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Submitted Article

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Abstract Higher animal welfare standards increase costs along the supply chain of certified animal-friendly products (AFP). Since the market outcome of certified AFP depends on consumer confidence toward supply chain operators complying with these standards, the role of trust in consumer willingness-to-pay (WTP) for AFP is paramount. Results from a contingent valuation survey administered in five European Union countries show that WTP estimates were sensitive to robust measures of consumer trust for certified AFP. Deriving the WTP effect of a single food category on total food expenditure is difficult for survey respondents; hence, a budget approach was employed to facilitate this process.

Key words: Animal welfare, certification, consumer trust, WTP, budget approach.

JEL codes: C81, Q13, Q18.

Introduction

The issue of farm animal welfare (FAW) came seriously to the forefront only after World War II. For it was since then that the livestock sectors of the agro-food industry of industrialized countries adopted intensive breeding practices in order to lower average production costs. The consequences of intensive breeding began to cause concern in intellectual circles and, in the 1960s, after publication in the United Kingdom of Ruth Harrison's *Animal Machines*, public outcry led to the formation of a special commission to examine FAW issues. The resulting Brambell Report (1965) has become a worldwide technical and socio-political point of reference, especially for the evaluation of conditions regarding the well-being of animals. Thereafter, animal welfare began to gain importance among scientists, politicians, and, during the last ten years, economists.

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Most of the studies on the economic aspects of FAW have been undertaken in the European Union (EU), where researchers have explored the financial impact along the livestock production chain (McInerney 2004), consumer attitudes, and willingness to pay (WTP) for measures and policies supporting FAW (Bennett and Blaney 2003; Carlsson, Frykblom, and Lagerkvist 2007). The few studies conducted on financial impacts indicate that breeding systems delivering higher standards of FAW induce production costs that are significantly higher than those of conventional systems, a result of higher input costs (labor and feed) and lower productivity due to reduction in stocking density (e.g., SCAHAW 2000; Bornett, Guy, and Cain 2003). The issue of higher costs in animal welfare standards has also been highlighted in a cross-cultural study conducted on farmers' attitudes in several European countries (France, Italy, Netherlands, Norway, Sweden, and the United Kingdom) within the Welfare Quality Project (see <http://www.welfarequality.net>). Higher costs in animal welfare schemes appear to put farmers under pressure because they do not believe in consumers' WTP. In particular, they worry about consumers' lack of knowledge of animal welfare standards and the associated quality of FAW production. Any measure aimed at diversifying the market for animal products on the basis of FAW requires an understanding of consumers' WTP and how this relates to (difficult to measure) psychological constructs, such as belief and trust in FAW certification. The present study contributes to the economics literature on FAW by deriving results from data collected in an internet survey conducted in five EU countries with the aim of estimating consumers' WTP for certified AFP. In estimating WTP we take into account stated household weekly expenditure for farm animal products. A novel contribution is that of exploring the impact of psychological constructs built on the perception of trust toward stakeholders working in the animal-friendly chain. The paper is organized as follows. First we review the literature on consumer studies; then we explain how we measure psychological constructs and household WTP for certified AFP; then we present our results and conclusions.

Consumers and Farm Animal Welfare

Animal welfare is an emotional subject which provokes a wide range of reactions in the public (Pratt and Wynne 1995). Consumer attitudes toward FAW differ widely across the EU. Residents in northern countries appear to be more sensitive than those living in either southern or newly entered member states (European Commission 2005). Concerns about FAW can come either from specific groups of consumers (e.g., vegetarians) or from citizens who believe that the way in which animals are reared is wrong and immoral (Brom 2000). Previous studies show that consumers seem more concerned about the welfare of poultry than of other farm animals (Verbeke and Viaene 2000; McEachern and Schröder 2002; European Commission 2005), despite consumption of conventionally reared white meat exceeding that of red meat. Furthermore, the increasing demand for "natural food" is probably more motivated by private goals (e.g., the desire for health protection linked to BSE and food scares, absence of chemical substances) than by compassion toward farm animals (Webster 2001). Empirical studies of consumers' concerns about FAW have been conducted employing both qualitative and quantitative

methods. We now briefly review the evidence gathered so far from the application of both these methods.

Qualitative Research

Research conducted using qualitative methods, such as in-depth interviews, focus groups, and the means-end chain model, seems to indicate that consumers' concerns for FAW can be seen as a multidimensional concept split into two parts: zoocentric and anthropocentric. These concepts are related to the way in which animals are treated in production systems (zoocentric) and how FAW affects food safety and quality (anthropocentric). Miele and Parisi (2001) found that space given to animals was linked to consequences such as life quality and naturalness (reduction of freedom). These in turn were associated with ethical values which, according to participants, were the most important motivators. Respect for these values requires avoidance of economic exploitation of farm animals' suffering. However, consumers' concerns about FAW appear to be of secondary importance when compared to human health concerns related to food safety (Verbeke and Viaene 1998). Interestingly, McEachern and Schröder (2002), amongst others, find that consumers are unclear about animal-friendly and organic products, often regarding the two as the same.

Why should this be the case? Are *tangible* attributes (such as price and organoleptic characteristics) more important than *credence* attributes (such as increased standards for food safety or farm animal welfare), or is it simply a matter of communication? Cues associated with food are important in communication media. Following Steenkamp (1990), cues are pieces of information used to form quality expectations. Northern (2000) emphasizes the necessity to produce effective communication, distinguishing between cues with an intrinsic nature (e.g., fat, color, taste) and those with an extrinsic one (e.g., food safety). Since animal welfare is essentially a credence attribute, extrinsic cues must be used to communicate the output of the schemes or standards under which the animals have been reared. This is important because it is likely that physical characteristics of products will not be altered by animal-friendly treatments, and this has to be made clear in the minds of consumers. Thus, strategies for extrinsic cues have to be different from those used for intrinsic cues. Transparency and credibility of extrinsic cues must be adequately communicated through well-designed labeling so that scheme standards and the associated inspections of production systems can be widely trusted.

Quantitative Research

Quantitative research is mainly related to stated preferences on purchasing intentions and consumer behavior. Results conducted in different EU countries confirm that FAW is not the most important meat choice attribute (Verbeke and Viaene 2000; Bernués, Olaizolab, and Corcoran 2003; McCarthy et al. 2003, 2004): healthiness, leanness, and safety appear to be preferred by the majority of respondents. These studies also show that people with higher incomes and living in large and medium-sized cities tend to be those most concerned with animal welfare.

Another interesting aspect involves consumers' belief in the association between animal-friendly foods and higher quality (Anwander Phan-Huy and Badertscher Fawaz 2003). If this association is linked with an intrinsic

characteristic (e.g., good flavor), then it can transform an intangible characteristic into an experience attribute, where expectations can be confirmed after purchase. Consumers could reject their (perhaps unrealistic) expectations regarding the better flavor of AFP, and so a potential barrier to increasing demand for these products is raised. Market researchers need to understand how to communicate animal-friendly characteristics, or other credence attributes, without creating unrealistic expectations and with maximum transparency.

Most studies estimating WTP for AFP have been carried out to explore policy changes that raise FAW standards. Contingent valuation (CV) has been widely used to estimate the benefits of legislation that would, for example, improve conditions for veal calves and hens (Bennett and Larson 1996), ban exports of live animals destined for slaughter (Bennett, Anderson, and Blaney 2002), and ensure a more humane way of slaughtering pigs (Bennett and Blaney 2002). These studies indicate a strong dependency between WTP for such legislation and the type of payment vehicle, namely a tax or an increase in weekly food expenditure. These studies have also investigated how perceived social consensus and moral beliefs (Jones 1991) affect WTP. Support for legislation is significantly correlated with high social consensus and moral variables appear to be more important in the high social consensus model than in the low one. In their investigation of the benefits of EU Directive 99/74/EC, which from 2012 foresees the elimination of laying hens in battery cages, Bennett and Blaney (2003) find that WTP increases as income rises and concern for FAW grows. But they note that higher values of WTP might be affected by "warm glow" and "part-whole" effects, that is, the purchase of moral gratification.

In summary, quantitative studies highlight that consumers' statements on WTP converge on issues such as reasons for concern, scope for introducing policies to raise welfare standards, and socioeconomic characteristics affecting purchasing intentions. However, we are not aware of any study that has investigated consumers' trust and how attitudes on FAW may differ across countries. Differences in this respect are important, as they underlie different marketing strategies. Furthermore, in past CV studies WTP has been assessed with respect to a particular improvement in FAW for a given species. Our exploration is more general and relates to the category of certified livestock and dairy friendly products. In this study we address these important issues with a survey instrument administered in five EU countries (Britain, France, Germany, Italy, and Spain).

Methodology

The communication of FAW concepts to survey respondents from different countries may create some confusion due to variation of cues and conjectures across mother tongues and cultural backgrounds. This issue has been often neglected in the few cross-national surveys conducted in the field of food economics (Bredhal 2001; Lusk, Roosen, and Fox 2003). To minimize confusion we apply the concept of equivalence (Harkness, Van de Vijer, and Johnson 2003), implemented using the ASQ (ask-the-same-question) model which is based on the supposition that questions couched in the source language will be comprehensible and appropriate in the target language. The application of the ASQ model is

not just a matter of knowledge of languages, but also of cultural aspects, and it aims at reducing and/or eliminating the possibility of bias and error measurements (Embreton 1983; Van de Vijver and Leung 1997; Braun 2003; Van de Vijver 2003).

Two focus groups were run to test the concepts, items, and measurement scales used in the questionnaire. Although these took place only in Italy, information gained appears to be in line with qualitative research conducted on FAW in other countries, that is, ethical aspects in food consumption are considered to be the second best choice and there is a need for better information (Verbeke and Viaene 1998; Harper and Makatouni 2002; McEachern and Schröder 2002). Furthermore, the focus groups provided useful information about the values to be used in the bidding game during the survey pilot and about the role of labeling in establishing a relationship of trust for certified AFP. In this respect, one participant observed: "Brand names do not objectively make me completely trust the product, but there may be other things linked to the product in the costlier phases of production which could induce lying... in other words the person in control may be dishonest." This concern was also voiced in different forms by other respondents and it highlights that trust toward stakeholders working along the food chain is an issue which needs to be explored and documented further to achieve a better guarantee of compliance to expected standards.

With the questionnaire we elicit consumers' information about knowledge regarding breeding systems, trust toward stakeholders operating along the animal-friendly production chain, consumption habits of farm animal products, WTP for certified animal-welfare products, as well as the conventional socioeconomic characteristics of respondents. The remaining part of this section describes in detail how trust was measured, how the CV study was developed, how the hypotheses were tested, and how the data were collected.

Measuring Trust

Including trust in the investigation is a novel and central contribution of this study and requires further illustration. It was motivated by the idea that, in the buying-decision process, the consumer's interpretation of the label certifying the credence attribute "animal friendliness" is most probably reliant on a latent trust relationship between the consumer and the stakeholders. Importantly, it is very likely to be centered around the stakeholders' compliance with FAW standards. According to Mayer, Davis, and Schoorman (1995, p. 712), trust may be defined as the willingness of a party to be vulnerable to the actions of another party, based on the expectation that the trustee (e.g. the producer or retailer) will perform a particular action important to the trustor (the consumer), irrespective of the ability of the latter to monitor or control such an activity.

In practice we measure trust toward stakeholders with the Fishbein attitude model (Fishbein and Ajzen 1975). To apply this model, respondents are informed that farmers and other stakeholders are able to improve animal well-being in several ways and that certification ensures compliance with FAW standards. The FAW standards employed in the questionnaire were (table 1)¹: freedom of movement in stalls (FREE), daily inspection

Table 1 Items Employed to Measure Attitudes

Variable	Item
Attitude toward farmers	
FREE	How important is it for you that stables and sheds are large enough to guarantee freedom of movement for the animals? To what extent do you think it is likely or unlikely that farmers who produce certified products would be willing to guarantee their animals freedom of movement?
INSP	How important is it for you that all animals kept in stables are inspected at least once a day? To what extent do you think it is likely or unlikely that farmers who produce certified products would be willing to inspect all animals at least once a day? To what extent do you think it is likely or unlikely that farmers who produce certified products actually do not perform the practices mentioned above?
DIET	How important is it for you that animals are not fed unbalanced diets? To what extent do you think it is likely or unlikely that farmers who produce certified products would be willing to give up feeding their animals unbalanced diets?
MUTI	How important is it for you that practices such as castration, clipping tails, cutting horns and beaks, placing rings through pigs' noses, etc. are not performed. To what extent do you think it is likely or unlikely that farmers who produce certified products actually do not perform the practices mentioned above?
Attitude toward other stakeholders	
SELE	How important is it for you that animal breeding does not focus only on the selection of animals which quickly develop a large muscular mass? To what extent do you think it is likely or unlikely that farmers who produce certified products will not focus only on the selection of animals which quickly develop a large muscular mass?
TRAN	How important is it for you that animals are provided with sufficient space during transportation to guarantee adequate hygienic conditions? To what extent do you think it is likely or unlikely that transporters who work for breeders who produce certified products actually do provide animals with adequate hygienic conditions during transportation?
PERS	How important is it for you that the people involved in transporting animals of certified production to the abattoirs are qualified and specialized? To what extent do you think it is likely or unlikely that the people involved in transporting animals of certified production to the abattoirs are qualified and specialized?
VEIC	How important is it for you that vehicles which transport animals to abattoirs have special mechanical and technical characteristics? To what extent do you think it is likely or unlikely that people who are responsible for vehicles which transport animals to abattoirs and who work for breeders who produce certified produce actually do provide vehicles which have special mechanical and technical characteristics?

Continued

Table 1 Continued

Variable	Item
SLAU	How important is it for you that animals rest in order to recover from transportation before being slaughtered? To what extent do you think it is likely or unlikely that operators who produce certified products would be willing to allow animals to rest before being butchered?

(INSP), avoiding unbalanced diet (DIET), banning mutilations (MUTI), reducing exploitation of productivity through selection (SELE), providing sufficient space during transportation (TRAN), employing qualified personnel for transportation to abattoirs (PERS), using vehicles with special mechanical and technical characteristics for transportation (VEIC), and allowing animals to rest after transportation and before slaughtering (SLAU). Given that the last three items involve the death of farm animals, they were not presented to vegetarians because of the likelihood of triggering potentially too emotional a reaction, which would have introduced a specific bias.²

The selection of these standards was based partly on the existing literature and partly on what emerged from the two focus groups. For each FAW standard, respondents were first asked to rate on a five-point scale how important it was to them (evaluative element). Subsequently, they had to express, also on a five-point scale, ranging from "extremely unlikely" to "extremely likely," their confidence that farmers and other stakeholders operating under a certified scheme would actually comply with the standard (probabilistic element). Use of the evaluative scale came from formative research, while the probabilistic element was based on the theoretical paper by Bhattacharya, Devinney, and Pillutla (1998, p. 462) who argue that "trust is an expectancy of positive (nonnegative) outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty." As a result "extremely unlikely" was assigned the value of one and "extremely likely" the value of five. Furthermore, since the set of FAW standards involves all stakeholders, we measured attitudes, and thus trust, toward farmers (A_F) and other

¹Respondents were told that certification programs ensure that the animal product comes from breeding systems that comply with the proposed standards described in table 1. Furthermore, the website gave respondents access to additional information about FAW issues related to the application of the proposed higher standards.

²Certainly it could be argued that at higher prices some consumers might decide to buy less of some livestock products, since the budget line swivels to the left. However, in this study respondents were asked to increase their weekly expenditure for a category of food products. It is reasonable to expect the own price elasticity of such a category to be relatively low and closer to zero than that of a single commodity (Colman and Young 1992; Tiffin A and Tiffin R 1992). It has also been observed that in developed countries, where this survey was administered, when an event increases the prices of all food products then the overall price does not affect the total level of food intake (Ritson and Petrovici 2001). Furthermore, it might also be assumed that cross-price elasticity effects for livestock substitutes might induce consumers to buy less of the most expensive products and more of the less expensive, a series of compensating quantity effects. In the light of these considerations it can be inferred that the proposed increases in prices should minimally affect the quantity demanded of certified AFP, that is, the quantity purchased is fixed, so as to avoid simultaneous adjustments to both quantity and animal welfare certification which would be confounding the contingent market.

stakeholders (A_O) separately, according to the Fishbein expectancy value model:

$$A_{Fk} = \sum_{i=1}^n I_{Fik} T_{Fik} \quad (1)$$

$$A_{Ok} = \sum_{i=1}^n I_{Oik} T_{Oik} \quad (2)$$

where i = applied FAW standard; k = consumer; I_F = the importance score given by consumer k to attribute i accomplished by farmers (FREE, INSP, DIET, and MUTI); I_O = the importance score given by consumer k to attribute i accomplished by others stakeholders (SELE, TRAN, PERS, VEIC, and SLAU); T_F = consumer k 's trust (belief) that the certified product possesses attribute i accomplished by farmers; T_O = consumer k 's trust (belief) that the certified product possesses attribute i accomplished by other stakeholders; A_{Fk} = consumer k 's attitude score toward the application of animal welfare standards accomplished by farmers; A_{Ok} = consumer k 's attitude score toward the application of animal welfare standards accomplished by other stakeholders.

Measuring attitudes toward farmers and other stakeholders gave us the opportunity to explore how A_F and A_O impact on WTP. Since in Equations (1) and (2) attitudes were not observed directly but derived from a sum of pair-wise multiplicative scores, a reliability test using Cronbach's alpha (Malhotra 1996) was performed before obtaining A_F or A_O . Inspection of the values of "alpha if items are deleted" reveals that for A_F and A_O no removal significantly improves the values of Cronbach's alpha. These coefficient values are very good, ranging for A_F from 0.71 (Spain) to 0.80 (Italy web respondents), and for A_O from 0.75 (Italy web respondents) to 0.86 (France). Consequently, the latent variables A_F and A_O were used as explanatory variables in our econometric models.

Estimating WTP Using a Budget Approach

WTP for certified AFP was estimated using the CV method (Bateman et al. 2002). One of the main problems of this method relates to providing the respondent with an effective reminder of his or her budget constraint (Hailu, Adamowicz, and Boxall 2000). This is particularly important when CV scenarios involve food products because, at least in developed countries, prices for most of these products are affordable to the majority of people, that is, food is relatively cheap in comparison to the total share of expenditures on nonfood products and public goods. Consequently, when respondents state their WTP for a food item the declared amount of money is often low, e.g. a few cents or pence. As noted by Caswell (2000, p. 414):

If a consumer is willing to pay, for example, 30% more for a Salmonella-free chicken sandwich, does that mean that he or she would be willing to pay 30% more to gain similar levels of enhanced safety over all foods bought? Would the respondent reduce the total quantity demanded? What if that extrapolation yields implausible expenditure figures?

To overcome this problem we employed an itemized budget construction approach to retrieve accurate estimates of weekly average expenditure for:

1) meat, dairy products, and eggs, if respondents were omnivores; and 2) cheese, other dairy products, and eggs, if respondents were vegetarians. Thus, WTP relates to a more general utility function where people choose more or less the same quantity based on the quality of the product and where WTP for a quality change would relate to an equivalent or compensating variation given the price and quality change.

As shown in figure 1, the budget approach, built using information technology, allowed respondents to interact with the CV scenario.³ The value elicitation format is a dichotomous choice with a follow-up question, leading to a double-bounded model, which improves efficiency (Hanemann, Loomis, and Kanninen 1991; Alberini 1995; Scarpa and Bateman 2000) over the single-bounded format (Bateman et al. 2002) while it is expected to produce little incentive for strategic behavior in private goods. Respondents were first asked to pay a certain percentage increase of their stated weekly expenditure for farm animal products in order to buy certified AFP. If they answered "yes" they were then asked with a follow-up question to state their WTP for a further increase (t^h), while if they answered "no" they were prompted with a lower increase of their weekly expenditure (t^l). The bidding game was administered randomly and automatically by a script which prompted respondents with the exact monetary increase of weekly expenditure associated with buying certified AFP, as calculated according to the respondent's specific budget (figure 1). Bid amounts were chosen on the basis of initial parameter estimates of the WTP distribution obtained from the pilot survey responses. Moreover, the bounds for vegetarians were a little wider than those established for omnivores, because during piloting it was noticed that vegetarians answered "yes" more frequently at high bid levels (table 2).

Testing Hypothesis

Under the assumption that the first and second responses have the same underlying distribution of WTP and that respondents maximize their utility, this format allows us to estimate a change in total utility (ΔU) on the basis of the distribution of the four possible mutually exclusive combinations of responses (yes, yes; yes, no; no, yes; no, no). To estimate WTP conditional on the random distribution of bid amounts ($WTP|t_i$) for certified AFP, an interval-data probit specification is employed. The micro-economic underpinnings of such a specification are well known (for a review, see Hanemann and Kanninen 1999). Thus, assuming that $WTP|t_i$, as well as being affected by socioeconomics determinants, can also be influenced by trust toward stakeholders, it follows that:

$$\Delta U_i = \Delta V_i + \varepsilon_i = \alpha + \beta P_i + \gamma S_i + \varepsilon_i \quad (3)$$

where ΔV is a change in indirect utility, α is a constant, β is a vector of

³The CV scenario of figure 1 has to be interpreted in conjunction with standards proposed in table 1. Thus the "utmost respect" would point to the highest standards (e.g., inspection at least once a day, feeding balanced diets, etc.) which farmers and other stakeholders can achieve to produce certified AFP. When shoppers buy certified AFP they know that these products come from breeding systems which enhance animal well-being, but they are not informed on specific improvements obtained along the live-stock chain, as is usual when consumers buy these products. Thus, the proposed CV scenario reproduces a real market situation in which consumers are willing to pay for higher farm animal welfare and not for a specific action.

Figure 1 WTP scenario using a budget approach

QUESTION 16

Roughly how much does your family spend weekly for the following products:

Please ANSWER 0 if you do not spend anything for any of these products.	- Dairy products (milk, cheese, yogurt, etc): £	10
	- Meat and cured meats: £	15
	- Eggs: £	2
Click on this button in order to obtain your weekly expenditure		Sum £ 27

Now imagine that certified products are available in shops and supermarket, in other words consumers can buy products which have been obtained with the utmost respect for animals. However, these products are expensive. If they cost more than 30% of their usual price would you be willing to buy ONLY certified products?

In your case you would spend £ 35.1 for the same amount of food derived from farm animals (before answering remember that your budget is limited and so spending more for these products you will have less money to buy things):

Yes NO

And if they cost more than 20% of their usual price, would you be willing to buy them? In your case the same amount of food would cost £ 32.4

Yes NO

Table 2 Distribution of Bid Amounts, Percent

Omnivores			Vegetarians		
<i>t</i>	<i>t^h</i>	<i>t^l</i>	<i>t</i>	<i>t^h</i>	<i>t^l</i>
10	20	5	10	20	5
20	30	10	20	30	10
30	40	20	30	40	20
40	50	30	40	50	30
—	—	—	50	60	40

Note: —, Not available.

parameters of psychological constructs, \mathbf{P}_i is a vector of psychological constructs measured using the Fishbein model, γ is a vector of parameters of socioeconomics characteristics, \mathbf{S}_i is a vector of socioeconomic characteristics including the bid amount t_i , and ε_i is the stochastic disturbance.

We test whether \mathbf{P}_i contributes to the explanation of change in indirect utility (ΔV_i) for certified AFP. In particular, we expect that the greater the scores obtained using the Fishbein model, the greater should be the utility change induced by certified food and, hence, the larger the WTP for these products, that is, the null (H_0) and alternative (H_1) hypotheses are:

$$H_0 : \partial \Delta V_i(\cdot) / \partial \mathbf{P}_i \leq 0 \rightarrow \partial \text{WTP}_i(\cdot) / \partial \mathbf{P}_i \leq 0 \quad (4)$$

$$H_1 : \partial \Delta V_i(\cdot) / \partial \mathbf{P}_i > 0 \rightarrow \partial \text{WTP}_i(\cdot) / \partial \mathbf{P}_i > 0. \quad (5)$$

Thus, the partial derivative of the probability function of the WTP, conditional on bid amounts for high welfare products with respect to the vector of psychological constructs, is positive, which implies a one-tail test on the sampling distribution of the maximum likelihood estimator.

Data Collection

Although the process of globalization should encourage researchers to investigate more aspects of consumer behavior at the international level, factors such as high costs, involvement of more human resources and

time, complex organizational issues, and problems regarding the interpretation and analysis of results appear to limit the use of cross-national surveys (Kohn 1989; Lynn 2003). To overcome the restrictions in budget and human resources we decided to administer the questionnaire via the Web, despite the danger of unrepresentativeness⁴ of the sample due to self-selection.⁵ A control sample of telephone interviews was also conducted, but it was affordable only in Italy. Sampling was stratified, in that vegetarians were sampled separately, since their preferences on FAW can be expected to be saliently different from meat-eaters, and their proportion in the population of consumers tends to be relatively small.

In internet surveys the sampling frame presents more difficulties than in traditional surveys because individuals cannot be as easily identified and contacted. In this study, respondents were invited to complete the questionnaire using a mixture of probabilistic sampling methods (Best and Krueger 2004): e-mail and a banner. Invitation through e-mail is considered the best method because it gives researchers the possibility of reaching about 80% of the internet population (Best and Krueger 2004). This was used to sample in all five countries. Respondents were contacted through six newsletters (two in Italy and one in every other country) sent via an Italian and a German gateway. Invitations were sent to a sample of customers of these gateways. Vegetarians were reached through newsletters sent by the European and Italian associations of vegetarians who agreed to invite their members to take part in the survey. Furthermore, in Italy the study was also advertised through a banner which was placed on the COOP (one of the biggest national grocery retailers) website for three weeks. This allowed us to contact websurfers who did not necessarily use e-mail. The Italian sample was supplemented by a computer aided telephone interview (CATI), which was conducted using random-digit dialing numbers with an average success rate of one in four. The surveys were administered between November 2004 and March 2005 and the data were analyzed using SPSS and GAUSS.

Results

Of the 25,000 e-mail invitations sent out in the five countries, respondents (and their return rates) were as follows (in percent): Italy 40 (6.8); Britain 16 (4.6); Germany 16 (3.9); Spain 16 (4.1); France 12 (3.8). Half of all returns were received within three days and 90% after one week, confirming the high speed of Web surveys (Schonlau, Fricker, and Elliott 2002). The final usable sample size was 1,416, of which 91% represent respondents to the on-line survey and 75% represent omnivores. In terms

⁴Despite the fact that the majority of the interviews—except for the Italian case, in which there was also a CATI sub-sample—were internet based, it is worthwhile pointing out that according to Internet World Stats (<http://www.internetworldstats.com>) at the time in which the survey was administered the penetration index of internet users in the five countries was (in percent): France 50, Germany 57, Italy 49, Spain 43, and the UK 60. Thus, even if internet users may not be representative of the whole population, no one can argue that they did not represent a substantial proportion of the whole population when this survey was administered.

⁵The electronic format was prepared using Hypertext Markup Language and internet language programming (JavaScript and Active Server Pages) which allowed us to store data coming from the Web into a database and to satisfy specific research needs required to develop the contingent valuation section.

of country composition, 57% of respondents were from Italy, 13% from Britain, 12% from Spain, 11% from Germany, and 8% from France. As expected, the majority of respondents in the internet sample (table 3) were younger than 40 (58%) and educated to degree or post-degree level (71%). Moreover, 56% are women, 56% own a pet, 33% have at least one child younger than 15 years of age, 36% have a net household monthly income of €2,500 or more, and 27% work in the agro-food sector. The average household size is 2.7 people. A breakdown by country is reported in table 3.

Significant differences are observed between the socioeconomic characteristics of Italian Web respondents (table 3) and those of phone respondents (table 4). The values of χ^2 , under the null of no difference across the two samples, are statistically significant for age, education, presence of children, people working in the agro-food sector, and pet ownership. These differences are taken into account in estimating WTP.

Consumer Trust Toward Stakeholders

The majority ($> 80\%$) of respondents considered improvement of the selected standards to be either "quite important" or "very important." However, the likelihood of stakeholders' compliance with these improvements displays strong uncertainty. Almost half of respondents believe it is unlikely that stakeholders will comply with standards regarding MUTI, PERS, SELE, SLAU, TRAN, and VEIC. Trust in northern European countries appears to be higher than in southern ones, especially for FREE, INSP, DIET; the majority of British, French, and Germans believe that farmers are most likely to comply with these three standards, while most Italians and Spanish think that farmers will not. Furthermore, the sub-sample of the Italian respondents who were surveyed by phone using a computer assisted telephone interview (CATI), appear more skeptical than those who were surveyed via Web.

Cross-cultural differences in trust between northern and southern Europe are confirmed in table 5, which shows the multiplicative scores, $I \times T$, and in table 6, which shows the scores for A_F and A_O . The Bonferroni multiple comparison post hoc test of ANOVA indicates that A_F scores for Italian and Spanish attitudes toward farmers are significantly lower than those of respondents from northern European countries, while for A_O scores this is the case only for Italians. We also find that the mean value of A_F for Italian phone respondents (42.1) is significantly lower than that of Italian Web respondents (48.3) under the assumption of equal variance in the samples ($t = 3.58$, $df = 798$, $p < 0.001$). For A_O , the difference between Italian Web (38.8) and phone (41.2) respondents is not statistically significant. Nevertheless, the results suggest that Italians are the most skeptical about stakeholders applying FAW standards. Finally, comparing results between omnivores and vegetarians, the cross-cultural differences highlighted for A_F and A_O maintain their significance.

Consumer Purchasing Habits and WTP for Certified Products

Around 70% of respondents consume farm animal products more than once a week, 18% once a week, and the rest less than once a week. In total, 65% of respondents buy farm animal products in supermarkets, 25% from butchers and specialized shops, and 10% from both supermarkets and

Table 3 Socioeconomic Characteristics by Country (Internet Sample)

Socioeconomic variables	France (N = 114)	Germany (N = 156)	Italy (N = 678)	Spain (N = 164)	UK (N = 182)	Total (N = 1294)
Gender: females	61	84	396	87	101	729
Age: below 40	46	119	405	97	85	752
Education: degree/higher	71	138	401	156	154	920
Children: yes (<15)	59	34	190	65	80	428
Pets: yes	81	60	405	76	106	728
Income: ≥ € 2,500	44	37	217	74	91	463
Agro-food sector: yes	12	51	168	65	50	346

Table 4 Socioeconomic Characteristics of Italian Telephone Respondents

Socioeconomic variable (SE)	Telephone respondents (N = 124)		χ^2 test (type of survey vs. SE)	
	Count	%	χ^2	P value
Gender: females	82	67.2	3.33	0.068
Age: below 40	46	38.3	19.00	0.000
Education: degree or higher	41	33.6	27.27	0.000
Children: yes (<15)	80	65.6	65.20	0.000
Pets: yes	60	49.6	4.35	0.037
Income: $\geq \text{€}2,500$	40	35.4	0.51	0.476
Agro-food sector: yes	7	5.7	21.94	0.001

small retailers. Vegetarians are slightly more likely than omnivores to buy their animal products in supermarkets; the differences for Web respondents are statistically significant for British ($\chi^2 = 6.76$, $df = 2$, $p = 0.034$), French ($\chi^2 = 4.99$, $df = 2$, $p = 0.083$), and Italian ($\chi^2 = 43.83$, $df = 2$, $p = 0.001$) respondents. Beef is the favourite meat of French, Italian, and Spanish omnivore respondents, while poultry is the most preferred by the British and Germans. Across all five countries, on average, 25% of respondents are indifferent to what type of meat to consume and no differences can be seen between Italian Web respondents and phone respondents. With regards to the distribution of responses to WTP for AFP in relation to increases in weekly expenditure on these products, we observe 626 yes, yes; 454 yes, no; 146 no, yes; and 176 no, no.

The bottom rows of table 7 show the WTP estimates of the dichotomous choice model for certified AFP. The abbreviations for the explanatory variables reported in this table are *BID* for bids (see table 2), *FEM* for females, *OLD40* for respondents aged over 40, *HSIZE* for the number of people in the respondent's household, *DEG* is a dummy variable indicating the respondent has a university degree, *INC* is income level, *VEG* denotes vegetarians, and *FR*, *GER*, *SP*, and *UK* are dummy variables that respectively denote French, German, Spanish, and British respondents. In Model 1, *DEG*, *INC*, *VEG*, *CATI*, and *A_o* were found not to be statistically significant in explaining response probability to given expenditure increases. Therefore Model 2 represents our best parsimonious model for WTP for AFP, where the explanatory power of most predictors improves slightly. Moreover, since parameter estimates for *FR*, *GER*, and *UK* show that WTP is significantly lower than in *SP* and *IT*, we also present in table 7 the results by country, using the variables selected in Model 2.

The estimated sign for the *BID* coefficient is consistent with economic theory in all models, that is, increasing the bid amounts diminishes the probability of a positive response. In Model 2, all three socioeconomic variables show a positive effect on WTP for AFP. However, the analysis by country shows that overall sample results are strongly influenced by the Italian subsample, because in all other countries these variables do not affect WTP other than *HSIZE* in *FR*. In *IT*, women are WTP €2.04 more than men, while Italians older than 40 are associated with being WTP €2.59 more.⁷ One more household member raises the WTP by €1.10 for

Table 5 Pair-wise Mean Multiplicative Scores ($I \times T$) used to Construct Attitudes, by Country

FAW standards	France (N = 114)	Germany (N = 156)	Italy _{web} (N = 122)	Italy _{phone} (N = 678)	Spain (N = 164)	UK (N = 182)
FREE	15.10 (5.50)	14.74 (5.17)	11.85 (5.46)	10.29 (5.40)	11.75 (5.52)	15.17 (5.97)
INSP	14.85 (6.21)	14.56 (6.17)	12.52 (5.91)	12.23 (6.07)	11.63 (6.56)	15.79 (6.50)
DIET	15.74 (5.80)	15.38 (5.31)	13.04 (5.73)	10.07 (5.28)	13.07 (5.62)	13.62 (6.13)
MUTI	13.14 (6.82)	12.59 (6.26)	10.87 (5.91)	9.50 (4.86)	9.39 (5.38)	10.07 (6.04)
SELE	9.48 (6.10)	11.82 (6.27)	8.91 (5.13)	8.37 (4.62)	8.67 (5.08)	10.32 (5.48)
TRAN	13.04 (6.20)	12.80 (5.67)	10.18 (5.30)	9.62 (5.97)	11.09 (5.45)	11.40 (5.77)
PERS	13.22 (6.77)	12.24 (5.77)	11.21 (5.66)	9.14 (5.26)	11.57 (5.64)	11.99 (5.68)
VEIC	12.51 (6.18)	11.14 (5.18)	10.31 (5.10)	9.69 (5.03)	11.07 (5.35)	10.92 (5.77)
SLAU	11.35 (6.58)	9.81 (6.05)	7.84 (5.35)	5.98 (4.08)	10.09 (6.00)	7.99 (5.52)

Note: Standard deviations in parentheses.

Table 6 Comparison of Mean A_F and A_O Scores by Country (Internet Sample)

Attitude	France ($N = 114$)	Germany ($N = 156$)	Italy ($N = 678$)	Spain ($N = 164$)	UK ($N = 182$)	ANOVA one way		
						F	d.f.	P value
A_F	58.82 (19.09)	57.28 (17.13)	48.27 (17.73)	45.84 (16.77)	54.64 (19.55)	19.38	4	0.0001
A_O	47.57 (27.28)	52.06 (24.12)	38.84 (22.86)	50.09 (21.41)	45.33 (23.29)	3.80	4	0.004

Note: The sums of the means of the five standards from table 5 used to build A_O do not match the values reported in table 6 because they are obtained from different sample sizes. Standard deviations are given in parentheses.

Table 7 Maximum Likelihood Estimates of Structural Parameters from Double-bounded Logit¹

Variables	Pooled sample		Analysis by country				
	Model 1 N = 1,402	Model 2 N = 1,402	France N = 113	Germany N = 155	Italy N = 792	Spain n = 160	UK N = 182
CONSTANT	0.77 (5.6)***	0.67 (5.4)***	0.30 (0.9)	0.29 (0.8)	0.77 (4.4)**	0.66 (1.9)	0.22 (0.6)
BID	-0.12 (32.9)***	-0.12 (33.5)***	-0.12 (10.4)***	-0.17 (11.9)***	-0.12 (25.3)***	-0.08 (11.3)***	-0.16 (9.9)***
FEM	0.20 (2.9)**	0.19 (2.9)**	0.86 (1.1)	-0.10 (0.5)	0.25 (2.9)**	-0.03 (0.2)	0.30 (1.5)
OLD40	0.24 (9.4)***	0.24 (9.5)***	0.20 (0.8)	0.44 (1.9)	0.32 (3.5)***	-0.02 (0.1)	0.09 (0.5)
HSIZE	0.11 (4.3)***	0.12 (4.4)***	0.19 (2.1)*	0.11 (1.3)	0.13 (3.7)***	0.04 (0.5)	0.04 (0.5)
DEG	-0.01 (0.2)	—	—	—	—	—	—
INC	0.01 (0.4)	—	—	—	—	—	—
VEG	-0.17 (1.4)	—	—	—	—	—	—
CATI	-0.01 (0.3)	—	—	—	-0.08 (0.5)	—	—
A _F	0.53 (2.6)*	0.40 (2.7)**	0.39 (2.2)*	1.15 (2.6)**	0.08 (0.4)	0.62 (1.3)	1.39 (3.22)**
A _O	-0.28 (0.9)	—	—	—	—	—	—
FR	-0.38 (3.1)*	-0.38 (3.2)**	—	—	—	—	—
GER	-0.31 (2.9)**	-0.30 (2.9)**	—	—	—	—	—
SP	0.13 (1.4)	0.19 (1.3)	—	—	—	—	—
UK	-0.26 (2.4)*	-0.25 (2.4)*	—	—	—	—	—
95% C.I.E _(WTP) ²	€11.25	€11.11	€8.89	€8.11	€11.81	€13.35	€9.11
-Upper bound	€12.37	€12.06	€11.87	€10.32	€13.27	€17.69	€11.50
-Lower bound	€10.13	€10.06	€5.91	€5.90	€10.35	€9.01	€6.72
Mean log-L	-1.4254	-1.4265	-15572	-1.6064	-1.3913	-1.5206	-1.0894

¹ Absolute values of t-statistics in parentheses.

² Expected WTP delta method.

*** Significant at $p < 0.0001$; ** significant at $p < 0.001$; * significant at $p < 0.01$.

Note: The sampling error on the WTP estimates, reported toward the bottom of the table, were computed using the Krinsky and Robb (1986 and 1990) procedure (which is a form of parametric bootstrap) as is standard practice in this literature. —, Not available.

Italian respondents and by €1.52 for the French. The coefficient estimate for the internet survey format (CATI) is not statistically significant in the Italian model and thus we conclude that there is no evidence of a difference in WTP for certified AFP between the internet and phone surveys.

As regards consumer trust toward economic agents involved in the animal-friendly production chain, our findings indicate that WTP appears to be positively affected only by consumer trust toward farmers. However, when results are examined by country, the estimated coefficient on trust is significant only for the northern EU countries (*FR*, *GER*, and *UK*). Higher levels of trust between consumers and farmers in these countries suggest that some consumers are prepared to pay a premium price for certified AFP. In *IT* and *SP*, the apparent absence of trust toward economic agents in the animal husbandry sector is likely to make it less easy for marketers to differentiate products on the basis of animal-friendly characteristics. It is perhaps surprising therefore to find that Italian and Spanish respondents state, on average, to be WTP a higher fraction of their family weekly food expenditure for AFP (€11.81 and €13.35) than their northern European counterparts (€8.11 to €9.11).

Conclusions

Our results offer some insight into the hypothesis that trust on stakeholders' compliance with certification standards for AFP plays a major role in consumers' preferences. Consumers' trust on farmers is shown to differ between northern and southern Europe, despite the five countries surveyed belonging to a well-defined economic area (EU). Thus, we conclude that we have found evidence that consumer behavior toward AFP appears to be influenced by cross-cultural differences.

The budget approach employed for eliciting WTP is interesting from a methodological viewpoint, because it allowed us to estimate WTP not only for a single food item but for the entire category of animal food products. This approach helps address the issue regarding the overestimation of WTP in CV studies. However, this needs to be tested in further experimental studies, with random allocation of respondents to scenarios both with and without a budget approach, and thus revealing whether linking WTP to a category of food products gives lower and more realistic information of monetary values, an approach we could not afford to implement here.

The use of internet surveys allowed us to undertake this study at an international level with low administration costs. Given the nature of the self-selection, we might expect our estimates of WTP to be upwardly biased with regards to the general population. However, concerns regarding the representativeness of the sample are tempered by our finding of no difference between the results of a more conventional CATI survey and those obtained using the internet. Rather surprisingly, most of the socioeconomic variables employed in our models affected WTP only for Italian respondents, although this might be related to the smaller sample sizes for the other countries. Perhaps the most interesting result is the positive effect, in some countries, of trust on WTP estimates for certified AFP, which seems to offer two pointers to marketers and policy-makers. First, this effect is observed only for farmers, most probably for two reasons: 1)

farmers operate at the beginning of the food chain and thus consumers need a strong trust relationship with them to believe that FAW standards are being met from the outset; 2) consumers are aware that farmers are the economic agents in the food chain who take care of farm animals for most of their life. Second, this effect is observed only for respondents from northern European countries, possibly because their marketing information systems are more trustworthy than those in southern European countries. This means that British, French, and German retailers can more easily identify segments of consumers who are ready to pay a premium price for AFP. But then what about southern Europe? And how could one improve consumers' trust toward economic agents working along the livestock chain? Because animal welfare is a credence attribute, the perceived credibility of the source of information explained is a crucial factor in improving consumers' trust. In these countries, communication policies should aim at increasing trust relationships along the food chain, ensuring that products comply with the standards of animal welfare claimed. This means that policymakers and economic agents involved in public and private schemes need to understand how to create a monitoring system which removes any doubt arising from the several stages of production, processors, and supermarkets. The marketing of certified AFPs has to be guaranteed through transparency and ensuring that animal keepers or handlers, as well as consumers, are more involved and informed on current standards of FAW. This could facilitate the exchange of information and the application of best practice among stakeholders, thereby improving consumer trust and awareness of current farming practices, and enabling more informed purchasing decisions.

Means of verification such as the introduction of traceability systems can make it possible for consumers to check both how farm animals are treated during their life and how higher FAW standards are applied. Thus consumers will develop and reinforce their trust relationship with private and retailer brands because they have the means to understand better the monitoring system and how economic agents comply with the advertised standards.

Labeling rules can play a very important role in purchasing decisions because they allow consumers to make better choices between fresh and processed, and between imported and domestic, livestock products. Labeling should inform consumers not only that AFP are produced in respect of FAW standards (e.g., labeling of hens' eggs), but also on the specific welfare standards that have been adopted to improve the well-being of animals during their lives. At present, other than for eggs, there is a scarcity of appropriate information in the EU on animal welfare attributes and no harmonized labeling policy for other AFP. Thus, it is difficult for a single person, households, retailers, caterers, and other economic agents to satisfy their information needs with respect to FAW.

Our results suggest that, in the five countries studied, there are segments of consumers who are ready to pay more for products which incorporate credence attributes for production processes respecting or increasing FAW. This may imply that the agro-food sector should make further efforts in communicating and promoting industry standards and certification practices. Tailoring specifically the establishment of trust on FAW certification processes seems of particular importance in countries with low trust, such as Spain and Italy.

Unfortunately, the current paucity of studies on the cost side of FAW production makes it difficult to evaluate whether the introduction of higher standards is economically viable in terms of a cost–benefit analysis. This area of research should be expanded further. There are a number of studies looking at the additional cost of meeting EU regulations involving increased animal welfare. For pork these seem to indicate a cost increase of less than 1% per kg (de Roest et al. 2008). However, production processes that go beyond what is included in EU regulations seem to imply a much higher additional production cost, though little research has been dedicated to these aspects. For example, free-range pig farming has been estimated to induce a cost increase ranging from 4 to 8% on conventional methods (Bennett, Guy, and Cain 2003). This shows how important additional information on FAW may be and why adequate labeling can make the difference. If so, existing minimum standards for FAW in the EU could then be designed by policy-makers in line with scientific evidence and socioeconomic assessments calibrated at the level of the single country or region of interest.

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