

**UNIVERSITY OF WAIKATO**

**Hamilton  
New Zealand**

**Consumer trust and willingness to pay for  
certified animal-friendly products**

Giuseppe Nocella

Lionel Hubbard

Riccardo Scarpa

**Department of Economics**

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**Giuseppe Nocella**

Food Economics  
Research Unit, Faculty of  
Agriculture,  
University of Bologna,  
Piazza Goidanich, 60 -  
47023 Cesena, Italy.  
+390547636141,  
[giuseppe.nocella@unibo.it](mailto:giuseppe.nocella@unibo.it)  
Web: <http://www.unibo.it/>

**Lionel Hubbard**

School of Agriculture,  
Food and Rural  
Development,  
Agriculture Building,  
University of Newcastle  
Newcastle upon Tyne,  
United Kingdom  
+44-(0) 191 222 6886,  
[lionel.hubbard@ncl.ac.uk](mailto:lionel.hubbard@ncl.ac.uk)  
Web: <http://www.ncl.ac.uk/>

**Riccardo Scarpa**

Economics Department  
University of Waikato  
Private Bag 3105  
Hamilton, New Zealand  
Tel: +64 (0) 7-838-4045  
Fax: +64 (0) 7-838-4331  
[rscarpa@waikato.ac.nz](mailto:rscarpa@waikato.ac.nz)  
Web:  
<http://www.mngt.waikato.ac.nz>

## **Abstract**

Increasing animal welfare standards requires changes along the supply chain which involve several stakeholders: scientists, farmers and people involved in transportation and slaughtering. The majority of researchers agree that compliance with these standards increases costs along the livestock value chain, especially for monitoring and certifying animal-friendly products. Knowledge of consumer willingness to pay (WTP) in such a decision context is paramount to understanding the magnitude of market incentives necessary to compensate all involved stakeholders. The market outcome of certification programs is dependent on consumer trust. Particularly, there is a need to understand to what extent consumers believe that stakeholders operating in the animal-friendly supply chain will respect certification standards. We examine these issues using a contingent valuation survey administered in five economically dominant EU countries. The implied WTP estimates are found to be sensitive to robust measures of consumer trust for certified animal-friendly products. Significant differences across countries are discussed.

### **Key words:**

Animal welfare

Certification

Consumer trust

Willingness to Pay

Budget approach

### **JEL Classification**

C81, Q13, Q18

## **1. Introduction**

The issue of farm animal welfare (FAW) came seriously to the forefront only after World War II when, in order to bridge the gap between supply and demand in the agro food sector, especially with regard to meat, poultry and dairy foods, industry resorted to intensive breeding practices in order to increase low cost production. The issue is mostly of concern in the animal husbandry sector of industrialized countries where intensive breeding became increasingly common to the point of becoming a standard production method. However, the consequences of intensive breeding began to cause concern in intellectual circles. 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, the Brambell Committee, to examine FAW issues. This Committee produced the so called Brambell Report (1965) which has become a worldwide technical and socio-political point of reference, especially for the evaluation of conditions regarding the well-being of animals. From this moment onwards the question of animal welfare began to gain ever more in importance among scientists, politicians and during last ten years also among economists.

Most of the studies tackling the economic aspects of FAW are from the EU where researchers have aimed at exploring the financial impact along the livestock production chain, consumer attitudes and willingness to pay (WTP) for policies supporting FAW. The few studies conducted on financial aspects of farming indicate that breeding systems delivering higher standards of FAW induce production costs that are significantly higher than those of conventional systems. This is due to the higher cost of labour and feed and lower productivity determined by a reduction in stocking density (Ouden, 1996; SCAHAW, 2000 and Bornett *et al.* 2003). Any policy aimed at diversifying the market for animal products on the basis of FAW demands an understanding of consumers WTP and its relation with consumer's belief and trust in FAW certification, which are psychological constructs that are difficult to measure. Specifically, the question regards whether market prices are able to compensate farmers and other stakeholders involved in the animal-friendly production chain. This study contributes to the economics' literature on FAW by providing the results of an internet survey conducted in five selected EU countries with the aim of estimating consumers WTP for certified animal-friendly products. In estimating WTP we take into account stated household weekly expenditure for farm animal products and a novel contribution is that of exploring the impact of psychological constructs built on the perception of trust towards stakeholders working in the animal-friendly chain.

The remainder of this paper is organized as follows. In section 2 we provide a review of literature on consumer studies, in section 3 we explain how we measured psychological constructs and household WTP for certified animal-friendly products and in section 4 and 5 we respectively present results and draw our conclusions.

## **2. Consumers and farm animal welfare**

Animal welfare is an emotive subject and thus it is unavoidable to observe wide variation in the range and level of public reactions to the subject (Pratt, 1995).

Consumer attitudes across EU countries show that residents in Northern countries appear to be more sensitive than those living in Southern countries and in new member States (European Commission, 2005). Concerns towards FAW can matter either to specific groups of consumers (e.g. vegetarians) or to persons in their role of citizens because they believe that the way in which animals are reared is bad and immoral (Brom, 2000). Much research indicates that consumers are more concerned towards poultry welfare than that of other farm animals (Verbeke and Viaene, 2000, McEachern and Schröder, 2002 and European Commission 2005). On the other hand, meat consumption patterns show that white meat demand exceeds that of red meat. Furthermore, the increasing demand for natural food is probably more motivated by private goals (i.e. desire for health protection linked to BSE and food scares, absence of chemical substances) than compassion towards farm animals (Webster, 2001). Empirical studies regarding consumers' concern towards FAW have been conducted employing qualitative and quantitative research methods and our review will cover both streams of literature.

## **2.1 Qualitative research**

Research conducted using qualitative methods (in depth interviews, focus groups and means end chain) seem to indicate that consumer concern towards FAW could be seen as a multidimensional concept which can be split into two parts: zoocentric and anthropocentric (Harper and Henson, 2001). The zoocentric and anthropocentric concepts are related respectively to the way in which animals are treated in production systems and how FAW affects food safety and quality.

Miele and Parisi (2001), through a hierarchical map found that space given to animals was linked to consequences such as life quality and naturalness (reduction of freedom). These in turn were associated to ethical values, which according to participants were the most important motivators. The respect of these values requires avoidance of economic exploitation of farm animals' suffering. Furthermore, consumers concern towards FAW appears to be of secondary importance when compared to human health concerns related to food safety (Verbeke and Viaene, 1998). McEachern and Schröder (2002) confirm previous results and found that consumers were unclear about animal-friendly and organic products, and often regarding the two concepts as referring to the same thing.

Why should this be the case? Are tangible attributes more important than credence attributes? Or is it simply a matter of communication? Cues associated with food are important in communication media. Following Steenkamp (1990) for cues we intend 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, colour, 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 animals have been reared. This is an important aspect 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 mind 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 labelling so that scheme standards and inspections may be widely trusted to be effective.

## 2.2 Quantitative research

Quantitative research to date is mostly based on surveys collecting information regarding stated preferences on purchasing intentions and consumer behaviour. Results from quantitative research conducted in different EU countries confirm that FAW is not the most important meat choice attribute (Verbeke and Viaene, 2000; Bernués *et al.*, 2003 and McCarty *et al.* 2003 and 2004). Attributes such as healthiness, leanness and safety appear to be preferred to animal welfare by the majority of respondents. These studies also show that people with income higher than the median and living in large and medium sized cities are those who tend to be 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 flavour) it can transform an intangible characteristic into an experience attribute, where expectations can be confirmed after purchase. After consumption, consumers could reject their (perhaps unrealistic) expectations regarding the better flavour of animal-friendly products and so a potential barrier for 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 the maximum transparency.

Most studies exploring and estimating WTP for animal-friendly products, have been carried out to explore policy changes raising FAW standards. To explore whether policy changes could meet citizens' expectations Bennett *et al.* set up three studies where British and US undergraduate students were presented different contingent valuation scenarios. In particular they estimated benefit of legislations that:

- could improve conditions of veal and hens (Bennett and Larson, 1996);
- would ban both exports of live animals destined to slaughtering and use of egg cages for 2010 (Bennett *et al.*, 2002) and
- would introduce a compulsory method to slaughter pigs in a more humane way (Bennett and Blaney, 2002).

To estimate WTP supporting these legislations two payment vehicles were used: a tax and an increase of students' weekly food expenditure. Estimated WTP for a tax raising welfare standards of veal and hens was on average £7.89, while estimated WTP on changes of weekly food expenditure ranged from a minimum of £0.94 p/week for a ban on egg cages to a maximum of £2.75 for slaughtering pigs "softly". This indicates a strong dependency of estimates on payment vehicles. These exploratory studies also investigate how perceived social consensus and moral beliefs<sup>1</sup> affected WTP. Findings showed that support for legislation adoption was significantly correlated with high social consensus and that moral variables appeared to be more important in the high social consensus model than in the low one.

In another British study Bennet and Blaney (2003) explored the benefits of the application of Directive 99/74/EC which from 1<sup>st</sup> January 2012 foresees the elimination of laying hens in battery cages. Their results showed that respondents were on average WTP £0.41 for a dozen eggs and that WTP increased as income rose and concern towards FAW grew. Higher values of WTP might have been affected by "warm glow" and "part-whole" effects i.e. by the fact that their

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<sup>1</sup> For an explanation of social consensus and moral intensity see Jones (1991).

intention to pay could be considered a charitable act and including not only the true WTP for higher FAW but also the purchase of moral gratification.

In another UK study, Burgess *et al.* (2003) assessed net benefits which could be obtained from schemes aimed at improving the welfare of laying hens, dairy cows, broiler chickens and pigs. A comparison of WTP estimates showed that laying hens were mostly preferred (£2.95), followed respectively by dairy cows (£2.89), chickens (£2.63) and pigs (£2.10). Moreover, comparing WTP estimates at the lower 95% confidence interval and annual costs incurred in implementing welfare schemes net benefits resulted at £73.3 million for laying hens, £71.7 million for dairy cows, £65.6 million for chickens and £52.0 million for pigs.

The findings presented in this brief review highlight that consumers' statements on WTP converge on certain issue such as the reasons for concern, scope for introducing policies raising welfare standards and socio-economic characteristics affecting purchasing intentions. However, these studies have not investigated the important issue of consumer's trust and across countries attitudes on FAW. With the present study we attempt to fill this gap by addressing these issues with a survey instrument developed and administered in five EU countries (England, France, Germany, Italy and Spain). The next section describes the methods employed.

### **3. Methods and data collection**

The communication of difficult FAW concepts to respondents in different countries may create some confusion due to variation of cues and conjectures across mother-tongues and cultural backgrounds. We note that this issue is often neglected in the few cross national surveys conducted in the field of food economics (Bredhal, 2001, Lusk et al. 2003). To minimize this we applied the concept of equivalence<sup>2</sup> implemented using the ASQ model (Ask-the-same-question) which is based on the supposition that the 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 (Embretson, 1983; Van de Vijver and Leung, 1997; Braun, 2003; Van de Vijver 2003).

To test concepts, items and measurement scales used in the questionnaire two focus groups were run in Italy. In the questionnaire we elicited information about knowledge regarding breeding systems, trust towards stakeholders operating along the animal-friendly production chain, consumption habits of farm animal products, WTP for certified animal welfare products and socio demographic characteristics of respondents.

According to several scholars of cross-national surveys (Rokkan et al. 1969; Kohn, 1989), the factors limiting international investigations range from high costs, the involvement of more human resources and time expenditure to complex organization and problems regarding the interpretation and analysis of results. In this study, to overcome the restrictions in budget and human resources it was

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<sup>2</sup> The concept of equivalence can be summarized by the possibility of standardizing the various elements which are part of the study so that it is feasible to compare diverse cultural groups. There are different definitions of the equivalence concept (construct equivalence, full score equivalence, functional equivalence, linguistic equivalence, measurement unit equivalence, operational equivalence, scalar equivalence and structural equivalence) but entering in detail is behind the scope of this study. For an explanation of these concepts see Harkness *et al.* 2003.

decided to administer a questionnaire via web, and pay the inevitable price of lack of representativeness due to self-selection in at least part of the sample. The questionnaire was hence transferred in an electronic format<sup>3</sup> which was the medium used to administer the survey both via web. A control sample of telephone surveys was also conducted, but only in Italy. Finally sampling was stratified, in the sense that vegetarians were sampled separately, so as to account for this fraction of consumers whose preferences on FAW are bound to be saliently different from meat-eaters.

In internet surveys, the sampling frame presents more difficulties because individuals cannot be easily identified and contacted as in other more traditional surveys. In this study, respondents were invited to fill in the questionnaire using a mixture of probabilistic sampling methods: invitations through email and a banner<sup>4</sup>. Invitation through e-mail is considered the best method because it gives researchers the possibility to reach about 80% of the Internet population (Best and Krueger, 2004) and so it was used to sample in all five countries. Respondents were contacted through 6 newsletters (2 in Italy and one in every other country) sent out via an Italian and a German gateway. These invitations were sent out to a sample of customers of these gateways. Vegetarians were reached through newsletters sent out by the European and Italian associations of Vegetarians that 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 retailers) website for three weeks. This also allowed us to contact surfers who did not necessarily use e-mail. The survey was also administered via telephone to tackle the issue of unrepresentativeness in web surveys. The computer aided telephone interview (CATI) was conducted personally using random-digit dialling numbers with an average rate of 1 out of four answers. The surveys were administered between November 2004 and March 2005 and data were analysed using SPSS and GAUSS.

The remaining part of this section describes the way in which trust was measured and how the contingent valuation study was developed and the hypotheses tested.

### **3.1 Measuring trust**

The idea of including trust<sup>5</sup> in the investigation is motivated by the observation that in the buying decision process the consumers' interpretation of the label certifying the 'animal-friendly' credence attribute is most probably reliant on a latent trust relationship between consumers and the extent to which stakeholders comply with FAW standards. The issue of trust towards agents at specific stages of the food value chain under cross-cultural differences is an important agency issue yet to be explored in this literature and would appear to be a novel contribution of our study.

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<sup>3</sup> The electronic format was prepared using hypertext mark-up language and internet language programming (Java Script and Active Server Page) 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.

<sup>4</sup> For a review of non-probabilistic and probabilistic methods of data collection in internet see Best and Krueger (2004).

<sup>5</sup> 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 other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party (Mayer, 1995, page 712).

Trust towards stakeholders was measured using the Fishbein attitude model (Fishbein and Ajzen, 1975). To apply this model, respondents were 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 set of FAW standards employed in the questionnaire were: freedom of movement in stalls (FREE), daily inspection (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), allowing animals to rest after transportation and before slaughtering (SLAU). Note that the last three items involved the death of farm animals and were not presented to vegetarians,<sup>6</sup> this because they were expected to trigger a potentially too emotional reaction by vegetarian respondents. Such a reaction would have introduced a specific bias.

The selection of these measures was partly drawn from the existing literature and partly emerged from the degree of understanding assessed during the two focus groups. Thus, for each FAW standard respondents were first asked to rate on a 5-point scale how important each of these was to them (evaluative element). Subsequently they had to express on a 5-point scale ranging from “extremely unlikely” to “extremely likely” their confidence that farmers and other stakeholders operating under a certified scheme actually comply with the standard (probabilistic element). The use of the evaluative scale came from formative research, while that used for the probabilistic element was based on the theoretical paper of Bhattacharya et al. (1998) where they 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*” (page 462). 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 involved farmers and other stakeholders we measured attitudes and thus trust in both directions. According to what prescribed in the Fishbein expectancy value model we measured attitudes towards farmers ( $A_F$ ) and other stakeholders ( $A_O$ ) in the following way:

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

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);

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<sup>6</sup> The separation of vegetarians from omnivores was obtained at the beginning of the survey, when a web page containing a script developed using Active Serve Page redirected respondents in function of their consumption habits. In the case of the CATI survey the telephone operator asked the question but the technology for redirecting respondents was the same. Furthermore if respondents declared to not consume at all farm animal products (vegan) they were thanked and invited not to fill in the survey.



- $T_F = k$ 's trust (belief) that the certified product possesses attribute  $i$  accomplished by farmers;
- $T_O = k$ 's trust (belief) that the certified product possesses attribute  $i$  accomplished by other stakeholders;
- $A_{Fk} = k$ 's attitude score towards the application of animal welfare standards accomplished by farmers;
- $A_{Ok} = k$ 's attitude score towards the application of animal welfare standards accomplished by other stakeholders.

The decision to explore attitudes in both directions as well as being interesting in its own right, gave us the opportunity to explore how  $A_F$  and  $A_O$  impacted on WTP. Furthermore, since in equations 1 and 2 attitudes are not observed directly because they are derived from a sum of pair-wise multiplicative scores, a reliability<sup>7</sup> test using *Cronbach's alpha* 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 would improve very much the values of Cronbach's alpha coefficients. These coefficients are very good ranging for  $A_F$  from a minimum of .71 (Spain) to a maximum of .80 (Italy web respondents) and for  $A_O$  from a minimum of .75 (Italy web respondents) to a maximum of .86 (France). As a result the latent variables  $A_F$  and  $A_O$  will be used as explanatory variables in the econometric models.

### **3.2 Estimating WTP using a budget approach**

WTP for certified animal-friendly products was estimated using the contingent valuation (CV) method. In estimating WTP for certified animal-friendly products we pay attention to one of the main problem of the CV method<sup>8</sup> i.e. the effective reminder to the respondent of the budget constraint on food expenditure, which is inevitably an important individual issue to each respondent. This is particularly important when CV scenarios involve food products because at least in developed countries the price for the bulk of these products is affordable by the majority of people and it is relatively cheap in comparison to prices of non food products and public goods. As a result when respondents have to state their WTP for a food item products the declared amount of money is often low, in the order of cents in the case of euros or dollars or pence in the case of pounds. Thus if someone states that she is WTP 10% more for a pack of sausages obtained from animals reared respecting FAW, does this mean that this person is WTP 10% more on all farm animal products? This issue is observed by Caswell (2000, page 414) who puts it as follows:

If a consumer is willing to pay, for example, 30 per cent more for a Salmonella-free chicken sandwich, does that mean that he or she would be willing to pay 30 per cent 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?

We hence employed an itemized budget construction approach (Figure 1) to retrieve the weekly average expenditure for:

- meat, dairy products and eggs if respondents were omnivores and

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<sup>7</sup> Reliability refers to the extent to which a measurement scale may produce consistent results if repeated measurements are made. For further information see Malhotra, 1996 – page 304.

<sup>8</sup>For a review of other issues and various techniques of the CV method see Bateman et al. (2002).

- the weekly average expenditure for cheese, other dairy products and eggs if they were vegetarians.

As illustrated in figure 1 the budget approach, built using information technology, allowed respondents to interact with the CV scenario. The value elicitation format was the double-bounded dichotomous choice (DB-DC) format because it improves the efficiency<sup>9</sup> of the single-bounded dichotomous choice format<sup>10</sup> while it is expected to produce little incentive for strategic behaviour in private goods (Hanemann *et al.* 1991). In the first round respondents were asked to pay a certain percentage increase of their stated weekly expenditure for farm animal products in order to buy certified animal-friendly products. If they answered 'yes' then they were asked 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 that they should pay to buy certified animal-friendly products (Figure 1) as calculated according to the respondent's specific budget.

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 bit wider than those established for omnivores because during piloting it was noticed that vegetarians answered 'yes' more frequently at high bid levels (table 1).

Under the assumption that the first and second response have the same underlying distribution of WTP and that respondents maximize their utility, the DB-DC format allows us to estimate a change in utility ( $\Delta v$ ) analyzing the distribution of the four possible mutually exclusive combinations of responses (Yes, Yes; Yes, No; No, Yes and No, No). In order to estimate WTP conditional to the random distribution of bid amounts ( $WTP|t_i$ ) for certified animal-friendly products, an interval-data probit specification was employed. The microeconomic underpinnings of such a specification are well known in economics' literature and so they will not be repeated here (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 towards stakeholders it follows that:

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

where  $\alpha$  is the constant,  $\beta$  is the vector of the parameters of psychological constructs,  $P_i$  is a vector of psychological constructs measured using the Fishbein model,  $\gamma$  is the vector of parameters of socio economics characteristics,  $S_i$  is the vector of socioeconomic characteristics including the bid amount  $t_i$  and is  $\varepsilon_i$  the stochastic disturbance.

In order to reach our objective we test whether  $P_i$  contributes to the explanation of  $\Delta U_i$  for certified animal-friendly products. In particular, we assume that the greater the scores obtained using the Fishbein model the greater should be the utility change induced by certified food  $\Delta U_i$  and hence the larger the WTP for these products be i.e. the following null hypothesis ( $H_0$ ) and alternative hypothesis ( $H_1$ ) were stated:

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<sup>9</sup> The question of achieving efficiency gained from double bounded estimation is addressed in the seminal paper delivered by Hanemann *et al.* (1991) and in other relevant works delivered by Cameron and Quiggin (1994) and by Alberini (1995) and so it will no be repeated here. Addition of a third bound was shown to provide little efficiency gains (Scarpa and Bateman 2000) when compared with the additional potential for strategic behaviour from the respondent.

<sup>10</sup> For an explanation of the various WTP elicitation methods see Bateman *et al.* (2002).

$$(4) \quad H_0: \partial \Delta U_i(.) / \partial P_i \leq 0 \rightarrow \partial WTP_i(.) / \partial P_i \leq 0$$

$$(5) \quad H_1: \partial \Delta U_i(.) / \partial P_i > 0 \rightarrow \partial WTP_i(.) / \partial P_i > 0$$

Thus, our research hypothesis states that the partial derivative of the probability function of the WTP conditional to 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.

## 4. Results

Of the 25,000 e-mail invitations sent out in the five countries, 40% were addressed to Italian respondents, 16% to British, 16% to Germans, 16% to Spanish and 12% to French. The average return rate was 4.3% and 50% out of 4.3% of all Internet respondents had already answered in three days and after one week nearly 90% had submitted the questionnaire, confirming the high speed of web surveys (Schonlau *et al.*, 2002). Nevertheless the voluntary nature of self-selection in response should caution the reader not to generalize the results.

The final usable sample size is 1416 of which 91.4% is made up of respondents who answered the on-line survey. Omnivores represent 75.4% of the total sample with nearly the totality of vegetarians (97.7%) answering via Internet. In terms of country composition, 56.5% of respondents are from Italy, 12.9% Britain, 11.6% from Spain, 11% from Germany and 8.1% from France. As expected, the majority of respondents in the Internet sample (table 2) is younger than 40 (58.1%) and educated to degree or post-degree level (71.1%). Moreover, 56.3% are women, 56.3% own a pet, 33.1% have at least one child younger than 15 years of age, 35.7% have a net household monthly income above €2,499 and 26.7% work in the agro-food sector. The average household size is 2.7 components ( $s=1.3$ ). A breakdown by country is reported in table 2.

Substantial differences are observed by comparing socio-demographic characteristics of Italian web respondents (table 2) with those of phone respondents (table 3). The values of  $\chi^2$  test under the null of no difference across samples for socio-demographic variables are statistically significant at .0001 for age, education, presence of children and people working in the agro-food sector, for pet ownership was .05, and that for gender was .09. Interestingly, the null of no difference in income could not be rejected in this sample. Thus these differences were taken into account in estimating WTP.

### 4.1 Consumer trust towards stakeholders

In all five countries results indicate that the majority of respondents considered the improvement of the selected standards to be either quite or very important i.e. well above 80%. However, the likelihood of stakeholders' compliance towards FAW standards displays strong uncertainty in all five countries. The majority of respondents (48.8%) believe that 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 European countries (Italy and Spain) especially for FREE, INSP, DIET. In fact, in this case, results show that the majority of British, French and Germans believe that farmers are most likely to comply with the latter three standards, while most Italians and Spanish think that farmers will not respect these standards. Furthermore, Italian respondents from the CATI survey appeared to be more sceptical than those who answered via web.

Cross-cultural differences in trust between Northern and Southern Europe are confirmed in table 4 which shows the results of multiplicative scores  $P \times I$ . The crucial role that trust appears to play in the formation of consumer attitudes is strengthened by country differences found for  $A_F$  and  $A_O$  (table 5) which are statistically significant to the ANOVA one way test. Furthermore, the Bonferroni multiple comparison post-hoc test of ANOVA indicates that  $A_F$  scores for Italian and Spanish attitudes towards farmers are significantly lower than those of web respondents from Northern European countries, while for  $A_O$  scores the test shows that only for Italians do we observe differences significantly lower than those observed in respondents from other countries. This means that Italians are also the most suspicious respondents about stakeholders applying FAW standards in transportation and slaughtering. We also found that  $A_F$  for Italian phone respondents ( $\bar{x} = 42.09$ ) is lower than that of Italian web respondents ( $\bar{x} = 48.27$ ) and that this difference is significant in the t-test for independent samples under the assumption of equal variance ( $t = 3.577$ ,  $d.f. = 798$ ,  $p = .0001$ ). For  $A_O$ , the difference between web ( $\bar{x} = 38.84$ ) and phone respondents ( $\bar{x} = 41.18$ ) in the Italian sample is not statistically significant. Finally, comparing results between omnivores and vegetarians cross-cultural, the differences highlighted so far for  $A_F$  and  $A_O$  maintain their significance.

#### ***4.2 Consumer purchasing habits and WTP for certified products***

As regards shopping habits, in all five countries, on average, most respondents buy farm animal products in supermarkets (65%), 25% from butcher's and specialised shops, respectively, and 10% from both supermarkets and small retailers. Vegetarians buy their animal products slightly more in supermarkets than omnivores do and these differences for web respondents are statistically significant for British ( $\chi^2 = 6.762$ ,  $d.f. = 2$ ,  $p = 0.034$ ), French ( $\chi^2 = 4.990$ ,  $d.f. = 2$ ,  $p = 0.083$ ) and Italian ( $\chi^2 = 43.826$ ,  $d.f. = 2$ ,  $p = 0.000$ ). Moreover, more than 2/3 of omnivore respondents stated that they prefer to consume beef, poultry and pork and thus other types of meat represent niche markets. In particular, beef is the favourite type of meat for French, Italians and Spaniards respondents, while poultry is the most preferred for British and Germans. In 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. Around 70% of respondents consume farm animal products more often than once a week, 18% once a week and the rest less than once a week.

With regards the distribution of responses to WTP for farm animal products in relation to increases in percentage terms of weekly expenditure for farm animal products, we observe that 626 Yes|Yes, 454 Yes|No, 146 No|Yes and 176 No|No. Table 6 illustrates the econometric WTP estimates of the dichotomous choice responses for certified animal-friendly products. The abbreviations and referring categories of explanatory variables reported in this table are BID for bids (see table 1), FEM for females, OLD40 for respondents aged over 40, HSIZE for the number of people in the household, DEG for respondents having a degree, INC for income, VEG for vegetarians and FR, GER, SP and UK respectively for French, German, Spaniards and British respondents. In Model 1 DEG, INC, VEG, CATI and Ao were found not to be statistically significant in explaining response probability to given expenditure increases. As a result, Model 2 represents our best parsimonious model for WTP for animal-friendly products and where the explanatory power of most predictors presented in Model 1 improve slightly.

Moreover, since parameter estimates for FR, GER and UK show that WTP is statistically significant lower than IT and SP we also present the results by country on the variables selected in Model 2.

In table 6, we observe that the sign of the BID coefficient is consistent with economic theory in all models, i.e. increasing the bid amounts diminishes the probability of a positive response. In model 2 all the socioeconomic variables show a positive effect on WTP for animal-friendly products. However, the analysis by country shows that results are strongly influenced by the Italian sample because in all other countries these variables do not affect WTP other than HSIZE in FR. In Italy, women are WTP €2.04 more than men, while being older than forty is associated with being WTP €2.59 more. An increase of one component in the size of household raises the WTP by €1.10 for Italian respondents and by €1.52 for French. The CATI parameter is not statistically significant and thus we can assume that there are no differences in WTP for certified animal-friendly products between the internet and phone surveys.

As regards consumer trust towards economic agents involved in the animal-friendly production chain our findings indicate that WTP appears to be positively affected only by consumer trust towards farmers and thus our research hypothesis is partially supported. However, the role of this factor is better understood when results are examined by country because we detect that results of Model 2 are affected by trust in Northern EU countries i.e. FR, GER and UK. This would suggest that in these countries higher levels of trust relationship between consumers and farmers can indicate that some consumer segments are ready to pay a premium price because they trust certified animal-friendly products. On the other hand, in Italy and Spain the lower level of trust towards the economic agents working in the animal husbandry sector do not give marketers the possibility to differentiate the markets of farm animal-friendly products according to trust.

## 5. Conclusions

The results we obtain are consistent with the hypothesis that trust towards stakeholders' compliance to certification standards for animal-friendly products plays a major role in respondents' preferences. Results on attitudes also underscore that consumer trust between respondents from Northern European countries and those from Southern European countries appear to diverge especially with respect to  $A_F$  despite the fact that all five countries belong to a well-defined economic area (EU). In other words, consumer behaviour towards animal-friendly products appears to be influenced by cross-cultural differences.

The budget approach employed for eliciting WTP appears to be interesting from a methodological viewpoint because it allows us to estimate WTP not for a single food item but for the category of animal food products. This approach might well become appealing in tackling the issue regarding the overestimation or real WTP in CV studies. However, this hypothesis needs to be tested in further experimental studies where respondents answering randomly to scenarios with and without a budget approach could reveal whether linking WTP to the category of food products could give lower, more realistic and more usable information of monetary values. The use of web surveys was appealing because it allowed us to carry out this study at an international level with low administration costs. Of course, we are aware of the limits of the representativeness of the sample, which however, are

tempered by our upshot of no difference between the results of a more conventional CATI survey sample and those obtained with the web-based survey. WTP estimates show that on average, respondents are WTP €11.11 of their family weekly expenditure for animal-friendly products i.e. €577.72 per year. Given the nature of self-selection at work in our sample we expect this to be an estimate that is upwardly biased with regards to the general population. Most of the socioeconomic variables employed in our models affect WTP only for Italian respondents and this might be related to the smaller sample sizes of other countries. It was also surprising to observe that Spaniards and Italians are WTP more than respondents from Northern European countries which might be explained by the higher emotive involvement of respondents from Southern European countries, in line with their country stereotype.

The most interesting econometric result of this study is given by the positive effect of trust on WTP estimates for certified animal-friendly products, which seems to give two indications to marketers and policy makers. This effect is observed only for farmers most probably for the following two reasons:

- farmers are the end of the food chain and thus consumers really need a strong trust relationship with them to believe that they comply with FAW standards;
- consumers are aware that farmers are the only economic agents in the food chain who take care of farm animal for most of their life.

Secondly, this effect is observed only for respondents from Northern European countries probably because their marketing information systems are more trustworthy than those existing in Southern European countries. This means that British, French and German retailers can identify segments of consumers who are ready to pay a premium price for animal-friendly products because they trust more.

But then what about southern European countries? In these countries communication policies become more important than in northern European countries because they should aim at increasing trust relationships along the food chain from fork to the farm. Policy makers should ensure that animal keepers/handlers as well as consumers are more involved and informed on current standards of animal protection and welfare in order to appreciate FAW more. This action could facilitate the exchange of information and the application of best practices among stakeholders and at the same time improve consumer trust and awareness of current farming practices and thus more informed purchasing decisions.

Altogether our results suggest that in these five countries there are segments of consumers who are ready to pay more for products which incorporate credence attributes that can guarantee a production process respecting animal welfare. This may imply that the agro-food sector should make a further effort in promoting industry standards and certification practices that can enhance FAW. Our study also encourages more cross-cultural studies which in this context should aim at evaluating whether the introduction of higher standards is economically viable and whether it can be accepted by our society. In this way existing minimum standards for FAW in the EU could be upgraded by policy makers in line with scientific evidence and socio-economic assessments.

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**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):	£	<input type="text" value="10"/>
- Meat and cured meats:	£	<input type="text" value="15"/>
- Eggs:	£	<input type="text" value="2"/>
Click on this button in order to obtain your weekly expenditure		Sum £ <input type="text" value="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 £  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

Figure 1: WTP scenario using a budget approach.

Table 1: Distribution of bid amounts.

Omnivores			Vegetarians		
$t$	$t^h$	$t^l$	$t$	$t^h$	$t^l$
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%

Table 2: Socioeconomic characteristics by countries (Internet sample).

<b>Socio-demographic</b>	<b>Country</b>	<b>France</b>	<b>Germany</b>	<b>Italy</b>	<b>Spain</b>	<b>UK</b>	<b>Total</b>
		(N=114)	(N=156)	(N=678)	(N=164)	(N=182)	(N=1294)
<b>Gender:</b> Females		61	84	396	87	101	729
<b>Age:</b> Below 40		46	119	405	97	85	752
<b>Education:</b> Degree/higher		71	138	401	156	154	920
<b>Children:</b> Yes   <15		59	34	190	65	80	428
<b>Pets:</b> Yes		81	60	405	76	106	728
<b>Income:</b> € 2,500 or above		44	37	217	74	91	462
<b>Agro-food sector:</b> Yes		12	51	168	65	50	346

Table 3: Comparison of socioeconomic characteristics of Italian respondents by type of survey.

<b>Socio-demographic (SD)</b>	<b>Telephone interviews (N=124)</b>		<b><math>\chi^2</math> test (Type of Survey vs SD)</b>	
	Count	%	$\chi^2$	<i>p-value</i>
<b>Gender:</b> Females	82	67.2	3.334	.068
<b>Age:</b> Below 40	46	38.3	19.001	.000
<b>Education:</b> Degree or higher	41	33.6	27.274	.000
<b>Children:</b> Yes	80	65.6	65.202	.000
<b>Pets:</b> Yes	60	49.6	4.346	.037
<b>Income:</b> €2,500 or above	40	35.4	0.508	.476
<b>Agro-food sector:</b> Yes	7	5.7	21.935	<.001

Table 4: Countries comparison of pair-wise multiplicative scores ( $I \times P$ ) used to construct attitudes.

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

Table 5: Countries comparison of  $A_F$  and  $A_O$  (internet sample).

Country Attitudes	France	Germany	Italy	Spain	UK	ANOVA one way		
	(N=114)	(N=156)	(N=678)	(N=164)	(N=182)	<i>F</i>	<i>d.f.</i>	<i>p-value</i>
$A_F$	58.82 (19.09)	57.28 (17.13)	48.27 (17.73)	45.84 (16.77)	54.64 (19.55)	19.377	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)	3.795	4	0.004



Table 6: Maximum likelihood estimates of structural parameters from double-bounded logit<sup>1</sup>.

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 <sub>F</sub>	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 <sub>o</sub>	-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) <sup>2</sup> :	€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

<sup>1</sup> Absolute values of t-statistics in parenthesis

<sup>2</sup> Expected WTP delta method

\*\*\* Significant at  $p < 0.0001$ ; \*\* Significant at  $p < 0.001$ ; \* Significant at  $p < 0.01$