



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



How Much Do Consumers Value PDO Certifications? Estimates of WTP for PDO Dry-Cured Ham in Italy

Christian Garavaglia^{1,2}, Paolo Mariani²

¹ University of Milano-Bicocca, Italy

² CRIOS-Bocconi University

Paper prepared for the 145th EAAE Seminar “Intellectual Property Rights for Geographical Indications: What is at Stake in the TTIP?”

April 14-15, 2015

Parma, Italy



Copyright 2015 by Garavaglia and Mariani. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

How Much do Consumers Value PDO Certifications? Estimates of WTP for PDO Dry-Cured Ham in Italy

Christian Garavaglia ^{a,b} and Paolo Mariani ^a

^a *University of Milano-Bicocca, DEMS, Italy*

^b *CRIOS, Bocconi University, Italy*

Abstract

This study investigates consumers' preferences and WTP for PDO certifications. First, the paper proposes the use of a new index in food studies to measure WTP. We focus on dry-cured ham in Italy. Our results add a geographical dimension to studies of consumer preferences by providing evidence of the existence of differences based on place of residence. Consumers who live in the same area where certified ham is produced are willing to pay a lower premium price than consumers living farther away are willing to pay: the closer consumers live to the area of production of the certified product, the less they refer to extrinsic certification cues.

1. Introduction

In food purchasing behaviours, consumers are guided by both their perceptions regarding the intrinsic properties of products and by products' extrinsic characteristics. Intrinsic properties, such as quality, safety, nutritional and functional attributes, respect for environmental standards, and authenticity, cannot be directly perceived by consumers and present the typical traits of experience and credence goods (Grunert, 2005; Rangnekar, 2004). Given that perfect information about products' quality and safety is hardly available in food markets, the classic market failures related to asymmetric information conditions are likely to emerge (Akerlof, 1970). Therefore, consumers' evaluations and purchase decisions need to refer to some cues. Many studies emphasize how brands, logos and images are among the most influential aspects of products in driving consumers' purchasing decisions. Trademarks are also key instruments that support such information (Menapace and Moschini, 2012). In particular, in the agri-food market, information about geographical origin seems to be increasingly associating quality with food products.

Many papers in the literature show how product origin and safety attributes are considered the most interesting for consumers of food products (Baker and Mazzocco, 2005; Veale and Quester, 2009a, 2009b; Bruwer and Johnson 2010; Banterle et al., 2012). These results have been confirmed with regard to various goods: cheese (Bernab u et al., 2010), strawberries (Darby et al., 2008), beer (Lentz et al., 2006), fresh meat (Loureiro and McCluskey, 2000), jam (Hu et al., 2012), wine (Orth et al., 2005), olive oil (Menapace et al., 2011), wheat (Barlin et al., 2009), animal products (Carpio and Isengildina-Massa, 2009). Specifically, in the agri-food market, certifications of geographical origin have gradually diffused as indicators and surrogates of those intrinsic attributes of food products. They are related to quality, safety, authenticity, and sustainability, reassuring consumers about their purchase decisions and providing them with a positive utility (Kim, 2008; M orkbak, et al., 2010; Menapace et al., 2011; Visser et al., 2013). There is also evidence that the presence of these certifications may influence the direct sensory perception of consumers (Leclerc et al., 1994).

The European Union has created, as protection tools, certifications that guarantee the quality of products based on their link with a particular territory. These certifications are, essentially, public indications intended to provide consumers with information on the authenticity, origin, and safety of the products in question. Among the certifications, protected designation of origin (henceforth PDO) and protected geographical indication (henceforth PGI) labels were established by EEC Regulation 2081/92 (recently replaced by EC Reg. 510/2006) and progressively distributed throughout countries. The issue of safety, authenticity and traditions in food production is of

particular interest for the upcoming world trade fair, Expo 2015, to be hosted in Milan, which will focus on themes about “Feeding the Planet, Energy for Life”. Policies and tools such as PDO certifications, which are able to strengthen the image of countries as deliverers of quality food production, are of current interest and debate.

Our paper aims at contributing to the studies regarding certifications of geographical origin such as PDO. Both the impact of PDO certifications on consumers’ preferences and the related willingness to pay (WTP) a premium price for having a PDO product have already been analysed in the economic literature. However, the heterogeneity among these studies is vast; different methodologies have been implemented, many different products have been analysed, and the studies have been conducted in different countries. The results of the studies are also heterogeneous. Among others, Scarpa et al. (2005) show that the extrinsic attribute of geographical origin is influential in consumer evaluations, but the extent of its importance varies by product and consumers. The authors find consumers preference heterogeneity in an unobserved form, with a mixed logit modelling, and suggest to explore less conventional socioeconomic variables, like place or residence, to better capture taste variation.

The original contribution of our paper is twofold. First, we propose the use of a new index in food studies to measure the monetary value of PDO certifications. Second, we provide evidence of preference heterogeneity within consumers with respect to PDO certifications (and WTP for PDO certifications) based on place of residence. These are relevant issues from firms’ point of view; to respect the stringent requirements and restrictions to obtain PDO certifications, producers incur additional production costs when compared with non-PDO producers (Arfini et al., 2006; Scardera and Viganò, 2008; Bouamra-Mechemache and Chaaban, 2010).¹ In fact, the strict rules of production involve extra costs for manufacturers because of both the selected raw materials to be used and additional controls on the production process. Therefore, when deciding to adhere to Consortia which produce certified products, producers need to evaluate the pros and cons of possible membership by estimating, on the one hand, the additional costs they will incur and, on the other hand, the premium price which may be earned. Higher prices are charged for PDO products to recover these higher costs of production; producers’ strategy to obtain the PDO certification is justified only if consumers confer a higher value on PDO products and consequently have a higher WTP for those products. In addition, producers should evaluate the extent of the geographic impact of the certification of the certified product; PDO certification is worth more, the more well-known

¹PDO-cured ham is not an exception, as pointed out by Garcia Collado et al. (2006) for the case of the Spanish ham Dehesa de Extremadura.

and successful the certification is outside the area of production. This opens up a wider range of profit opportunities. In this paper, we assess both of these important aspects. We also go beyond the existing literature by providing monetary estimates of consumers WTP for PDO certifications through a new index in food studies and, primarily, by quantifying the spatial differences of WTP among consumers to assess the benefits that these certifications bring to producers inside as well as outside the geographic area of production.²

In particular, our contribution is intended to explore these aspects by providing a study on how the Italian Parma dry-cured ham and its characteristics are differently perceived and valued by consumers living in the typical place of production in Italy (Parma) and elsewhere. Our findings show that consumers from different regions display different evaluations of PDO labels, according to the distance between the origin of the product and the location of the consumer. This result suggests interesting marketing strategies for firms producing PDO products.

The methodology we use is conjoint analysis (henceforth, CA). CA has been a widely used technique for investigating consumer choice behaviour in commercial studies for many years (Green and Srinivasan 1978, 1990; Cattin and Wittink 1982, Green and Krieger 1991). Some authors claim that this method has indisputable merits; it can be used in situations where changes are multi-dimensional and links between them are important; also, respondents are not asked to determine explicitly their willingness to pay. The results generated by conjoint analysis are considered more realistic than are those sourced from methods where consumers are directly asked for their WTP, such as contingent valuation (Henson, 1996; Walley et al., 1999; Krystallis and Chryssohoidis, 2005).

For these reasons, CA has been extensively used in economics and marketing to study consumer preferences. Kohli and Mahajan (1991) published the first article explicitly focusing on WTP estimation within a conjoint analytical framework. However, to the best of our knowledge, only few papers used the CA methodology to estimate consumer WTP (Padilla et al., 2007; Darby et al., 2008). In this paper, we propose a measure to value WTP using CA.

The paper is structured as follows. Section 2 discusses the relevant literature; section 3 presents the researched product; section 4 presents the methodological approach. Empirical results are discussed in section 5. Section 6 presents the conclusions.

²An interesting further development of this research should be to extend the analysis to foreign cities. In the context of global markets, where there are interesting export opportunities for food products, understanding the potential of attraction that a designation of origin has against consumers who do not belong to the reference zone, is crucial.

2. Background Literature

Today's consumers are increasingly aware, demanding, and sensitive to food safety, quality and authenticity. Among the various communication strategies and signals, labelling plays a key role. In particular, labels related to certifications of geographical origin, such as PDO, have received increased consideration in recent years. Serving as a guarantee of food safety, quality and environmental respect, certifications of geographical origin provide consumers with positive utility. PDO labels were established by EEC Regulation 2081/92 (recently replaced by EC Reg. 510/2006) and progressively distributed throughout countries. Italy has 259 PDO and PGI products to date end 2013, followed by France and Spain (Table 1). These products generate increasing revenues for the producers, thus representing a key resource for national economies.

Insert Table 1 here

Several studies in the economic literature specifically focus on the effects of PDO certifications on consumers' preferences. While a few papers do not support the idea that consumers confer a quality signal on PDO certifications (Bonnet and Simioni, 2001; Bello Acebron and Calvo Dopico, 2000), most studies provide evidence about the positive effect of PDO certification on consumers' utility. Monjardin de Souza Monteiro and Ventura Lucas (2001), among others, investigate the impact of PDO certification on consumer preferences for traditional cheeses in Lisbon and find that 56% of the respondents judge "recognition as PDO" as the most important of a series of product attributes. An experimental study by Cavicchi et al. (2010) shows that consumers value "Pecorino di Fossa" cheese more highly if it carries a visible PDO label; the same cheese presented exclusively with the corporate brand is rated less highly. Loureiro and McCluskey (2000) find that geographical identification labelling, like PGI, is a powerful tool to signal quality in combination with other signals of quality for meat products: in particular they show that PGI labels play an important role for high quality products except for either quality extremes, low-end meat products and high-end products and high quality cuts, where other factors play a stronger role. Moschini et al. (2008) present a model showing that certification at the local level allows vertical differentiation of food products; consumers equate certification with high quality and realize that certification has costs (including the cost of control). Aware that these costs are sustained precisely to guarantee the higher quality of the products, they are willing to pay a premium price for the presence of certifications.

In line with these results, some attempts to estimate consumers' WTP for PDO certifications in food products have been made. Fotopoulos and Krystallis (2003) study PDO Zagora apples in the Greek market and show how PDO certification gives consumers a higher utility, thus leading to a higher WTP. Another study, on olive oil, deepens the discussion, showing that products with geographical indication are valued more than products without it and, among geographical indications, consumers' evaluation of PDO status is greater than of the PGI label (Menapace et al., 2011). In a recent paper, Bazoche et al. (2014) study if consumers in four different European countries are willing to pay a premium price for pesticide reduction in apples; in particular, they investigate how different systems of certification existing on the market may affect consumer WTP. From among the results, we highlight that consumer WTP for PDO certification is among the highest, almost equal to that for organic certification and greater than WTP for information about the inclusion of GAP rules ("Good Agricultural Practices"). This result confirms consumers' trust and familiarity, and preference, for the information conveyed by the PDO certification label. Another interesting paper that investigates the value of denominations with regard to the concept of *terroir* is proposed by Cross et al. (2011); analysing vineyard sales in Oregon, the authors find that the value (i.e., price) of a wine is determined by its designated appellation rather than the real attributes of *terroir* (i.e., slope, aspect, elevation, soil types).

However, WTP estimates differ across the literature, as noted by Deselnicu et al. (2013) on consumer WTP for geographical indication (GI) labels in food products, Cicia and Colantuoni (2010) on consumer WTP for meat traceability, Lusk et al. (2005) on consumer WTP for GM food, and Lagerkvist and Hess (2011) on consumer WTP for animal welfare. In particular, Deselnicu et al. (2013) present a meta-analysis in which they study how the specific product and market characteristics or policy institutions influence the premium price that consumers are willing to pay for GI labels. Interestingly, their results show that product categories significantly influence the variation in WTP, minimally processed foods being those that benefit most from GI labels; fully branded products have a lower GI premium price than do GI products with no private labels. PDO certifications lead to higher premiums than a less-stringent certification such as PGI in Europe.

One less-explored but still important reason that may explain these differences is related to the geographical location of consumers involved in the investigation (Resano-Ezcaray et al., 2010). With the exception of few studies, there has been little investigation of regional differences in consumer preferences and WTP for certifications of origin. Van der Lans et al. (2001) study the preferences of Italian consumers with regard to extra virgin olive oil. They find that product origin and PDO certification can affect consumer choices both directly and indirectly, in the first case

through appreciation of these attributes *per se*, and in the second through perception of them as indicators of quality and thus as surrogates for other information. With regard to the direct effect, an interesting phenomenon is highlighted: consumers living in the region where the oil is produced are found to be more sensitive to the origin of the product than are consumers from other regions. Following a different approach, Gil and Sanchez (1997) analyse consumer preferences for wines produced in a region, disentangling consumers living in and consumers living outside that region. The objective of this paper is to understand the relative importance of geographical origin in the structure of consumer preferences living in the region of production of the certified product compared with consumers who do not live in the same region of production. The markets under study are in Spain: Navarra, where the D.O.Ca. (Denominación de Origen Calificada-qualified designation of origin) certified Rioja wine is locally produced, and the Aragona market, where there are deeply rooted wine grape varieties other than Rioja. In both cases, consumers display a strong preference for the local wine; in Navarra, consumers display a significant preference for Rioja wine and are willing to pay a price premium for it, whereas the opposite happens in Aragona, where consumers favour local production. In another paper, Mesias et al. (2005) analyse through conjoint analysis the attributes that define the beef-purchasing preferences of consumers in Spain, disentangling the relative importance of each of the relevant attributes in the purchasing process. They find that the highest utility for consumers came from beef from their own region, showing that consumers are supposed to favour beef from their own region. In contrast with this conclusion is the paper by Hu et al. (2012), which analyses the blackberry jam products in Ohio and Kentucky in the United States. The paper's results support the idea that consumers are willing to pay more for having a local indication of production, but do not find evidence of consumers' valuing more products of their own region rather than products from another region in the same state or products with no production location information at all.

These interesting results deserve deeper research. Our research directly relates to these topics, proposing a measure of the value of geographical certifications by estimating consumer WTP for dry-cured ham in Italy.

3. The Researched Product: Dry-Cured Ham

Hams come from the rear haunches of the pig. To produce dry-cured hams, manufacturers follow a basic procedure in two steps: curing and drying. The curing process involves covering the leg in salt and gradually pressing to facilitate humidity loss and salt penetration. Afterwards, the legs hang for a time in refrigerated, humidity-controlled rooms. The hams are then washed and brushed to remove

excess salt, then hung in drying rooms for few days. Then, the legs are hung in ventilated rooms to allow a gradual drying process of the hams. Finally, they are transferred to and hung in cellars until the drying is completed.³

The curing and drying processes are crucial for the development of the hams distinctive flavour. The duration of this process differs according to the type of ham. For example, the curing of Serrano ham involves 9-12 months (Sentandreu and Toldrá, 2001); at least 13 months are required for the San Daniele ham;⁴ the Parma ham needs a minimum of 12 months; and some legs may be cured up to 3 years.⁵

The taste and flavour of dry-cured hams significantly vary across nations and inside a nation across areas of production. Italy is among the most well-known areas of production in the world. In Italy, PDO dry-cured ham producers coexist with other non-PDO producers. The best-known hams are those produced in geographical areas in which the selection of raw materials, the refinement of processing technique and a conducive climate for foraging make the difference in giving flavour and taste to hams. The most famous PDO hams in Italy come from Parma, San Daniele, Berico Euganeo, Modena, Carpegna, and Tuscany; the Norcia ham is a PGI product.

In the following, we focus our attention on the PDO Parma dry-cured ham. Italian national Law No. 506/1970 was the first to protect the designation of origin of Parma ham, which was later recognised as a PDO with EC Regulation No. 1107/1996. The organoleptic characteristics of the Parma ham are a mild and delicate flavour, slightly salty with a fragrant and distinctive aroma, and a colour, when sliced, which ranges uniformly from pink to red, marbled with white fat; the texture is silky and provides a tactile sensation of tenderness and balanced dissolvability. Special attention is given to all stages of production, starting from the breeding of pigs to the production process and the aging process, which must follow strict rules. The quality of the Parma hams starts from an accurate selection of the pigs, which must be specially bred Large White, Landrance and Duroc breeds, born and raised by authorized breeding farms located in 10 regions of central-northern Italy (*Consorzio del Prosciutto di Parma*). The pigs' diet is composed of a regulated mix of grains, cereals and whey from Parmigiano-Reggiano cheese production, which guarantees a heavy pig with a modest daily growth. Pigs must be at least nine months old and weigh no less than 140 kg at the

³The dry curing process is a very old technique for preserving meat. Before Romans, Celtic traditions used to employ salt to preserve the pork meat. Later, the Romans left an important document by Cato the Elder in 160 BC, who wrote about the use of salt for hams in his book *De AgriCultura* (Callow, 1947).

⁴Consorzio del Prosciutto di San Daniele, www.prosciuttosandaniele.it.

⁵Consorzio del Prosciutto di Parma, www.prosciuttodiparma.com.

time of slaughter. This makes a difference when compared with that use pigs born and raised abroad (usually in northern Europe) and slaughtered at 6 months of age at lower cost.

These strict processes of selection and control make the certified dry-cured ham a product of undisputable high quality. These stringent requirements impose additional costs of production on firms owing these labels compared with non-PDO producers (Bouamra-Mechemache and Chaaban, 2012).

Production of dry-cured ham is particularly important in the Italian meat products industry. Table 2 reports the production of cold cuts in 2012. The market share of dry-cured ham is the highest, in terms of both quantity and value. Export of dry-cured ham also registered interesting performances, accounting for 41.1% of the total export of cold cuts in Italy in 2012, valued at 571,844 mln Euro.

With regard to all PDO and PGI products in Italy in 2012, meat products are second in terms of sales, with a percentage of 37.3, following only cheese (Indagine Qualivita – Ismea 2013). In particular, PDO Parma dry-cured ham is the third-best product in terms of revenues among all PDO and PGI products in Italy in 2012, with a share of 14.6, and PDO San Daniele dry-cured ham is fourth with 4.7%, following only the best sellers Grana Padano PDO and PDO Parmigiano-Reggiano cheeses, with 26.6% and 19.6%, respectively. Among all PDO and PGI meat products, PDO Parma dry-cured ham is the undisputed leader, as shown in Table 3.

This brief analysis clearly shows the importance of dry-cured ham in Italian national consumption, and gives evidence of the particular popularity of our researched product, the Parma dry-cured ham.

Insert Table 2 here

Insert Table 3 here

4. The Model

CA is among the most used methods to analyse consumer choice. In this paper, we explicitly refer to goods as sets of characteristics that define the good, in a Lancasterian spirit (1966, 1971). Consumers derive utility from the properties of each single characteristic of the good. We use the conjoint ranking response format to exploit the additional information regarding respondent's preferences in a conjoint ranking survey. A part-worth utility linear function is assumed as the preference model, and part-worth utilities for each level of the various attributes are estimated by

using OLS multiple regression. Our main objective is to develop a coefficient based on part-worth utilities that can determine the monetary variation associated with any change in the combination of the attributes of a good with respect to the actual revenue generated by that good. We apply the proposed coefficient to the PDO dry-cured ham. We first hypothesize some changes in the status quo of the offered product; then, we determine hypothetical revenue variations by using the coefficient.

In particular, we focus on ranking scale and opt for a very general preference model used in traditional CA. In fact, we exploit the information contained in the ranking conjoint format by regressing individual responses on a piece-wise linear function of all the attribute levels that describe the good in question. Because conjoint data are collected on a nonmetric scale, a nonmetric estimation procedure such as MONANOVA would be more appropriate than OLS. However, as demonstrated in Carmone *et al.* (1978) and Cattin and Wittink (1982), OLS regression provides similar parameter estimates for both ranking and rating scales; therefore, it seems a reliable estimation procedure. The function is defined as follows:

$$U_k = \sum_{i=0}^n \beta_i x_{ik} \quad (1)$$

where x_0 is equal to 1 and n is the number of all levels of the attributes which define the combination of a given good. Each variable x_{ij} is a dichotomous variable that refers to a specific attribute level; it equals 1 if the corresponding attribute level is present in the combination of attributes that describes the alternative k ; otherwise, that variable is 0. As a result, the utility associated with alternative k (U_k) is obtained by summing the terms $\beta_i x_{ik}$ over all attribute levels, where β_i is the partial change in U_k for the presence of attribute level i , holding all other variables constant. We refer to this piece-wise linear function as a part-worth function model that gives a specific utility value for each level of the considered attributes, usually referred to as part-worth utility. Consequently, the number of parameters estimated by assuming the part-worth specification is greater than that required by alternative preference model specifications such as the vector model form and the ideal model.⁶

⁶ The vector model states that a single linear function relates preference to a given quantitative attribute and that it needs to estimate the smallest number of parameters. In the ideal point model, the number of estimated parameters is lower than the part-worth model but higher than the vector model (Green and Srinivasan, 1990).

4.1. Coefficient of Economic Valuation

Different models have been proposed in the literature to measure the economic value derived from the CA. The monetary value of the unit of utility has been calculated as the ratio of the difference between maximum and minimum price. Related utilities and quantification of the monetary value of the utility of a given attribute are obtained by multiplying the monetary value for the utility perceived by customers in combination with a better or worse level of attribute (Busacca, 2004). Measures of willingness to pay (WTP) follow a similar interpretation of the part-worth utilities and offer monetary values for various attributes (Hu et al., 2012). If the change in attribute increases welfare, an individual would pay more to have a change in attribute and *vice versa* (Darby et al., 2008). Following Louviere et al. (2000), these are calculated as the part-worth utility for the various attribute levels divided by the negative of the marginal utility of income. The marginal WTP was applied to estimate the attribute quality label certified (Padilla et al., 2007; van der Pol and Ryan, 1996).

To the best of our knowledge, few papers in the economic literature provide an index to estimate consumers WTP using CA. Louviere et al. (2000) estimate WTP as the part-worth utility for various attribute levels divided by the negative of the marginal utility of income: $\beta_{\text{attribute}}/\beta_{\text{price}}$. Gan and Luzar (1993) calculate WTP as the negative of the ratios of the coefficient on each attribute divided by the coefficient for total cost. Busacca (2004) estimates WTP by calculating the following ratio: the numerator is the difference between the maximum and minimum prices considered in the analysis, while the denominator is the difference between the maximum utility associated with the minimum price and the minimum utility associated with the maximum price. WTP is, then, given by this ratio multiplied by the difference of the utilities associated with the change in attribute level i : $[(p_{\max} - p_{\min})/U_{\max}(p_{\min}) - U_{\min}(p_{\max})] * \Delta U_i$.

In this paper, we propose an alternative procedure, as introduced by Mariani and Mussini (2013) for investigating cultural events. Having chosen the preference model (and the ranking scale), we proceed to develop a coefficient of economic evaluation for a hypothetical change that occurs in the combination of the attribute levels. We introduce the following notation:

- Let b be the current profile (hereafter, status quo) of the good or service;
- Let i (with $i = 1, \dots, n$) be the alternative profile, which differs from b for attribute level i ;
- Let U_b denote the sum of the part-worth utilities associated with the status quo of the good;
- Let U_i denote the sum of the utility scores associated with alternative profile i .

We calculate total utility variation by replacing one attribute level of status quo b with attribute level i , that is, when passing from status quo b to alternative profile i . M_i indicates the ratio that results from dividing the difference between the total utility of alternative i and the status quo by the total utility of the status quo; formally:

$$M_i = \frac{U_i - U_b}{U_b} \quad (2)$$

where U_b is assumed to be different from 0.⁷ The ratio in (2) indicates whether the status quo modification generates a loss or a gain in terms of total utility. It is evident that a zero value for M_i represents the indifferent situation between loss and gain in terms of total utility. However, the utility modification arising from an attribute-level modification can be considered more or less important by respondents. Consequently, such an attribute-level modification can have a more important economic impact than can a utility modification, which has a similar intensity but involves a less relevant attribute. As a solution, we propose to weigh M_i by the relative importance of the modified attribute.

The range of the utility values (from highest to lowest) for each attribute provides an indicator of how important the attribute is compared to the remaining attributes. Attributes with larger utility ranges play a more important role than those with smaller ranges. For any attribute j , the relative importance can be computed by dividing its utility range by the sum of all utility ranges as follows:

$$I_j = \frac{\max(W_j) - \min(W_j)}{\sum_{j=1}^J [\max(W_j) - \min(W_j)]}, \quad (3)$$

where J is the number of attributes and W_j is the set of part-worth utilities referred to the various levels of attribute j . Usually, importance values are represented as percentages and have the property of summing to one hundred. Otherwise, we can express these importance values in terms of decimal fractions whose sum is one. If this is the case, entering the importance of the modified attribute in equation (2), the coefficient formulation becomes the following:

$$MI_{ij} = M_i * I_j. \quad (4)$$

Because U_b can be negative, the general formulation of the coefficient is:

⁷Assuming $U_b = 0$ would be equivalent to saying that the utility score associated with the status quo is zero. Because this situation is unlikely, assuming $U_b \neq 0$ is a very weak constraint.

$$MI_{ij} = \begin{cases} \frac{U_i - U_b * I_j}{U_b} & U_b > 0 \\ \frac{U_b - U_i * I_j}{U_b} & U_b < 0 \end{cases} \quad (5)$$

We use formula (5) to estimate the variation of the total revenue generated by assuming a change in the status quo profile. Given the total revenue (R) associated with the status quo profile, the coefficient of economic evaluation is expressed as follows:

$$V_{ij} = M_{ij} * R \quad (6)$$

where V_{ij} denotes the amount of the revenue variation. Revenue variation in equation (6) is obtained by supposing that the monetary attribute referred to the product (price) varies in proportion to the change in total utility of that good. This assumption may seem restrictive. However, we argue that if the monetary amount asked of a consumer concerning a product reflects how that user values the combination of attributes of the good in terms of utility, it is credible to assess the economic value of a change in the combination of attributes as a function of the utility and importance of the modified attribute. In addition, we notice that CA serves the scope of approximating the real structure of preferences, given that only a partial knowledge of preferences can be known. We therefore suggest using the coefficient of economic evaluation as a monetary indicator that approximates the impact of a given utility change in monetary terms.

To test the applicability of our index in food economics, we consider some studies reported in the literature and use their results to compute WTP for the attributes related to brands and certifications. Table 4 shows that we obtain plausible values; the last column reports the percentage increase in price that consumers are willing to pay for the considered attributes. The increase ranges from 5% to 32%, with the exception of the paper by Fotopoulos and Krystallis (2003) about PDO Zagora apples.

Insert Table 4 here

5. Survey Design and Data Collection

In this study, we collected original data through face-to-face interviews of consumers in two cities in Italy, Parma and Monza. The locations have a similar population distribution regarding gender and age and are in line with the Italian population. We performed a judgmental sampling choice (Cicchitelli et al., 1992) by making a selection based on the cities, assuming that consumer behaviour changes from city to city.

The places of the interviews were two different shopping centres in Parma and Monza, within which there are two hypermarkets. The interviews were conducted in the area outside the cash registers. We covered almost all the time slots, from morning until late afternoon. Each interview lasted approximately twenty minutes. The sample size used in conjoint analysis may vary considerably. Cattin and Wittink (1982) state that sample sizes in commercial conjoint studies are generally between 100 and 1,000, with a typical range being between 300 and 550. In another study, Akaah and Korgaonkar (1988) argue that the most common samples are smaller (less than 100). In our survey, we interviewed 204 consumers; 15 were excluded because they declared they did not consume dry-cured ham. We finally obtained 189 interviews, 88 in Monza and 101 in Parma. The different dimension of the samples of the two cities is justified by the different sizes of the populations of Parma and Monza. Using the dichotomy question concerning product penetration, we have $\text{Alpha} = 5\%$ and $\text{Theta} = 5\%$ (Frosini et al., 1999). Participants were selected based on a convenience sample (gender and age). Table 5 shows the demographic characteristics of the sample.

Insert Table 5 here

To develop an ad hoc questionnaire for our research (Careri et al., 1993; Issanchou, 1996; Flores et al., 1997; Resano et al., 2007, 2009, 2010; Hersleth et al., 2011), we studied the disciplinary production of dry-cured ham of the most important Consortia (Parma and San Daniele). We also interviewed some industry experts and retailers to identify the important attributes of dry-cured ham. Among others, Morales et al. (2008) emphasize the importance of fat, smell, salty taste and aged flavour characteristics in dry-cured ham consumers' purchasing behaviours while, surprisingly, brand name and geographic origin are considered most frequently as "not important" or "slightly important".

We chose five attributes to use to construct the profiles of the product (Table 6): the presence of a PDO or PGI certification, taste, origin of producer, ageing and price. Each attribute has two levels, with the exception of price, which has three. In particular, the variable relating to the presence of a PDO (or PGI) certification is dichotomous, with two levels, "Yes" or "No". Additionally, the attribute taste is divided into "Sweet" and "Tasty" (which generally evokes a more salty taste); the producer may be generally "Italian" or "Local", with the explicit specification "Local: Province of Monza and Brianza" for those questionnaires administered in Monza, and "Local: Province of Parma" when administered in Parma. The ageing attribute was given two

levels: “12 months” or “16 months”. We defined the price variable at three levels, namely high, medium and low, that is, 20 Euro/kg, 25 Euro/kg and 30 Euro/kg, respectively.

Insert Table 6 here

Starting from a full factorial comprising $(2 \times 2 \times 2 \times 2 \times 3)$ 48 profiles, we created a fractional factorial design for main-effects that included eight profiles – i.e., combinations of attribute levels (Addelman 1962). The orthoplan subroutine in SPSS is used to produce an orthogonal main-effects design ensuring the absence of multi-collinearity between attributes and allowing the reduction of the number of profiles to eight, as shown in Table 7, which we used in our interviews.

Insert Table 7 here

We refined the questionnaire following a pilot survey. The questionnaire administered to respondents observes the typical “funnel” structure, from general to specific. The final questionnaire is divided into three relevant parts. The first part is the set of questions related to consumer purchase behaviour, with filter questions used to confirm that the interviewee is a buyer of cold cuts and dry-cured ham. The second part presents to the interviewee the eight profiles; respondents were asked to sort them from 1 to 8 according to their preferences, with 1 indicating the preferred profile and 8 the least preferred. The third part asks for personal characteristics of the interviewee such as gender, age, professional status and education. While some papers debate the validity of survey data in comparison to actual purchase data to estimate consumers WTP (e.g., Carson and Groves, 2007), others (e.g., Lusk and Schroeder, 2004, Cicia and Colantuoni, 2010) show that measures of WTP using the two different methods are similar.

6. Analysis of Results

In this section, we hypothesize changes in the status quo (profile H); we then calculate the corresponding revenue variation by using the coefficient of economic valuation. We pursue this objective in two stages: first, we estimate part-worth utilities and the relative importance for each attribute; second, we use these estimates to obtain a valuation of revenue variation associated with a change in the combination of the attributes describing the product in question. We also investigate how the degree of customer satisfaction affects the consumer preference structure in terms of utility.

We estimate the part-worth utilities using OLS.⁸ Table 8 shows the utilities for each attribute level and the relative importance assigned to the corresponding attribute in the two cities. The Pearson's R and Kendall's Tau are both significant.

Insert Table 8 here

Insert Table 9 here

The results show that, even if some basic similarities characterise the preferences of consumers in the two cities, two different patterns of consumption emerge. The presence of PDO certification conveys positive utility to consumers in both Parma and Monza. Sweet taste is preferred to tasty in both cities, and the utility of price is inversely proportional to the price level, indicating a preference, other conditions being equal, for the lowest price. The preference for attribute “Ageing” is also similar in the two cities, with the most aged - 16 months - ham preferred over the 12 months aged. The interesting and crucial differences that emerged was with regard to the preference for the attribute “Producer’s origin” and the importance values of the single attributes in consumers’ total utility. Consumers in Monza assign their preference to the ham produced by a national producer, while in Parma consumers prefer local production. We interpret this result as indicating that interesting distinctions among consumers emerge in accordance with their place of residence. For example, those consumers who live in the same area of production of the typical product, i.e., Parma (recall that Parma dry-cured ham is the most sold in Italy), attach positive utility to the local origin of production, while those consumers who live farther away from the area of production of the typical product prefer hams of national producers.

These results reveal how the *terroir* makes a difference in consumers’ preference. The most important attribute for Monza consumers is the presence of “PDO certification” (38.6%), followed by “Taste” (27%), while the opposite holds for Parma consumers, where “Taste” weighs 40.4% and “PDO certification” 29.8%. The interpretation of this result is strictly related to the abovementioned preference for the “Producer’s origin” attribute; consumers who do not live in the same area of production of the typical PDO product search for a signal of quality both in the origin of production, i.e., national, and in the presence of the PDO certification. On the other hand, consumers living in Parma recognize the quality in the local origin of production and in the presence of PDO

⁸OLS regression is performed using the SPSS statistical package.

certification but with less importance when compared to Monza consumers. This explains why consumers' utility in Monza is more affected by PDO certification than that of consumers in Parma, where the weight of the "Producer's origin" attribute in total utility is four times higher (16.4%) than for Monza consumers (4.2%). Moreover, in Parma, "Taste" is the most important attribute, weighing 40.4%. This result clearly indicates that consumer preferences in Parma are more influenced by those attributes that involve the organoleptic characteristics of the ham. This signals a more refined attention of consumers to the intrinsic properties of the product; sweet taste and ageing in Parma are more significant in determining the value of ham rather than in Monza, weighing 50.8% and 35.3%, respectively.

It is interesting to investigate these results in comparison with other results in the literature. Gil and Sanchez (1997) show that consumers in Spain display a strong preference for locally produced wine. Carpio and Isengildina-Massa (2009) provide evidence about consumers' preferences for animal products in South Carolina. Visser et al. (2013) discuss how consumers consider knowledge about food origin as a quality attribute and claim that consumers better trust local food because the source is known because it is perceived to be healthier than non-local food and because they value authenticity more highly. Our results add a further aspect to the discussion, highlighting that Visser et al. (2013) conclusions hold only (or more strongly) in those areas of production of acknowledged typical PDO products. For those consumers who live far from these areas of production, trust is attached more to certifications. Our results are consistent with the Resano-Ezcaray et al. (2010) paper; the authors find evidence about consumer preference for dry-cured ham produced in the acknowledged Teruel area when compared with unspecified Spanish origin and with respect to foreign origin (Bayonne), which is negatively valued. They also find that the impact of the quality certification is positive; consumers display preference for dry-cured ham with quality certification in general, and PDO Jamòn de Teruel in particular, rather than the absence of quality labels. These conclusions are consistent with our results both in showing consumers preference for quality labelling and in emphasising the existence of local preferences for products produced within the region where consumers in the sample live (Zaragoza, where Jamòn de Teruel is produced).

We utilise now these part-worth utilities and relative importance values to estimate the revenue variation generated by a change in the status quo of the product in accordance with equation (6), with the main aim to measure the monetary value of the PDO certification attribute. We therefore compute the total utility associated with the status quo by summing the part-worth utilities of the corresponding attribute levels. Thus, we can hypothesize any change in the status quo

combination of the attribute levels and calculate the total utility assigned to that alternative. Table 10 reports the combination of attribute levels specifying the status quo (profile H); we can now estimate the revenue variation induced by a single attribute-level change. We define the H profile, taking as a reference product one of the types of ham considered less acceptable. First, we calculate the score of the H profile and the score of the theoretical profiles in which only one attribute at a time is different from those in profile H. Given these scores, we calculated M_j and M_{ij} . The latter is obtained as the product between M_j and the importance of each attribute. We analyse the results of the monetary value calculated separately for Monza and Parma.

In accordance with the part-worth utilities values as reported in Table 8, some interesting differences of behaviour emerge in the two cities with regard to consumer WTP. Consumers in Monza assign the highest importance to the PDO certification attribute and, accordingly, are willing to pay the highest premium price for those products with this characteristic. The estimate we obtain is a WTP equal to 5,16 €, on an initial price of the product of 30 €/Kg, affecting the determination of the price by 17.2%. Consumers in Monza also display a clear preference for a national producer, thus being negatively influenced by local production; we estimate that consumers are willing to pay 3,35 € less for a dry-cured ham coming from the area of Monza rather than from a national manufacturer (which corresponds to 0.2%).

Taking into account the respondents in Parma and considering the average price of 25 €/Kg, consumers are willing to pay a positive (but smaller than in Monza) premium price of 2,3 € for a PDO certified dry-cured ham as opposed to the non-PDO product; this corresponds to 11,72% of the total value of the product. With regard to the attribute “Producer’s origin”, differently from Monza, in Parma we estimate a WTP of 4,82 €, which corresponds to an increase of 3.54%, for a locally produced ham. This result reflects the local preference of Parma consumers, while respondents living in Monza do not assign an added value to the fact that the ham is produced locally. These results confirm that consumer preferences in Parma are more influenced, and then display higher WTP, by those attributes.

Insert Table 10 here

To conclude, our analysis provides evidence of the positive and relevant impact that the PDO certification gives to a well-known, certified, and among the most sold products in Italy, dry-cured ham. Without distinguishing based on the place of residence of consumers, we show that consumers gain positive utility from having a certified product. We interpret this result in line with

existing literature that emphasises the role of PDO certifications as a guarantee of quality and safety in food products (Monjardin de Souza Monteiro and Ventura Lucas, 2001; Van der Lans et al., 2001; Cavicchi et al., 2010; Menapace et al., 2011; Aprile et al., 2012; Deselnicu et al., 2013; Bazoche et al., 2014). This is in contrast to Bonnet and Simioni (2001) and Bello Acebron and Calvo Dopico (2000). Our conclusion is in line with the wide diffusion that PDO certified products have registered in EU countries in recent decades; Italy, in particular, has given an important contribution in the EU, as shown in Table 1.

The results of our paper put in evidence another crucial issue. Two distinct patterns of behaviours seem to emerge in our study. People living outside the area of production of the typical PDO certified product display interesting differences from people who live inside this area. Those consumers who live far from the production area are much more sensitive to the presence of the certification, which is recognized as the main guarantee of product quality. Inside the area of production, instead, PDO certification is not the main attribute stirring consumer confidence. We claim that the deeper knowledge and experience of consumers resident in the place of production give them another privileged means of information, related to the information about the local origin of the producer, which is recognized as a positive and significant attribute in determining total utility. Accordingly, the deeper experience leads consumers living in the area of production of the PDO product to assign a stronger importance to sensory characteristics.

The estimates of WTP of the various attributes follow accordingly with these conclusions in the two cities. We believe that the index we implement in this paper to measure WTP is robust and can be considered for further research.

7. Conclusions

Our research is motivated by the recognition that consumers have increasingly assigned importance to the role of authenticity and safety in food products in recent decades. To this end, public authorities have implemented regulations that certify the quality of products based on their connection to a territory. These certifications define geographical origin labels as tools of identification of authenticity and safety in food, providing consumers with information on the authenticity, origin, and safety of the products in question. Among the certifications, the EEC established PDO labels which, on the one hand, give information to consumers and, on the other hand, define restrictive methods of production for producers. The aim of our paper is to estimate the value of these certifications. This is crucial both to quantify to what degree consumers are willing to

pay a premium price for receiving the information linked to PDO certifications and to give useful insights to producers who incur higher production costs when deciding to pursue and receive PDO status for their products.

Some studies in the economic literature have analysed the impact of PDO certifications on consumers' preferences and the related WTP, adopting different methodologies and focussing on various products and countries. The heterogeneity of the results is large. Our paper contributes to the existing literature by focussing on a well-known PDO product, dry-cured ham, of a famous Italian place of production, Parma. Parma ham is the most sold PDO product in Italy among cold cuts, and third only after Grana Padano and Parmigiano Reggiano cheeses.

The methodology we implement is CA. Based on CA, we propose the use of a new index for estimating WTP for food products.

Overall, our findings are in line with many studies in the economic literature, showing that consumers are willing to pay a relevant premium price for having a PDO certification in dry-cured ham. However, our results give an important contribution by revealing a further interesting aspect: important territorial differences exist. Given the place of residence of consumers, results show that consumers' WTP varies according to their place of residence. Those consumers who live in the same area of production of the certified ham are willing to pay a lower premium price when compared to other consumers living farther from Parma. The explanation we give is related to the signal that consumers perceive; the information set of consumers varies with their distance from the area of production. Consumers who live in the same area of production of the certified ham have a stronger preference for the origin of the producers, thus recognising that the *terroir* itself provides food with a higher quality. In our study, we give evidence to the concept of *terroir* as a concept of quality itself, which is capable of increasing consumers' utility in food products (Josling, 2006). Thus, the place of production acts as a signal of quality; people living in the same area where the certified product is produced trust the local origin of the product, while people living outside that area suffer a disutility from the product locally sourced, preferring a national origin instead. These conclusions support the claim of Visser et al. (2013), which discuss how consumers consider knowledge about food origin a quality attribute; consumers trust local food more because the source is known because it is perceived to be healthier than non-local food, and because they value authenticity over industrialized food. On the other hand, people living outside the Parma area look for other stronger quality signals, finding in the PDO certification a reassuring guarantee. In this sense, PDO certifications play a role of passing information replacing other conventional means of

quality guarantee, like trust-based relationships and personal contact, which become weaker as the distance between producers and consumers widens (Bardaji et al., 2009).

Our results show how quality signals may vary according to the place of residence of consumers; when consumers have access to different sources of knowledge about the production process of the food product, they continue to appreciate PDO certifications. However, they refer less to PDO certifications as a guarantee of safety and quality; rather, they give more importance to their private knowledge. These results are in line with Rao and Monroe (1988) and Dentoni et al. (2009), which claim that highly familiar consumers use extrinsic information less than low-familiar consumers. Our result adds a geographical dimension to this explanation by claiming that the closer consumers live to the area of production of the certified product, the less they refer to extrinsic certification cues.

Some instructive considerations on the role of certification in quality provision result from our analysis. From a management point of view, the analysis suggests distinct strategies of product differentiation for dry-cured ham in different territories, emphasizing the place of production when the aimed target is the local consumer, while focusing on the PDO certification when the targeted consumers live outside the area of production.

From a policy perspective, our results confirm the positive role of the PDO certification scheme on consumers' utility. The information conveyed by PDO labels is revealed to be clear and indicative. This is an important conclusion when we consider that some authors (Lusk and Marette, 2012) raise doubts about the positive role of information when consumers have limited attention, showing that more information (even if it leads to more-accurate perceptions of quality) is not always better. In addition, other studies show that trust in food varies across different types of food. Our result, instead, provides evidence that PDO certification gives a positive utility to consumers, corroborating the results of many other papers (Van der Lans et al., 2001; Monjardin de Souza Monteiro and Ventura Lucas, 2001; Fotopoulos and Krystallis, 2003; Moschini et al., 2008; Tendero and Bernabéu, 2005; Stasi et al., 2011; Menapace et al., 2011).

From a marketing perspective, our results claim the need to strengthen the “*terroir* marketing” strategies in view of the upcoming 2015 world trade fair, Expo 2015, which will be hosted in Milan on themes about “Feeding the Planet, Energy for Life”. Among these themes, food will play a role of protagonist. This event will attract people from the entire world with little knowledge about the locally well-known Italian excellence of production in the agri-food market. With respect to this, the power of PDO certifications in signalling quality products and attracting consumer purchases becomes even stronger. Policies to reinforce the role of the quality signal of

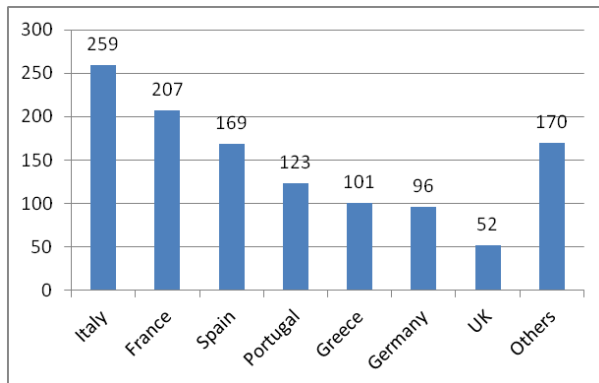
PDO certifications are particularly important to underpin the image of Italy as a country with high-quality food production, to reinforce the development of a Made in Italy food consensus, and to sustain future international commercial exchanges. With regard to food, the Lombardy Region also has given particular attention to safety and traditions in food production. In fact, the Lombardy Region, the City of Milan and a local bank foundation (Cariplo) have launched a joint call to finance programs of international cooperation on food security. The areas to be addressed include sustainable agriculture, quality and safety of food supply chain innovation (production, storage, control and distribution of products), and enhancement of the knowledge of local food traditions as competitive elements.⁹ We claim that public authorities should exploit Expo 2015 as an opportunity to strengthen the already well-known effect of PDO certifications.

This research has some limitations and potential areas for improvement in future work. First, the sample dimension could be developed and improved by extending the empirical analysis to consumers living in other cities and in other countries. It would be interesting to develop a relationship between consumers' WTP for a PDO label of a certified product and their distance from the place of production. Second, another methodology could be used to assess the same question; for example, it would be interesting to run experimental studies where consumers who have previously completed a questionnaire might be asked to taste products with different characteristics and then be called to actually buy their favourite product. The correspondence between the results of experimental economic analyses and the results of the conjoint analysis would make the conclusions more robust. Finally, the analysis could be extended to consumers who do not usually consume the researched product to study communication strategies to penetrate markets where the product is not yet widely distributed.

⁹ Source: <http://www.info-cooperazione.it/EN/category/donatore/regione-lombardia/>

Tables

Table 1. Number of registered PDO and PGI names across EU nations as of end 2013



Source: IndagineQualivita – Ismea 2013

Table 2. Production (quantity and value) of cold cuts in Italy in 2012

Product	2012 volume (000 t)	2012 volume (%)	2012 mln €
Dry-cured ham	297.4	24.8	2246.7
Ham	286.3	23.9	1939.7
Mortadella	174.3	14.6	682.9
Salame	111.0	9.3	935.2
Würstel	69.2	5.8	242.1
Pancetta (Bacon)	53.8	4.5	248.2
Coppa	42.9	3.6	321.8
Speck	29.5	2.5	296.8
Bresaola	15.9	1.3	256.6
Other	117.0	9.8	819.0
Total	1197.0	100	7989.0

Source: ASSICA (Associazione Industriali delle Carni e dei Salumi), Annual Report 2012

Table 3. Production of PDO and PGI meat products in 2012

Product	Production (000 t)	Share %
PDO Parma dry-cured ham	90.527	46.3
PDO Bologna Mortadella	34.145	17.5
PDO San Daniele dry-cured ham	27.454	14.0
PGI Bresaola from Valtellina	12.516	6.4
PGI Speck from Alto Adige	10.723	5.5
PDO Tuscan dry-cured ham	2.928	1.5
PDO Cacciatora salami	2.358	1.2
PGI Cotechino from Modena	2.212	1.1
PGI Norcia dry-cured ham	1.841	0.9
PDO Coppa from Parma	1.839	0.9
Other	8.900	4.6
Total	195.442	100

Source: IndagineQualivita – Ismea 2013

Table 4. Application of the index to other studies in the literature

Authors	Researched product	Attributes	Levels	Parth-worth	Relative importance	Increase in WTP (%)
Mesias et al. (2005)	Carne bovina	Price	6 euro	-1.57	15%	32%
			7,8 euro	-2.04		
			9,6 euro	-2.51		
		Quality certification	Si	0.74	23%	
No	-0.74					
Caniglia et al. (2008)	Doc Etna Wine	Price	< 4,00€	-0.39	24%	32%
			da 4,00€ a 8,00€	0.45		
			> 8,00€	-0.06		
		Brand	Si	0.89	19.1	
No	-0.89					
Baker (1999)	Fresh Apples	Price	0.69	-1.26	14.5	6%
			0.99	-1.81		
			1.29	-2.36		
		Certification Program	Monitoring	-0.38	10.1	
Certification	0.38					
Gil and Sánchez (1997)	Wine	Base Level	250 PTS	-0.72	24.0	10%
			400 PTS	-1.12		
			600 PTS	-1.68		
		Origin	Local production	1.84	57.0	
		Rioja	2.29			
Others	-4.13					
Huang and Fu (1995)	Chinese sausage	Price	NT\$170	0.00	6.98	5%
			NT\$150	0.09		
			NT\$120	0.82		
		CAS Label	Si	2.24	19.11	
		No	0.00			
Fotopoulos and Krystallis (2003)	Zagora Apples	Price	300 GRD (0.88 EURO)	-1.94	55.45 %	89%
			400 GRD (1.17 EURO)	-3.87		
			500 GRD (1.46 EURO)	-5.81		
		PDO Label	Other common apples	1.56	44.55 %	
		Regional indication Zagora	3.11			
		PDO Zagora apples	4.67			
Krystallis and Ness (2005)	Greek Olive Oil	Price	3.25 €	0.03	7.17%	5%
			4.41 €	0.06		
			5.88 €	0.10		
			6.76 €	0.13		
			PDO Label	No		
		Si	0.64			

Table 5. Demographic characteristics of sample

		City	
		Parma	Monza
		%	%
Gender	Male	41.6	36.6
	Female	58.4	50.5
Education	Primary Education	33.7	25.0
	High school	43.6	56.8
	Graduate	22.8	18.2
Age (years)	< 35	9.9	12.9
	36-45	35.6	17.8
	46-60	22.8	27.7
	> 60	31.7	28.7
Occupation	Self-employed	10.9	7.9
	Workers	39.6	18.8
	Retired	23.8	25.7
	Housewife	12.9	19.8
	Student, unemployed, others	12.9	14.9

Table 6. Attributes and levels

Attribute	Levels
PDO Certification	Yes No
Taste	Sweet Tasty
Producer's origin	Italian Local (Province of...)
Ageing	12 months 16 months
Price	20 Euro/kg 25 Euro/kg 30 Euro/kg

Table 7. Profiles (prices are for 1 Kg of dry-cured ham)

Profile	PDO/PGI certification	Taste	Producer	Ageing	Price
A	Yes	Sweet	Italian	16 months	20 Euro/Kg
B	Yes	Tasty	Italian	12 months	25 Euro/Kg
C	No	Tasty	Local	12 months	20 Euro/Kg
D	No	Sweet	Local	16 months	25 Euro/Kg
E	Yes	Sweet	Local	12 months	20 Euro/Kg
F	Yes	Tasty	Local	16 months	30 Euro/Kg
G	No	Tasty	Italian	16 months	20 Euro/Kg
H	No	Sweet	Italian	12 months	30 Euro/Kg

Table 8. Part-worth utilities values

Attributes	Levels	Monza		Parma	
		Utility	Std. Err.	Utility	Std. Err.
PDO certification	Yes	0.784	0.106	0.780	0.049
	No	-0.784	0.106	-0.780	0.049
Taste	Sweet	0.548	0.106	1.054	0.049
	Tasty	-0.548	0.106	-1.054	0.049
Price	20 Euro/Kg	0.307	0.142	0.069	0.065
	25 Euro/Kg	0.276	0.166	0.017	0.076
	30 Euro/Kg	-0.582	0.166	-0.087	0.076
Producer's origin	Local (Province of...)	-0.085	0.106	0.428	0.049
	Italian	0.085	0.106	-0.428	0.049
Ageing	12 months	-0.168	0.106	-0.272	0.049
	16 months	0.168	0.106	0.272	0.049
(Constant)		4.423	0.112	4.483	0.051

Table 9. Attributes' importance values.

	Monza	Parma
PDO certification	38.6	29.8
Taste	27.0	40.4
Price	21.9	3.0
Producer's origin	4.2	16.4
Ageing	8.3	10.4

Table 10. Economic re-evaluation by changing a non-monetary attribute

			Part-worth	Relative importance	Increase in WTP (%)
Monza	Price	20 Euro/Kg	0.307	21.9	
		25 Euro/Kg	0.276		
		30 Euro/Kg	-0.582		
	PDO certification	Yes	0.784	38.63	17.2
		No	-0.784		
	Producer's origin	Local (Province of Monza)	-0.085	4.19	-0.2
Italian		0.085			
Parma	Price	20 Euro/Kg	0.069	2.18	
		25 Euro/Kg	0.017		
		30 Euro/Kg	-0.087		
	PDO certification	Yes	0.78	28.84	11.72
		No	-0.78		
	Producer's origin	Local (Province of Parma)	0.428	16.39	3.54
Italian		-0.428			

References

- Akaah, I. & Korgaonkar, P. (1988). A conjoint investigation of the relative importance of risk relievers in direct marketing. *Journal of Advertising Research*, 28, 38-44
- Akerlof, G.A. (1970). The Market for “Lemons”: Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84, 488-500.
- Addelman, S. (1962). Symmetrical and Asymmetrical Fractional Factorial Plans, *Technometrics*, 4, 47-58.
- Aprile, M.C., Caputo V., & Nayga Jr R.M. (2012). Consumers’ valuation of food quality labels: the case of the European geographic indication and organic farming labels. *International Journal of Consumer Studies*, 36, 158–165.
- Arfini, F., Boccaletti, S., Giacomini, C., Moro, D. & Sckokai, P. (2006). Case study: Parmigiano Reggiano. Università Cattolica and Università degli Studi di Parma, Paper prepared for EU-DG JRC/IPTS.

- Baker, G.A. (1999). Consumer Preferences for Food Safety Attributes in Fresh Apples: Market Segments, Consumer Characteristics, and Marketing Opportunities. *Journal of Agricultural and Resource Economics*, 24, 80-97.
- Baker, G.A. & Mazzocco, M. (2005). Who Should Certify the Safety of Genetically Modified Foods? *International Food & Agribusiness Management Review*, 8, 1-20.
- Banterle, A., Cavaliere, A., & Ricci, E.C. (2012). Food Labelled Information: An Empirical Analysis of Consumer Preferences. *International Journal on Food System Dynamics*, 3, 156-170
- Bardaji, I., Iràizoz, B., & Rapun, M. (2009). Protected Geographical Indications and Integration Into the Agribusiness System. *Agribusiness*, 25, 198-214.
- Barling, D., Sharpe, R., & Lang, T. (2009). Traceability and ethical concerns in the UK wheat–bread chain: from food safety to provenance to transparency. *International Journal of Agricultural Sustainability*, 7, 261-278.
- Bazoche, P., Combris, P., Giraud-Héraud, E., Seabra Pinto, A., Bunte, F. & Tsakiridou E. (2014), Willingness to pay for pesticide reduction in the EU: nothing but organic?, *European Review of Agricultural Economics*, 41, 87-109.
- Bello Acebron L., CalvoDopico D. (2000).The importance of intrinsic and extrinsic cues to expected and experienced quality: an empirical application for beef. *Food Quality and Preference*, 11, 229-238.
- Bernabéu, R., Díaz, M. & Olmeda, M. (2010). Origin vs organic in Manchego cheese: which is more important?. *British Food Journal*, 112, 887-901.
- Bonnet C., Simioni M., (2001). Assessing Consumer Response to Protected Designation of Origin Labelling: a Mixed Multinomial Logit Approach. *European Review of Agricultural Economics*, 28, 433-449.
- Bouamra-Mechemache Z., Chaaban J. (2010).Determinants of Adoption of Protected Designation of Origin Label: Evidence from the French Brie Cheese Industry. *Journal of Agricultural Economics*, 61, 225-239.
- Bruwer, J. & Johnson, R. (2010). Place-based marketing and regional branding strategy perspectives in the California wine industry. *Journal of Consumer Marketing*, 27, 5-16.
- Busacca B., Costabile M., Ancarani F. (2004). Prezzo e valore per il cliente. *Tecniche di misurazione e applicazioni manageriali*, Perugia, ETAS.
- Callow, E.H. (1947). The Action of Salts and other Substances Used in the Curing of Bacon and Ham, *British Journal of Nutrition*, 1, 269-274.

- Caniglia, E., D'Amico, M., & Peri, I. (2008). An analysis of consumers' perception of the quality of the Etna DOC wine. *NEW MEDIT*, 3, 32-40.
- Careri M., Mangia A., Barbieri G., Bouoni L., Virgili R., Parolari G. (1993), Sensory Property Relationships to Chemical Data of Italian-type Dry-cured Ham. *Journal of Food Science*, 58, 968–972.
- Carmone, F.J., Green, P. E., Jain, A. K. (1978). Robustness of Conjoint Analysis: Some Monte Carlo Results. *Journal of Marketing Research*, 15, 300-303.
- Carpio, C.E., & Isengildina-Massa, O. (2009). Consumer Willingness to Pay for Locally Grown Products: The Case of South Carolina. *Agribusiness*, 25, 412-426.
- Carson, R.T. & Groves, T. (2007). Incentive and informational properties of preference questions. *Environmental and Resource Economics*, 37, 181-210.
- Cattin, P., Wittink, D.R. (1982). Commercial Use of Conjoint Analysis: A Survey. *Journal of Marketing*, 46, 44-53.
- Cavicchi, A., Bailetti, L. & Santini, C. (2010). Marca o denominazione di origine? Uno studio esplorativo sulla brand equity del Pecorino di Fossa. *Agriregionieuropa*, 6 (20).
- Cicchitelli G., Herzel A., Montanari G.E. (1992). Il campionamento statistico, Bologna, Il Mulino.
- Cicia, G. & Colantuoni, F. (2010). Willingness to Pay for Traceable Meat Attributes: A Meta-analysis. *International Journal on Food System Dynamics*, 1, 252-263
- Cross R., Plantinga A., Stavins R.N. (2011). What Is the Value of Terroir? *American Economic Review*, 101, 152-156.
- Darby K., Batte M.T., Ernst S., Roe B. (2008), Decomposing Local: a Conjoint Analysis of Locally Produced Foods. *American Journal of Agricultural Economics*, 90, 476–486.
- Dentoni, D., Tonsor, G.T., Calantone, R.J. & Peterson, H.C. (2009). The Direct and Indirect Effects of 'Locally Grown' on Consumers' Attitudes Towards Agri-Food Products. *Agricultural and Resource Economics Review*, 38, 384–396.
- Deselnicu O., Costanigro M., Souza-Monteiro D.M., McFadden D.T. (2013). A Meta-Analysis of Geographical Indication Food Valuation Studies: What Drives the Premium for Origin-Based Labels?. *Journal of Agricultural and Resource Economics*, 38, 204–219
- de Souza Monteiro D.M., Lucas M.R.V. (2001). Conjoint measurement of preferences for traditional cheeses in Lisbon. *British Food Journal*, 103, 414 - 424.
- Flores, M., Ingram, D.A. Bett, K.L. Toldrà, F., Spanier A.M. (1997). Sensory Characteristics of Spanish "Serrano" Dry-Cured Ham. *Journal of Sensory Studies*, 12, 169–179.

- Fotopoulos, C. & Krystallis, A. (2003). Quality labels as a marketing advantage. The case of the “PDO Zagora” apples in the Greek market. *European Journal of Marketing*, 37, 1350-1374.
- Frosini B.V., Montinaro M., Nicolini G. (1999). *Il Campionamento da Popolazioni Finite*, Torino, UTET Libreria.
- Gan, C., Luzar, E.J., (1993). A conjoint analysis of waterfowl hunting in Louisiana. *Journal of Agricultural and Applied Economics*, 25, 36-45.
- Garcia Collado, R., Martinez Navarro, E., Riccioli, C. & Càceres Clavero, F. (2006). Case study: Dehesa de Extremadura – PDO cured ham. Junta de Andalucia, prepared for EU-DG JRC/IPTS.
- Gil, J.M. & Sanchez, M. (1997). Consumer preferences for wine attributes: a conjoint approach. *British Food Journal*, 99, 3-11.
- Green, P.E. & Krieger, A.M. (1991). Segmenting Markets with Conjoint Analysis. *Journal of Marketing*, 55, 20-31.
- Green, P.E., & Srinivasan, V. (1978). Conjoint Analysis and Consumer Research: Issues and Outlook. *Journal of Consumer Research*, 5, 103-123.
- Green, P. E., Srinivasan, V. (1990). Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice. *Journal of Marketing*, 54, 3-19.
- Grunert, K.G. (2005). Food Quality and Safety: Consumer Perception and Demand. *European Review of Agricultural Economics*, 33, 369-391.
- Henson, S. (1996). Consumer willingness to pay for reductions in the risk of food poisoning in the UK. *Journal of Agricultural Economics*, 47, 403–420.
- Hersleth M., Lengard V., Verbeke, W., Guerrero, L., & Næs T. (2011). Consumers’ acceptance of innovations in dry-cured ham: Impact of reduced salt content, prolonged aging time and new origin. *Food Quality and Preference*, 22, 31–41.
- Hu W., Batte M.T., Woods T., & Ernst S. (2012). Consumer preferences for local production and other value-added label claims for a processed food product. *European Review of Agricultural Economics*, 39, 489-510.
- Huang, C.L., & Fu, J. (1995). Conjoint Analysis of Consumer Preferences and Evaluations of a Processed Meat. *Journal of International Food & Agribusiness Marketing*, 7, 35-53
- ISMEA - Istituto di Servizi per il Mercato Agricolo Alimentare (2013). *Rapporto Ismea Qualivita*. Roma.
- Kim, R. (2008). Japanese consumers’ use of extrinsic and intrinsic cues to mitigate risky food choices. *International Journal of Consumer Studies*, 32, 49–58.

- Kohli, R. & Mahajan, V. (1991). A Reservation-Price Model for Optimal Pricing of Multiattribute Products in Conjoint Analysis. *Journal of Marketing Research*, 28, 347-354.
- Krystallis, A., & Chrysosoidis, G. (2005). Consumers' willingness to pay for organic food: Factors that affect it and variation per organic product type. *British Food Journal*, 107, 320 – 343.
- Issanchou S. (1996). Consumer expectations and perceptions of meat and meat product quality. *Meat Science*, 43, 5–19.
- Lagerkvist, C.J., & Hess, S. (2011). A Meta-Analysis of Consumer Willingness to Pay for Farm Animal Welfare. *European Review of Agricultural Economics*, 38, 55–78.
- Lancaster, K. J. (1966). A New Approach to Consumer Theory. *Journal of Political Economy*, 74, 132-157.
- Lancaster K. (1971). *Modern Consumer Theory*. Aldershot: Elgar.
- Leclerc F., Schmitt B.H., & Dubé L. (1994). Foreign branding and its effects on product perceptions and attitudes. *Journal of Marketing Research*, 31, 263-270
- Lentz, P., Holzmüller, H.H. & Schirrmann, E. (2006). City-of-origin effects in the German beer market: transferring an international construct to a local context. *Advances in International Marketing*, 17, 251-274.
- Loureiro, M. L., & McCluskey J. J. (2000). Assessing Consumer Response to Protected Geographical Identification Labeling. *Agribusiness*, 16, 309-320.
- Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated Choice Methods: Analysis and Application*. Cambridge University Press.
- Lusk, J. L., M. Jamal, L. Kurlander, M. Roucan, & L. Taulman. (2005). A Meta-Analysis of Genetically Modified Food Valuation Studies. *Journal of Agricultural and Resource Economics*, 30, 28–44.
- Lusk, J.L. & Marette, S. (2012). Can Labeling and Information Policies Harm Consumers?. *Journal of Agricultural & Food Industrial Organization*, 10.
- Lusk J.L. & Schroeder T.C. (2004). Are Choice Experiments Incentive Compatible? A Test with Quality Differentiated Beef Steaks. *American Journal of Agricultural Economics*, 86, 467-482.
- Mariani P., & Mussini M. (2013). A new coefficient of economic valuation based on utility scores, *Argumenta Oeconomica*, 2, 33-46.
- Mariani, P., Mussini, M., & Zavarrone, E. (2011). The Measure of Economic Re-Evaluation: a Coefficient Based on Conjoint Analysis [in] Ingrassia S., Rocci R., & Vichi M., (eds.) *New Perspective in Statistical Modeling and Data Analysis*. Springer-Verlag, Heidelberg, 85-92.

- Menapace, L., Colson, G., Grebitus, C. & Facendola, M. (2011). Consumers' preferences for geographical origin labels: evidence from the Canadian olive oil market. *European Review of Agricultural Economics*, 38, 193-212.
- Menapace L. & Moschini G. (2012). Quality certification by geographical indications, trademarks and firm reputation. *European Review of Agricultural Economics*, 39, 539-566.
- Mesias F.J., Escribano M., Rodriguez de Ledesma A., & 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.
- Morales, R., Guerrero, L., Claret, A., Guàrdia, M.D., & Gou, P. (2008). Beliefs and attitudes of butchers and consumers towards dry-cured ham. *Meat Science*, 80, 1005–1012.
- Mørkbak, M.R., Christensen, T. & Gyrd-Hansen, D. (2010). Consumer preferences for safety characteristics in pork. *British Food Journal*, 112, 775-791.
- Moschini, G., Menapace, L. & Pick, D. (2008). Geographical Indications and the Competitive Provision of Quality in Agricultural Markets. *American Journal of Agricultural Economics*, 90, 794-812.
- Krystallis, A., & Ness, M. (2005). Consumer Preferences for Quality Foods from a South European Perspective: A Conjoint Analysis Implementation on Greek Olive Oil. *International Food and Agribusiness Management Review*, 8, 62-91.
- Orth, U.R., McGarry, Wolf M. & Dodd, T.H. (2005). Dimensions of wine region equity and their impact on consumer preferences. *Journal of Product & Brand Management*, 14, 88–97.
- Padilla C., Villalobos P., Spiller A., & Henry G. (2007), Consumer Preference and Willingness to Pay for an Officially Certified Quality Label: Implications for Traditional Food Producers. *Agricultura Técnica*, 67, 300-308.
- Rangnekar, D. (2004). The Socio-Economics of Geographical Indications. UNCTAD-ICTSD Project on IPRs and Sustainable Development 8.
- Rao, A.R., & Monroe, K.B. (1988). The moderating effect of prior knowledge on cue utilization in product evaluations. *Journal of Consumer Research*, 15, 253-264.
- Resano, H., Sanjuán, A.I., Cilla, I., Roncalés, P., & Albisu, L.M. (2010). Sensory attributes that drive consumer acceptability of dry-cured ham and convergence with trained sensory data. *Meat Science*, 84, 344–351
- Resano, H., Sanjuán, A.I., & Albisu, L.M. (2007). Consumers' acceptability of cured ham in Spain and the influence of information. *Food Quality and Preference*, 18, 1064–1076.

- Resano, H., Sanjuán, A.I., & Albisu, L.M. (2009). Consumers' acceptability and actual choice. An exploratory research on cured ham in Spain. *Food Quality and Preference*, 20, 391–398.
- Resano-Ezcaray H., Sanjuan-Lopez A.I., & Albisu-Aguado 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, 480–498.
- Scardera A., & Viganò L. (2008). DOP e IGP, i numeri della qualità, in *Il funzionamento delle aziende agricole con prodotti di qualità e le politiche a loro favore*, Bologna, 12 Settembre 2008.
- Scarpa, R., Philippidis, G., & Spalataro, F. (2005). Product-Country Images and Preference Heterogeneity for Mediterranean Food Products: A Discrete Choice Framework. *Agribusiness*, 21, 329-349.
- Sentandreu M., & Toldrà F. (2001), "Dipeptidyl peptidase activities along the processing of Serrano dry-cured ham. *European Food Research and Technology*, 213, 83-87.
- Stasi, A., Carlucci, D. & Seccia, A. (2008). Informazione asimmetrica e regolamentazione per l'etichettatura del vino. *Rivista di Economia Agraria*, 2.
- Tendero, A. & Bernabéu, R. (2005). Preference structure for cheese consumers. A Spanish case study. *British Food Journal*, 107, 60-73.
- Van der Lans, I. A., Van Ittersum, K., De Cicco, A. & 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 der Pol, M. & Ryan, M. (1996). Using conjoint analysis to establish consumer preferences for fruit and vegetables. *British Food Journal*, 98, 5-12.
- Veale, R. & Quester, P. (2009a). Tasting quality: the roles of intrinsic and extrinsic cues. *Asia Pacific Journal of Marketing and Logistics*, 21, 195-207.
- Veale, R. & Quester, P. (2009b). Do consumer expectations match experience? Predicting the influence of price and country of origin on perceptions of product quality. *International Business Review*, 18, 134–144.
- Visser J., Trienekens J., & van Beek P. (2013). Opportunities for Local for Local Food Production: A case in the Dutch Fruit and Vegetables. *International Journal on Food System Dynamics*, 4, 73-87.
- Walley, K., Parsons, S., & Bland, M. (1999). Quality assurance and the consumer: A conjoint study. *British Food Journal*, 101, 148-162.