

Urban consumers' response to the EU food mountain labelling: an empirical application in Southern Europe

ANA I. SANJUÁN^{1,2}, SAOUSSAN KHLIJ³

Jel codes: Q13 Q18 D12

1. Introduction

The European Union has recently regulated the conditions for a voluntary labelling scheme of mountain food products (EU Regulation, 665/2014)¹ in order to guarantee their authenticity and contribute to the sustainability of the economic mountainous systems. Beef rearing destined to meat accounts for 16% of total EU mountain turnover and is the second most important mountain production after dairy (28%), while only Spain and France account for more than half of the EU mountain beef production (20 and 36%, respectively) (Santini *et al.*, 2013). A majority of EU consumers (65%) find benefits in buying mountain products (Eurobarometer, 2011) which are mainly associated with environmental and economic sustainability (small scale, contribution to

Abstract

By using beef as a typical mountain product, this paper investigates the role of the mountain origin claim among urban consumers in four Pyrenean bordering regions, in France and Spain, applying a choice experiment. In addition, breed, intrinsically linked to beef mountain systems, is also studied. An Error Components mixed logit model is estimated and attribute non-attendance is analytically derived. Results suggest that the mountain labelling may have a limited impact on consumption, as it is highly non-attended and its Willingness to Pay is low even after control for non-attendance. Nevertheless, preference heterogeneity suggests a feasible niche market in Spain. In contrast, the use of breed as a differentiation claim, not currently used in Spain, could have a more immediate impact on consumers' choices. The paper finds synergies between mountain labelling and other quality schemes.

Keywords: stated preferences, mountain labelling, Gascon breed, cross-regional, Error Component model, Attribute Non-attendance.

Résumé

A partir de la viande de bœuf considérée comme un produit typique des zones de montagne, nous allons examiner dans cet article le rôle de la mention d'origine «montagne» auprès des consommateurs urbains dans quatre régions transfrontalières des Pyrénées, en France et en Espagne, à l'aide d'une expérience à choix discret. Parallèlement, nous allons étudier la race qui est intrinsèquement liée aux systèmes de production de bovins dans les régions de montagne. Un modèle «logit à composante mixte» est estimé et la non prise en compte des attributs est déterminée analytiquement. Les résultats indiquent que la mention «montagne» peut avoir un impact limité sur la consommation, en raison de la forte non prise en compte et de la faible disposition à payer même après le contrôle de non prise en compte. Néanmoins, l'hétérogénéité des préférences suggère qu'il est possible d'envisager un marché de niche en Espagne. Par contre, le recours à la «race» comme allégation de différenciation, non utilisée actuellement en Espagne, pourrait avoir un effet plus immédiat sur les choix des consommateurs. Enfin, l'accent est mis sur les synergies possibles entre la mention «montagne» et d'autres signes de qualité.

Mots-clés: préférences déclarées, mention montagne, race gasconne, transrégional, modèle à composante d'erreur, non prise en compte des attributs.

rural economy, short circuits), although not necessarily to wholesomeness or superior quality (Schjøll *et al.*, 2010; Tebby *et al.*, 2010).

Food choices, however, rarely involve a single attribute, and although the mountain origin may exert a positive influence when considered isolated this might be mitigated when contemplated in a more general multi-attribute setting, in particular when confronted with alternative origins. In this sense, much of the literature on food choices and beef meat in particular, has focused on the role of local or regional origins, as opposed to national and imported (Alfnes, 2004; Mesias *et al.*, 2005; Mennecke *et al.*, 2007; Scozzafava *et al.*, 2014) finding evidence of a preference towards the closest geographical provenance to the consumer

as a result of emotional attachment, ethical concerns, ethnocentric behaviour or superior quality connotations (Van der Lans *et al.*, 2001; Van Ittersum *et al.*, 2007).

The voluntary mountain labelling can be combined with other existing quality labelling schemes, such as Protected Designation of Origin (PDO) or Protected Geographical Indications (PGI)². There is a vast literature dealing with the role of EU quality certifications in consumers preferences and choices (e.g. Bonnet and Simioni, 2001; Van der Lans *et al.*, 2001; Van Ittersum *et al.*, 2007; Resano *et al.*, 2010, 2012), while in the specific sector of beef the literature is more scant and aims, mainly, at explaining the motivations

¹ Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA), Government of Aragón, Avda. Montañana, 50059 Zaragoza, Spain.. Corresponding author: anaisabel.sanjuan@gmail.com.

² Joint Research Centre, Institute for Prospective Technological Studies (IPTS-JRC), European Commission. C/ Inca Garcilaso 3, 41092 Sevilla, Spain.

³ IRTA-Monells, Finca Camps i Armet, 17121 Monells, Spain.

¹ Mountain areas are identified by the Member States within the framework of Regulation EC 1257/1999, Article 18.1.

² PDO and PGI guarantee the origin and the compliance of the product with specific standards of quality regulated by a Code of Practice. The EU established these quality labels in 1992 (last update is Regulation (EU) 1151/2012).

behind the choice of quality labelled beef and the label role as a cue for quality and food safety (Angulo and Gil, 2005; Sepúlveda *et al.*, 2008).

From a policy perspective, local cattle breeds have been enhanced in the framework of rural development programs (Council Regulation (EC) No. 1974/2006) to maintain diversity and encourage organic production (Domínguez-Torreiro, 2014). Although the breed is usually ruled within the Code of Practice of each PDO/PGI, it usually remains hidden to the final consumer. An exemption is found in France, where the breed is used as an additional quality cue and differentiation tool. Such is the case, for instance, of the Gascon breed, one of the three main French autochthonous breeds. Due to its high capacity for adaptation, hardiness and meat quality, the Gascon beef breed is widely spread in mountainous areas, in particular, the French side of the Pyrenees³. Cattle breed has generally been neglected in consumers' based studies though. Exemptions include Scarpa *et al.* (2012), Domínguez-Torreiro (2014), where a reference to 'local breed' is included in their choice experiment conducted in Italy and Spain, respectively; and Mennecke *et al.* (2007) and Scozzafava *et al.* (2014), who study the influence of a number of alternative breeds in the US and Italy, respectively. In every case, the breed is found to affect significantly choices, although no farther inquiries are pursued with the exception of the latter, where the relative importance and WTP are also calculated.

Through an hypothetical choice experiment, we examine to what extent the claim of the mountain origin Pyrenees, and the explicit recognition of the breed, in particular Gascon, have an appeal among urban consumers of beef meat, residents in the main cities of four regions across the Pyrenees: Aragón and Catalonia in Spain, and Midi-Pyrénées and Languedoc-Roussillon in France. Interestingly, previous research (Schjøll *et al.*, 2010) found that mountain food products were better accepted and valued by mountain residents.

Therefore, we aim at contributing to fill the gap in the literature on consumers choice for beef, by recognizing the heterogeneity of consumers' preferences depending on the region/country of residence, and by placing special emphasis on the role of the 'mountain' claim, breed and quality certification schemes. Furthermore, the heterogeneity of consumers' preferences is also contemplated by using the Error Components Mixed Logit (EC-ML) model, which allows two types of unobserved heterogeneity, associated to specific individual taste parameters and to the choice alternatives (Hensher *et al.*, 2008). Finally, attribute non-attendance (AN-A) (i.e. ignorance of specific attributes when making choices) is considered when providing estimates of Willingness to Pay (WTP) using Hess and Hensher (2010)

approach. In considering AN-A, our goal is providing more accurate estimates of WTP for the novel features of mountain origin and Gascon breed. Besides, non-attendance in itself can be relevant in identifying the profile of those consumers who show a lack of interest for these features and, accordingly, provide some insights into how to better market beef to reach larger segments of the market. While the AN-A literature on transport (e.g. Hensher *et al.*, 2005a) and environmental economics (eg. Scarpa *et al.*, 2009) is quite extensive, applications on food marketing and consumer behaviour are very scarce (Scarpa *et al.*, 2012).

The remainder of the paper is organized as follows. Section 2 presents an overview of the data and the methods of analysis; Section 3 describes the results; Section 4 presents the discussion, and Section 5 the main conclusions.

2. Materials and methods

2.1. The survey

A representative sample of the regional population in terms of gender and age was recruited in the main cities of the four regions analysed between September 2010 and April 2011. The survey was addressed to regular consumers of beef, involved in food shopping and older than 18 years old. The final sample is composed by 1217 consumers, 300 in Aragón, 304 in Catalonia, 314 in Midi-Pyrénées and 299 in Languedoc-Roussillon. The choice experiment was complemented with socio-demographic questions, consumption and purchasing habits of beef, knowledge and purchase of brands and quality labels, as well as valuations of observed quality cues.

2.2. The design of the choice experiment

Consumers were asked to simulate the purchase of 1 kg of striploin in fillets for consumption at home. This is the second top category of beef meat with the second highest market prices (after sirloin). Cheap talk introduced the choice experiment to participants in order to reinforce the idea that the choice would affect their budget, having less resources to buy other products.

Given that not all the attributes under study are currently available in each of the regions considered, stated instead of revealed preferences were investigated, whilst budgetary and logistical constraints precluded the application of non-hypothetical (i.e. with economic incentives) choice experiments. This means that a possible upward bias on WTP might be present, although previous literature on beef choices has not confirmed this issue. Indeed, Lusk and Schroeder (2004) did not find higher marginal WTP for defining attributes of beef steaks.

A labelled experiment was designed with three alternatives that synthesize the options to market beef, currently available in any of the four regions: 'Generic' product or unbranded; branded with a private brand, either owned by the producer or the distributor ('Brand'); and certified with a quality label, either EU (e.g. PDO/PGI in both countries), regional or national (e.g. Label Rouge in France) ('Quality Label').

Each option in each region is described by a specific

³ The Gascon breed is marketed with three different brands depending on the characteristics of the product and the distribution channel used: *Label Rouge Gascon*, *Race Gasconne* and *Cadet Gascon Viande de nos Vallées*.

range of prices to avoid unrealistic combinations (see Table 1). To keep orthogonality between alternatives, constant gaps between the levels of prices were defined (Hensher *et al.*, 2005b). Specific regional examples of each brand and quality label alternatives were provided to ease the cognitive effort.

Three alternative origins were included: ‘Pyrenees’, ‘Region’ and ‘Country’. By using ‘Pyrenees’ we accommodate both, the new EU legislation on mountain labelling (proposal at the time of designing the experiment) and the specific objectives of the EU programme that funded this research (POCTEFA⁴) which aims at a better economic and social integration of trans-Pyrenean regions. ‘Region’ and ‘Country’ changed according to the place where the study was conducted.

Three levels were selected for the attribute ‘Breed’ (shown with name and pictures): ‘Gascon’, ‘Friesian’ and ‘Unspecified’ (lack of explicit recognition). The ‘Gascon’ breed is widely spread on the Pyrenees (mainly on the French side), while the Friesian breed (also known as Prim’ Holstein) was chosen as it is amongst the most important breeds in both countries (65% of the cattle herd in Spain (MAGRAMA, 2012) and 27% in France (FranceAgriMer, 2012).

Among possible intrinsic attributes, marbling (visible fat) was selected (Roosen *et al.*, 2003) as it can be visually observed at the moment of purchase, and three levels were used shown in pictures (‘low’, ‘medium’ and ‘high’).

An efficient fractional factorial design for main effects was applied, that led to 12 scenarios or choice sets, grouped into two blocks (of six choice sets each)⁵.

2.3. The econometric model

An Error Components Mixed Logit (EC-ML) model is estimated, as proposed by Hensher *et al.* (2008). As the more common Mixed Logit (ML), the EC-ML captures het-

erogeneity in preferences relative to attributes by allowing specific taste coefficients for each individual (i.e. β_n below) and is suitable for a panel structure, where there might be correlation between repeated choices made by the same individual. In addition, the EC-ML allows unobserved factors (i.e. errors) that explain the choice of each alternative to be different, and accordingly, have a different standard deviation or scale (i.e. θ_i). In the general EC-ML specification, the utility that consumer n gets from choosing alternative i from a choice set composed by M alternatives is:

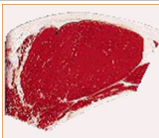

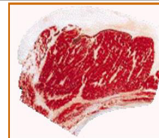



$$U_{in} = \alpha_i + \beta_n x_{in} + (\text{any of } \theta_1 E_{i1}, \theta_2 E_{i2}, \dots, \theta_M E_{iM}) \quad (1)$$

where x_{in} is the array of explanatory variables; $(E_{im} (m = 1, \dots, M \sim N[0,1]))$ is a set of independent individual terms specific to alternative i which allow to induce different patterns of correlation across alternatives, α_i is an alternative specific intercept; b and θ are parameters to estimate. As in the mixed logit, maximum simulated likelihood is used to estimate the probability of choice .

Recent literature on choice experiments has focused on attribute non-attendance (AN-A), that is, the possibility that respondents make their choices ignoring some of the attributes that describe each choice alternative (see Collins (2012) for an exhaustive review). Cognitive burden, simplification of choices, unrealistic attribute levels are some of the reasons behind the consumer’s decision of ignoring, consciously or unconsciously, some attributes (Alemu *et al.*, 2013).

The main concerns relate to the implications of AN-A in terms of demand forecasting (Hensher and Greene, 2010) and willingness to pay (WTP) (i.e. the price that the consumer would be willing to pay to stay at the previous utility level when the level of an attribute changes, and calculated as the ratio of the attribute to the price coefficient) (Hensher, 2007). The evidence on the latter, however, is mixed. Since non-attendance biases downwards the taste coefficients β_n , the result on WTP will depend on their relative changes (i.e. attribute and price coefficients). Besides, in a random parameter model, non-attendance affects also the variance or range of values of β_n (Collins, 2012). As a consequence, the final impact seems to be case specific, while there is some agreement in considering that AN-A might be captured to some extent by inflated preference heterogeneity (Hess and Hensher, 2010).

Early attempts used self-reported statements on attribute non-attendance and then modified the utility function

Table 1 - Description of the attributes and levels used in the choice experiment.			
Attribute	Levels	Region	
Origin	Pyrenees Own Region Own Country	All	
Marbling			
	Low	Medium	High
Price (/kg)	Generic (11, 13 and 15)	Aragón	
	Brand and Quality label (20, 24 and 28)	Catalonia	
	Generic (12, 14 and 16 /kg)	Midi-Pyrénées	
	Brand and Quality Label (20, 24 and 28)	Languedoc-Roussillon	
	Generic (19, 21 and 23)	Midi-Pyrénées	
Breed	Brand (21, 23 and 25)	Languedoc-Roussillon	
	Quality Label (24, 26 and 28)	Languedoc-Roussillon	
			
	Gascon	Friesian	Unspecified

⁴ <http://www.poctefa.eu/>

⁵ NGENE software was used, and the D-efficiency measure of the design was 70.5%.

of these individuals accordingly (Hensher, 2006). Main drawbacks relate to the lack of accuracy of statements and the cost associated with the extra questions (Collins, 2012). Alternatively, several methodological approaches have been proposed to infer non-attendance analytically. Amongst these, the Constrained Latent Class (CLC) (Hess and Rose, 2007; Scarpa *et al.*, 2009) defines classes in terms of the combination of non-attended attributes, by restricting taste coefficients in the utility functions to zero. The number of classes and their definition, however, is up to the researcher, and these decisions seem to have a significant impact on the final output (Scarpa *et al.*, 2009; Hensher *et al.*, 2012), apart from being parametrically intensive.

The literature is still vague on which approach is superior. In this paper we follow the proposal by Hess and Hensher (2010) (HH hereinafter) mainly for pragmatical reasons, due to the lack of stated information and the convenient model consistency across different analysis. HH's approach requires that each consumer makes several choices. Using the Mixed Logit model, the posterior mean and standard deviation for each attribute/level by each consumer conditional on her sequence of choices can be derived (also used in the calculation of individual WTP) and a Coefficient of Variation (CoV) calculated. A mean close to zero may be the result of lack of interest but also low sensitivity to that attribute, while the CoV informs about the uncertainty or the variability of taste intensity for that attribute across repeated choice tasks by the same individual. A CoV higher than 2 is used as the threshold to allocate the respondent to the part of the sample that ignored that attribute when making the choice. Despite that this threshold is arbitrary, in a cross-model comparison exercise, the HH approach has not been found to be inferior to CLC or other latent class models with stated AN-A (Scarpa *et al.*, 2012).

Usually, the literature has always referred to Attribute non-attendance, while more recent developments deal with Attribute/Level non-attendance, which is more flexible, as consumers may discard particular levels of an attribute but not necessarily all of them (Erdem *et al.*, 2014). In our application, we will refer indistinctly as attribute or attribute/level non-attendance although we are actually dealing with attribute/level.

3. Results

3.1. Description of the sample

Consumers interviewed are mainly women (53.3%), between 35 and 54 years old (40.0%), with secondary studies (55.3%) and intermediate income, between €1 500 and €3 000 per month (48.5%) (Table 2). The proportion of women and young people (below 35 years old) is substantially higher in Languedoc-Roussillon, the sample in Catalonia is biased towards middle age consumers, and the sample in Aragón towards consumers with higher level of studies. Comparison with

regional population statistics reveals a general upward bias in terms of education level and downwards in terms of age (IAEST, 2009; IDESCAT, 2009; INSEE, 2009). Consumers interviewed are also regular beef eaters (88.7% consume beef at least once a week at home).

Across different types of brands and labels, the EU quality labels occupy the second position in knowledge after producers' brands. Thus, 85.9% of consumers recognize some of the producers' brands suggested, and 78.2% some of the EU quality labels proposed. By regions, however, the ranking differs. Thus, EU quality labels occupy the first position of awareness among Spanish consumers (around 83%), while in France, the EU quality labels occupy the last position, and producers' and distributors' brands are the most popular (around 96% and 78-82%, respectively).

The awareness of different brands and labels schemes, however, does not translate automatically into purchases. Thus, only around half of the consumers interviewed have actually purchased some of the EU quality labels, or the producers' brands, while the percentage of consumers hav-

Table 2 - Description of the regional samples.

	Aragón (%)	Catalonia (%)	Mid-Pyrénées (%)	Languedoc-Roussillon (%)	Total
Gender					
Female	51.5	52.0	51.6	58.9	53.3
Age ^{***}					
18-34 years old	30.7	23.7	35.0	43.1	33.1
35-54 years old	36.3	50.7	39.5	33.4	40.0
≥55 years old	33.0	25.7	25.5	23.4	26.9
Education ^{***}					
Primary	16.0	10.8	4.1	3.0	8.5
Secondary	34.0	60.5	62.4	63.9	55.3
University	49.0	28.6	33.1	33.1	35.9
Net Income ^{***}					
< 1500 €/month	29.0	28.1	33.5	34.3	31.3
1500-3000 €/month	51.2	55.5	47.0	40.1	48.5
> 3000 €/month	19.8	16.4	19.5	25.5	20.3
Frequency of beef consumption at home ^{***}					
At least once a week	83.3	93.4	91.7	85.9	88.7
Knowledge of beef brands and labels ^a					
EU Quality Labels ^{***}	83.0	83.2	79.3	67.2	78.2
Regional or National Quality Labels ^{***}	44.0	35.9	87.6	84.6	63.2
Producers' brands ^{***}	70.0	80.3	96.2	96.7	85.9
Distributors' brands ^{***}	49.7	55.3	81.8	77.6	66.2
Purchase of beef brands and labels (at least once in the previous year) ^a					
EU Quality Labels ^{***}	51.7	63.8	42.7	28.8	46.7
Regional or National Quality Labels ^{***}	26.0	20.1	43.9	40.5	32.7
Producers' brands ^{***}	43.0	58.2	59.2	61.5	55.5
Distributors' brands ^{***}	31.7	33.9	48.1	33.8	37.0
Retail outlets used for beef purchases					
Butcher's ^{***}	37.3	35.2	49.7	42.8	41.3
Supermarket	54.0	52.6	53.5	53.5	53.4
Discount ^{***}	16.0	27.0	31.5	29.1	26.0
Hypermarket ^{***}	40.7	43.1	52.2	49.2	46.3
Meat specialized self-service ^{***}	30.7	47.7	26.4	11.7	29.2
Directly from the farmer ^{***}	8.3	13.2	25.8	26.8	18.6
Quality cues (in agreement) ^b					
Marbling	45.0	47.0	43.9	38.5	43.6
Quality label [*]	78.3	74.3	80.2	82.3	78.9
Distributors' brands ^{***}	47.0	50.7	39.5	36.4	43.4
Producers' brands	60.7	58.9	59.9	56.5	59.0
Animal breed ^{***}	63.7	63.5	74.2	79.6	70.2
Grazing ^{***}	85.3	88.5	79.6	88.3	85.4

^a Respondents were presented with an array of beef brands and quality labels specific to their region. For comparison, these were classified in the four categories in the table.

^b Original responses based on 5 points were grouped into 3 levels: 1 = totally disagree and disagree; 2 = neither agree nor disagree; 3 = agree and totally agree.

ing purchased the regional or national quality labels or distributors' brands falls to 33 and 37%, respectively. Across regions, the ranking of purchases reproduces, in general, the ranking of awareness.

With respect to the type of distribution channel used for purchasing beef, on average, the supermarket occupies the first position (53.4%), followed by the hypermarket (46.3%), and the butchers' (41.3%). Other channels, such as discount supermarkets and meat specialized self-service retailers are used by a smaller number of consumers (26-29%). Likewise, buying directly from the producer is an option chosen by one fifth of the interviewees. Traditional butcher's, discount, hypermarkets and buying directly from the farmer are significantly more used in France than Spain, while the supermarket is equally used.

The presence of a quality label (77.2%) and breed are clearly associated with superior quality by a high proportion of the interviewees (78.9% and 70.2%, respectively), while private brands, either owned by the producer or the distributor, and marbling are related to better quality by a smaller proportion of consumers (59.0, 43.4 and 43.6%, respectively). In Spain there is a better perception of quality of distributors' brands, while in France, the breed has more weight as a quality cue.

3.2. Estimation results

Estimated coefficients of the EC-mixed logit model, for each regional sample, are presented in Table 3. Price enters the model as a continuous variable and a log-Normal distribution is assumed in order to restrict the possible values to the negative range (Hensher *et al.*, 2005b; *inter alia*). The rest of attributes enter as effect codes (with the absent level taking value -1), and are assumed to follow a Normal distribution to allow preferences of opposite signs. A specific intercept and EC is estimated for each alternative (normalized to one in 'generic'). In every model, all the explanatory variables are jointly significant (log-likelihood ratio LLR is highly significant), and the EC-mixed logit improves the fit compared to a standard multinomial logit where no heterogeneity is allowed (LLR1 is significant). The fit does not improve by fixing those coefficients where the standard deviation is not significant (LLR2 is not significant). The error components, on the other hand, are not significant, and accordingly the possible heterogeneity linked to the choice of alternatives are subsumed in taste heterogeneity.

Both, the specific constants for brand and quality label are positive and highly significant in every region, indicating that, faced to a generic product, both differentiation strategies lead to a superior utility *ceteris paribus*. In both French regions the utility provided by the Brand is higher than the quality label, and the opposite occurs in both Spanish regions, which is entirely consistent with the pattern of awareness and purchase exposed in Table 2.

Higher prices reduce significantly the probability of

Variable	Aragón		Catalonia		Midi-Pyrénées		Languedoc-Roussillon		
	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	
Brand	2.05***	0.288	2.07***	0.20	0.92***	0.12	0.92***	0.13	
Quality Label	2.81***	0.29	2.78***	0.21	0.87***	0.20	0.86***	0.20	
Price	Mean	-1.61***	0.13	-1.89***	0.13	-1.76***	0.18	-1.75***	0.19
	Std.Dev	0.85***	0.07	0.80***	0.08	0.95***	0.15	1.27***	0.11
Pyrenees	Mean	0.15	0.10	0.06	0.08	0.04	0.08	-0.00	0.08
	Std.Dev	0.54***	0.13	0.38***	0.13	0.02	0.33	0.14	0.20
Region	Mean	0.41***	0.07	0.37***	0.06	0.22***	0.06	0.27***	0.07
	Std.Dev	0.39***	0.11	0.17	0.18	0.27**	0.10	0.23*	0.13
High Marbling	Mean	-1.11***	0.13	-0.56***	0.09	-0.97***	0.09	-1.23***	0.10
	Std.Dev	1.50***	0.14	1.05***	0.11	1.04***	0.10	0.87***	0.08
Medium Marbling	Mean	0.59***	0.10	0.26***	0.09	0.36***	0.07	0.43***	0.08
	Std.Dev	0.56***	0.13	0.64***	0.12	0.22	0.16	0.02	0.27
Gascon Breed	Mean	0.46***	0.10	0.27***	0.10	0.73***	0.08	0.61***	0.08
	Std.Dev	0.24	0.16	0.51***	0.09	0.42***	0.10	0.14	0.25
Friesian Breed	Mean	-0.08	0.12	0.16	0.11	-0.26***	0.09	-0.19*	0.10
	Std.Dev	0.18	0.25	0.08	0.30	0.08	0.38	0.64***	0.12
EC Generic	1.00	3.15	1.00	3.54	1.00	3.03	1.00	2.08	
EC Brand	0.51	1.62	0.52	1.84	0.06	0.18	0.02	0.03	
EC Quality Label	1.23	0.91	1.13	1.27	0.09	1.11	0.14	0.93	
LL(01)	-1533.11		-1628.93		-1750.48		-1624.97		
LLR0	808.8 (0.00)		672.9 (0.00)		578.5 (0.00)		625.7 (0.00)		
LLR1	588.3(0.00)		463.3(0.00)		283.7(0.00)		262.6(0.00)		
LLR2	118.06 (0.00)		75.08 (0.00)		40.85 (0.00)		67.27 (0.00)		
McFadden's R ²	0.225		0.187		0.150		0.173		
Number respondents	300		304		314		299		
Number observations	1800		1823		1875		1788		

^a Number of draws in the simulation is 200; ***, ** and * stand for significance at 1, 5 and 10% level, respectively. LL(01) is the maximum of the log-likelihood function; LLR stands for log-likelihood ratio (p-values in parentheses); LLR0 compares with an only constants model; LLR1 compares with a standard Multinomial Logit; LLR2 compares with a model where coefficients with non-significant standard deviations are kept fixed.

^a Number of draws in the simulation is 200; ***, ** and * stand for significance at 1, 5 and 10% level, respectively. LL(01) is the maximum of the log-likelihood function; LLR stands for log-likelihood ratio (p-values in parentheses); LLR0 compares with an only constants model; LLR1 compares with a standard Multinomial Logit; LLR2 compares with a model where coefficients with non-significant standard deviations are kept fixed.

choice while this influence is heterogeneous across consumers.

On average, the origin Pyrenees does not affect significantly consumers' choice, although preferences of Spanish consumers are heterogeneous. On the other hand the claim of a regional origin attracts positively consumers in every region, and contributes to raise the probability of choice on average, while heterogeneous preferences are found in all regions but Catalonia.

Interestingly, the explicit recognition of the Gascon breed helps the average consumer to make his/her choice in every region, while there is substantial heterogeneity in preferences towards this attribute in Midi-Pyrénées and Catalonia.

With the exception of consumers in Aragón where on average medium marbling is preferred, the lowest level of visible fat is the most preferred⁶. Nevertheless, a high degree of heterogeneity is found with respect to marbling, and significant market segments exist.

Further investigation on possible sources of preference heterogeneity did not provide a systematic pattern of influences across regions. The most significant result is that, while in France (Midi-Pyrénées) the preference for Gascon is accentuated amongst those consumers who use breed as a quality cue, in Spain (Catalonia) the preference is attenuated. Therefore, Gascon acts as a better quality cue in France than Spain.

3.3. Non-attendance rates and profile of non-attendants to the Pyrenees attribute

Table 4 reports the percentage of consumers ignoring each attribute/level, calculated applying the HH method to the estimates from the EC-Mixed Logit (Table 3). The rate of attribute non-attendance is also calculated by counting the number of consumers who do not attend to any of the levels that define the attribute (i.e. non-attendance to ‘Origin’ implies that neither ‘Pyrenees’, ‘Region’ nor ‘National’ levels are attended) (Scarpa *et al.*, 2009). These rates, however, are very low, under 2%, and with predominance of 0%, with the exception of ‘Marbling’ in Catalonia, where the rate reaches 11%.

Table 4 - Percentage of consumers ignoring or non-attending each attribute/level.

Region	Attribute/Level						
	Price	Pyrenees	Region	High Marbling	Medium Marbling	Gascon Breed	Friesian Breed
Aragón	0%	54%	5%	13%	11%	0%	55%
Catalonia	0%	70%	0%	24%	35%	0%	42%
Midi-Pyrénées	0%	1%	14%	17%	0%	0%	1%
Languedoc-Roussillon	27%	96%	1%	8%	0%	0%	48%

The Pyrenees origin is non-attended by a substantial portion of the sample in every region apart from Midi-Pyrénées, being more extreme in Languedoc-Roussillon (96%) and Catalonia (70%). The regional origin, on the other hand, is attended by the vast majority of respondents. Marbling is also attended by most of the consumers, with the highest rate of non-attendance found in Catalonia (24% and 35%, for high and medium marbling, respectively). With respect to breed, an interesting pattern emerges, as while the Gascon breed is attended by all the consumers in every region, the Friesian breed is not by a quite large proportion of respondents in both Spanish regions and Languedoc-Roussillon. We find that attendance to price prevails, while only the sample in Languedoc-Roussillon showed a higher disinterest towards price (27%).

The lack of attendance to the mountain origin in three out of the four regions deserves more attention as the mountain claim is one of the motivations behind this research. Thus, we try to find out if consumers who discarded the Pyrenean origin in our choice experiment share some common traits

⁶ The mean of the coefficient for the absent level of marbling (low) is the sum of the coefficients for high and medium levels sign reversed.

which might help to better market the Pyrenean mountain claim in the future. For this purpose, we run bivariate Chi-Squared tests of association between the attendant/non-attendant segment and an array of individuals’ characteristics. Only significant results are shown in Table 5. Usual socio-demographic features such as gender, education, or income do not differ significantly across attendance segments.

Table 5 - The profile of non-attendants to the Pyrenean origin claim (% over the segment size).

	Attendants (% over the segment) n=553	Non-attendants (% over the segment) n = 669
Frequency of beef consumption at home		
At least once a week [*]	90.4	87.2
Knowledge of beef brands and labels		
Regional or National quality labels ^{***}	70.0	57.5
Producers’ brands ^{**}	88.4	83.7
Purchase of beef brands and labels		
Regional or National quality labels ^{**}	36.2	29.8
Retail outlets used for beef purchases		
Butcher’s [*]	44.7	38.5
Quality Cues (in agreement) [*]		
Grazing ^{***}	81.6	88.5

^a See note b in Table 2.

A higher proportion of frequent consumers is found within the segment who attends the Pyrenees claim (3 percent points), as well as of consumers who are aware and purchase beef regional or national quality labels. In the Pyrenees attending group there is also a bigger proportion of consumers who are aware of producers’ brands (5 percent points higher). Likewise, consumers who paid attention to the Pyrenean origin tend to buy more at the traditional butchers’ (45 vs 38%, in the attendant and non-attendant group, respectively). Finally, grazing is considered as a quality cue by a statistically significant larger proportion of non-attendant consumers to the Pyrenees origin (88 versus 82%).

3.4. Willingness to Pay taking into account non-attendance

Results on mean WTP and 90% confidence intervals are presented in Table 6, for the attendant group, and the whole sample for some specific features. Note that only in the sample of Languedoc we found also price non-attendance. Accordingly, in this region, the attendant group is defined as attending both attribute and price. As WTP are ratios of coefficients, scale (i.e. error variance) differences across samples are cancelled out and comparisons are meaningful (Hensher *et al.*, 2008), while this is not the case with coefficients.

Results indicate that, in general, the WTP by the segment who attends is higher than the WTP estimated for the whole sample, while when price is not attended (as Languedoc-Roussillon) a lower WTP is found for the attendant group.

In general, WTP for every product characteristic is higher in the Spanish regions than in the French regions. In comparison with other attributes, the claim that beef was born and reared in the Pyrenees shows the lowest WTP, while across regions, the highest values are found in Aragón

Table 6 - WTP based on the EC-mixed logit model and the attendant segment^a

Characteristic	Aragón	Catalonia	Midi-Pyrénées	Languedoc-Roussillon ^b
Brand	10.84(2.17, 22.38)	13.33 (3.79,23.48)	4.72 (1.41,8.44)	3.67(0.70,8.73)[4.30]
Quality Label	14.87(2.98,30.70)	17.90 (5.09,31.53)	4.50 (1.34,8.04)	3.40(0.64,8.08)[3.98]
Pyrenees	1.38(-2.09, 3.78)[0.75]	0.87(-1.63, 2.80)[0.41]	0.20 (0.06, 0.37)	-0.19(-0.47, 0.25)[-0.02]
Own Region	2.38(0.42,5.75)[2.28]	2.40 (0.65,4.23)	1.29(0.32, 2.84)[1.16]	1.11(0.20,2.66)[1.30]
Medium marbling	3.32(0.64,8.02)[3.04]	2.27(-3.26, 7.45)[1.56]	1.91(0.52,3.65)	1.69(0.32,3.99)[1.98]
Gascon breed	2.43(0.49, 5.29)	2.86(-0.57,6.16)[1.79]	3.72(0.99,7.99)	2.46(0.46,6.08)[2.88]

^a 90% confidence intervals in parentheses. Whole sample mean WTP in brackets when different from the attendant group.
^b Attendants defined as attending the attribute and price.

(€1.38) and Catalonia (€0.87) (€0.75 and €0.41 in the whole sample, respectively). Although mean WTP for the Pyrenean origin is low, taste heterogeneity in Spain reveals the existence of a niche market. Thus, 5% of the population who is not indifferent to the mountain origin of beef is willing to pay more than €3.78 (€3.10 if all the population is considered) in Aragón, and €2.80 (€1.99) in Catalonia. Interestingly, consumers in Midi-Pyrenees do not ignore the Pyrenean origin but this only has a very limited impact on their preferences as revealed by the low WTP (€0.20).

On the other hand, the claim that the beef is born and reared in the own region triggers a higher price premium than the Pyrenees claim in any region, with a marginal WTP of around €1.10-1.30 in France and €2.4 in Spain.

Nevertheless, Gascon breed and medium marbling are found to evoke a higher WTP than mountain or regional origin. The claim that the breed is Gascon triggers a higher WTP than the lack of any explicit recognition of the breed, or the explicit recognition of the Friesian breed. The WTP for the Gascon breed ranges between €2.43 in Aragón and €3.72 in Midi-Pyrénées.

WTP for medium marbling is also higher in the Spanish than the French regions (between €1.70-1.90 in France and €2.3-3.3 in Spain). The values of the confidence intervals reveals a large variability on WTP for marbling as a result of preference heterogeneity, in particular in Spain.

Brand and the Quality Label are the attributes where the difference in WTP is bigger across regions. Compared to the value of a private brand, on average, the Quality Label adds around €4 in both Spanish regions, while compared to the generic product, the brands add between €10 and €13 in Aragón and Catalonia, respectively. In the French regions, on the other hand, the Quality label and the brand add between €3 and €5 to the generic product, respectively.

4. Discussion

From a methodological point of view, the paper shows the relevance of accounting for heterogeneity as well as non-attendance when explaining consumers' preferences and their willingness to pay for food products characteristics. In absence of heterogeneity, our results would be interpreted as a

total lack of impact of the Pyrenean origin on consumers' preferences for beef while the heterogeneity treatment allows identifying some receptive demand segments amongst Spanish consumers. Although the mean WTP is €1.12, for a niche market WTP could rise to €3.10 and €2.80 in Aragón and Catalonia, respectively. Likewise, neglecting non-attendance would lead to an even lower average WTP (less than €50 cents).

While not a particular socio-demographic profile is found for those consumers who pay attention to the Pyrenees claim, some interesting features differentiate them from non-attendants. Thus, farmers using the mountain labeling could benefit from an association with existing quality schemes or private producers' brands and promotion at traditional butchers' as attendants are more familiar with these labels and brands and buy more at this retail outlet. Grazing is considered as a quality cue in general, and shockingly, more by non-attendants to the Pyrenean origin, what seems to indicate a lack of knowledge about the methods of production in mountainous areas that should be reinforced in order to gain consumers' attention.

As in previous literature, our results suggest that consumers prefer the regional over the national origin, but we also provide evidence on the predominant role of the regional over the mountain source of beef. On average, the regional claim raises WTP around €1-1.5 in comparison to the mountain origin. Interestingly, the regional origin is highly attended by consumers when making their choices, while the Pyrenean origin is neglected by a significant part of the sample. Our results suggest that the region claim has an emotional or cognitive effect on consumers' choice that the Pyrenees claim is lacking, either because of geographical distance (a minimum of 130 km), emotional detachment, or the lack of a strong association between mountain beef and superior quality (the latter is also noted by Schjøll *et al.*, 2010; Tebby *et al.*, 2010).

In both countries a significant gap in quality perception, even more intense in France, is found between quality labels and private brands (especially distributors' brands in France), which however, do not translate into equivalent price premium. Thus, in Spain, a much bigger gap is found, and WTP for quality labels (also for private brands) is higher than in France. The lower WTP for any attribute, in general, in the French regions suggest that price sensitiveness might be higher than in Spain. Complementarily, it could be argued that brands and quality labels are more successful signalling credence attributes in Spain, reducing the need to search for additional information. Quality labels in Spain are linked to specific regional origins and therefore benefit from the positive impact of the region on preferences, while in France labels are not necessarily linked to a specific region (e.g. Label Rouge). Besides, although historically quality-labelled beef schemes have been more developed in France than in Spain, the expansion of private brands and the emergence of premium ones have depressed their market shares (Sans *et al.*, 2008), and accordingly, it is not unexpected that quality labels have lost ground amongst French consumers' preferences.

Breed affects consumers' preferences and this happens

not only in France, where a higher level of consumers' knowledge was expected due to the wide use of breed in the marketing of beef, and the finding of a more intense association with quality. Besides, there is a clear tendency to favour the Gascon over the Friesian breed, whilst across regions, further analysis on preference heterogeneity suggests that Gascon is a better quality reference in France (Midi-Pyrénées) than in Spain (Catalonia). In France, the Friesian breed may have attached a negative connotation, as this is considered a 'dairy' breed whose use as meat comes as a by-product from cull-cows, with low carcass and meat quality (40% of the meat comes from the dairy herd (FranceAgriMer, 2012)), what could explain that Friesian ranks lower in preferences than the lack of breed specification. Beef production in the Spanish regions under study, however, is mainly based on both, intensive systems with Friesian calves and semi-extensive systems with pure local breeds (MAGRAMA, 2012), which is consistent with the finding that the Friesian claim equates with the generic product in terms of utility.

Finally, our results concur with the previous literature in finding that marbling is a more important attribute than origin and that lower levels are preferred (Realini *et al.*, 2014). However, preferences towards marbling are highly heterogeneous revealing market segments with opposite tendencies. Thus, there is a segment of consumers who prefer medium marbling, as it favours eating experience thanks to its correlation with tenderness, flavour and juiciness (Froehlich *et al.*, 2009) without compromising health. Across countries, French consumers are more aware of marbling when making their choices although they are not willing to pay more for it.

5. Conclusions

A new voluntary labelling scheme has been introduced by the EU to support mountain food productions and contribute to their economic sustainability. This paper attempts to offer a first evaluation of the hypothetical response of consumers to the mountain origin, in a food product well rooted in mountain areas, such as beef meat, and in a geographical area bordering the Pyrenees in both the French and Spanish sides. Mountain production is based on grazing availability, extensive production systems, and breeds well adapted to the extreme edaphic and climate conditions. Gascon, originated in France, is one of such breeds, which in turn is used explicitly in the marketing of beef in that country. Those two main attributes, origin and breed, have been completed with visible fat (marbling) to define a labelled choice experiment, where the label is defined as either a quality label, a private brand or a generic product. From a methodological perspective, the paper illustrates the application of an Error Components Mixed Logit, and contributes to the empirical literature concerned with attribute non-attendance by using the method proposed by Hess and Hensher (2010).

Our results suggest that the mountain labelling is likely going to find a timid response among urban consumers, while the prospects for the use of the breed seem more optimistic. In particular, to increase the currently low consumers' attention the mountain labelling could benefit from an association with oth-

er quality labels and brands. Besides, the mountain claim would be reinforced if associated with a particular region, while the specificity of mountain beef production systems and how it influences desired attributes, such as the provision of healthy and quality meat, animal welfare and environmentally friendly practices, needs to be highlighted to target urban consumers.

The results on breed suggest that the claim that the breed is Gascon triggers a higher WTP than the Friesian or the lack of any explicit recognition. While this result seems consistent with the French market reality, it is somehow unexpected for the Spanish regions, where further research is required to better understand the cognitive or emotional components that explain this positive reaction.

The main salient differences across countries lie on the value attached to quality labels and brands (much higher in Spain), and to the mountain claim, with more potential demand in Spain, in particular in Aragón.

The high estimated WTP obtained for some attributes (i.e. quality labels), in particular in Spain, might be open to criticism. Complementary methods of analysis, aiming at a closer representation of the monetary restriction through non-hypothetical choice experiments or experimental auctions could shed some light and refine the results.

Acknowledgements

This study was funded by EU-FEDER Operative Programme of Territorial Cooperation Spain France Andorra, 2007-2012 (POCTEFA), Project OTRAC. The authors would like to thank the coordinator Pilar Santolaria, and other researchers who helped designing the questionnaire and collecting the data in the different locations (Helena Resano, Gabriela Zeballos, Nuria Panella-Riera, M. Mar Campo, Pierre Sans, Ana Guerrero, M. Angels Oliver and Carlos Sañudo).

Disclaimer

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

References

- Alemu M.H., Mørkbak M.R., Olsen S.B. and Jensen C.L., 2013. Attending to the reasons for attribute non-attendance in choice experiments. *Environmental Resource Economics*, 54: 333-359.
- Alfnes F., 2004. Stated preferences for imported and hormone-treated beef: application of a mixed logit model. *European Review of Agricultural Economics*, 31(1): 19-37.
- Angulo A., and Gil J.M., 2005. Risk perception and consumer willingness to pay for certified beef in Spain. *Food Quality and Preference*, 8: 1106-1117.
- Bonnet C. and Simioni M., 2001. Assessing consumer response to protected designation of origin labelling: a mixed multinomial logit approach. *European Review of Agricultural Economics*, 28(4): 433-449.
- Collins A.T., 2012. Attribute non-attendance in discrete choice models: measurement of bias, and a model for the inference of both nonattendance and taste heterogeneity. Institute of Transport and Logistics Studies, University of Sydney Business School. PhD Thesis.

- Domínguez-Torreiro M., 2014. Alternative experimental design paradigms in choice experiments and their effects on consumer demand estimates for beef from endangered local cattle breeds: An empirical test. *Food Quality and Preference*, 35: 15-23.
- Erdem S., Campbell D. and Hole A.R., 2014. Accounting for attribute-level non-attendance in a health choice experiment: does it matter? *Health Economics*. Doi: 10.1002/hec.3059.
- Eurobarometer, 2011. The Common Agricultural Policy. Special Eurobarometer 368. http://ec.europa.eu/public_opinion/archives/ebs/ebs_368_en.pdf [access 19th January 2015].
- FranceAgriMer, 2012. *La filière bovine française, face à la sortie des quotas laitiers*. Elevage/ viande, 12. www.franceagrimer.fr [access June 2012]
- Froehlich E.J., Carlberg J.G. and Ward C.E., 2009. Willingness-to-Pay for fresh brand name beef. *Canadian Journal of Agricultural Economics*, 57: 119-137.
- Hensher D.A., 2006. How do respondents handle stated choice experiments? Attribute processing strategies under varying information load. *Journal of Applied Econometrics*, 21: 861-878.
- Hensher D.A., 2007. Reducing sign violations for VTTS distributions through endogenous recognition of individual's attribute processing strategy. *International Journal of Transport Economics*, 34(3): 333-349.
- Hensher D.A. and Greene W.H., 2010. Non-attendance and dual processing of common-metric attributes in choice analysis: a latent class specification. *Empirical Economics*, 39(2): 413-426.
- Hensher D.A., Rose J., Greene W. H., 2005a. The implications on willingness to pay of respondents ignoring specific attributes. *Transportation*, 32: 203-222.
- Hensher D.A., Rose J. and Greene W., 2005b. *Applied choice analysis. A primer*. Cambridge University Press.
- Hensher D.A., Rose J.M., and Greene W.H., 2008. Combining RP and SP data: biases in using the nested logit 'trick' - contrasts with flexible mixed logit incorporating panel and scale effects. *Journal of Transport Geography*, 16: 126-133.
- Hensher D.A., Rose J. and Greene W.H., 2012. Inferring attribute non-attendance from stated choice data: implications for willingness to pay estimates and warning for stated choice experiment design. *Transportation*, 39: 235-245.
- Hess S. and Hensher D.A., 2010. Using conditioning on observed choices to retrieve individual-specific attribute processing strategies. *Transportation Research Part B*, 44: 781-790.
- Hess S. and Rose J. M., 2007. A latent class approach to modeling heterogeneous information processing strategies in SP studies. In: *Oslo Workshop on Valuation methods in transport planning. Oslo, 2-5 November*.
- IAEST, 2009. *Nivel, calidad y condiciones de vida. Evolución de la distribución de los hogares según la renta*. <http://www.aragon.es/DepartamentosOrganismosPublicos/Organismos/InstitutoAragonesEstadistica/AreasTematicas/EstadisticasSociales> [Access February 2012]
- IDESCAT, 2009. *Societat, qualitat i condicions de vida. Llars per trams d'ingressos nets anuals Catalonia*. <http://www.idescat.cat/territ> [Access February 2012]
- INSEE, 2009. *Chiffres clés sur un territoire*. <http://www.insee.fr/fr/bases-de-donnees/esl/resume.asp?codgeo=015andnivgeo=AU2010> [Access August 2010]
- Lusk J.L. and Schroeder T.C., 2004. Are choice experiments incentive compatible? A test with quality differentiated steaks. *American Journal of Agricultural Economics*, 86: 467-482.
- MAGRAMA, 2012. *ARCA: Datos censales ganadería*. <http://aplicaciones.magrama.es/arca-webapp> [Access June 2012]
- Mennecke B.E., Townsend A.M., Hayes D.J. and Lonergan S.M., 2007. A study of the factors that influence consumer attitudes towards beef products using the conjoint market analysis tool. *Journal of Animal Science*, 85: 2639-2659.
- Mesias F.J., Escribano M., De Ledesma A.R. and Pulido F., 2005. Consumers' preferences for beef in the Spanish region of Extremadura: a study using conjoint analysis. *Journal of the Science of Food and Agriculture*, 85: 2487-2494.
- Realini C.E., Kallas Z., Pérez-Juan M., Gómez J.L., Olleta J.L., Beriain M.J., Alberti P. and Sañudo C., 2014. Relative importance of cues underlying Spanish consumers' beef choice and segmentation, and consumer liking of beef enriched with n'3 and CLA fatty acids. *Food Quality and Preference*, 33: 74-85.
- Resano H., Sanjuán A.I., Albisu L.M., 2010. Combining stated and revealed preferences on typical food products: The case of dry-cured ham in Spain. *Journal of Agricultural Economics*, 61(3): 480-498.
- Resano H., Sanjuán A.I., Albisu L.M., 2012. Consumers' response to the EU Quality policy allowing for heterogeneous preferences. *Food Policy*, 37: 355-365.
- Roosen J., Lusk J.L. and Fox J.A., 2003. Consumers demand for and attitudes toward alternative beef labelling strategies in France, Germany and the UK. *Agribusiness: An International Journal*, 19(1): 77-90.
- Sans P., de Fontguyon G. and Giraud G., 2008. Value-based labels for fresh beef: an overview of French consumer behaviour in a BSE crises context. *International Journal of Consumer Studies*, 32: 407-413.
- Santini F., Guri F. and Gomez y Paloma S., 2013. *Labelling of agricultural and food products of mountain farming*. European Commission, Joint Research Centre, Institute for Prospective Technological Studies. Report EUR 25768.
- Scarpa R., Gilbride T.J., Campbell D. and Hensher D.A., 2009. Modelling attribute non-attendance in choice experiments for rural landscape valuation. *European Review of Agricultural Economics*, 36(2): 151-174.
- Scarpa R., Zanoli R., Brushchi V. and Naspetti S., 2012. Inferred and stated attribute non-attendance in food choice experiments. *American Journal of Agricultural Economics*, 95(1): 165-180.
- Schjøll A., Amilien V., Revoredo-Giha C., Leat P., Kupiec B. and Lamprinopoulou C., 2010. Promotion of mountain food: An explorative study about consumers' and retailers' perception in six European countries. *9th European IFSA Symposium, Vienna*, pp. 1558-1567.
- Scozzafava G., Casini L. and Contini C., 2014. Analysis of Italian consumer preferences for beef. *New Medit*, 13(11): 66-72.
- Sepúlveda W., Maza M.T. and Mantecón A.R., 2008. Factors that affect and motivate the purchase of quality-labelled beef in Spain. *Meat Science*, 80: 1282-1289.
- Tebby C., Giraud G. and Amblard C., 2010. Determinants of interest in mountain food products: A European cross-country study. *9th European IFSA Symposium. 2010. Vienna (Austria)*, pp. 1568-1578.
- Van der Lans O.A., Van Ittersum K., De Cicco A. and Loseby M. (2001). The role of the region of origin and EU certificates of origin in consumer evaluation of food products. *European Review of Agricultural Economics*, 28: 451-477.
- Van Ittersum K., Meulenberg M.T.G., van Trijp H.C.M. and Candel M.J.J.M., 2007. Consumers' appreciation of regional certification labels: a pan-European study. *Journal of Agricultural Economics*, 58: 1-23.