# What Determines the Success of a Geographical Indication?

# A Price-based Meta-Analysis for GIs In Food Products

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## Introduction

Over the past two decades a global and liberalized agricultural and food market emerged, partly motivated by conclusion of the Uruguay round of the General Agreement on Tariffs and Trade (GATT) and the creation of the World Trade Organization (WTO). Perhaps reacting to increased cost competition from developing countries, US and EU agricultural markets started shifting from a focus on commodity to differentiated markets in hopes of capturing value for quality derived by more affluent consumers (Herrmann and Tauber 2010).

Food producers and manufacturers differentiate products in a variety of ways, namely through systems of production (organic vs. conventional farming), health or nutrition claims or use of genetically modified inputs (Levidow and Bijman 2002). Identification that is easily distinguishable (through brands and labels) and meaningful (through governmental and industry standards) is essential to effective product differentiation and a critical element of marketing strategies that perform well in complex food supply chains. The name or brand of a product is an important piece of information to consumers, which provides cues about more intangible attributes that consumers seek (Caswell, 1998). In short, the label of differentiated products is often associated with both tangible and intangible features.

Companies producing and marketing processed foods such as beer, breakfast cereals and beverages have been using brands for almost a century. However, for most agricultural products or minimally-processed foods, brands only recently started being a more common marketing strategy. Nevertheless, for some of these products, origin has been used to differentiate those products in informal ways as well as through promotional campaigns. For example, certain regions have become synonymous with products, such as Vidalia onions, Idaho potatoes and Colorado Rocky Ford melons. Internationally, several Southern European regions have long-established reputations for heritage foods, such as Parma's cheese Parmigiano Reggiano and Champagne's sparkling wine.

Firms and policy makers have long realized the potential of geographical origin (Geographical Indications, GI henceforth) to impact product valuation, international trade flows and farm policy (Herrmann and Tauber 2010). Still, using origin to name products will only succeed if it is associated with attributes sought by consumers, i.e. if it adds to a strategic marketing strategy and value proposition. Furthermore, certain agricultural products may be more suitable than others for GI-based differentiation. Developing a brand, raising awareness and customer loyalty that elevate its status all take time and require considerable investment in promotion and marketing relationships (with consumers, retailers, chefs and media). Thus if there is already well established consumer preference and loyalty associated with a certain geographical origin, using such names can lead to savings in marketing efforts, thereby suggesting a competitive advantage in a global marketplace.

In the early 1990's, the European Union conferred legal protection to foods and foodstuffs with a GI, through Regulation (EEC) 2081/92 (EEC Council 1992). At the core of such legislation is the idea that products originating from certain regions are *sui generis,* in that a direct link between the product origin and its final quality has been demonstrated (Herrmann and Tauber 2010). Such link may be established via the set of standardized processing practices typical of a region, or the concept of *terroir,* which Josling (2006) identifies as the essential link between the location of production and the quality of a food or beverage. While the EU legislation on GIs is perhaps the most fully articulated and comprehensive (Josling 2006), other countries have their own systems.

As of February 2011, there were 970 products registered with a PDO or PGI (465 PGI and 505 PDOs) by the EU Commission. These are divided into ten main product groups: 1) fresh meat; 2) meat products; 3) cheeses; 4) other products of animal origin; 5) oils and fats; 6) fruits, vegetables and cereals; 7) beers; 8) waters; 9) bread, pastry and confectionary products; and 10) essential oils (European Commission 2011). While the total volume of sales for GI products has steadily grown, their market penetration in the EU is still somewhat limited. Between 2005 and 2008, total sales varied from 13,695 to 14,519 million euro (EUDG, 2011). Moreover this turnover was not equally split across product

categories or countries. Rather, Italy, France and Spain had the lion share of this revenues. For example, Italy had 34 of the 163 cheeses registered as a PDO or a PGI as of 2008. The turnover of Italian GI cheeses was 3,122 million Euros, which represented 60% of the total EU volume. Moreover, PDO/PGI cheeses had a third of the total turnover of GI products in the EU. The main difference between PDO and PGI certified products is that PGI certification is granted as long as a certain stage of the production process takes place in a specific region; while for PDO certification all stages of production must take place in a certain region (O'Connor, 2007).

In addition to the 970 products formally registered as geographical indications in the EU, one needs to add a number of wine geographical regions and products named after their origin in regions across the world. In many regions producers have used GIs along with their own brands. This is particularly clear in wine GI (Costanigro et al 2010) and, increasingly, in olive oils (Sottomayor et al 2010; Menapace). However, not all GIs are equally successful or renowned in the marketplace. Indeed, the large literature of studies empirically estimating the (ceteris paribus) price premium attributable to GIs has produced a wide spectrum of estimates, ranging from non-significance to very large amounts.

Why is there such difference across countries and products in the use and economic importance of GIs? What makes a GI successful? What explains variations in willingness to pay (WTP) across different products? The aim of this paper is to the address these questions. More specifically, we aim to explore what factors (product-based, place-based and research-based) explain the differences across consumer willingness to pay for different GIs. Towards this goal, we conduct a meta-analysis using a range of studies quantifying the premium (over the prevailing market price) paid by consumers for agricultural products carrying a specific GI.

An obvious answer to why consumers may be willing to pay a premium for GI products is product quality. But, as the broader literature on food product differentiation illustrates, quality can be defined by a complex array of tangible and intangible product and process attributes. Moreover, it is

reasonable to believe that other factors might influence the value of a GI name. For example, a formalized certification framework might increase the effectiveness of GIs. In contrast, for ethnocentric consumers, the identification of a region may suffice, as consumers may believe they are supporting an economy to which they are affiliated (Herrmann and Tauber 2010). Finally, the importance and value assigned to a GI may relate to consumer perceptions about how relevant place-based indicators are to particular food categories (as categorized by food type, level of processing and importance of place-based production resources).

In this article we investigate the hypothesis that WTP premia for GIs may vary by product, regional designation or research approach. A secondary hypothesis is that if there are variations among products, the patterns may be partially explained by the complexity of post-farm food supply chain activities that take place before final marketing. Next we offer an overview of EU and US policy and literature on the use of GI in food products. Then we introduce our methodology. In the fourth section of this paper we present and discuss our results. Finally we offer some final remarks and suggest future research.

**Legislative and Institutional Background**

Agricultural and foods products have long been associated with unique characteristics and heritage aspects of their origin. Geographical names have been used since classical times to designate products with exceptional quality: for example, classic documents reveal the notoriety of olive oils from Baetica in Rome (Blasquez, 1992). Through the ages, a number of other products identified with their origins emerged and established a niche in food and beverage markets. Well-known examples are the wines of Bourdeaux or Porto, the cheeses of Parma or Rochefort or the hams from Parma or Bayone. Protection of this “intellectual property” associated with unique terroir, food culture or processing acumen is a primary goal of new GI marketing policies.

There are many reasons for the surge of consumer interest related to geographical indication. Bramley, Biénabe and Kirsten (2009), claim that a main reason is the rise of income and concerns for food quality, safety and variety. This motive may have an opposite effect if the current economic downturn persists. Another potential reason is ethnocentric preferences or home bias, which states that consumers tend to prefer products from the region or country with which they identify (Scarpa et al 2005), or alternatively, preferences related to origin of the ancestors with which a consumer identifies. As yet another example, Broude (2005) suggests that GIs are sought after by an increasing number of consumers as a reaction to counteract the perception that increasing globalization has led to overly standardized food choices imposed by international brands. Others may associate GI with a type of authenticity, cultural heritage or the ability to trace food they eat to its origin (Herrmman and Tauber 2010).

Besides demand side motives, GI were recognized as an important ingredient or instrument to raise farmers' incomes and promote rural development (Josling 2006). This is particularly evident in the EU, where in the preamble of both EEC Council regulation 2081/92 and more recently in its revised version, Council Regulation (EC) No 510/2006, it is stated that "The promotion of products having certain characteristics can be of considerable benefit to the rural economy, particularly in less favoured or remote areas, by improving the incomes of farmers and by retaining the rural population in these areas" (p.12). Still, these objectives can only be attained if we use a strict and limited definition of GI and if geographical name implies creation of value in a well defined region.

In the US, GIs are protected within the standard trademark system, and simply certify the geographical origin of a product and its principal ingredients. The U.S. Trademark Act provides that geographic names or signs--which otherwise would be considered primarily geographically descriptive -- can be registered as certification marks. A certification mark is any word, name, symbol, or device used by a party or parties other than the owner of the mark to certify some aspect of the third parties' goods/services. There are three types of certification marks used to indicate: 1) regional or other origin; 2)

material, mode of manufacture, quality, accuracy or other characteristics of the goods/services; or 3) that the work or labor on the goods/services was performed by a member of a union or other organization. The U.S. Trademark Act differentiates certification marks from trademarks by two characteristics. First, a very important feature of a certification mark is that its owner does not use it. Second, a certification mark does not indicate commercial source nor distinguish the goods or services of one person from those of another person. This suggests it is a quasi-public good for all producers of a certain geographic area.

Clearly, the type of GI used will impact both consumer valuation and policy implications. Likely, when the geographical name is decoupled from a production or processing activity both consumer preferences and impact on rural development will be affected (Herrmann and Tauber 2010). Similarly, the use of a broader geographical name, say a country, will only be associated with higher quality when it is coupled with some quality standard (Clemens and Babcock 2004; Herrmann and Tauber 2010).

There is not a single and unanimous definition of a GI. Rather a number of definitions exist and, as suggested by Herrmann and Tauber (2010), they lie on a spectrum ranging from a very loose link between a geographical name and product to a very intrinsic link between the origin, the product and its characteristics. Thus, in one end of the continuum, are products with a very loose link to the place where they are produced, they simply are made there, without any claim to special attributes because of that fact. There are products labelled with a "made at/in …" mark. On the other end, we have products with a intrinsic relation to their local of production. These products have a well-defined link between origin, product and quality best translated by the French word *terroir.* ,A clear example being wines where viticultural areas have long been used as effective differentiation schemes. *Terroir* refers to both the agroecological, geological and climatic as well as human factors present in a place that contribute to the uniqueness of products there produced (Broude 2005).

Consequently not every product seems equally suitable to capture the benefits of a geographical association. The literature briefly reviewed in here, suggests that the closer the link between product's

quality and the locale of production the stronger will be consumer preference. However, even when GIs are decoupled from a quality link, GI names may still capture positive premiums due to home bias preferences or heritage-based preferences. By examining WTP for GI products from different points of the definition space we hope to contribute to the literature's understanding of how consumers value GIs. In the next section we describe the methodology used in this study.

**Data and Methodology**

Individual valuation studies published within the last two decades were collected and the information was compiled into a database. Products were clustered in groups (such as dairy, meat, fruit, etc) and information pertaining to the following variables was extracted from each study's narrative: data collection and location the study, country demographics, legislative medium (e.g. Protected Designation of Origin, Protected Geographical Indication, or other type certification), type of data in original study (i.e. survey, experiment, scanner data, etc), original valuation methodology used to estimate the price premium (hedonic methods, contingent valuation, etc), and willingness to pay/ or price premium (in percentage). We indentified 19 studies, however as several of these studies report estimates for several products, the dataset contains 122 observations in total.

**Table 1. Description of variables in meta-analysis:**

| | |
|---|---|
| **WTP (%)** | Value of the product in percentage price premium (+/ -) % |
| **WINE** | Binary variable coded 1 if the product is in Wine Category, 0 otherwise |
| **CHEESE** | Binary variable coded 1 if the product is in Cheese Category, 0 otherwise |
| **COFFEE** | Binary variable coded 1 if the product is in Coffee Category, 0 otherwise |
| **MEAT** | Binary variable coded 1 if the product is in Meat Category, 0 otherwise |
| **FRUIT/VEGGIE** | Binary variable coded 1 if the product is in Fruit/Veggie Category, 0 otherwise |
| **OLIVE OIL** | Binary variable coded 1 if the product is in Olive Oil Category, 0 otherwise |
| **GRAIN** | Binary variable coded 1 if the product is in Grain Category, 0 otherwise |
| **EUROPE** | Binary variable coded 1 if the study data pertains to Europe, 0 otherwise |
| **NORTH AMERICA (US & Canada)** | Binary variable coded 1 if the study data pertains to the North America, 0 otherwise |
| **AUSTRALIA/NEW ZEALAND** | Binary variable coded 1 if the study data pertains to Australia/New Zealand, 0 otherwise |
| **SAMPLE SIZE** | Number of observations in sample for each study |
| **PDO** | Binary variable coded 1 if product is PGI, 0 otherwise |

| | |
|---|---|
| **PGI** | Binary variable coded 1 if product is PDO, 0 otherwise |
| **REGIONAL** | Binary variable coded 1 if product is regional (no specific geographic regulation), 0 otherwise |
| **PRIMARY DATA** | Binary variable coded 1 if primary data, 0 if secondary data sources are used |
| **CONJOINT** | Binary variable coded 1 if methodology is Conjoint, 0 otherwise |
| **HEDONIC** | Binary variable coded 1 if methodology is Hedonic, 0 otherwise |
| **OTHER** | Binary variable coded 1 if methodology is not Conjoint, Hedonic; 0 otherwise |
| **LOW/INTERMEDIATE PROCESSED** | Binary variable coded 1 if product involves low to intermediate processing, 0 otherwise |
| **HIGHLY PROCESSED** | Binary variable coded 1 if product is retailed fresh, 0 otherwise |
| **FRESH PRODUCE** | Binary variable coded 1 if product involves a high level of processing, 0 otherwise |

Unfortunately, numerous studies included in the sample do not report data on the socio-demographic characteristics of the sample. Most likely, income is an important determinant of WTP, and more affluent samples may produce larger WTP estimates. Statistically insignificant GI premia estimates were coded as "zero", to represent the fact that there is no evidence that the PDO-PGI certification provides a price premium for those products, yet several studies did not report standard errors or provided enough information to recover them. Other studies attempting meta-analyses encountered similar problems, and following Lusk et al (2005), the lack of information on the statistical precision of estimates was compensated by weighting them by the sample size[1].

The dependent variable, WTP, is normalized across the studies as a percentage increase or decrease of the regulated or regional product price or value relative the price (or value) of the product without label. The percentage presentation of the dependent variable is common in meta-analyses studies (Ehmke, 2006; Lusk et al., 2005), where premiums in different currencies from

[1] As sample size increases, standard errors will diminish. By giving more weight to estimates coming from larger samples, we hope to mitigate the problem of not having specific information on individual WTP significance.

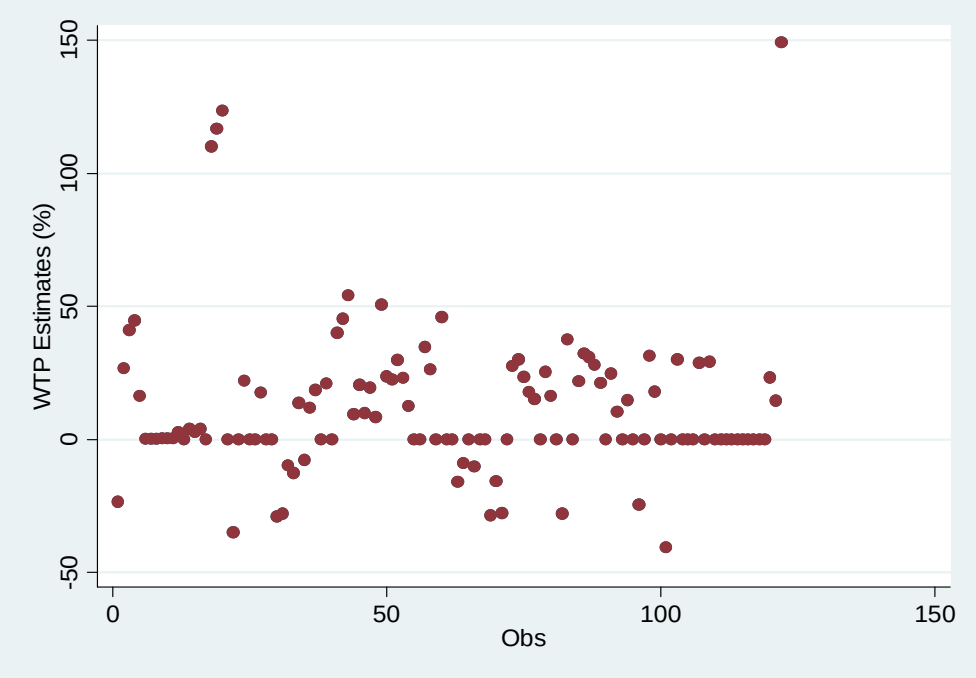
different years concerning different units (i.e., kilograms, pounds, bottles, etc) need to be unified across studies. Here, the percentage was calculated as:

$$\text{WTP (\%)} = \frac{(\text{Price or Value of product with label} - \text{Price or Value of reference product})}{\text{Price or Value of reference product}} \times 100$$

In two studies where information about the reference product was missing (Stefani et al., 2006; Menapace et al., 2011), market prices were used in the above formula to calculate percentages. In a study using an experimental design where a reference price was not given (Groot et al., 2009), the median of the price treatments was used a reference price (following Lusk et al., 2005). For hedonic studies with log-linear specifications, estimated premiums are immediately inferable.

A plot of the WTP variable shows that most estimates fall in the -50% - +50% range, except for four observations which are higher than 100% and appear to be outliers. These four outliers belong to three studies, and they were removed from the sample. The sample containing the remainder 118 observations in 16 studies was used in the rest of the analyses and results in the paper.

**Figure 1. Data scatter plot of WTP estimates (N=122):**




A table of the summary statistics for the variables in this study can be found below:

**Table 2. Summary statistics, data without outliers (N=118):**

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| **WTP** | 7.88 | 18.38 | -40.70 | 53.97 |
| **Wine** | 0.69 | 0.47 | 0 | 1 |
| **Cheese** | 0.08 | 0.27 | 0 | 1 |
| **Coffee** | 0.03 | 0.16 | 0 | 1 |
| **Meat** | 0.08 | 0.28 | 0 | 1 |
| **Fruit/Veggie** | 0.04 | 0.20 | 0 | 1 |
| **Olive Oil** | 0.06 | 0.24 | 0 | 1 |
| **Grain** | 0.03 | 0.16 | 0 | 1 |
| **Europe** | 0.37 | 0.49 | 0 | 1 |
| **N America** | 0.06 | 0.24 | 0 | 1 |
| **Aus/New Zealand** | 0.57 | 0.50 | 0 | 1 |
| **PDO** | 0.25 | 0.43 | 0 | 1 |
| **PGI** | 0.09 | 0.29 | 0 | 1 |
| **Regional** | 0.66 | 0.48 | 0 | 1 |
| **Primary Data** | 0.20 | 0.40 | 0 | 1 |
| **Hedonic** | 0.84 | 0.37 | 0 | 1 |
| **Conjoint** | 0.09 | 0.29 | 0 | 1 |
| **Other** | 0.07 | 0.25 | 0 | 1 |
| **Fresh Produce** | 0.04 | 0.20 | 0 | 1 |
| **Low/Int. Processed** | 0.16 | 0.37 | 0 | 1 |
| **Highly Processed** | 0.80 | 0.40 | 0 | 1 |

The average WTP is positive, indicating, at a first glance, that consumers generally value more GI certified food.

## The Model

This meta-analysis aims to determine how results from studies measuring the premium associated with GIs differ depending on methodological approach and product characteristics. By analyzing these cross sectional differences in estimated premia, this study attempts to find which

study characteristics are important, and also draw some general unifying conclusions about the kind of foods that benefit more from being associated with a GI certification.

Our model specification regresses estimated premia on the product and study characteristics mentioned previously. To account for missing data on the statistical significance of WTP estimates, the regression is weighted by the sample size of each study, thereby giving more weight to observations coming from a larger sample size. Furthermore, the model accounts for within-study correlation of WTP estimates via an appropriately clustered specification of the variance covariance matrix. The tested hypotheses can be summarized as: 1) $\boldsymbol{H0_a}$**:** products regulated under PDO-PGI receive a higher price premium than the premium from unregulated regions 2) $\boldsymbol{H0_b}$**:** Products under a PDO regulation receive a higher price premium than products under a PGI regulation; and 3) $\boldsymbol{H0_c}$**:** The price premia for more processed products, such as cheeses and wines, and non-differentiable agricultural products are different.

**Results and Discussion**

The first version of the weighted model includes, as product characteristics, the general product category the foods belong to (such as, Meat, Cheese, etc), and several measures of the methodologies used to generate the WTP estimates, as well as PDO and PGI dummy variables. Results are presented in Table 3. GI products based in Europe receive a lower premium than products in North America and Australia-New Zealand. This result is surprising at first, because GI regulation is most developed in Europe. However, most regional names in the EU do have a PDO or PGI label, while the certification is not in use outside of the EU. In essence, the dummy variable only captures the difference between non-PDO/PGI regional names in the EU vs the rest

of the world. It is possible that non-certified regional names are discounted in the EU because more regimented certifications are available.

**Table 3. Model 1: Weighted Regression with product categories**

| Variable WTP (%) | Coefficient | Robust Clustered Std. Error[a] | P-value |
|---|---|---|---|
| **Wine** | 29.97 | 18.78 | 0.132 |
| **Cheese** | 49.13** | 18.74 | 0.019 |
| **Meat** | 31.13 | 18.56 | 0.114 |
| **Fruit/Veggie** | 75.82*** | 21.88 | 0.003 |
| **Grain** | 57.7** | 20.67 | 0.014 |
| **Olive Oil** | 27.42 | 16.13 | 0.123 |
| **Europe** | -9.49** | 3.46 | 0.015 |
| **N America** | 2.07 | 19.10 | 0.915 |
| **PDO** | 27.08*** | 3.67 | 0.000 |
| **PGI** | 17.22** | 7.77 | 0.043 |
| **Primary Data** | -4.04 | 8.55 | 0.644 |
| **Conjoint** | 74.62*** | 10.37 | 0.000 |
| **Hedonic** | 63.48*** | 5.13 | 0.000 |
| **Constant[b]** | -89.58*** | 21.00 | 0.001 |
| **Obs.** | 118 | | |
| **Adj. R-squared** | 0.724 | | |
| **F-stat.** | 74.67 (prob > F = 0.000) | | |

*Source: Authors' estimates*

**** Indicates significance at 0.01 level; ** Indicates significance at 0.05 level; *Indicates significance at 0.1 level;*

[a] *Std. Errors are clustered on the paper the estimates are collected from;*

[b] *The constant term refers to a WTP for coffee product, a study from Australia-New Zealand, coming from a region that is not PDO-PGI certified but has its own reputation, and which was estimated with secondary data using a methodology other than Conjoint or Hedonic analyses.*

Results show that percentage price premia for Cheese, Fruit/Veggie and Grain products are the highest in our sample[2]. The original product price is also a measure of how processed the food is. Products that require a lot of transformation from their original state, such as cheese, are likely to be more expensive than, for example, grain, which is harvested, ground up, and ready to use. But the percentage WTP maybe deceivingly greater for low processed foods because of their original low price. Also, some of the categories in Table 3 above, such as Meat, include very

[2] Note that Since the WTP is expressed in percentage, if the price of the product is low, any positive WTP will represent a high percentage of that small initial price.

heterogeneous products. This category includes, for example, both fresh steak and Serrano Ham. While they are both meats, fresh steak is very low processed and has a different price structure than the highly processed Serrano ham. We believe that such heterogeneities make some of the ceofficients of the product categories above to be insignificant and also it makes the interpretation of the significant coefficients difficult.

In Model 2, the product categories above (i.e., Meat, Cheese, etc.) are replaced with three dummy variables specified differently. Following Gehlhar et al., 2001, we classify products in fresh, low-intermediate processed and highly processed products. “Fresh” refers to fresh horticultural products, fruits and vegetables. Even though these have a low level of processing as a final consumer product, they have other characteristics that differentiate them from low processed foods such as grain. The “Low-Intermediate Processed” refers to foods such as grain or coffee, which are only lightly processed. “Highly Processed” refers to highly processed foods (such as cheese and wine). The results presented in Table 4 suggest that the fresh and highly processed foods receive a price premium over low to intermediate processed foods. All the other coefficients and inference are very consistent with the previous model, suggesting that the processing level dummies successfully replace the product categories used in Model 1, while at the same time adding explanatory power to its coefficients.

**Table 4. Model 2: Weighted Regression with Product Processing Level dummies**

| Variable WTP (%) | Coefficient | Robust Clustered Std. Error[a] | P-value |
|---|---|---|---|
| **Fresh** | 49.33*** | 11.11 | 0.000 |
| **High** | 17.53* | 9.07 | 0.073 |
| **Europe** | -9.55** | 3.40 | 0.013 |
| **N America** | 6.59 | 12.41 | 0.604 |
| **PDO** | 41.95*** | 7.67 | 0.000 |
| **PGI** | 21.86*** | 1.53 | 0.000 |
| **Primary Data** | 6.50 | 8.41 | 0.452 |
| **Conjoint** | 46.44*** | 8.28 | 0.000 |
| **Hedonic** | 59.46*** | 7.80 | 0.000 |
| **Constant** | -73.12*** | 16.21 | 0.000 |
| **Obs.** | 118 | | |
| **Adj. R-squared** | 0.708 | | |
| **F-stat.** | 1253.62 (prob > F = 0.000) | | |

**** Indicates significance at 0.01 level; ** Indicates significance at 0.05 level; *Indicates significance at 0.1 level;*

[a] *Std. Errors are clustered on the paper the estimates are collected from;*

[b] *The constant term refers to a WTP for product that is low to intermediately processed, a study from Australia-New Zealand, coming from a region that is not PDO-PGI certified but has its own reputation, and which was estimated with secondary data using a methodology other than Conjoint or Hedonic analyses.*

Based on these results, GI certifications appear successful in differentiating agricultural products. The next important result from Model 2 concerns highly processed foods. Highly processed products involve a variety of stages of raw product transformation. Since this complex transformation is very strictly supervised under the GI certification, this signals to consumers an obvious gain in quality and food safety relative to the generic product without the label. Therefore, highly processed products earn a price premium under GIs. Low to intermediately processed foods do not suffer such a radical and complex transformation. As such, supervision of this process by a GI certification does not bring in as much price premium as for the more complex highly-processed foods. Furthermore, fresh produce, such as fruits and vegetables, receive a price premium over foods with a lower level of processing.

The PDO and PGI coefficients in both models are positive and statistically significant, the estimate for PDOs being the larger one. Estimates are relative to a product using a non PDO/PGI regional name. Thus, investing in a regulated and recognized process such as the PDO-PGI or Trademarks induces a higher price premium than just associating their product with a reputable region of production. A one-sided Wald test is performed for each of the model (results in Table 5) testing the null hypothesis that the PDO premium lower or equal to that of the PGI's. The test is inconclusive based on Model 1, while the hypothesis is rejected based on model 2.

**Table 5. Testing if PDO premiums are higher than PGI premiums:**

| Model | Null Hypothesis | F-stat. | Prob. > F | Decision |
|---|---|---|---|---|
| **Model 1** | PDO-PGI=0 | 2.29 | 0.151 | Cannot Reject Null |
| **Model 2** | PDO-PGI=0 | 8.85 | 0.009 | Reject Null |

*Source: Authors' estimates*

Goodness of fit measures such as the AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) show that the models are equivalent in term of explanatory power.

**Table 6. Measures of relative goodness of fit (Model 1 versus Model 2):**

| Model | Obs. | AIC | BIC |
|---|---|---|---|
| **Model 1** | 118 | 963.25 | 996.50 |
| **Model 2** | 118 | 965.98 | 993.69 |

**Final Remarks**

Food producers have long been using GI to differentiate their products and create reputation and value to consumers. The emergence of an increasingly competitive and globalized food supply renewed the interest in the use of origin to differentiate agricultural and food products. While geographical names have been used to identify products for centuries only in 1992 did the then European Economic Community legislated this practiced and opened it to a wide variety of agricultural and food products. Since then in excess of 900 products were recognized as either a PDO or PGI in the EU. In the US, GI have been recognized as trade marks, but there is increasing interest at the State level to use origin to differentiate products based on locality.

The empirical literature suggests a wide range of premiums for food and agricultural products carrying GI labels. However, to the best of our knowledge, no previous study systematically analyzed what justifies price differences across GIs. Here, we aim to identify the major determinants of the success of a GI, as measured by the associated price premium. To address these questions we conducted a Meta-analysis, based on 19 studies that included 122 WTP estimates for GI products. Our preliminary results already give some tentative answers to these questions. Specifically our findings suggest that cheeses, fruits and vegetables and grain get a larger premium when using a GI. PDO products, which observe a more strict production protocol, obtain the highest market premiums, followed by PGI and the other more generic GI denominations. Another finding is that, when multiple certifications options are available, as in Europe, generic GI names become less effective. The most promising result so far, perhaps, is that GI premiums are different across products and categories. A preliminary exploration of this phenomenon showed that the level of processing or other intrinsic product characteristics (e.g. perishability) may relate to the usefulness of a GI denomination. The matter will be

investigated more in detail in the next months, as we expand the database of studies included in the meta-analysis.

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## Appendix

**Table A1. Summary of GI valuation studies included for final analysis**

| No | Study | Year |
|---|---|---|
| 1 | Bonnet et al. | 2001 |
| 2 | Fotopoulos et al. | 2001 |
| 3 | Fotopoulos et al. | 2003 |
| 4 | Hassan et al. | 2006 |
| 5 | Ittersum et al. | 2007 |
| 6 | Laureiro et al. | 2002 |
| 7 | Loureiro et al. | 2000 |
| 8 | Menapace et al. | 2011 |
| 9 | Mtimet et al. | 2006 |
| 10 | Oczkowski et al. | 1994 |
| 11 | Santos et al. | 2005 |
| 12 | Schamel et al. | 2006 |
| 13 | Schamel et al. | 2007 |
| 14 | Schamel et al. | 2003 |
| 15 | Stefani et al. | 2006 |
| 16 | Teuber et al. | 2007 |