Beef Credence Attributes: Implications of Substitution Effects on Consumers’ WTP

Inês Viegas, Luís Catela Nunes, Lívia Madureira, Magda Aguiar Fontes and José Lima Santos¹

[Original submitted July 2013, Revision received October 2013, Accepted January 2014]

Abstract

Consumers’ choices for food are influenced by a wide variety of credence attributes, but the food industry faces problems assessing whether the price premiums that consumers are willing to pay for these attributes will be sufficient to offset higher production costs. In this context, consumers’ willingness to pay (WTP) for safer, cleaner and animal friendlier beef was investigated through a choice experiment. The relative importance of WTP for these attributes shows that consumers place the highest values on food safety, followed by animal welfare and finally environmental protection. WTP for different combinations of the three attributes cannot be obtained by independent valuation and summation due to the presence of significant substitution relationships. However, some suggestions for the relations between these attributes can be proposed through an after-survey analytical solution. The bias involved in separately valuing closely related attributes can potentially jeopardize the success of a differentiation strategy.

Keywords: Choice-modelling; beef; credence attributes; substitution effects; joint valuation; individual valuation and summation (IVS) bias.

JEL classifications: C18, C83, Q18

1. Introduction

¹ Magda Aguiar Fontes is the corresponding author, magadaguiar@fmv.ulisboa.pt, and is with the CIISA, Faculdade de Medicina Veterinária, Universidade Técnica de Lisboa, Pólo universitário da Ajuda, Avenida da Universidade Técnica, 1300-477 Lisboa, Portugal, Phone: (+ 351) 21 365 2884, as is Inês Viegas. Luís Catela Nunes is with the Nova School of Business and Economics, Universidade Nova de Lisboa. Lívia Madureira is with the Department of Economics, Sociology and Management, University of Trás-os-Montes e Alto Douro (UTAD). José Lima Santos is with the Centro de Estudos Florestais (CEF)/Forest Studies Centre - Instituto Superior de Agronomia, Universidade Técnica de Lisboa. We would like to thank two anonymous referees and the editor of JAE for their helpful comments on an earlier version of this paper.
As societies become richer and more complex, consumers’ choices for food products are influenced by an increasingly wide variety of food characteristics and attributes. Food attributes consumers’ utility and, consequently, consumers’ preferences and choices (Lancaster, 1966), and process attributes – related to characteristics of the production process that do not necessarily lead to a different final product (Caswell, 1998) – are no exception. Emphasising one or a combination of several of these process attributes in a food product can increase the probability of it being selected by consumers (Pouta et al., 2010; Ubilava et al., 2010; Olynk and Ortega, 2013). Pesticide-free fruits or free-range eggs are well known examples of product differentiation driven by consumers’ preferences.

Food safety, animal welfare and environmental protection are often jointly supplied. Less intensive systems are often considered more environmentally friendly, and also to provide higher standards of animal welfare, each linked to safer food (de Passillé and Rushen, 2005; Kallas et al., 2007; Lusk and Norwood, 2012), but also have higher production costs, and therefore higher product prices (Nocella et al., 2010). However, assessing whether the price premium consumers are willing to pay is sufficient to offset the higher production costs may not be straightforward or continuous (Frank, 2006), especially for credence attributes. A brief literature review shows several studies estimating consumers’ willingness-to-pay (WTP) for animal welfare, food safety or environmental protection as food attributes.

Tonsor et al. (2009) found statistically significant and positive values for safety enhancements in beef in four countries, which is in line with the findings of Angulo and Gil (2007). Traceability and information about hormones or antibiotics were associated with positive WTP (Lusk et al., 2001; Dickinson et al., 2003) as well as BSE-tested and traceability-enabled beef (Lim et al., 2013). A meta-analysis by Cicia and Calantouni (2010) concluded that consumers are willing to pay 22% above the base price for food safety attributes. The same study also concluded that European citizens have a marginal WTP of 14% for animal welfare attributes (see, also, Kehlbacher et al., 2012). A meta-analysis by Lagerkvist and Hess (Lagerkvist and Hess, 2011) suggests that European consumers are willing to pay a premium for animal friendlier products. Nocella et al., 2010 report results from a cross-national survey in five European countries, which show

---

2 Credence attributes are attributes that cannot be verified by consumers even after the product is purchased and consumed and whose presence must be guaranteed by others (Grunert et al., 2004).
positive WTP for animal friendly products for some consumer segments, in spite of cross-cultural differences.

Hurley et al. (2006) found a positive WTP for “environmentally friendly” pork meat. Travisi and Nijkamp (2008) found that Italian consumers are willing to pay more for agricultural foodstuffs produced in environmentally benign ways, leading also to human health improvements. Similar results were found in Spain, where consumers stated positive WTP for healthier and environmentally friendlier milk, although their valuation was higher for the health attributes (Aldanondo-Ochoa and Almansa-Sáez, 2009). Ubilava et al. (2010) find that these environment and health attributes are often associated in consumers’ preferences and expectations. The demand for animal or environmentally friendlier products is often associated with the belief that these products are safer, besides other altruistic motives (Verbeke et al., 2010; Lusk and Norwood, 2012).

Lancaster’s framework (1966) implies that there may be substitution (or complementarity) effects between these attributes (Ubilava et al., 2010; Dachary-Bernard and Rambonilaza, 2012). Ubilava et al. (2010) find a 30% premium for environmentally certified pork chops, with a 30 to 45% premium for animal friendly and health/safety attributes, depending on the social status of respondents. Lusk et al. (2007) found positive mean WTP for all three attributes (see, also, Olynk et al., 2010; Olynk and Ortega, 2013). Pozo et al. (2012) and Tonsor (2011) also found positive WTP for pork production with animal welfare and food-safety related attributes in pork meat.

However, consumers do not separately value each of these attributes (Ubilava et al., 2010), so the omission of other utility-relevant food attributes may bias WTP values because of the incomplete specification of the valuation context (Gao and Schroeder, 2009; Korzen et al., 2011). Gao and Schroeder (2009) implicitly estimated substitution effects using multiple surveys with overlapping choice experiments, and conclude that “changes in WTP for a certain beef attribute not only depends on the attribute’s relationship with the newly added beef attribute but are also determined by the presence of other attributes”. We use a different and not directly comparable methodology to estimate these effects explicitly.

Within environmental and landscape valuation, the sum of independent valuation of different attributes has been shown to be prone to considerable bias, because different attributes typically behave as substitutes in valuation (Santos, 1998).
Independent valuation and summation (IVS) is therefore considered an invalid procedure because of this bias (Hoehn, 1991; Randall, 2002). To the authors’ knowledge, little scientific evidence exists regarding substitution effects and context-dependency that may exist between animal welfare, food-safety and environmental protection as food attributes in one single product.

We use a choice experiment to identify trade-offs between attributes and to determine WTPs for different combinations of non-price attributes (Mørkbak et al., 2012). We hypothesise that WTP for each one of these attributes is conditional on the presence of the others (substitution effects). We suggest that the three attributes should be valued together, where interactions between attributes provide more reliable WTP estimates for different combinations.

The main objectives of this paper are: (i) to establish which substitution effects exist between food safety, animal welfare and the environment as beef credence attributes, and to estimate the influence those substitution effects have on WTP; (ii) to suggest possible interpretations of consumers’ reasoning that leads to substitution effects, and (iii) to estimate the potential bias arising from independently valued WTP estimates for food attributes.

Section 2 reports on the methods used and the survey design, followed by the presentation of results (Section 3). The final section concludes with a more general discussion of context dependency.

2. Methods

2.1 Choice modelling

Choice experiments (CE) belong in a family of stated preference methods with roots in Lancaster’s theory of consumer choice, according to which consumers derive utility from a good’s attributes and not from the good itself (Lancaster, 1966). Different goods are represented as different bundles of attributes. A consumer (subject to a budget constraint) chooses amongst goods by selecting the bundle of attributes that maximizes utility.

A choice experiment is intended to represent a real shopping situation, as consumers select a product with some given characteristics (attributes) within a finite and discrete set of options. With price included as none of the varying attributes it is possible to evaluate tradeoffs among product attributes and to identify their marginal values (Hanley et al., 1998). We use a standard choice modelling methodology
following, among others, Hanley et al., 1998, Bateman et al., 2002 and Hensher et al., 2005.

We consider two alternative models. The first (hereafter designated as main effects model) includes only the isolated variables representing the three quality attributes and one variable for the price attribute:

\[ V_{in} = \beta_{AW} AW_i + \beta_{ENV} ENV_i + \beta_{FS} FS_i + \beta_{Price} Price_i \]  

where \( AW \), \( ENV \) and \( FS \) represent animal welfare, environment and food safety, respectively. As discussed below, these qualitative attributes take only two possible values, equalling 1 when the attribute is present in an alternative and -1 otherwise.\(^3\) Our second model includes interactions between pairs of the three attributes:

\[ V_{in} = \beta_{AW} AW_i + \beta_{ENV} ENV_i + \beta_{FS} FS_i + \beta_{Price} Price_i + \beta_{AW,FS} AW_i \times FS_i + \beta_{ENV,FS} ENV_i \times FS_i + \beta_{AW,ENV} AW_i \times ENV_i \]  

In a MNL, the WTP for any attribute \( k \) can be determined by the negative of the ratio between the marginal utility of the attribute and the marginal utility of money (\( i.e. \), the price attribute) (Burton et al., 2001). For model (3), without interactions, with the qualitative attributes defined using effects coding, the WTP for attribute \( k \) is given by

\[ WTP = -\frac{2\beta_k}{\beta_{Price}}. \]  

For model (4), with interactions, the WTP for a given attribute depends on the presence or not of the other attributes. For instance, the WTP for food safety (\( FS \)) is given by:

\[ WTP = -\frac{2(\beta_{FS} + \beta_{AW,FS} \times AW + \beta_{ENV,FS} \times ENV)}{\beta_{Price}}. \]  

In what follows, only the results of the estimation of RPL models are presented.\(^4\) The model allows the parameters to vary randomly across different decision makers but keeps them fixed for all choice situations faced by the same decision maker. We assume a Normal distribution for the coefficients of the qualitative attributes and corresponding interactions. The price coefficient is kept fixed.

2.2 Survey design

A CE design should include a precise definition of the attributes, including their levels and ranges (Hanley et al., 1998). For our choice experiment the attribute levels

---

\(^3\) We followed the suggestion of an anonymous referee. An alternative approach would be to use the zero-one dummy variable coding. In any case, although the WTP formulas differ, the estimated WTP values are invariant to whether effects or dummy coding are used.

\(^4\) The conclusions obtained using standard MNL models were qualitatively similar.
available for respondents in the questionnaire were therefore defined based on a multi-tier approach which included literature review, the available production possibilities and insights from focus groups discussions. These discussions have shown that beef safety, the environmental impact of livestock production and the welfare of production animals are not well known topics amongst consumers. As a consequence, the attribute levels were formulated in the simplest possible manner, i.e. with only two levels: the current legally imposed minimums (Legal Standards) and an improved level (Certified Additional Levels). Moreover, a symbol was adopted for each attribute in order to facilitate respondents’ recognition of the attributes’ levels (Froehlich et al., 2009). Finally, the intensity of the guided discussions led to the elaboration of an accurate leaflet that was used as a support for the CE questionnaire. Consumers needed this additional information to be able to answer truthfully and meaningfully to the questionnaire of the SP survey.

During the focus groups – and also relevant to the survey design – some participants spontaneously expressed interest in beef products with a bundle of these attributes, mentioning that if safety, animal welfare and the environment were all present in the same product they would be much more interested in buying it. Such statements are consonant with what previous research has shown (Harper and Makatouni, 2002; Wezemael et al., 2010) and validates the determination of the interactions across attributes.

The participants’ difficulties in specifying and elaborating on the debated issues showed that designing survey scenarios without the focus groups input would likely result in attribute misspecifications and invalid results.

Table 1 presents the description of the attributes’ levels as shown to respondents, as well as the symbols used to indicate the presence of a given attribute at the improved level in the choice experiments. As attributes and their levels could represent a significant cognitive burden on respondents, an additional small leaflet was presented, containing clear sentences and visual aids relative to the status quo and the improved levels for all three attributes (Appendix A).

Table 1
Beef credence attributes

(Please insert Table 1 about here)
Price was offered at 9.98€/kg for the status quo beef plus five different premium levels (12.98€/kg; 15.98€/kg; 18.98€/kg; 21.98€/kg; 24.98€/kg) based on current market prices and values determined through focus groups choice exercises (Viegas et al., submitted). In fact, the price range obtained was considered reasonable as it was somewhat within the premium priced beef cuts already existing in the Portuguese market. Therefore, through these choice exercises it was also possible to generate priors to be used in the experimental design.

Each choice situation included two hypothetical differentiated beef products (varying in the three credence attributes and a varying premium price) and an undifferentiated beef product (with the three credence attributes at the minimum legal levels and the status quo price) (Appendix B). Since our assessment is conditional on beef consumption, the baseline level was the “status quo beef”, the option of choosing the beef according to the legal standards at the current market prices.

Before the first choice set was presented, respondents’ instructions included a “cheap talk” script with the objective of reducing hypothetical bias (Lusk, 2003).

A pilot study showed that five choice tasks, each including three alternatives, were easily performed by respondents, who did not show signs of survey fatigue.

The adopted experimental design was not orthogonal in the main effects or interactions. It was a D-efficient design implemented using Ngene 1.1.1 (Rose and Bliemer, 2009) with priors coming from pilot surveys (based on information collected in focus groups). Although the design allows efficient estimation of main effects alone, it also allows for estimating interaction terms (see Hensher, 2008). The final choice design resulted in twenty choice sets, which were blocked into four groups of five. Each participant was randomly presented with one of the four different types of questionnaire.5

In addition to the choice experiments, respondents were asked a group of questions regarding beef shopping and consumption habits and preferences, a group of questions about their attitudes and concerns regarding beef production, environmental and societal issues, and a group of questions related with socio-demographic characteristics.6

5 The use of four blocks might have led to different scale factors in the choice model. However, a likelihood ratio test of the null hypothesis of equality of the scale factors does not reject it (the test statistic equals 4.5 giving a p-value of 20.9% using a chi-square distribution with 3 degrees of freedom).

6 Some of the work related with the non-valuation and the socio-demographic questions of the questionnaire can be found in Viegas et al. (2013).
A stratified (for gender and age) random sample of 650 individuals, residents in Lisbon and Oporto, was selected for the face-to-face home survey. These cities were selected because of their significant differentiated beef market consumption (Banovic et al., 2010), and higher purchasing power. The households were selected through a random route procedure.

The survey was administrated by a market research company in face-to-face home interviews with an adult responsible for the household food shopping. Respondents who did not consume beef were excluded.

3. Results
A total of 613 valid questionnaires were completed by respondents. Table 2 presents the summary statistics for demographic variables.

Table 2
Summary statistics for demographic variables

Table 3.1 displays the estimation results for the main effects RPL model (i.e., the model that includes only single attributes and no interactions) and Table 3.2 for the RPL model including the attribute interactions. In this latter model, the mean of the distribution of the coefficient of the interaction between AW and ENV was set equal to zero since it was not statistically significant.7

In both models, the means of all the parameter distributions are statistically significant. The estimated means of the distributions of the parameters associated with the interaction terms (between animal welfare and food safety, and between environment and food safety) are negative, indicating significant pair-wise substitution effects for these attribute combinations. Price has always a negative coefficient, as expected. All the variables representing the attributes’ marginal utility when separately valued have positive mean coefficients. The standard deviations of the parameter distributions are all significant suggesting the presence of some degree of heterogeneity in preferences.

7 All models were estimated with NLOGIT 4.0. Confidence intervals were obtained using the delta method (Hole, 2007).
The mean WTP for each attribute presented in Table 3.2 is calculated for the cases in which the other attributes are not present. However, due to the existence of interactions between the attributes, the WTP for each attribute actually depends on the values taken by other attributes, and the sequence in which the attributes are considered.

Table 4 identifies the six possible inclusion sequences for the three attributes. The notation \( \text{WTP (AW| (0,0,0))} \) means “WTP for animal welfare conditional on the presence of...”, regarding the code 0=absence and 1=presence, in the following order: (AW, ENV, FS). The mean WTP is followed by the 95% confidence interval.

Logically, the final cumulative WTP (18.00€/kg [13.64, 22.36]) is the same for all the inclusion sequences. Note that the incremental WTP values for the third attribute added is never statistically significant.

The lowest values (which are not significantly different from zero) are reached by aggregating ENV to sequences where food safety has been added already, which is due to the strength of the substitution effect between these two attributes being larger than the isolated environment attribute effect. This means that consumers are not willing to pay any more for ENV in the presence of FS. The maximum WTP is obtained by aggregating FS and AW (19.54€/kg [15.60, 23.49]).

The inclusion sequences can be seen from a different perspective, more indicative of the effects of the presence (absence) of FS on the WTP for the other two attributes. Table 5 shows such WTP for AW and table 6 for ENV.
These results confirm that in presence of FS the WTP for both AW and ENV is not statistically different from 0.

Finally, it is also interesting to present the results on WTP for FS in the presence (absence) of the other two attributes, as shown in table 7. As can be seen, WTP for FS is not statistically different from zero in the presence of the other two attributes.

### Table 7
WTP for food safety

4. Conclusions

The ranking of consumers’ WTP for these attributes seems to be clear, with surveyed consumers placing the highest WTP value on food safety, followed by animal welfare and, finally, by environmental protection. Lusk et al. (2007) found a similar order for these attributes’ marginal values, translated into higher mean WTP for the food safety attribute, followed by the animal welfare attribute and finally by the environmental protection attribute.

The fact that AW has a stronger effect compared with ENV on consumers’ stated preferences may be due to consumers’ lack of awareness about the true environmental impact of livestock production (Viegas et al., 2011), which is supported by the fact that consumers rarely change their meat consumption habits due to environmental concerns (Vanhonacker et al., 2013).

Our findings also suggest that the combination of the three attributes has effects on the estimated WTP, which are interpreted here as substitution relationships. Substitution effects were expected and predictable – in light of Consumer Theory (Lancaster, 1966).

Even though it is recognized that consumer’s choices are influenced by the presence of (related) attributes within choice experiments (Gao and Schroeder, 2009),
we haven’t been able to find in the literature explicit estimates for these substitution effects.

The RPL results show the potential bias of ignoring interaction effects when estimating and interpreting consumers’ WTP for each attribute. If a model that included only the simple attributes was considered, the coefficients (and thus the estimated WTP) for each isolated attribute would be smaller than the coefficients presented in table 3.2, as, in the former model, the WTP for each attribute is averaged across situations in which the other attributes are either present or absent. As the estimated interaction effects are negative (attributes are substitutes for each other), the WTP for a bundle of attributes is smaller (at €18) than the simple adding up of the WTP for each isolated attribute obtained from the estimated coefficients of the main effects model (at €19.42). This also happens if a WTP estimate is built (e.g. in a benefit transfer) for a bundle of attributes based on results secured by studies that independently valued each attribute. This finding strongly suggests that attributes should be jointly valued in order to avoid any IVS bias.

According to the estimation results, the interaction effect between AW and ENV was not statistically significant, suggesting that these two attributes satisfy distinct consumer needs and thus are not substitutes for each other.

These findings also have implications for context-dependency and its effect on consumers’ preferences and choices. Context dependency is, perhaps, a universal and inevitable phenomenon. A consumer is always likely to be influenced by the specific context of the decision or choice. In particular, although our choice experiment followed current best-practice, the experiment could not replicate the normal shopping experience, especially since it necessarily focused participants’ attention of the three specific attributes and their stylised representation. In this sense, our participants were obliged to consider the substitutability between the attributes in ways which may not be typical of their normal shopping experience (Harvey and Hubbard, 2013).

Nevertheless, and more specifically, context dependency includes path-dependency with respect to the determination of the optimal bundle of attributes (Santos, 1998). If it were possible to describe and have consumers stating their preferences for continuous attributes, then the determination of the optimal basket of animal welfare, food safety and environmental protection attributes in beef would be a point in a tri-dimensional space. However, this is clearly impractical, and possibly even infeasible. Our three
attributes are generally perceived as quite marginal concerns for our consumers, as clearly shown by focus group results (Viegas et al., 2011). Moreover, the gains (or improvements) in the levels of the attributes are not only multidimensional, but also discontinuous (though see Kelbacher et al. (2012) for an approach to measure animal welfare as a continuous attribute).

Besides this inevitable context-dependency, other possible theoretical explanations for negative interactions should be introduced. On the one hand, consumers most certainly make inferences on the available cues (Steenkamp, 1990), not only based on the information intentionally supplied by choice experiments, but also unconsciously (which is uncontrollable by the researcher).

On the other hand, it is not possible to control the a priori information that respondents hold. Those better informed about animal production may in fact have some knowledge about the joint supply of attributes, and thus perceive an environmentally friendlier system as an animal friendlier one, for example.

Either way, it is not possible to control such inferences in a choice-experiment context, and it would only be possible to properly investigate and clarify them in a post-questionnaire focus group context (Powe et al., 2005). Therefore, the following suggestions for the relations between AW, ENV and FS can be proposed – keeping in mind the inclusion sequences shown in table 4 – and are mainly based on the authors’ qualitative experience derived from focus groups and pilot surveys.

Animal welfare and environment are probably acting as cues for food safety. The WTP for FS when the attributes AW and ENV are already present decreases to values close to zero (Table 7). It may be that consumers’ can get all the food safety they want derived from animal welfare and environment. In fact, Carlsson et al. (2007) alluded to the possibility that animal welfare attributes are cues for food safety, supporting our suggestion.

Our consumers’ general lack of awareness about the environmental impact of livestock production finds support in the close to zero WTP values reached by ENV to sequences 1, 5 and 6 (Table 4). This suggests that ENV may only act as a cue for food safety, and that, once safety is present, consumers ignore environment-related attributes. AW, on the other hand, appears to have some independent value, as implied by the positive WTP values, even after the introduction of FS.

Sequence 3 – ENV-FS-AW is the only sequence where average WTP values do not have negative values (though included in the confidence interval). Regarding the
proposed relationships between these three attributes, it seems that in this case ENV could act as a cue for food safety, having thus some value for consumers. FS could still have some additional value for consumers, as ENV did not exhaust consumers’ demand for food safety. Finally, consumers would still have some WTP for AW. This positive valuation, even with the satisfaction of the demand for FS and ENV, may arise from true altruistic values.

We also suggest that this joint valuation of attributes that are not only jointly produced but also hard to separate by consumers may have lead to WTP values that are not so prone to hypothetical bias. The stated WTP values for differentiated beef with these three attributes is well within market values for premium beef products in Portugal, which seems to support this conclusion. It would be interesting to confirm this by computing the previous estimates found in the literature and summing them. This would also help determining the magnitude of the IVS bias in this case.

The positive and significant WTP values for all of the attributes and for several combinations of them should nevertheless be considered with some caution. Income restrictions always play a role in consumer’s choices and markets for differentiated food products are often niche markets. Future research is needed in order to identify segmentation variables and the corresponding consumer segments, as it is likely that there are niche markets for different combinations of these attributes. Undertaking this segmentation (that will also be based on the socio-demographic profiles that were collected with the questionnaires) can help capitalize on consumers’ heterogeneous preferences, by showing new market opportunities for beef differentiation.

6. References


Viegas, I., J.L. Santos and M. Aguiar Fontes “Consumers’ perceptions towards beef safety, animal welfare and environment: getting insights and choice scenarios from focus groups”, submitted (2013).
Appendix A

BEEF CATTLE WELFARE IS RELATED WITH REARING CONDITIONS AND CARETAKERS’ ATTITUDE.

CURRENT LEGAL STANDARDS
Maximum animal stocking is defined by law.
Access to pasture isn’t mandatory.
Caretakers training is mandatory.

CERTIFIED ADDITIONAL LEVEL 5
It is possible to provide incentives for beef production in extensive systems where animal stocking is lower and animals have more free space.
Animals will have guaranteed access to pasture.
Caretakers would have increased training.

BEEF PRODUCTION CAN HAVE MAJOR ENVIRONMENTAL IMPACTS
Current legislation defines minimum standards aiming to prevent some environmental problems related with beef production, such as water and soil pollution.

CERTIFIED ADDITIONAL LEVEL 5
It is possible to provide incentives for beef production in environmentally friendly systems.
These systems are considered sustainable and are important for landscape preservation.
They are also important to prevent desertification and wild fires.

THE EU LEGISLATION IS VERY STRINGENT CONCERNING FOOD SAFETY FROM FARM TO FORK
For example:
- It is only possible to use antibiotics that are approved by authorities;
- Authorities control the use of antibiotics in farms through inspections and periodic analysis;
- Meat is periodically analysed in slaughterhouses.

CERTIFIED ADDITIONAL LEVEL 5
It is possible to reduce to allowed level of antibiotics residues in meat.
It would be implemented a tighter control of antibiotic use in farms.
It would be established a tighter control of the presence of antibiotic residues in meat.

Appendix B

Please choose between the available beef products:

<table>
<thead>
<tr>
<th>Certified Beef 1</th>
<th>Certified Beef 2</th>
<th>Current Beef</th>
</tr>
</thead>
<tbody>
<tr>
<td>€21.98/Kg</td>
<td>€12.98/Kg</td>
<td>€9.98/Kg</td>
</tr>
</tbody>
</table>