11-2-2009

Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels

Luisa Menapace
Iowa State University, luisa@iastate.edu

Gregory J. Colson
The University of Georgia, gcolson@uga.edu

Carola Grebitus
Universität Bonn, carola.grebitus@ilr.uni-bonn.de

Maria Facendola
ISMEA

Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels

Abstract

Motivated by the recognition that geography is often correlated with and/or an important determinant of the overall quality of agricultural products, consumer groups, industry representatives, and domestic and trade representatives have increasingly considered the potential role of geographical origin labels as consumer information and marketing tools. We investigate whether consumers recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study disentangles and assesses three nested types of origin labels: country of origin (COOL), geographical indications (GI), and PDO/PGI. We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay varies across different countries of origin, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI. Overall, our findings support the recent surge in interest by both developed and developing nations in reaching an agreement for stricter and more widespread protection of GIs within ongoing WTO discussions and harnessing them as marketing tools for expanding shares in export markets.

Keywords

geographical indications, consumer preferences, country of origin labels, PDO, PGI, olive oil

Disciplines

Economics

Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels

Luisa Menapace, Gregory Colson, Carola Grebitus, Maria Facendola

Working Paper No. 09021
November 2009

IOWA STATE UNIVERSITY
Department of Economics
Ames, Iowa, 50011-1070

“Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels”

Luisa Menapace
Department of Economics
Iowa State University
Ames, IA 50010
Tel: (515) 451-7012
Email: luisa@iastate.edu

Gregory Colson
Assistant Professor
314 Connor Hall
The University of Georgia
Athens, GA 30602
Tel: (706) 583-0616
Email: gcolson@uga.edu

Carola Grebitus
Abteilung für Marktforschung der Agrar- und Ernährungswirtschaft
Institut für Lebensmittel- und Ressourcenökonomik
Universität Bonn
Nussallee 21
53115 Bonn, Germany
Tel: +49 (0228) 73-3582
Email: carola.grebitus@ilr.uni-bonn.de

Maria Facendola
ISMEA
Direzione Mercati e Risk Management
Analisi Economiche e Finanziarie
Settore Rating

The authors would like to thank GianCarlo Moschini for his helpful comments. Luisa Menapace was supported in part by the U.S. Department of Agriculture through a cooperative research project with Iowa State University.

Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels

Abstract

Motivated by the recognition that geography is often correlated with, or an important determinant of, the overall quality of agricultural products, consumer groups, industry representatives, and domestic and trade representatives have increasingly considered the potential role of geographical origin labels as consumer information and marketing tools. We investigate whether consumers recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study disentangles and assesses three nested types of origin labels: country of origin (COOL), geographical indications (GI), and PDO/PGI. We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay varies across different countries of origin, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI. Overall, our findings support the recent surge in interest by both developed and developing nations in reaching an agreement for stricter and more widespread protection of GIs within ongoing WTO discussions and harnessing them as marketing tools for expanding shares in export markets.

Key words: Consumer preferences, geographical indications, country of origin labels, PDO, PGI, olive oil

INTRODUCTION

The primary overarching economic motivation for product labels is to facilitate the resolution of market failures associated with the supply of high-quality goods under asymmetric information (e.g., Akerlof 1970). In the crowded, heterogeneous food product space, information asymmetries are particularly problematic given the abundance and importance of credence and experience attributes. As a result, food labeling is viewed as a critical mechanism to help ensure consumers can correctly match with products, enable producers to adapt production to meet consumer demands and expectations, and promote social or political economy objectives (e.g., health outcomes, growth in desirable sectors, increased exports).

One particular category of labels that has recently received extensive attention among regulators and trade representatives are "geographical origin" labels (i.e., labels that denote, with some degree of specificity, the location of origination of the end-product, inputs, or production). Informing consumers of the origin of food products via labeling is motivated by the recognition that geography is often correlated with a product's overall quality or, in the stronger case, geography may even be a determinant of a product's ultimate realized quality (i.e., the concept of *terroir*). Recently, interest in geographic origin labeling for foods has been invigorated as a result of (1) an increased demand by consumers for production and safety related information following a string of food scares,[1] (2) a surge in global culinary awareness and demand for foreign cuisine, and (3) a movement of many nations away from traditional agricultural price supports towards promotion of value-added and high quality products.

Two types of origin labels, country of origin labels (COOL) and geographical indications (GI), have received extensive attention in the economic and marketing literature and are currently the subject of domestic and international policy debates.[2] An abundant economic and marketing literature has analyzed COOL as signals of a broadly defined concept of product quality (i.e., the aggregation of many intrinsic and extrinsic product attributes linked to origin).[3] These variations in quality across countries are determined in part by differences in the natural environmental and climatic conditions as well as differences in national quality standards, production and processing technologies, quality audit systems, etc. This feature has even led to the reference of COOL as "country brands" (e.g., Unterschultz 1998; Gilmore 2002; Clemens and Babcock 2004).

Although geographical indications are similar to COOL, these two forms of origin labeling differ in several regards which significantly impact their informational content and potential value to both consumers and producers. Compared to COOL, GIs typically denote a much smaller geographical area of origin like a town or region (e.g., Champagne, France or Pelee Island, Canada). Hence, GIs are capable of communicating characteristics specific to a specialized area that are not necessarily reflected by the country as a whole. As well, in contrast to COOL, for a geographic name to be recognized and receive intellectual property (IP) protection as a GI, producers must demonstrate the existence of a link between the characteristics of the geographic environment of production and the quality of the product that seeks the GI status. Furthermore, in order for eligible producers in the delineated region to use the GI, they must adhere (subject to third-party inspection) to established production specifications, including input and processing requirements, that are unique to the GI and beyond those of standard non-GI products. Finally, one further distinction exists for European GIs. In the European GI system two distinct types of GIs are granted IP rights, *Protected Designation of Origin* (PDO) and *Protected Geographical Indication* (PGI), that differ depending upon how closely a product's quality is linked to geography. This distinction introduces an additional level of quality differentiation among GI labeled products, reserving the PDO status for the highest qualities (for more details on PDO vs. PGI see Moschini, Menapace, and Pick 2008 and EU Regulation 2081/92).

Conceptually, to understand how these distinctions between different geographical origin labels provide information to consumers, consider a purchase situation in which a consumer faces a distribution of products over a spectrum of qualities. From the prospective of a consumer that takes the product quality distribution as exogenous, we can consider a purchase from a set of unlabelled (or generic) products as a draw from an unconditional distribution that spans the entire quality range. Similarly, a purchase of a product with a "geographical origin" label is a draw from a conditional distribution, whereby the conditional distribution varies by type of label. For country-specific products the distribution is over a sub-set of the quality spectrum and centered around a country-specific mean (that could be above or below the unconditional mean). The GI distribution is a sub-set of the country-specific distribution, consisting of qualities above a truncation point determined by the GI's quality standards. Finally, PDOs are clustered in the upper portion of the GI distribution. At each iteration (from COOL to GIs to PDOs), the derived conditional distribution is characterized by a higher mean and a smaller variance. Based on this conceptual framework, geographical origin labels are valuable to consumers for two reasons: (i) they provide a more precise indication of the expected quality of a given product, thus improving the ability of the consumer to match with a desired quality (valued by both risk neutral and risk averse consumers) and (ii) they reduce the quality dispersion around the expected mean thereby reducing uncertainty regarding the purchase (valued by risk averse consumers).

In this paper, we investigate whether consumers indeed value the informational content of geographical origin labels. While several empirical studies have attempted to quantify the value of specific GIs in isolation,[4] our contribution is the first to consider three nested levels of geographically-based quality differentiation (COOL, GIs, and PDO/PGI). In order to disentangle and assess the value of these origin labels, a stated-choice experiment was constructed and administered to a random sample of adult Canadian consumers. The focus product, extra virgin olive oil, was selected because this type of oil represents a value-added product for which COOL and GI labeling are a potentially powerful information and marketing tool.

Our empirical findings correspond with the outlined theoretical framework of geographical origin labels. We find that consumers' willingness to pay varies across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI. As a whole, our findings support the recent surge of interest by both developed and developing nations in protecting GIs and harnessing them as a marketing tool for expanding shares in export markets.[5] In particular our findings are supportive of recent shifts in EU agricultural policy away from price support programs towards policy tools such as GIs that promote food quality.[6]

In what follows we first briefly present background information on the focus product, extra virgin olive oil. Then, we outline the choice experiment methodology employed for assessing consumers' valuations for geographical origin labels. The core of the article presents a discussion of the estimation results from a Bayesian mixed logit model with correlated coefficients using the full sample and three sub-samples obtained by partitioning consumers based on their purchasing location. Then, we conclude.

RESEARCHED PRODUCT

There are several different governing bodies that establish standards for different types of olive oil. The International Standards under resolution COI/T.15/NC no. 3-25 (revised June 2003) lists nine grades of olive oil in two primary categories, olive oil and olive pomace oil. Extra virgin is the highest grade of olive oil. It is obtained solely from the fruit of the olive tree (Olea europa L.) with a chemical-free process that involves only pressure and is characterized by a natural level of low acidity (0.8%) (IOOC, 2007).

As a traditional component of the Mediterranean diet, olive oil consumption has historically been significant in the Mediterranean countries. But, as this diet has gained popularity worldwide, consumption has grown considerably in many countries including Australia, Brazil, Canada, Japan, and the United States (global demand has risen at an annual rate of about 5.3% since 1995/96 according to Türkekul et al., 2007). According to the International Olive Oil council, imports of olive oil in Canada and the United States have increased from 64 million pounds in 1982 to 563 million pounds in 2005 (IOOC, 2006).

Global olive oil production is concentrated in the Mediterranean countries with Italy, Greece, and Spain accounting for more than 70% of worldwide production. Smaller producing countries include Morocco, Portugal, Syria, Turkey, and Tunisia. Italy is the leader in the Canadian market, representing over 70% of total olive oil imports to Canada (IOOC, 2006).

Several empirical studies, all of which were conducted in European countries, have specifically considered consumer preferences for olive oil. Krystallis and Ness (2005) find that GIs are relevant cues for several consumer segments in Greece. Freitas Santos and Cadima Ribeiro (2005) find that Portuguese consumers are willing to pay up to a 30% price premium for GI-labeled olive oil. Van der Lans et al. (2001) find for Italian consumers of extra virgin olive oil that PDO labels influence preferences only indirectly through perceived quality. Finally, a study by Scarpa and Del Giudice (2004) on extra virgin olive oil in Italy finds that origin matters differently across cities and that there is a bias in preferences towards local products.

EXPERIMENTAL PROCEDURE

The data for this study was collected via face-to-face interviews of consumers in the Toronto area of Ontario, Canada. Choosing Canada, a country not involved in the production chain of olive oil, has the advantage of preventing “domestic or home biases” effects on the results (Van Ittersum et al. 2007). Respondents were interviewed based on a convenience sample with each interview lasting approximately 15 minutes. Participants were screened for inclusion in the study based on two questions: whether they had (1) purchased and (2) consumed olive oil in the previous six months and three months respectively. Only those who answered positively to both questions qualified for the study. Interviews were conducted during the course of a week at four food retail stores including one gourmet store, two medium-sized grocery stores and a farmers market in three different cities (Guelph, Hamilton, and Toronto). Different store types were chosen to capture different consumer segments. A total of 207 individuals completed the full interview process and provided complete responses. The interview consisted of several sections including questions regarding the participants' knowledge of the product and a section collecting demographic information about the participants. Table 1 summarizes participants' socio-demographics.

Insert Table 1 here.

The core section of the interview consisted of a stated-choice experiment, following standard procedures (Louviere, Hensher and Swait, 2000; Street and Burgess, 2007), in which the surveyed customers were shown sets of alternative product descriptions and asked to select the one they would purchase. Specifically, in each of ten product scenarios, each participant was asked to select between two different olive oils and the "none-of-them" alternative, providing a total of 2070 responses. Each alternative olive oil was defined by a full set of characteristics (full-profile) including price, appearance, color, packaging size, production method (organic vs. non-organic), country of origin and GI-labels.[7] Following van der Lans et al. (2001), color and appearance were chosen as attributes describing olive oil visually. They are search quality attributes used by consumers to evaluate the product before purchase (Nelson 1970, 1974). Specifically, two colors (green, yellow) and two types of appearances (opaque, non-opaque) were included. Three bottle sizes (0.5 lt., 0.75 lt. and 1 lt.) were also included. Based on the actual price range of extra virgin olive oils in the Canadian market, a minimum and maximum price level were identified. While usually the price spread should not be too large (Green and Srinivasan, 1978), because of the presence of both conventional and organic olive oils, GI and non-GI labeled olive oils, as well as different bottle sizes, a price spread from 7 to 35 CAD $ was considered.[8]

With regard to credence attributes, we included two production methods (organic and non-organic) and several COOL and GI labels. COOL labels included oils from the three main olive oil producer countries: Greece, Italy and Spain. GI-labels included three Italian GI oils: Terra di Bari PDO, Garda PDO and Tuscany PGI. As our study includes several attributes and levels, we employed a fractional factorial design to define the set of alternatives used in the experiment applying the SAS macro as described in Kuhfeld (2001).

A MIXED LOGIT MODEL OF CONSUMERS' CHOICES

Consumers' choices of olive oils are modeled utilizing a random utility based discrete choice model, the multinomial mixed logit (MXL) with random and correlated coefficients. The MXL model is selected because, unlike the fixed coefficient multinomial logit (and related variants), it allows for taste heterogeneity unconditional on socio-economic covariates. Previous studies have shown that taste variation is only partially linked to, and poorly explained by, demographics such as age, education, gender, and income (Baker and Burnham 2001; West et al. 2003). Moreover, as Scarpa and Del Gudice (2004) note, a correlation structure across tastes for different attributes is typically present in the case of gourmet foods (such as extra virgin olive oil). This supports consideration of a correlated, over independent, distribution of taste parameters.

Model specification and estimation

Each of the study participants, *i (i=1,…, N; N=207),* faced ten choice situations *(t=1,…, T; T=10).* At each choice situation, the consumer was presented with a set of alternatives. Each set contained three elements: two olive oils and the "none-of-them" alternative. In total, there were twenty-one alternatives, indexed by *j (j=1,…, J; J=21),* including twenty olive oils and the "none-of-them" option. Let J_t represent the set of alternatives at choice situation *t.* The utility of person *i* from alternative *j*, in choice situation *t* is specified as $U_{ijt} = V_{ijt} + \varepsilon_{ijt}$ where

$$V_{ijt} = (\beta_{Oi}O_j + \beta_{Ai}A_j + \beta_{Yi}Y_j + \beta_{Ii}I_j + \beta_{Ki}K_j + \beta_{Gi}G_j)Size_j + \beta_{Ni}N_j + \beta_P p_j \qquad \text{Equation (1)}$$

where ε_{ijt} is distributed iid extreme value over individuals, alternatives and time, p_j is the price in CAD$ of alternative j and $Size_j$ is the size of the bottle in liters. All remaining variables are dummies and described in table 2. In addition to the dummies capturing the olive oil attributes (organic, appearance, country-of-origin and GI labels), we included one dummy variable capturing the “none-of-them” alternative (Hu, Veeman and Adamowicz 2005).

The utility specification, where size multiplies the attributes’ dummies, implies a proportional increase in utility with an increase in size for all olive oil attributes (Alfnes et al. 2006). To investigate the effect of bottle size *per se* on consumer choices, we also test an alternative utility specification that includes size as an additional explanatory variable but rejected the model via a likelihood ratio test. In addition to the main model in (1) we estimated two alternative models that differ with regards to their classification of the GI variable, as summarized in table 2.

Insert Table 2 here.

Let $y_i = y_{i1},...,y_{iT}$ denote individual *i*’s sequence of choices. Conditional on $\beta_i = \{\beta_{O,i},...,\beta_{N,i}\}$, and given the independent error structure, the probability of *i’s* sequence of choices is equal to

$$L(y_i \mid \beta) = \prod_{t=1}^{T} \left[\frac{e^{V_{iy_{it}t}}}{\sum_{j \in J_t} e^{V_{ijt}}} \right] \qquad \text{Equation (2)}$$

which corresponds to a product of logits. The unconditional probability of individual *i’s* sequence of choices is the integral of the expression $L(y_i \mid \beta)$ over β, $L(y_i \mid b,W) = \int L(y_i \mid \beta) f(\beta \mid b,W) d\beta$, where $f(\beta \mid b,W)$ is the multivariate distribution of the parameters. Summing the logarithm of the unconditional probabilities gives the log-likelihood function, $\sum_i \ln L(y_i \mid b,W)$. We assume a fixed price coefficient and multivariate normally distributed coefficients for the remaining variables in the model (Bonnet and Simioni 2001; Scarpa and Del Giudice 2004). The normal distribution, having support on both the negative and positive range, implies that some consumers like and some consumers dislike the considered attributes.

Parameter estimates for β_P, b and W can be obtained by simulated maximum likelihood methods or via a hierarchical Bayesian procedure following the approach developed by Allenby (1997) and generalized by Train (2001). We use the second method.[9] Specifically, we estimate the mixed logit model using Matlab code written by Train for panel data with correlated coefficients based on hierarchical Bayes.[10] The Bayesian approach has been used in previous studies of consumers' preferences for food products (e.g., Hu et al. 2006).

EMPIRICAL RESULTS

As a baseline set of estimates, Table 3 presents results for the fixed coefficient multinomial logit and MXL with random (normal) independent coefficients for the utility specification in (1).

Insert Table 3 here.

Based on the likelihood ratio test we reject both models in favor of the MXL model with random correlated coefficients that is presented in Table 4 (model 1).

Insert Table 4 here.

Table 4 also presents estimates for two alternative models that differ with regards to their classification of the GI variable(s).[11] In the base model (model 1), a single dummy variable "GIs" is included (equal to 1 for PDO Terra di Bari, PDO Garda or PGI Tuscany oils). In model 2, two dummy variables are used to separate the two types of GIs, PDO and PGI (one dummy equal to 1 for PGI Tuscany and one dummy equal to 1 for PDO Terra di Bari or PDO Garda oils). Finally, model 3 includes three dummy variables, one for each of the considered GI labels (Tuscany, Terra di Bari and Garda).

In all three models price is negative and statistically different from zero as one would expect. With regard to COOL, in each of the three models the posterior mean for the Italy coefficient is found to be positive and statistically different from zero. The estimates reveal that Canadian consumers (81-86% depending upon the model) prefer Italian olive oils over Spanish oils and are willing to pay a considerable premium (ranging from 7.68 to 9.48 CAD$/Liter) for Italian oils.[12] As well, the variance coefficient for Italy is found to be significant and sizable indicating that consumers are heterogeneous in their preferences for Italian oils. The posterior mean of the Greece coefficient is not found to be significant indicating that the sample of Canadian consumers does not prefer Greek over Spanish oils or vice versa.

In model 1, the coefficient for the single included GI dummy variable is positive and significant indicating that consumers respond to and are willing to pay a premium for GI olive oils. But, when comparing the estimates for Italian labels and GI labels, an interesting result emerges. For both types of oils, Italian and Italian GI, a large percentage of consumers are estimated to have a positive preference, but the percentage is greater for

Italian oils over GI oils (86% versus 70%). As well, the average WTP for Italian oils is twice that of the GI oils (9.48 versus 4.74 CAD$/Liter). This indicates that, while consumers are willing to pay a premium for Italian COOL and GI labels, the country-of-origin label captures much of the premium. This result is found to be consistent across the three models.

To test the hypothesis that consumers value PDO more than PGI, in model 2 dummy variables are included to separate the PGI (Tuscany PGI) from the PDO labels (Terra di Bari PDO and Garda PDO). Consistent with expectations, we find that consumers are willing to pay slightly more on average for the PDO than for the PGI oils (5.66 versus 4.48 CAD$/Liter). While this result provides evidence that PDOs are considered superior to PGIs (in fact, PDOs require a stronger geography-quality link in order to obtain certification than PGI), particularly given that the PGI used in this study is from a well-known tourist region associated with fine food products while the PDOs are from lesser known regions, it presents only part of the picture. We also find that for the PDOs, the estimated variance coefficient is quite large indicating sizable heterogeneity among the sample's preferences for these GIs. As well, the estimated share of consumers with positive preferences is only slightly more than half (57%). Conversely, for the Tuscan GI, the variance is magnitudes less and a larger share has positive preferences (76%). These results combined indicate that Tuscany is a more recognizable and widely valued GI, even though the premium consumers are willing to pay is lower than for the less recognized, but higher geography-quality linked, PDO oils.

Of the other considered attributes, neither of the two appearance features (opaque vs. non-opaque and yellow vs. green) are found to play a significant role in determining consumers' choices of oils. This falls in line with expectations that visual attributes of olive oils are not reliable cues for quality.[13]

The estimates across the three models provide strong evidence that consumers have favorable views of organic olive oils. In models 1 and 2 the estimated percentage of consumers with positive preferences for organic olive oils is 77% and 91% respectively. These results straddle the findings by Scarpa and Del Giudice (2004) that about 80% of their sample of Italian consumers prefer organic olive oils. For the two models, we estimate that consumers are willing to pay a sizable premium for organic olive oils of between 8.30 and 8.42 CAD$/Liter.

Taste variation based on consumer shopping location

While the results presented in the previous section provide strong evidence that consumers value both COOL and GI labels (with a greater value for the former), the models also indicate that there is significant taste heterogeneity among individuals. In lieu of considering commonly available socio-economic attributes (e.g., gender or age), which have been shown to be poor explanatory variables for taste heterogeneity, we consider differences in preferences based upon consumer shopping locations. Under the assumption that attributes unobserved by the researcher result in consumer self-selection in terms of their shopping locale, we can exploit this to compare preferences across consumer segments.

As discussed in the experimental procedure section, the sample for this study was drawn from three store types: supermarkets, gourmet stores, and farmers markets. One would expect preferences and unobserved individual level attributes to be related to consumers' selection of their primary shopping markets. For example, one might postulate that an individual who chooses to shop at a gourmet store would have a greater preference for ethnic or traditional products. As well, one might expect that individuals who choose to shop at farmers markets would have stronger preferences for natural, local and fresh foods when compared to shoppers at other locations.

To compare estimates across shopping locations, model 1 from the previous section was re-estimated using data from three sub-samples of consumers partitioned based upon their interview location. Table 5 presents, for each of the shopping locations, the ratio of the estimated posterior means for three measures comparing relative valuations: Italy COOL / Organic, GI / Organic, and Italy COOL / GI.

Insert Table 5 here.

From the ratios presented in table 5, it is evident that there are significant differences in preferences across the three shopping location sub-samples. Ceteris paribus, gourmet store patrons prefer Italian over organic olive oils by a significant factor of 3.42. Conversely, for supermarket and farmers market shoppers, the ratios are less than one indicating that they prefer organic over Italian oils. When considering GI versus organic olive oil, the picture is similar with gourmet store patrons preferring the former and supermarket and farmer market patrons preferring the latter. Interestingly, the relative preference for Italy versus GI is fairly similar across the three shopping locations and ranges from a factor of 1.65 to 1.92. This indicates that preference for Italy COOL over Italy GI labels is consistent across consumers in different shopping segments. As a whole, the results presented in table 5 tend to support the hypothesis that consumers who self-select in terms of their shopping location do have varying preferences. But the greatest variation is found to be between gourmet and non-gourmet shoppers in terms of their relative valuations for geographical origin labeled olive oils and organic olive oils.

CONCLUSIONS

Motivated by the recognition that geography is often correlated with, or an important determinant of, the overall quality of agricultural products, regulators, consumer groups, and industry representatives have increasingly considered the potential role of geographical origin labels as consumer information and marketing tools. In this article we investigate whether consumers indeed recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study has disentangled three nested forms of geographical origin labels.

Our findings are consistent with the outlined theoretical framework. We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay varies, ceteris paribus, across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI. Finally, to better account for taste heterogeneity among consumers, we partition the sample on the basis of consumers' choice of shopping location and find that different consumer groups vary to a large degree in their valuations for COOL, GI, and organic olive oils.

As a whole, our findings are consistent with the hypothesis that geographical origin labels are valued by consumers for their ability to provide information regarding the quality of the product and that the value is increasing with the informational content. Nevertheless, as the data show, the additional premia for GIs and PDO are relatively smaller than the premium for COOL, indicating that there might be decreasing returns to geographical labeling. Therefore, given that pursuing and receiving protected geographical indication status and meeting the required standards is not without cost, producers considering further geographical differentiation of their products beyond the country of origin level should interpret our findings with caution.

Footnotes

[1] Examples include bovine spongiform encephalopathy (BSE), E-coli, Salmonella, botulism, and harmful bacteria.

[2] For country of origin, the debate is largely between advocates who argue that mandatory COOL requirements would provide vital information to consumers regarding safety and opponents who assert that it imposes unnecessary or costly regulatory burdens on producers and retailers which ultimately hurt consumers. Additionally, opponents contend that COOL requirements effectively impose new non-tariff trade barriers that hamper international trade (e.g., see Rude, Iqbal, and Brewin 2006). For geographical indications, the debate regards the conflicting forms of cross-country legal protection for GIs and the level of exclusiveness reserved to GI names (Josling 2006).

[3] The empirical literature on COOL has grown to be quite large. Recent works focusing on agriculture include Loureiro and Umberger (2003), Alfnes and Rickertsen (2003), Umberger (2004), Tonsor, Schroeder, and Fox (2005), Carter, Krissoff and Peterson Zwane (2006), and Chung, Boyer and Han (2009). For reviews of works outside of the agricultural product space see Bilkey and Nes (1982) and Verlegh and Steenkamp (1999).

[4] See for example Bonnet and Simioni (2001), van der Lans et al. (2001), Scarpa and Del Giudice (2004), Santos and Ribeiro (2005), and Krystallis and Ness (2005). For an overview of empirical studies see Réquillart (2007).

[5] The so-called "friends of geographical indications" consists of a group of WTO member countries that includes the European Union, Guinea, India, Jamaica, Kenya, Kyrgyz Republic, Macedonia, Madagascar, Morocco, Pakistan, Sri Lanka, Switzerland, Tanzania,

Thailand and Turkey (see the Intellectual Property Watch's website at http://www.ip-watch.org).

[6] The EU and member States have been at the forefront in investing substantial resources to sponsor the GI certification system and to promote specific GIs in international markets, including the United States, Russia and China (see e.g., the Italian ministry of Agriculture' website at http://www.agricolturaitalianaonline.gov.it). However, while the EU may have a longer history with GIs, other countries are introducing or expanding their own GI systems and promotion programs. Examples include China (Xiaobing and Kireeva 2007), India (Rao 2006), South Korea (Suh and MacPherson 2007), Colombia (Teuber 2007). Kenya and Switzerland have an ongoing project aimed at developing a GI system of protection in Kenya and at raising awareness on GIs in the East African Community member states (see the Swiss Institute of Intellectual Property's website at https://www.ige.ch/en.html).

[7] Profiles are characterized by unbalanced levels. Related studies (Van der Lans et al. 2001; Scarpa and Del Giudice 2004) also rely upon unbalanced profiles.

[8] For example, organic olive oils in Spain capture a price premium varying from 30-35% for loose oil to 100% for bottled oil (Medicamento and De Gennaro 2006).

[9] For readers who may be less familiar with Bayesian methods, the Bernstein-von Misen theorem guarantees that the estimators resulting from the Bayesian procedure has the same properties as the large sample maximum likelihood estimator. "The researcher can therefore use the Bayesian procedures to obtain parameter estimates and then interpret

them as if they were maximum likelihood estimates" (Train 2003 Ch. 12 p. 287), where "…the mean of the posterior provides the point estimate and the standard deviation of the posterior provides the standard error" (Train 2003 Ch. 12 p. 294).

[10] Available at Train's webpage http://elsa.berkeley.edu/~train/software.html.

[11] Estimates of the variance-covariance matrix for the three models are available upon request from the authors.

[12] This corresponds with the "informal notion" that Italy enjoys an unrivaled international reputation for olive oil (Lusk et al. 2006; Anania and Pupo D'Andrea 2007).

[13] The appearance (opaque vs. non-opaque) and the color of olive oil widely depend on the olives' variety and the transformation techniques (settling and filtration) and are generally not reliable indications of the quality of olive oil.

References

Alfnes, F., A.G. Guttormsen, G. Steine, and K. Kolstad. 2006. Consumers' Willingness to Pay for the Color of Salmon: a Choice Experiment with Real Economic Incentives. American Journal of Agricultural Economics 88(4):1050-1061.

Alfnes, F., and K. Rickertsen. 2003. European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets. American Journal of Agricultural Economics 85(2):396-405.

Allenby, G. 1997. An introduction to hierarchical Bayesian modeling. Tutorial Notes, Advanced Research Techniques Forum, American Marketing Association.

Akerlof, G.A. 1970. The Market for Lemons: Quality Uncertainty and the Market Mechanism. Quarterly Journal of Economics 84: 488-500.

Anania, G. and M. R. Pupo D'Andrea. 2007. The global market for olive oil: actors, trends, prospects and research needs. Paper prepared for presentation at the I Mediterranean Conference of Agro-Food Social Scientists, 103rd EAAE Seminar "Adding Value to the Agro-Food Supply Chain in the Future Euro-Mediterranean Space." Barcelona, Spain, April 23rd - 25th, 2007.

Baker, G.A. and T.A. Burnham. 2001. Consumer Response to Genetically Modified Foods: Market Segment Analysis and Implications for Producers and Policy Makers. Journal of Agricultural and Resource Economics 26:387-403.

Bech, M. and D. Gyrd-Hansen. 2005. Effects coding in discrete choice experiments. Health Economics 14:1079-1083.

Bilkey, W.J. and E. Nes. 1982. Country-of-origin effects on product evaluations. Journal of International Business Studies 8(Spring/Summer):89-99.

Bonnet, C. and M. Simioni. 2001. Assessing consumer response to protected designation of origin labeling: a mixed multinomial logit approach. European Review of Agricultural Economics 28 (4) 433-449.

Carter, C., B. Krissof and A. Peterson Zwane. 2006. Can Country-of-Origin Labeling Succeed as a Marketing Tool for Produce? Lessons from Three Case Studies. Canadian Journal of Agricultural Economics, 54:513-530.

Chung, C.,T. Boyer and S. Han. 2009. Valuing Quality Attributes and Country of Origin in the Korean Beef Market. Journal of Agricultural Economics, 60 (3):682-698.

Clemens, R. and B.A. Babcock. 2004. Country of Origin as a Brand: The Case of New Zealand Lamb. MATRIC Briefing Paper 04-MBP 9 November 2004.

Gilmore F. 2002. A country - can it be repositioned? Spain - the success story of country branding. Journal of Brand Management 9(4/5):281-293.

Green, P.E. and V. Srinivasan. 1978. Conjoint Analysis in Consumer Research: Issues and Outlook. Journal of Consumer Research 5 (September):103-23.

Hu, W., M.M. Veeman and W.L. Adamowicz. 2005. Labelling Genetically Modified Food: Heterogeneous Consumer Preferences and the Value of Information. Canadian Journal of Agricultural Economics 53(1):83-102.

Hu, W., M.M. Veeman, W.L. Adamowicz and G. Gao. 2006. Consumers' Food Choices with Voluntary Access to Genetic Modification Information. Canadian Journal of Agricultural Economics 54(4):585-604.

IOOC. 2006. International Olive Oil Council, http://www.internationaloliveoil.org, August 1st, 2006.

IOOC. 2007. International Olive Oil Council, http://www.internationaloliveoil.org/web /aa-ingles/oliveWorld/aceite.html, December, 5th, 2007.

Josling, T. 2006. The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict. Journal of Agricultural Economics 57:337-363.

Krystallis, A. and M. Ness. 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 (2): 62-91.

Kuhfeld, W.F. 2001. Multinomial Logit, Discrete Choice Modeling: An Introduction to Designing Choice Experiments, and Collecting, Processing, and Analyzing Choice Data with SAS. TS-643. SAS Institute Inc., Cary, NC, USA.

Lence, S.H., S. Marette, D. Hayes, and W. Foster. 2007. Collective Marketing Arrangements for Geographically Differentiated Agricultural Products: Welfare Impacts and Policy Implications. American Journal of Agricultural Economics 89:947–963.

Loureiro, M.L., and J.J. McCluskey. 2000. Assessing Consumer Response to Protected Geographical Indication Labeling. Agribusiness 16(3): 309-320.

Loureiro, M.L., and W.J. Umberger. 2003. Estimating Consumer Willingness to Pay for Country-of-Origin Labeling. Journal of Agricultural and Resource Economics 28: 287-301.

Louviere, J.J., D.A. Hensher and J.F. Swait. 2000. Stated Choice Methods and Analysis. Cambridge: Cambridge University Press.

Lusk, J.L., J. Brown, T. Mark, I. Proseku, R. Thompson, and J. Welsh. 2006. Consumer Behavior, Public Policy, and Country-of-Origin Labeling. Review of Agricultural Economics 28(2): 284–292.

Medicamento, U. and B. De Gennaro. 2006. Social Networks and Supply chain Management in Rural Areas: A Case Study Focusing on Organic Olive Oil. Poster paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006.

Moschini, G.C., L. Menapace and D. Pick. 2008. Geographical Indications and the Competitive Provision of Quality in Agricultural Markets. American Journal of Agricultural Economics 90:794-812.

Nelson, P. 1970. Information and Consumer Behaviour. Journal of Political Economy 78:311-329.

Nelson, P. 1974. Advertising as information. Journal of Political Economy 82:729-754.

Rao, S.S. 2006. Indigenous knowledge organization: An Indian scenario. International Journal of Information Management 26:224–233.

Réquillart, V. 2007. On the Economics of Geographical Indications in the EU. Paper presented at the workshop “Geographical Indications, Country of Origin and

Collective Brands: Firm Strategies and Public Policies. Toulouse, June 14-15, 2007.

Rude, J., J. Iqbal and D. Brewin. 2006. This Little Piggy Went to Market with a Passport: The Impacts of U.S. Country of Origin Labeling on the Canadian Pork Sector. Canadian Journal of Agricultural Economics 54:401–420.

Santos, J.F. and J.C Ribeiro. 2005. Product attribute saliency and region of origin: Some empirical evidence from Portugal. Paper prepared for presentation at the 99th seminar of the EAAE (European Association of Agricultural Economists), "The Future of Rural Europe in the Global Agri-Food System." Copenhagen, Denmark, August 24-27, 2005.

Scarpa, R. and T. Del Giudice. 2004. Market segmentation via Mixed Logit: Extra-Virgin Olive Oil in Urban Italy. Journal of Agricultural and Food Industrial Organization 2(7). Available at: http://www.bepress.com/jafio/vol2/iss1/art7.

Street, D.J., and L. Burgess. 2007. The Construction of Optimal Stated Choice Experiments. New York: Wiley.

Suh, J., and A. MacPherson. 2007. The impact of geographical indication on the revitalisation of a regional economy: a case study of 'Boseong' green tea. Area 39(4):518-527.

Teuber, R. 2010. Geographical Indications of Origin as a Tool of Product Differentiation – The Case of Coffee. Journal of International Food and Agribusiness Marketing, forthcoming.

Tonsor, G.T., T.C. Schroeder, and J.A. Fox. 2005. European Preferences for Beef Steak Attributes. Journal of Agricultural and Resource Economics 30(2):367-380.

Train, K.E. 2001. A comparison of hierarchical Bayes and maximum simulated likelihood for mixed logit. Working Paper, Department of Economics, University of California, Berkeley.

Train, K.E. 2003. Discrete Choice Methods with Simulation. Cambridge, MA: Cambridge University press.

Türkekul, B., C. Günden, C. Abay, and B. Miran. 2007. A Market Share Analysis of Virgin Olive Oil Producer Countries with special respect to Competitiveness. Paper prepared for presentation at the I Mediterranean Conference of Agro-Food Social Scientists. 103rd EAAE Seminar "Adding Value to the Agro-Food Supply Chain in the Future Euromediterranean Space." Barcelona, Spain, April 23 - 25, 2007.

Umberger, W.J., D.M. Feuz, C. R. Calkins and B.M. Sitz. 2003. Country of Origin Label of beef products: U.S. Consumers' Perceptions. Journal of Food Distribution Research 34(3):103-116.

Unterschultz, J., K.K. Quagrainie, M. Veeman and R.B. Kim. 1998. South Korean Hotel Meat Buyers' Perceptions of Australian, Canadian and U.S. Beef Canadian. Journal of Agricultural Economics 46:53–68.

Van der Lans, I.A., K. van Ittersum, A. De Cicco and M. Loseby. 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(4):451-477.

Verlegh, P.W.J. and J-B.E.M. Steenkamp. 1999. A review and meta-analysis of country-of-origin research. Journal of Economic Psychology 20(5):521-546.

Van Ittersum, K., M.T.G. Meulenberg, H.C.M van TRijp and M.J.J.M Candel. 2007. Consumers' Appreciation of Regional Certification Labels: A Pan-European Study. Journal of Agricultural Economics 58(1):1-23.

West, G.E., B. Laruce, C. Gendron and S.L. Scott. 2003. Consumer Confusion over the Significance of Meat Attributes: The Case of Veal. Journal of Consumer Policy 25:65-88.

Xiaobing, W. and I. Kireeva. 2007. Protection of Geographical Indications in China: Conflicts, Causes and Solutions. The Journal of World Intellectual Property 10(2): 79–96.

Zago, M.A., and D. Pick. 2004. Labeling Policies in Food Markets: Private Incentives, Public Intervention, and Welfare Effects. Journal of Agricultural and Resource Economics 29(1): 150-165.

Table 1. Socio-economic characteristics of sample

Variable	Variable Definition	Count	% of Sample
Gender	Male	83	40
	Female	124	60
Age in years	19 – 34	38	18
	35 – 50	82	40
	51 – 60	49	24
	Older than 60	38	18
Education	Primary / Secondary	51	24
	Undergraduate	113	55
	Graduate	43	21
Income	Less than CAD $ 49,999	40	19
	CAD $ 50,000 – 99,999	86	42
	More than CAD $ 100,000	52	25
	No Answer	30	14
Household Size	1 Person	46	22
	2 Persons	82	39
	3 Persons	34	17
	4 Persons	34	17
	More than 4 Persons	11	5

Table 2. Summary of other variables used in the analysis

Variable			Variable Definition
O			1 if organic
A			1 if non-opaque, 0 if opaque
Y			1 if yellow, 0 if green
I[a]			1 if Italian oil
K[a]			1 if Greek oil
N			1 if "none-of-them"
Model 1	Model 2	Model 3	GI Variable Definition
G			1 if any GI (Tuscany, Terra di Bari, Garda)
	PGI		1 if PGI Tuscany
	PDO		1 if PDO Terra di Bari or PDO Garda
		T	1 if PGI Tuscany
		B	1 if PDO Terra di Bari
		R	1 if PDO Garda

[a] An indicator for Spanish olive oil is omitted.

Table 3. MNL and independent coefficient MXL parameter estimates

	Independent Coefficient MXL		MNL
	Mean Coeff.	**Variance Coeff.**	**Mean Coeff.**
Price	-0.253***	-	-0.194***
	(0.023)		(0.017)
Organic	2.385***	7.495***	2.525***
	(0. 515)	(1.987)	(0.359)
Non-Opaque	-0.179	1.699***	-0.039
	(0. 174)	(0.600)	(0.099)
Yellow	0.340	1.260***	0.489***
	(0. 218)	(0.588)	(0.149)
Italy	2.391***	4.192***	1.485***
	(0. 292)	(1.222)	(0.151)
Greece	0.114	1.127	0.353
	(0. 275)	(0.850)	(0.192)
GIs	1.015***	4.282***	0.790***
	(0. 262)	(1.263)	(0.159)
Nesting Dummy	-9.494***	17.787***	-3.778***
	(1.162)	(6.902)	(0.253)
Log-Likelihood	-1263		-1433

The asterisks indicate the level of significance at 1% for ***, 5% for **, and 10% for *.

Table 4. Parameters estimates of Mixed Logit Models with random correlated coefficients

	Model 1				Model 2				Model 3			
	Mean Coeff.	**Variance Coeff.**	**S>0 [a]**	**WTP [b]**	**Mean Coeff.**	**Variance Coeff.**	**S>0 [a]**	**WTP [b]**	**Mean Coeff.**	**Variance Coeff.**	**S>0 [a]**	**WTP [b]**
Price	-0.306*** (0.029)	-	-	-	-0.373*** (0.046)	-	-	-	-0.393*** (0.053)	-	-	-
Organic	2.576*** (0.617)	5.227*** (2.064)	77%	8.42	3.096*** (0.638)	4.967* (2.584)	91%	8.30	5.187*** (0.983)	7.043*** (2.726)	97%	13.20
Non-Opaque	0.041 (0.245)	2.977*** (0.858)	67%	0.13	-0.202 (0.543)	6.710*** (2.074)	67%	-0.54	0.486 (0.630)	6.139*** (2.213)	53%	1.24
Yellow	0.000 (0.303)	3.089*** (1.048)	51%	0.00	0.054 (0.367)	5.074*** (1.644)	64%	0.14	1.009* (0.490)	4.784*** (1.659)	67%	2.57
Italy	2.899*** (0.415)	9.558*** (2.951)	86%	9.48	2.915*** (0.449)	10.750*** (3.231)	85%	7.81	3.017*** (0.596)	11.801*** (3.786)	81%	7.68
Greece	0.368 (0.395)	5.826*** (2.120)	60%	1.20	0.016 (0.412)	6.489*** (2.353)	54%	0.04	0.128 (0.442)	8.355*** (3.197)	52%	0.33
GIs	1.451*** (0.284)	3.955*** (1.263)	70%	4.74	-	-	-	-	-	-	-	-
PGI Tuscany	-	-	-	-	1.669*** (0.296)	3.321*** (1.209)	76%	4.48	1.612*** (0.327)	3.499*** (1.255)	78%	4.10
Other GIs [c]	-	-	-	-	2.109* (1.278)	20.611*** (7.045)	57%	5.66	-	-	-	-
PDO Terra di Bari	-	-	-	-	-	-	-	-	-0.769 (1.825)	17.963 (12.500)	82%	-1.96
PDO Garda	-	-	-	-	-	-	-	-	1.535 (1.533)	30.083* (14.506)	60%	3.91
None-of-Them	-9.185*** (1.070)	24.452*** (7.771)	-	-	-10.904*** (1.857)	38.647*** (16.217)	-	-	-8.673*** (2.059)	24.336 (15.836)	96%	-
Log-Likelihood	-1232				-1215				-1204			

The asterisks indicate the level of significance at 1% for ***, 5% for **, and 10% for *.
[a] S > 0 denotes share of consumers with positive preferences.
[b] Willingness to pay is measured in Canadian dollars per Liter.
[c] Other GI denotes a PDO Terra di Bari or PDO Garda olive oil (i.e. not a Tuscan GI)

Table 5. Ratio of mean estimates

Shopping Location	Sample Size	Italy/Organic	GI/Organic	Italy/GI
Gourmet Store	57	3.42	1.78	1.92
Supermarket	101	0.79	0.46	1.71
Farmer market	49	0.58	0.35	1.65