

[9] Please note that the following 'no-buy cases' were excluded from the choice analysis: Participants who stated to not have chosen a product because they disliked the look, shape, colour, size, variety or smell of all offered alternatives.

[10] In the following description, the terms 'additional WTP' and 'price premium' refer to the *mean* additional WTP compared to similar products without a logo.

Table 6
RPL models on consumer preferences for organic certification logos.

		Apple models				Egg models		
		Model 1	Model 2	Model 3		Model 1	Model 2	Model 3
CZECH REPUBLIC								
	N	782	782	782		776	776	776
Parameters	RP[a]				RP[a]			
Price	Fix	−4.36***	−4.35***	−4.35***	Fix	−4.79***	−4.78***	−4.80***
ASC EU logo	RP	0.59**	0.53**	0.59**	RP	1.11***	1.05***	1.11***
ASC Gov'l logo	RP	2.45***	1.63***	1.58***	RP	2.56***	1.82***	1.98***
ASC Demeter	Fix	0.37**	0.78***	0.38**	RP	0.58***	0.95***	0.57***
ASC No-buy	Fix	−7.06***	−6.42***	−7.05***	Fix	−7.61***	−7.03***	−7.63***
Attitude-Scale[b]	Fix	–	0.44***	–	Fix	–	0.40***	–
Standard deviations of parameter distributions								
ASC EU logo		2.05***	1.91***	2.05***		1.36***	1.25***	1.37***
ASC Gov'l logo		3.16***	2.82***	3.13***		2.49***	2.01***	2.47***
Interaction term with the covariate 'Organic budget share'								
x Gov'l logo		–	–	0.25**		–	–	0.17**
Log Likelihood		−778.64	−748.21	−775.66		−748.80	−718.82	−746.87
McFadden Pseudo R^2		0.38	0.40	0.38		0.40	0.42	0.40
DENMARK								
	N	788	788	788		796	796	796
Parameters	RP[a]				RP[a]			
Price	Fix	−6.43***	−6.19***	−6.39***	Fix	−8.19***	−8.24***	−8.12***
ASC EU logo	RP	0.88***	0.53**	0.87***	Fix	1.64***	1.34***	1.62***
ASC Gov'l logo	RP	3.35***	1.77***	3.36***	RP	4.40***	2.91***	4.39***
ASC Demeter	RP	0.88***	0.79***	−1.42**	RP	1.78***	1.58***	−0.20
ASC No-buy	Fix	−9.05***	−7.87***	−9.00***	Fix	−10.43***	−9.63***	−10.37***
Attitude-Scale[b]	Fix	–	0.56***	–	Fix	–	0.55***	–
Standard deviations of parameter distributions								
ASC EU logo		0.94*	1.07**	0.94*		–		–
ASC Gov'l logo		2.34***	1.73***	2.40***		2.43***	2.25***	2.45***
ASC Demeter		2.05***	1.09***	1.69***		2.13***	1.50***	1.86***
Interaction term with the covariate 'Organic budget share'								
x Demeter		–	–	0.42***		–	–	0.36***
Log Likelihood		−684.68	−628.33	−669.92		−614.27	−565.43	−603.89
McFadden Pseudo R^2		0.46	0.50	0.47		0.52	0.56	0.53
GERMANY								
	N	772	772	740		770	770	738
Parameters	RP[a]				RP[a]			
Price	Fix	−3.33***	−3.24***	−3.33***	Fix	−2.27***	−2.23***	−2.44***
ASC EU logo	Fix	0.03	−0.05	0.03	Fix	0.48**	0.38*	0.50**
ASC Gov'l logo	RP	1.69***	0.44***	1.73***	RP	2.08***	0.72***	2.79***
ASC Demeter	RP	1.61***	0.24***	−0.41***	RP	2.38***	0.82***	0.90**
ASC No-buy	Fix	−34.56	−34.56	−33.27	Fix	−33.37	−33.52	−33.00
Attitude-Scale[b]	Fix	–	0.44***	–	Fix	–	0.48***	–
Standard deviations of parameter distributions								
ASC Gov'l logo		1.03***	0.92***	1.03***		1.03***	0.97***	1.04***
ASC Demeter		1.90***	1.01***	1.90***		1.33***	0.45	1.19***
Interaction terms with the covariate 'Organic budget share'								
x Gov'l logo		–	–	–		–	–	−0.12**
x Demeter		–	–	0.35***		–	–	0.26***
Log Likelihood		−805.06	−747.83	−746.20		−776.52	−691.15	−705.68
McFadden Pseudo R^2		0.35	0.40	0.37		0.37	0.44	0.41
ITALY								
	N	854	854	842		844	844	832
Parameters	RP[a]				RP[a]			
Price	Fix	−2.30***	−2.19***	−2.31***	Fix	−2.74***	−2.50***	−2.79***
ASC EU logo	RP	1.84***	0.63***	1.82***	RP	2.31***	0.98***	2.28***
ASC CCPB	RP	1.10***	0.57***	1.62***	RP	1.52***	0.87***	2.13***
ASC Demeter	RP	0.95***	0.87***	−0.55	RP	1.03***	0.84***	−0.51
ASC No-buy	Fix	−5.44***	−4.71***	−5.43***	Fix	−5.37***	−4.47***	−5.42***
Attitude-Scale[b]	Fix	–	0.56***	–	Fix	–	0.59***	–
Standard deviations of parameter distributions								
ASC EU logo		1.83***	1.28***	1.92***		2.50***	1.77***	2.64***
ASC CCPB		1.20***	1.01***	1.13***		1.81***	1.85***	1.83***
ASC Demeter		2.36***	1.06***	2.14***		2.31***	1.11***	2.06***
Interaction terms with the covariate 'Organic budget share'								
x CCPB		–	–	−0.10*		–	–	−0.13*
x Demeter		–	–	0.29***		–	–	0.30***
Log Likelihood		−987.59	−884.50	−955.27		−933.92	−851.41	−902.87
McFadden Pseudo R^2		0.28	0.35	0.30		0.31	0.37	0.33

(*continued on next page*)

Table 6 (*continued*)

		Apple models				Egg models		
		Model 1	Model 2	Model 3		Model 1	Model 2	Model 3
SWITZERLAND								
	N	772	772	772		778	778	776
Parameters	RP[a]				RP[a]			
Price	Fix	−3.49***	−3.40***	−3.53***	Fix	−3.45***	−3.37***	−3.43***
ASC Fake logo	Fix	0.62***	0.15	0.61***	RP	0.79***	0.41*	0.78***
ASC Bio Suisse	RP	1.90***	0.12	1.32***	RP	2.64***	0.68***	1.95***
ASC Demeter	RP	1.16***	0.04	−1.41***	RP	1.07***	−0.11	−1.86***
ASC No-buy	Fix	−7.12***	−6.76***	−7.17***	Fix	−33.48	−33.85	−33.67
Attitude-Scale[b]	Fix	–	0.51***	–	Fix	–	0.58***	–
Standard deviations of parameter distributions								
ASC Fake logo		–	–	–		0.90*	0.60	0.98**
ASC Bio Suisse		1.84***	1.78***	1.89***		1.80***	1.33***	1.77***
ASC Demeter		2.07***	0.89***	1.48***		3.06***	2.16***	2.78***
Interaction terms with the covariate 'Organic budget share'								
x Bio Suisse		–	–	0.12*		–	–	0.15**
x Demeter		–	–	0.52***		–	–	0.58***
Log Likelihood		−835.91	−757.04	−800.64		−777.08	−707.18	−755.58
McFadden Pseudo R^2		0.33	0.39	0.36		0.38	0.43	0.40
UNITED KINGDOM[c]								
	N	790	790	788		786	786	786
Parameters	RP[a]				RP[a]			
Price	Fix	−2.87***	−2.84***	−2.86***	Fix	−4.33***	−4.28***	−4.33***
ASC EU logo	Fix	0.23*	0.40***	0.24*	Fix	0.23	0.50***	0.23
ASC Soil Ass.	RP	0.75***	0.38**	0.30	RP	1.18***	0.56***	1.18***
ASC OF&G	RP	0.95***	0.69***	0.96***	RP	1.55***	1.13***	1.55***
ASC No-buy	Fix	−7.70***	−7.36***	−7.68***	Fix	−7.11***	−6.54***	−7.11***
Attitude-Scale[b]	Fix	–	0.20***	–	Fix	–	0.33***	–
Standard deviations of parameter distributions								
ASC Soil Ass.		1.57***	1.29***	1.56***		‘	1.69***	2.12***
ASC OF&G		1.13***	1.17***	1.14***		1.88***	1.82***	1.88***
Interaction term with the covariate 'Organic budget share'								
x Soil Assn.		–	–	0.09*		–	–	–
Log Likelihood		−939.50	−925.82	−935.83		−856.91	−832.63	−856.91
McFadden Pseudo R^2		0.26	0.27	0.26		0.32	0.34	.32

Statistical significance at level ***<0.01, **<0.5, *<0.1.
– Term was not estimated in the model.
[a] 'RP' stands for random parameters, 'Fix' stands for non-random (fixed) parameters.
[b] Attitude-Scale: Summated scale of consumer perceptions and attitudes regarding organic certification logos.
[c] In the egg models, no significant interaction terms were found with the covariate 'Organic budget share', therefore the results of Model 3 and Model 1 are identical.

Table 7
Additional WTP for organic logos.[a]

Country	Organic logos	Apples		Eggs	
		Mean	Standard deviation	Mean	Standard deviation
Switzerland	Fake logo	0.18	0.00[b]	0.23	0.08
	Bio Suisse logo	0.54	0.34	0.77	0.32
	Demeter logo	0.33	0.38	0.31	0.62
Czech Republic	Old EU logo	0.13	0.27	0.23	0.14
	Governmental logo	0.56	0.55	0.53	0.38
	Demeter logo	0.09	0.00[b]	0.12	0.00[b]
Germany	Old EU logo	0.00	–	0.21	0.00[b]
	Governmental logo	0.51	0.14	0.92	0.21
	Demeter logo	0.49	0.38	1.05	0.34
Denmark	Old EU logo	0.14	0.04	0.20	0.00[b]
	Governmental logo	0.52	0.25	0.54	0.20
	Demeter logo	0.14	0.17	0.22	0.14
Italy	Old EU logo	0.80	0.50	0.84	0.63
	CCPB logo	0.48	0.23	0.56	0.36
	Demeter logo	0.41	0.68	0.37	0.51
United Kingdom	Old EU logo	0.08	0.00[b]	0.00	–
	Soil Assn. logo	0.26	0.34	0.27	0.33
	OF&G logo	0.33	0.20	0.36	0.28

[a] Reference category are organic products without a logo. The WTP measures are based on Model 1 with relative price levels (0.8, 1.0, 1.2, and 1.4). The additional WTP is shown in percent of the average market price. For example, in Germany the additional WTP for apples with the governmental logo compared to organic apples without a logo amounted to 51% of the average market price.
[b] WTP measures with a standard deviation of zero indicate that the ASC of the respective logo was estimated as a fixed parameter so that the mean WTP was also a fixed parameter.

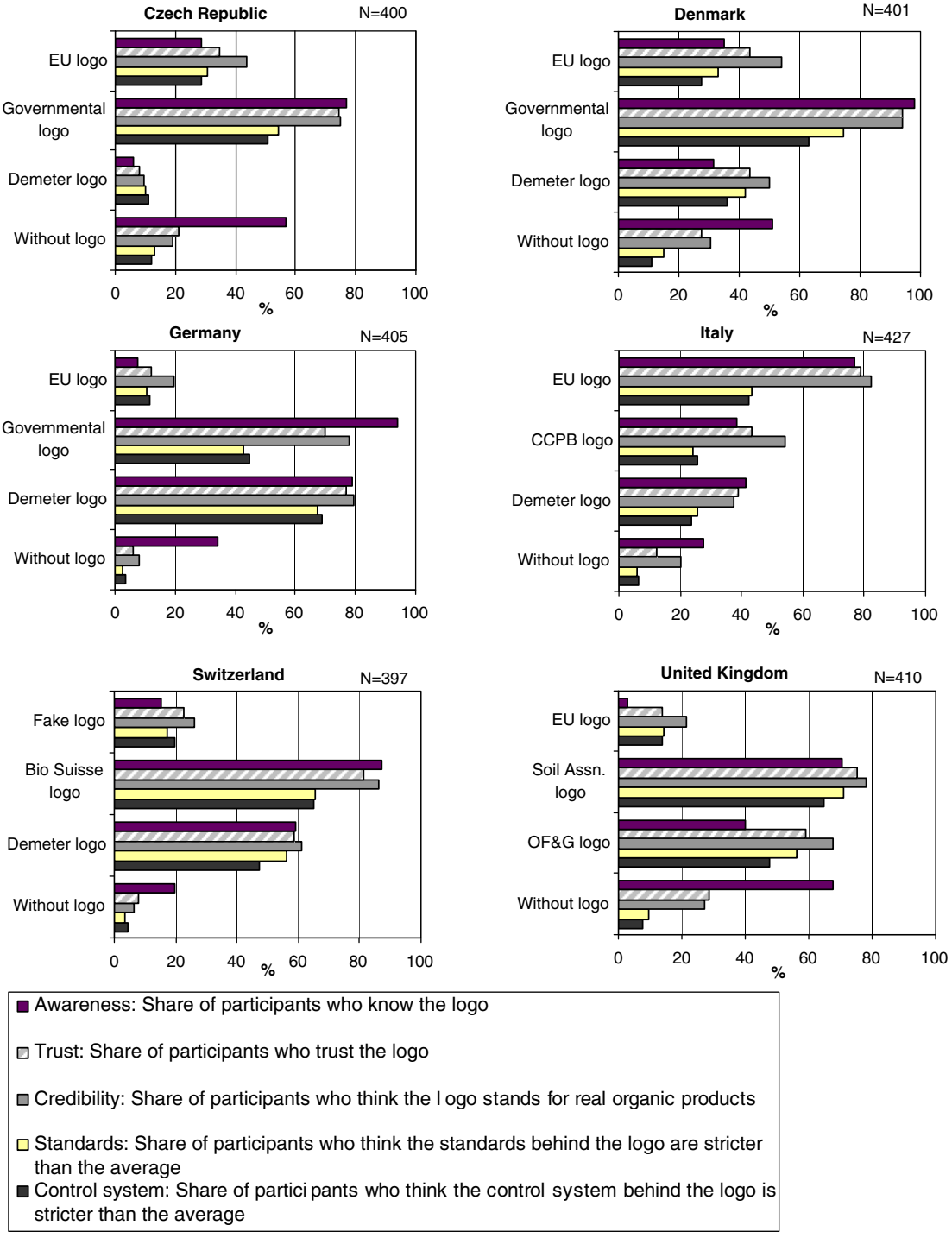

Fig. 2. Consumer perceptions and attitudes regarding different organic certification logos (The figures show the share of participants who rated the logo with the scores 6 or 7 on the respective item. See Table 3 for a description of the items and answer categories. See Table 1 for a description of the logos. 'Without logo' refers to generic labelling with the prefix 'organic' without a logo.).

standards and certification (Hoogland et al., 2007; McEachern & Warnaby, 2008; Sawyer, Kerr, & Hobbs, 2009). Consumer perceptions are mostly limited to a comparison between 'strict' and 'low' standards (Janssen & Hamm, 2011a).

4.2.2. Consumers' buying frequency of organic food

In each country, significant interaction terms of the logo coefficients (*ASCs*) with the covariate 'organic budget share' were found (Table 6, Model 3). Except for two logos, all interaction terms are positive indicating a higher WTP among frequent buyers of organic food compared to less frequent buyers, which seems very plausible (Millock, Hansen, Wier, & Andersen, 2002; Van Loo et al., 2011). In the following description, only interaction terms which were significant in both product models (apples and eggs) are mentioned. A common finding across Switzerland, Germany, Denmark and Italy is that consumers with a higher organic budget share had a higher preference for products of the farmers' association Demeter than consumers with a lower organic budget share. Regarding the

other private logos a mixed picture was found. In Switzerland Bio Suisse products were preferred more the higher the organic budget share, whereas in Italy products with the CCPB logo were preferred more the lower the organic budget share. For the private logos in the UK, the model estimates did not provide an interaction term that was significant for apples *and* eggs. The results regarding the governmental logos in the Czech Republic, Germany and Denmark are also diverse: Only in the Czech Republic, significant interaction terms were found in both product models. The Czech governmental logo was preferred more by consumers with a higher organic budget share. Preference heterogeneity regarding the EU logo was observed in Denmark, Italy and the Czech Republic but no significant interaction term with the covariate was found here (in Germany and the UK, the *ASC* of the EU logo proved to be fix in the population, so no preference heterogeneity was detected here).

4.3. Comparison with market data on organic logos

In our study, the highest price premiums were recorded for logos that were well-known and trusted. This raises the question of how consumers' familiarity with an organic logo might be related to the 'visibility' of that logo in the marketplace, like the number of products that carry the logo, the kinds of distribution channels where it is found (conventional supermarkets, organic food shops etc.), and the length of time that it has been in the marketplace. It therefore seems useful to provide a brief overview about the tested organic logos in the different countries. The following information refers to the situation prior to the introduction of the mandatory EU logo when the data for the present study was collected. The information on the logos is taken from Janssen and Hamm (2011b); the market data are taken from Schaack, Willer, and Padel (2011):

- *Czech Republic:* In 2009, the market for organic food was still relatively small but growing fast. The Czech governmental logo was the most frequently used organic logo, which the majority of organic products carried. The Demeter logo was found on a few imported products sold in organic food shops. The former EU logo for organic food was rarely used by Czech producers.
- *Denmark:* In the European country with the highest per capita expenditures on organic food, the Danish governmental logo was displayed on most organic products in 2009. Besides, the former EU logo was relatively common in the marketplace. Products with the Demeter logo were only found on selected products in organic food shops.
- *Germany:* Also in the largest national market for organic food in Europe the governmental logo was the most frequently used organic logo in 2009. While logos of farmers' associations have had a long tradition, products with the Demeter logo were mainly found in organic food shops. The former EU logo for organic food was rarely used by German producers.
- *Italy:* In Italy – a net exporter of organic products – the former EU logo was the most frequently used organic logo in the marketplace in 2009. In addition, numerous logos of private organisations were found, most of which only played a role in selected product categories. A national governmental logo did not exist.
- *United Kingdom:* In the third largest market for organic food in Europe, the former EU logo for organic food was rarely used. The market was characterised by several private organic certification logos, of which the logo of the Soil Association was the most common one. A national governmental logo did not exist.

The comparison of this background information with our results on consumer response to organic logos indicates that consumers' familiarity with and trust in an organic logo are closely related to the visibility of that logo in the marketplace. It can be concluded that consumers were willing to pay the highest price premiums for those organic logos which were most frequently found on products in the marketplace. The only exception was the Demeter logo in Germany, which achieved a high WTP even though it was mainly used in organic food shops but hardly in conventional supermarkets.

4.4. Limitations of the study

Previous research showed that organic certification logos might not be the only source of consumer trust in the integrity of organic products (Janssen & Hamm, 2011a; Naspetti & Zanoli, 2009). Other sources of trust could be manufacturer and private brands as well as trust in the farmer or owner of an organic food shop. These aspects were not investigated in the choice experiments. Thus our results regarding consumer preferences for organic certification logos are mostly valid for products like fruit and vegetables, meat and eggs that are not labelled with a well-known brand. This aspect is further elaborated in the final section.

The study was conducted prior to the introduction of the new mandatory EU logo. Our results regarding the old EU logo cannot be directly transferred to the new EU logo, since the new logo is mandatory. In a few years from now, the new logo will probably reach a higher level of consumer awareness than the old logo had when the study was conducted. It would be interesting to repeat the investigation once the new EU logo is well-known among the population.

5. Conclusions

According to our results, very few consumers trusted the generic labelling with the prefix 'organic' without a certification logo. For almost all tested organic certification logos, the WTP was significantly higher than for the generic labelling. That even holds true for a fake logo investigated in Switzerland. However, the WTP differed considerably between the tested logos. The highest price premiums were recorded for logos that were well-known and trusted with perceived strict organic standards and a strict control system. Based on our findings, recommendations for market actors in the organic sector are now derived. Furthermore, conclusions are drawn regarding the theoretical framework of credence goods and third-party certification. Lastly, the role of organic certification logos is critically discussed.

5.1. Recommendations for market actors in the organic sector

Consumers in the study countries clearly prefer certain organic certification logos over others. At the time of writing, it remains to be seen how quickly the new mandatory EU logo will gain consumer awareness in the population. However, it is likely that it will take some time until the new logo is widely trusted in those countries where the former voluntary EU logo was not very common. In these countries, it thus seems advisable to *additionally* label organic products with an organic logo that consumers know and trust, at least in a transition period. According to our findings, there were great differences between countries as to which kinds of organic logos were preferred by consumers. In Denmark and the Czech Republic, consumers were willing to pay the highest price premium for the governmental logo. In Germany, a high WTP was recorded for the logo of the farmers' association Demeter and the governmental logo. In Italy, the old EU logo reached the highest WTP. In Switzerland, the logo of the farmers' umbrella organisation Bio Suisse was clearly preferred. In the UK, the WTP was the highest for the logos of the Soil Association and the certification body

'Organic Farmers & Growers'. In some countries, the organic logos preferred by consumers are attached to further requirements in addition to the principles of EU Regulation (EC) 834/2007. However, the present results suggest that the effort of fulfilling additional requirements might be worth for producers and processors, in order to label their products with those logos preferred by consumers.[11]

Our findings showed that consumer preferences for some organic certification logos were influenced by consumers' buying frequency of organic food. A number of logos attracted a higher WTP among frequent buyers of organic food compared to occasional buyers. These findings can be used by organic producers and processors for choosing an organic labelling scheme as well as distribution channel for their products. Retailers can use the information likewise. For instance if they wish to attract more frequent buyers of organic food, they could list products with respective organic logos preferred by frequent buyers.

5.2. Credence goods and third-party certification

Our findings illustrate that product labelling based on third-party certification does not automatically overcome the dilemma of information asymmetry inherent in credence goods. Rather, consumer perceptions and attitudes regarding the logo that represents the underlying scheme play the central role at the point-of-sale. In our study, different logos which indicate the same were evaluated differently by consumers, so that the WTP was higher for some logos than for others. Thus, for a certification scheme to be successful, consumer awareness of the corresponding logo and positive attitudes towards the underlying scheme are of crucial importance. We recommend that organisations owning a labelling scheme for consumer goods invest in marketing communication and public relation for increasing consumer awareness of the logo and forming consumer attitudes towards the certification scheme behind it.

Communicating process-related characteristics of credence goods to consumers is certainly not easy, in particular in the food sector. The fact that many food purchases fall under habitual decision-making represents a great challenge in the context of food product marketing (Grunert, 2005). Previous research confirmed that consumers know little about agricultural practices and food production (Hoefkens, Verbeke, Aertsens, Mondelaers, & van Camp, 2009; Hoogland et al., 2007; Naspetti & Zanoli, 2009; Sawyer et al., 2009). This dilemma highlights the importance of identifying those aspects of a labelling scheme that are relevant to consumers and easy to communicate. In the case of organic food, several studies showed that consumers are particularly interested in animal welfare (Hughner et al., 2007; Zander & Hamm, 2010). Another reason for buying organic food frequently mentioned by consumers is that they desire products free of pesticide residues (Hughner et al., 2007; Naspetti & Zanoli, 2009; Yiridoe, Bonti-Ankomah, & Martin, 2005). Findings like these provide hints for successful marketing messages for shaping consumer perceptions of what stands behind an organic certification logo.

[11] For instance, the Danish governmental logo is a control logo which requires that the latest preparation of the product (packaging and/or labelling) was undertaken by a company in Denmark under the inspection of the Danish governmental control authorities (Bekendtgørelse om økologiske fødevarer m.v. No 1258; Fødevarestyrelsens vejledning om økologiske fødevarer m.v.). In the Czech Republic, the product must have been certified by a control body authorised by the Ministry of Agriculture (KEZ, Biokont, AbCert) in order to carry the Czech governmental logo (Act on Organic Farming No. 242/2000 Coll.). In the UK, the standards of the Soil Association exceed the EU organic principles in some respects (Soil Association Ltd., 2010). The logo of the inspection body OF&G can only be displayed by operators controlled by these inspection bodies. The Demeter logo preferred by frequent buyers in Germany indicates that the anthroposophical standards of Demeter are fulfilled (Demeter e.V., 2010, 2011). Similarly, the farmers' umbrella organisation Bio Suisse has own organic standards exceeding the EU principles (Bio Suisse, 2011).

5.3. Critical appreciation of the role of organic certification logos

The present study of consumer preferences for organic certification logos highlights the importance of understanding the consumer perspective on the organic food regime. Consumer perceptions of organic standards, certification and control are of subjective nature and in many cases not based on objective knowledge. It needs to be admitted that any organic certification logo which is neither mandatory nor already widely known among consumers will face severe difficulties in trying to attract consumer preferences. In the end, the decision upon the use of voluntary organic certification logos for product labelling lies with private processors and retailers. Processors and retailers, however, are primarily interested in promoting their own brand as a unique selling proposition to differentiate their products from other organic products. From the perspective of processors and retailers, organic certification logos only serve as tools for gaining consumer trust but they do not offer a unique selling proposition.

This circumstance will most likely have consequences for the design of product packages and the use of voluntary organic certification logos. Since July 2010, the mandatory EU logo and indication of origin must be displayed. More importantly, however, processors and retailers want to attract attention to their own brand label. Given that space on product packages is limited, particularly on the front side, voluntary organic certification logos therefore run the risk of losing importance – provided that the mandatory EU logo will gain consumer trust. This development will make it easier for processors and retailers to focus their efforts on establishing their own brands as unique selling propositions. Consequently, only those voluntary organic certification logos that consumers perceive as exceptional will maintain a position in the market.

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