Consumer preferences for extra virgin olive oil with country-of-origin and geographical indication labels in Canada

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Abstract

This paper investigates the impact of geographical origin labels on consumers' preferences. Specifically, we consider the preferences of Canadian consumers for extra virgin olive oils marketed with country-of-origin labels (COOL) and geographical indications (GIs). In contrast to previous studies, by considering a third-country market (a market different from that where production occurs), we can look simultaneously at COOL and GIs and separate the impacts of these two forms of geographical origin labels. We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers value both COOL and GI labels. But, in terms of the fraction of consumers with positive preferences and willingness to pay, COOL labels are valued more by Canadian consumers compared to GI labels. To better account for taste heterogeneity among consumers, we partition the sample on the basis of consumers' choice of shopping location. We find that different consumer groups vary to a large degree in their relative valuations for COOL, GI, and organic olive oils.

Keywords: country of origin labeling, extra-virgin olive oil, geographical indications of origin, mixed logit, PDO/PGI, stated-choice experiments.

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The primary overarching economic justification for product labeling is that labels can resolve market failures associated with the supply of high-quality goods under asymmetric information. When producers are unable to credibly signal the quality of their products, Akerlof's (1970) lemons problem results in pooling equilibria where only low-quality goods are transacted. Yet, while the economic motivations for labeling are clear, given the inherent costs involved the question remains as to the optimal information to provide on labels.

Prompted by both consumer and producer groups, regulatory bodies worldwide have recently wrestled with implementing optimal policies for labeling the geographical origin of food products. In contrast to the information commonly included on food product labels (e.g., vitamin content), geographical origin labels provide consumers with a composite set of information that is largely interpreted and valued by consumers differently and on an individual basis. Geographic origin labels are proffered as a means of conveying a wide range of information regarding not only the overall quality of a product, but also less easily and succinctly communicated information about credence attributes such as production processes (e.g., if traditional methods are utilized) and safety standards.

Two different forms of geographical origin labels are commonly utilized: country-of-origin labels (COOL) and geographical indications (GIs). Many countries worldwide require imports (both food and non-food items) to bear labels informing the ultimate purchaser of the product's country of origin. But following recent food scares,[1] several bills and regulations (e.g., the 2002 U.S. Farm bill and the European Union regulation 1760/2000), as well as industry initiatives (e.g., the Canadian Cattle Identification Program), have expanded, or attempted to expand, such labeling requirements on meats and other agricultural products.

This increased call for stricter/mandatory country-of-origin labeling is not without controversy. Advocates of mandatory COOL contend that these labels provide vital information to consumers regarding quality and safety. Unterschultz (1998) and Clemens and Babcock (2004) even refer to COOL as "country brands." In the context of food safety, several empirical studies have considered consumer preferences for COOL. Sterns et al. (2004), Loureiro and Umberger (2003), and Umberger (2004) have found that U.S. consumers are willing to pay sizable premiums for U.S. certified beef and fresh produce.

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

Opponents of expanded COOL requirements assert that it imposes unnecessary or excessively costly regulatory burdens on producers and retailers which ultimately hurt consumers. Carter, Krissoff and Peterson Zwane (2006) discuss necessary conditions for profitable product branding based on geographical origin and conclude that COOL is unlikely to be an effective marketing strategy for produce. Additionally, opponents contend that COOL effectively impose new non-trade barriers that hamper international trade (for an example of the impact of mandatory COOL on international trade see Rude, Iqbal, and Brewin, 2006).

Although to a degree geographical indications are similar to COOL, they differ in two primary aspects. GIs typically provide more specific information about the geographical origin of a product (i.e., GIs commonly denote a particular city or region within a country, and rarely an entire country). As well, unlike under COOL, in order for a GI to be recognized and protected, producers must develop and adhere to a set of "specifications" which establish standards that producers must follow to qualify for use of the GI label. These conditions include production processes and the production region. GI-labeled product is subject to inspection.

In Europe, the use of GIs to label food products has a long tradition. GIs used to be protected under national laws based on systems of "appellations of origin", which were harmonized in 1992 with the European Union's regulation 2081/92. This regulation provides for two types of GI, *Protected Designation of Origin* (PDO) and *Protected Geographical Indication* (PGI), that differ depending upon how closely a product is linked to geography (Moschini, Menapace and Pick, 2008).

Several theoretical papers have addressed the welfare implications of GIs. Zago and Pick (2004) show that GIs have ambiguous welfare effects when the supply of quality is determined exogenously. Based on the assumption that a fixed cost is necessary to develop and market a GI, Lence et al. (2007) suggest that some degree of market power is necessary for the formation of a producer organization that supplies a GI and show that the welfare implications of GIs strongly depend upon the degree of property right protection. Moschini, Menapace and Pick (2008) find that GIs can support a competitive provision of quality and lead to clear welfare gains in competitive markets with free entry and exit.

While the assumptions on which these theoretical contributions are based upon differ and lead to varying welfare conclusions, they are all predicated upon the common assumption that consumers value the quality attributes linked to GIs, and hence, value the information conveyed through GIs.

Several empirical studies have attempted to quantify the value of GIs and their impact on consumption choices.[2] These studies present conflicting evidence as to whether consumers consider GI-labeled products superior to non-GI-labeled products. Bonnet and Simioni (2001), addressing Camembert cheese in the French market, find that GI-labels are not valued by consumers. Other studies, for example, Scarpa and Del Guidice (2004), find that consumers care mostly about GIs from their own region ("home-bias"). Most of the studies regarding consumer preferences for GI-labeled products consider European markets, while studies regarding non-European markets are rare. A recent contribution by Teuber (2007) concerns the U.S. market for single-origin coffee.

The aforementioned studies (with the exception of Teuber, 2007) share the common feature of considering consumer preferences for domestic GIs. While this may be motivated by the fact that domestic markets (sometimes simply regional) are the primary markets for GIs, it does not permit consideration of the international appeal of GIs or the interaction between COOL and GI labels. In the context of the current transatlantic debate over GIs[3] between the European Union and a group of countries led by the United States and Canada, it is of interest to assess if, and to what degree, consumers value GIs on international products. Moreover, taking into account a third-party country adds a new dimension to geographical labeling considerations and enables the impact and value of COOL and GI labels to be disentangled and assessed.

In this paper we consider the Canadian market for both COOL and GI-labeled extra virgin olive oils. Attention is restricted to "extra virgin" olive oil because this category represents a value-added product for which COOL and GI labeling is an important marketing tool. Data collected through a stated-choice experiment is used to investigate consumers' willingness to pay (WTP) for olive oil under COOL and GIs as well as oils with other credence attributes (e.g. organic).

In what follows we first present some information about olive oil and an overview of previous literature that considers GI labels for olive oil. Then, we outline the methodology used

[2] See for example Bonnet and Simioni, 2001; van der Lans et al., 2001; Scarpa and Del Guidice, 2004; Freitas Santos and Cadima Ribeiro, 2005; Krystallis and Ness, 2005). For an overview of empirical studies see Réquillart (2007).
[3] For details, see Josling (2006).

for data collection and data analysis. The core of the paper presents a discussion of the estimation results with emphasis on both 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 of olive oil has grown considerably in many countries including Australia, Brazil, Canada, Japan, and the US (global demand has risen at a 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).

Olive oil production is concentrated in the Mediterranean countries. Italy, Greece, and Spain account for more than 70% of the total olive oil 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 Lanes et al. (2001) find that for Italian consumers of extra virgin olive oil, 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 through a consumer survey conducted in Ontario, Canada, in the area of Toronto, via face-to-face interviews. Respondents were interviewed based on a convenience sample (Malhotra, 1996) 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 different opening hours and all days of the 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. The final sample size consists of 207 participants (12 people who accepted to participate in the survey did not qualify).

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' demographic characteristics.

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
	35 – 50	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

The core section of the interview consisted of a stated-choice experiment in which 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, country of origin and GI-labels.[4] 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 and 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 conventionally and organically produced 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.[5]

Table 2. Extra virgin olive oil attributes in the stated-choice experiments

Attribute	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Price (CAD $)	7	9	12	15	25	35
Country of Origin	Italy	Spain	Greece			
GI-Label	PDO[a] Terra di Bari	PGI[b] Tuscany	PDO[a] Garda	No GI label		
Size	0.5 lt.	0.75 lt.	1 lt.			
Color	Green	Yellow				
Appearance	Opaque	Non-opaque				
Organic	Yes	No				

[a] PDO denotes Protected Designation of Origin

[b] PGI denotes Protected Geographical Indication

[4] Profiles are characterized by unbalanced levels (price has six levels, bottle size has three levels, color has two levels, etc.). Related studies (e.g. Van der Lans et al. (2001) and Scarpa and Del Guidice (2004)) also rely upon unbalanced profiles.

[5] 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).

With regard to credence attributes, we included two production methods (organic[6] 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 GI oils: Terra di Bari PDO, Garda PDO and Tuscany PGI.[7] As our study includes numerous attributes and levels, we emploied a fractional factorial design to define the set of alternatives used in the experiment obtained using the SAS macro as described in Kuhfeld (2001). Table 2 presents the olive oil's attributes considered in the study.

Mixed Logit

The consumers' selections 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 (see e.g., 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 the choice 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

$$V_{ijt} = \beta_0 p_j + (\beta_{1i} O_j + \beta_{2i} N_j + \beta_{3i} Y_j + \beta_{4i} I_j + \beta_{5i} G_j + \beta_{6i} T_j + \beta_{7i} B_j + \beta_{8i} R_j) Size_j, \quad (1)$$

[6] The market for organic products has been increasing in Canada (Macey, 2004).
[7] All the GI-labeled products are Italian.

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 3.

Table 3: Summary of other variables used in the analysis

Variable	Variable Definition
O	1 if organic
N	1 if non-opaque, 0 if opaque
Y	1 if yellow, 0 if green
I[a]	1 if Italian oil
G[a]	1 if Greek oil
T	1 if PGI Tuscany
B	1 if PDO Terra di Bari
R	1 if PDO Garda

[a] Dummy variable indicating Spanish oil is omitted

Let $y_i = y_{i1},..., y_{iT}$ denote person *i*'s sequence of chosen alternatives. Conditional on a person i's vector of parameters, $\beta_i = \{\beta_{0,i},...,\beta_{8,i}\}$, and given the independent error structure, the probability of person *i's* sequence of choices is equal to

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

which corresponds to a product of logits. The unconditional probability of person *i's* sequence of choices is the integral of 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. The sum over people of 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.

Parameter estimates for β_0, b and W, can be obtained by maximizing the simulated log-likelihood function or via a hierarchical Bayesian procedure following the approach developed by Allenby (1997) and generalized by Train (2001). We use the second method.[8] Specifically, we estimate the mixed logit model using Matlab code written by Train for panel data with correlated coefficients based on hierarchical Bayes.[9] The Bayesian approach has been used in previous studies on consumers' preferences for food products (e.g., Hu et al., 2006; Hu et al., 2004; Rigby, Burton and Young, 2005).

Empirical results

Table 4 presents estimation results for three models that differ with regards to their classification of the GI variables. In model 1, a single dummy variable "GIs" is included (equal to 1 for PDO Terra di Bari or PDO Garda or PGI Tuscany oils). In model 2, a dummy variable for "PGI Tuscany" and "Other GI" (equal to 1 for PDO Terra di Bari or PDO Garda oils) are included. This allows a comparison of a GI from a well-known tourist region, Tuscany, with GIs (Terra di Bari and Garda) from lesser known geographical areas. 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 found to be 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 oil over Spanish oils and are willing to pay a considerable premium for Italian oils (ranging from 7.68 to 9.48 CAD$/Liter). As well, the variance coefficient for Italy is found to be significant and sizable indicating that Canadian consumers are heterogeneous in their preferences for Italian oils. The posterior mean of the Greece coefficient is not found to be significantly different from zero, indicating that the sample of Canadian consumers does not prefer Greek over Spanish oils or vice versa.

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[8] 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).

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

Table 4. Parameters estimates

	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***	-	-	-	-0.373***	-	-	-	-0.393***	-	-	-
	(0.029)				(0.046)				(0.053)			
Organic	2.576***	5.227***	77%	8.42	3.096***	4.967*	91%	8.30	5.187***	7.043***	97%	13.20
	(0.617)	(2.064)			(0.638)	(2.584)			(0.983)	(2.726)		
Non-Opaque	0.041	2.977***	67%	0.13	-0.202	6.710***	67%	-0.54	0.486	6.139***	53%	1.24
	(0.245)	(0.858)			(0.543)	(2.074)			(0.630)	(2.213)		
Yellow	0.000	3.089***	51%	0.00	0.054	5.074***	64%	0.14	1.009*	4.784***	67%	2.57
	(0.303)	(1.048)			(0.367)	(1.644)			(0.490)	(1.659)		
Italy	2.899***	9.558***	86%	9.48	2.915***	10.750***	85%	7.81	3.017***	11.801***	81%	7.68
	(0.415)	(2.951)			(0.449)	(3.231)			(0.596)	(3.786)		
Greece	0.368	5.826***	60%	1.20	0.016	6.489***	54%	0.04	0.128	8.355***	52%	0.33
	(0.395)	(2.120)			(0.412)	(2.353)			(0.442)	(3.197)		
GIs	1.451***	3.955***	70%	4.74	-	-	-	-	-	-	-	-
	(0.284)	(1.263)										
PGI Tuscany	-	-	-	-	1.669***	3.321***	76%	4.48	1.612***	3.499***	78%	4.10
					(0.296)	(1.209)			(0.327)	(1.255)		
Other GI [c]	-	-	-	-	2.109*	20.611***	57%	5.66	-	-	-	-
					(1.278)	(7.045)						
PDO Terra di Bari	-	-	-	-	-	-	-	-	-0.769	17.963	82%	-1.96
									(1.825)	(12.500)		
PDO Garda	-	-	-	-	-	-	-	-	1.535	30.083*	60%	3.91
									(1.533)	(14.506)		
Nesting Dummy	9.185***	24.452***	-	-	10.904***	38.647***	-	-	8.673***	24.336	96%	-
	(1.070)	(7.771)			(1.857)	(16.217)			(2.059)	(15.836)		

[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)

In model 1, the coefficient for the single included GI dummy variable is found to be positive and significantly different from zero 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 Canadian 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 place greater value on “famous GIs”, in model 2 dummy variables are included to separate Tuscany PGI from the other two GI labels. Since Tuscany is a well known tourist region associated with fine food products, it could be hypothesized that consumers would value these oils over other lesser known GIs. Interestingly, it is found that consumers are willing to pay slightly more on average for the “other GIs” (Terra di Bari and Garda) than for Tuscany PGI oils (5.66 versus 4.48 CAD$/Liter). While this slight difference counters what one might expect, it presents only part of the picture. For the “other GIs”, the estimated variance coefficient is extremely large indicating sizable heterogeneity among the sample’s preferences for the 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 could indicate that Tuscany is in fact a more recognizable GI. While at first glance it may seem curious that the more widely recognized and positively valued Tuscan GI doesn’t command a larger premium, this likely reflects the difference between PDO and PGI GIs. Terra di Bari and Garda are PDO GIs whereas Tuscany is a PGI GI. PDOs are generally considered superior to PGIs because they require a stronger geography-quality link in order to obtain certification. This attribute of GI labels gives credence to the results that, while Tuscany PGI is more widely recognized, the premium consumers are willing to pay is lower than for the less recognized but higher geography-quality linked PDO oils.

Finally, in model 3, each of the GI labels is considered separately. Only the Tuscan GI is found to be statistically different from zero. Again, this may reflect the results from model 2 that found the Terra di Bari and Garda labels to be less recognized by consumers (the variance terms for these labels are quite large).

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 in that visual attributes of olive oils are not reliable cues for quality.[10]

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 Canadian 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

[10] 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 good indications of the quality of olive oil.

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.

Table 5: Ratio of mean estimates

Shopping Location	# of participants	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

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 farmers 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

A side-effect of increasing globalization and international trade has been greater awareness and availability of foreign and traditional food products. International demand for once regional or local cuisines and food items has seen tremendous growth. These trends present new opportunities for food producers of once local or specialty products to expand into international markets. Yet the rapid growth in trade of these types of products has presented challenges for nations and international regulatory bodies in implementing optimal labeling policies. Contrasting approaches by countries towards agricultural policy, trade issues and intellectual property protection are at the root of the divergent views on the role of geographical origin labels for reducing consumer information asymmetries.

This paper has expanded upon previous studies by considering geographical origin labels in the context of a third-party country (i.e., a country not involved in the production chain). In particular, this study has disentangled the two distinct forms of geographical origin labels. We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, Canadian consumers value both COOL and GI labels. But, in terms of the fraction of consumers with positive preferences and willingness to pay, COOL labels are more valued by consumers compared to GI labels. 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.

While it is hoped that the new focus and information provided in this study contributes to the growing body of literature addressing the role of geographical origins in international markets, there are limitations to the analysis. The utilized stated-choice methodology is commonly employed in this line of research, but suffers from some well recognized drawbacks. Alternative value elicitation methods such as experimental auctions could be considered. Additionally, while we find strong evidence regarding geographical origin preferences, because a single commodity was considered, we are unable to reach broader conclusions regarding the value of COOL and GI labels. Consideration of other food products with stronger and weaker geography-quality links would help quantify the value spectrum of geographical origin labels. Finally, while our results present some evidence regarding consumer preferences for PDO vs. PGI olive oils, we are limited in drawing definite conclusions due to the limited number of PDO and PGI labels considered. Given the recent renewed focus of the European Union on promoting these GIs internationally, research in this direction would likely be of significant interest.

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