

Are quality regulations displacing PDOs? A choice experiment study on Iberian meat products in Spain

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ABSTRACT

The publication of the Spanish Quality Standards legislation regulating meat products from Iberian pigs has meant the obligatory certification of the system of production, feed, and breed in the Iberian pig sector. The Standard is designed to ensure the quality of the final product, avoiding the frauds that may have occurred previously taking advantage of the heterogeneity of the product. Traditionally, the Protected Designation of Origin labels offered the consumer guarantee and security, but this role has largely been taken over by the Quality Standards. In this context, there is a need to study consumers' knowledge and valuation of these two quality indicators. It has been observed that, although PDOs are better known than the Quality Standards, consumers are willing to pay only a small premium for Iberian products with a PDO. Hence, PDOs need to be reoriented so as to provide added value to the product.

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Introduction

The Iberian pig sector is of great economic importance in agricultural production in Extremadura (SW Spain), as well as being a referent for the end consumers' perception of the concept of 'quality'. There are a number of factors within the Iberian pig sector that influence the characterisation of the final quality of its products: genetics (pure Iberian, Iberian crossed with other breeds, etc.), age and weight at slaughter, different livestock farming systems (extensive, or with various levels of intensification), the physical exercise done by the animal, the process of elaboration, and especially the feed (acorn and/or feedingstuff), etc. These characteristics generate great variability in the final Iberian meat products. This, together with the different Protected Designations of Origin (PDOs) in the market, the many producing industries, and the successive Quality Standards (the present one, of 2014, is the third, following those of 2001 and 2007), has resulted in a huge variety of commercial types and names.

Consumers thus naturally find it difficult to identify the different types, and may even make them wary of certain products with the name 'Iberian'. In this context, different studies have shown that consumers neither know nor distinguish between the different cured

Iberian pig meats that are on the market, and are therefore in many cases unwilling to pay the higher price resulting from the more demanding and higher quality production systems (Espejel et al. 2007; Resano et al. 2007; Mesías et al. 2009).

The publication of the Law 4/2014 (Spanish Official Bulletin 01/11/2014), approving the Quality Standard for Iberian pig meat, ham, shoulder, and cured loin, was aimed at correcting this complex market situation. This mandatory regulation sets out the conditions of production and labelling of Iberian products in order to improve the information given to consumers, and to reinforce the systems of traceability and control.

Producing industries intending to use the term 'Iberian' in their products must adhere to the Quality Standard and take special care with factors such as the characteristics of the raw materials, the process of elaboration, and the marketing strategies. All this leads to an increase in production costs that the producers sometimes do not recover in the selling price.

Iberian products marketed under a PDO which want to use the marketing denominations established in the Quality Standard must comply with its provisions. Thus, in some cases, PDO's regulations will have to be amended. Table 1 presents a comparative analysis of

Table 1. Development of the Iberian Quality Standard by the PDOs.

Product differentiators	Quality standard requirements	Protected designations of origin
Feed	<ul style="list-style-type: none"> Allows different types of feed depending on the product: acorn, pasture, and feedingstuff Acorn ('bellota'). Pigs are bred extensively and nourished in 'montanera', i.e. in a traditional method in which animals are free to roam in the dehesa countryside and have mainly eaten acorns and pasture Mixed pasture & feedingstuff ('cebo de campo'). Pigs are bred extensively but mainly fed with feedingstuff, although they also eat some pasture Feedingstuff ('cebo'). Pigs bred intensively and fed on a grain-based diet 	<ul style="list-style-type: none"> PDOs do not allow pigs fed on feedingstuff
Breed	<ul style="list-style-type: none"> 100%, 75%, and 50% Iberian pigs 	<ul style="list-style-type: none"> PDOs only allow 100% or 75% Iberian pigs
Production system	<ul style="list-style-type: none"> Extensive systems Intensive systems 	<ul style="list-style-type: none"> Only extensive systems
Type of product and labelling	<ul style="list-style-type: none"> Black Label: Fed on acorns and 100% Iberian breed Red Label: Fed on acorns Green Label: Fed on a mixture of pasture & feedingstuff White Label: Fed on feedingstuff 	<ul style="list-style-type: none"> All PDOs Currently included in the PDOs^a (DE, HU, and GUI) with 75% Iberian breed. PE PDO maintains its red label for the no longer used term 'recebo' All the PDOs with 75% or 100% Iberian breed Not included as a product Some PDOs add specific denominations or names to the labelling HU PDO markets SUMMUN, EXCELLENS, and SELECTION hams associated with the Quality Standard's labels black, red, and green, respectively
Labelling specifications		<ul style="list-style-type: none"> External certification and/or the PDO's certification
Quality control	<ul style="list-style-type: none"> External certification 	

^aSpanish PDOs for Iberian meat products: DE (Dehesa de Extremadura), HU (Jamón de Huelva), GUI (Jamón de Guijuelo), PE (Los Pedroches).

the Quality Standard and the situation of the different Iberian meat products PDOs.

Within this context, the objective of this paper is to study the knowledge that consumers have about the Quality Standard and the PDOs of Iberian products, analysing in particular whether they are willing to pay a premium for the PDO seal or instead are satisfied with only the regulatory labelling and controls set by the Quality Standard.

Materials and methods

Data collection

The study was conducted in the Region of Extremadura (SW Spain) from November 2014 to January 2015 through an online survey (www.docs.google.com). The form included some questions about consumers' knowledge regarding Quality Standard and PDOs, together with a choice experiment task. Participants were recruited via e-mail, using research databases created from previous consumer studies. The design of the sample was a random stratified sampling weighted in proportion to the population's sex and age in Extremadura with a total of 250 valid completed questionnaires being obtained. Table 2 shows the socio-demographic characteristics of the final

Table 2. Socio-demographic characteristics of the final sample compared with those of the population of Extremadura (%).

Variable	Extremadura ^a	Sample
Sex		
Man	49.76	49.2
Woman	50.24	50.8
Age		
18–35 years	30.4	31.2
36–50 years	28.8	30.8
>50 years	40.7	38

^aSpanish Statistical Institute (2015).

sample compared with those of the population of Extremadura.

Choice experiment

The method chosen was a 'choice experiment', a useful instrument to estimate the effect of different attributes that shape consumer's preference structure. It has been widely used in the meat sector, with research studies relating to beef (Baba et al. 2016), pork (Morkbak et al. 2011), and lamb (Gracia & de-Magistris 2013).

Choice experiment is based on the idea that goods or services can be described by the attributes of which they are comprised (Lancaster 1991), and that

consumers make purchasing decisions based on those attributes. In a choice experiment, the data are acquired through a questionnaire in which the respondents are asked to choose from a set of options that present the product being assessed in different configurations. The selection of the levels and attributes that will define the product is a critical stage, as it must reflect the product's characteristics and dimensions which are most important to the consumer in the process of decision making (Chrea et al. 2011). In this case, from all the Iberian pig products we chose dry-cured ham because, besides this being a widely consumed product, it is found in most local supermarkets.

The attributes and levels used in the present study were selected after a revision of previous studies on consumer preferences for Iberian products (Resano et al. 2007; Mesías et al. 2009). The final attributes included in the study and their corresponding levels are the following:

Type of feed: Acorn; Mixed pasture & feedingstuff;
Feedingstuff
% Iberian breed: 100%; 75%; 50%
PDO: With; Without
Price; 20.00 €/kg; 35.00 €/kg; 50.00 €/kg

Once the attributes and levels were selected, they were combined to create hypothetical products that were presented to the consumers as a 'choice set'. Each choice set was composed of two hypothetical dry-cured hams and a third option representing the no-choice option. The respondents were posed the following purchasing situation: 'Suppose you are buying an Iberian dry-cured ham at a supermarket/shop and you have to choose between two hams from pigs with different levels of breed purity, different types of feed, produced or not under a PDO, and with different prices'. The consumer then had to choose the option that seemed best from three alternatives. Each consumer was presented with nine choice sets.

Data analysis

A conditional logit model was carried out using the *clogit* module of R statistical package version 3.1.2., following the guidelines described by Aizaki and Nishimura (2008). Although conditional logit has some constraints – mainly it does not account for heterogeneity of preferences – it is a technique widely used for exploratory purposes in consumer research (Chen et al. 2013; Mauracher et al. 2013; Eldsouky et al. 2016).

Baseline reference levels were set for each of the attributes in order to estimate the level of marginal

Table 3. Results of the Choice experiment.

Variable	Coefficient	Standard error	p-value
Acorn	2.0155	0.09912	0.0e+00***
Mixture of pasture and feedingstuff	0.7138	0.10137	1.9e-12***
100% Iberian breed	0.5364	0.09333	9.1e-09***
75% Iberian breed	0.0432	0.13494	7.5e-01 (n.s.)
Designation of Origin	0.2763	0.07412	1.9e-04***
Price	-0.0605	0.00326	0.0e+00***

*** $p < .01$; ** $p < .05$; * $p < .1$; n.s.: not significant.

utility that the consumer receives in passing from one level to another. For the 'Type of Feed' attribute, the reference level was 'Feedingstuff', for the '% Iberian Breed' attribute it was '50% Iberian', and for the 'PDO' attribute it was set to 'Without PDO'.

Results and discussion

The level of the respondents' knowledge of PDOs was higher (40% showed high knowledge, and 31.4% medium) than that of the Quality Standard (11.9% and 75%, respectively). No significant differences were detected in terms of socio-demographic variables. There was noticeable confusion among the consumers in identifying the different PDOs, since sometimes they could not differentiate between brand names, dry-cured ham production zones, and the PDOs themselves.

A high percentage of consumers stated they valued a PDO positively (93.6%) and were willing to pay a premium for this characteristic (89%). It must be clarified, however, that in this high percentage the proportion of consumers willing to pay more than 10% for the PDO was 56.7%, and only 8.9% were willing to pay a premium of more than 20%. These values can be compared with the results of the choice experiment which are given in Table 3.

From the results given in Table 3, one can see that all the attributes except Price have a positive impact with respect to their reference levels on the utility of the respondents. For example, the results for the attribute 'Type of Feed' indicate that consumers get more utility by choosing the extensively raised Iberian pigs (mainly those fed on acorns and also those fed on a mixture of pasture and feedingstuff). The case is similar for '% Iberian breed', an attribute in which only the 100% Iberian level has a positive impact on the respondents' preferences, since 75% Iberian is not significant, i.e. does not influence the purchasing decision.

It is especially relevant to determine the willingness to pay (WTP) for an attribute. The WTP should be understood in the present context as the difference in Euros between what the consumer is willing to pay for

a particular level in comparison with the baseline reference level. The WTP was calculated by dividing the parameter (coefficient) of the attribute concerned by the parameter of the price with its sign reversed.

It was found that the respondents would be willing to pay an additional 33.31 €/kg for an Iberian dry-cured ham from an acorn-fed pigs compared with the baseline. The WTP for dry-cured ham from pigs fed on a mixture of pasture and feedingstuff would be an additional 11.80 €/kg compared to the intensive feedingstuff-fed Iberian ham. The difference in WTP between the acorn ham and that from pigs fed on pasture and feedingstuff gives the value for the consumer of the 'gap' between both levels, in this case, 21.51 €/kg.

Regarding the '% Iberian breed', the premium for 100% Iberian when compared to the baseline reference level (50% Iberian) is 8.87 €/kg, a figure that drops to only 0.71 €/kg premium for 75% Iberian. Finally, with respect to the PDO, the WTP was only 4.57 €/kg, reflecting the low added value of this attribute for the consumer.

As it has been shown, the fact that the dry-cured ham is protected by a PDO has a positive effect, since it would increase the likelihood of that product being chosen. However, this attribute is relatively less important than the 'Type of Feed' and the '% Iberian breed' attributes which are not dependent on the PDO but which are set by the Quality Standard. This low appreciation of the PDO is a problem reflected in other studies (Mesías et al. 2009, 2010). It appears when the consumer – who has declared a positive valuation of the PDO guarantee – comes to face the challenge of paying more for the product. Usually the consumer accepts some price premium which nevertheless is often insufficient to cover the additional costs for the producer in complying with the even more stringent standards set by the PDOs.

Within the PDO, producers are subject to additional fees, to more field controls, and to increased bureaucracy. If they understand that the extra margin they will receive through pricing when they produce under a PDO does not outweigh this additional cost and effort, the future of the PDOs in the sector of Iberian meat products may be seriously compromised.

The negative effect of Price implies that, as the price of Iberian dry-cured ham decreases, the utility for the consumer increases. This result is consistent with normal demand behaviour, and is a habitual finding in studies on food preferences (Mesías et al. 2011; Koutsimanis et al. 2012; Gadioli et al. 2013).

The figures for WTP regarding the levels of '% Iberian breed' – which is close to zero for the level

75% Iberian – could indicate that consumers do not distinguish between the different levels of cross-breeding once the animal is not 100% Iberian. It is also coherent with the lack of significance of this 75% Iberian level. This could be a reason to consider new production ideas since, until now, the 75% Iberian pigs have had a notable presence in the dehesa (holm-oak woodland) pig-farming systems, with this being one of the strong points in the breed structure contemplated by all the PDOs, since none of them allow 50% Iberian crosses.

Conclusions

Despite the nature of the study and the limited size of the sample, this study shows that the attributes most valued by consumers of Iberian meat products are those traditionally guaranteed by the PDOs – type of feed and breed purity. Nevertheless, these two aspects are currently regulated by the compulsory Quality Standard of Iberian meat products, thus taking importance away from the PDOs.

Although the Quality Standard is less known and understood than the PDOs, it is to be expected that, as familiarity with this mandatory standard grows, its valuation will be increasing at the expense of the PDOs. The future of these traditional quality schemes seems complicated unless they can provide some additional benefit to consumers, as they had done for many years when the absence of any national legislative standard made the PDOs the sole guarantors of the quality of the Iberian meat products.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

References

- Aizaki H, Nishimura K. 2008. Design and analysis of choice experiments using R: a brief introduction. *Agr Inform Res*. 17:86–94.
- Baba Y, Kallas Z, Costa-Font M, Gil JM, Realini CE. 2016. Impact of hedonic evaluation on consumers' preferences for beef attributes including its enrichment with n-3 and CLA fatty acids. *Meat Sci*. 111:9–17.
- Chen Q, Andres S, An H. 2013. Measuring consumer resistance to a new food technology: a choice experiment in meat packaging. *Food Qual Prefer*. 28:419–428.
- Chrea C, Melo L, Evans G, Forde C, Delahunty C, Cox DN. 2011. An investigation using three approaches to understand the influence of extrinsic product cues on consumer behavior: an example of Australian wines. *J Sens Stud*. 26:13–24.

- Eldesouky A, Mesías FJ, Elghannam A, Gaspar P, Escibano M. 2016. Are packaging and presentation format key attributes for cheese consumers? *Int Dairy J.* 61:245–249.
- Espejel J, Fandos C, Flavián C. 2007. Spanish air-cured ham with protected designation of origin (PDO) a study of intrinsic and extrinsic attributes influence on consumer satisfaction and loyalty. *J Int Food Agribus Market.* 19:5–30.
- Gadioli IL, Pineli LLO, Rodrigues JDSQ, Campos AB, Gerolim IQ, Chiarello MD. 2013. Evaluation of packing attributes of orange juice on consumers' intention to purchase by conjoint analysis and consumer attitudes expectation. *J Sens Stud.* 28:57–65.
- Gracia A, de-Magistris T. 2013. Preferences for lamb meat: a choice experiment for Spanish consumers. *Meat Sci.* 95:396–402.
- Koutsimanis G, Getter K, Behe B, Harte J, Almenar E. 2012. Influences of packaging attributes on consumer purchase decisions for fresh produce. *Appetite.* 59:270–280.
- Lancaster K. 1991. *Modern consumer theory.* Cheltenham: Edward Elgar Publishing.
- Mauracher C, Tempesta T, Vecchiato D. 2013. Consumer preferences regarding the introduction of new organic products. The case of the Mediterranean sea bass (*Dicentrarchus labrax*) in Italy. *Appetite.* 63:84–91.
- Mesías FJ, Martínez -Carrasco F, Martínez JM, Gaspar P. 2011. Functional and organic eggs as an alternative to conventional production: a conjoint analysis of consumers' preferences. *J Sci Food Agric.* 91:532–538.
- Mesías FJ, Gaspar P, Pulido AF, Escibano M, Pulido F. 2009. Consumers' preferences for Iberian dry-cured ham and the influence of mast feeding: an application of conjoint analysis in Spain. *Meat Sci.* 83:684–690.
- Mesías FJ, Gaspar P, Escibano M, Pulido F. 2010. The role of protected designation of origin in consumer preference for Iberian dry-cured ham in Spain. *Ital J Food Sci.* 4:367–376.
- Morkbak MR, Christensen T, Gyrd-Hansen D. 2011. Consumers' willingness to pay for safer meat depends on the risk reduction methods – A Danish case study on Salmonella risk in minced pork. *Food Control.* 22:445–451.
- Resano H, Sanjuán AI, Albisu LM. 2007. Consumers' acceptability of cured ham in Spain and the influence of information. *Food Qual Prefer.* 18:1064–1076.
- Spanish Statistical Institute [Internet]. 2015. INEbase 2011 Population and Housing Census. [updated 2015 Oct 1; cited 2015 Nov 1] Available from: http://www.ine.es/en/inebmenu/mnu_cifraspob_en.htm.