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Evaluation of geographical label in consumers' decision-making process: A systematic review and meta-analysis

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Abstract

The Geographical origin of agri-food products has become astrategic tool of differentiation: it is a unique attribute which makes productsdifficult to reproduce, and presumed to be a quality cue for agri-food products. Consumer studies on the relevance of geographical labelling provide heterogeneous evidence on the relevance of this extrinsic attribute as compared to the relevance of other product characteristics.

A systematic review of consumer studies on the relevance of geographical labelling has been conducted, and collected data have been quantitatively analysed through a meta-regression approach, in order to assess drivers of differences in relevance of geographical labelling across studies. An *ad hoc* index has been built to measure the relevance of geographical labelling as compared to other attributes of a product. Several chosen control factors allowed to explain differences in the relevance of geographical label across studies in terms of characteristics of studies (structural heterogeneity), methodological issues (methodological heterogeneity), and publication processes.

Results show that the relevance of geographical label, although not biased by publication selection, is influenced by the structural characteristics of studies and, to a lower extent, by issues related to the publication process. In particular, the attitude of consumers towards geographical labels tend to be product- and origin-specific: geographical labelling is the main differentiation tool for expensive products (e.g., wine), but is of low relevance for several countries depending on country-specific factors (e.g., nationality, culture, image and reputation). Managerial and policy implications are provided.

Keywords: Geographical label; Consumer; Agri-food; Heterogeneity; Systematic review; Meta-analysis.

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1. Introduction

It is rather usual to adopt marketing strategies to enhance the perceived value of agri-food products, and to induce consumers to link the product with a geographical place (either a country, or a region, of even a small area): the main scope of using a geographical label (GL) is to improve products' competitiveness (Acharya and Rahman, 2016). Place-based branding is a debated topic among academics, producers, marketers, policymakers, and any other stakeholder of the agri-food sector. Place-based branding has the strategic advantage of differentiating agri-food products on the basis of geographical origin, a unique attribute, hardly reproducible, proxy of quality (van Ittersum et al., 2007). A geographical origin may be defined as *"an area, situated within one or more countries, which forms an entity based on local, regional characteristics such as traditions, culture and scenery"* (van Ittersum et al., 2007, p. 452). Such a broad and evocative definition characterises an agri-food product associated with a geographical origin: in fact, the quality and fame of a product originated in a specific location may be attributed to its geographical origin, and the product itself is marketed using the name of geographical origin (van Ittersum et al., 2007). By using a GL, producers and marketers exploit existing associations linking consumers and geographical indication (Marcoz et al., 2016).

Several scholars have investigated the effects of GLs. Food products of a specific geographical origin are generally perceived to be of high quality: Stefani et al. (2006) investigate the affective and symbolic influence of a geographical origin, concluding that the narrower the area of origin, the higher the quality expectation. The product-specific analysis of van der Lans et al. (2001) concludes that GL influences consumers' preferences for olive oil, while for wine, the influence of GL is markedly heterogeneous across-origins (Aranda et al., 2015; Marcoz et al., 2016), and consumers' experiences (Pucci et al., 2017).

Previous reviews have focused mainly on certified Geographical Indication (GI). Deselnicup et al. (2013) conducted a meta-review on price premiums for agri-food products differentiated by certified GI: they fiound that price premiums are product- and GI-specific. The study has been recently expanded by Leufkens (2018), who quantify consumers' willingness to pay (WTP) for European GI labels: consumers show positive WTP, with large heterogeneity due to GI labels. Dias and Mendes (2018), through a bibliometric analysis, isolate four groups in emerging literature: 'Protected Geographical Indication', 'Certification of Olive Oil and Cultivars', 'Certification of Cheese and Milk', and 'Certification and Chemical Composition'.

Although these reviews are linked to GL, they lack the evaluation of the relevance of GL for consumers, as compared to the relevance of other attributes for consumers.

The aim of the study is to consolidate the state of academic research in this field. A systematic review of studies on GL, coupled with a quantitative analysis of data on the relevance of GL, allows to conclude on potential publication selection bias and on the factors that contribute to increase or decrease the relevance of GL for consumers. The sample collects two hundred observations related to different products, origins, and methodological framework. In short, the study assesses how GL influences the perceived value of a product and characterises drivers of heterogeneity in the relevance of GL.

2. Methodological approach

2.1 Search strategy and inclusion/exclusion criteria

Following the Cochrane Review methods (Higgins and Green, 2011) and other previous systematic reviews (e.g., Fakhri et al., 2019a, b; Keramati et al., 2019) consumers studies on GL have been systematically reviewed, during the period between July and September 2018. The focus is on papers indexed in the Scopus database .

Several combinations of label-, consumer-, and sector-related keywords have been used to select the studies of interest: label-related terms allowed to select studies that focused on GL; consumer-related terms identified studies analysing consumer perceptions; sector-related terms allowed to restrict the search to studies pertaining to the agricultural and food sectors. In total, 54 separate searches have been run (3 label-related keywords times 9 consumer-related keywords times 2 sector-related keywords) to identify an initial set of studies (947) which contain, abstract or keywords and all possible combinations of selected keywords, in their title. In particular, the following strings were used: [“place brand” OR “region-of-origin” OR “umbrella brand”] AND [“attitude” OR “attribute” OR “behaviour” OR “choice” OR “consumer” OR “consumption” OR “preference” OR “segmentation” OR “willingness to pay”] AND [“agri food” OR “food”]. After removing duplicates, the selected studies (276) were screened based on information contained in titles, abstracts, and full texts. The selected studies (43) for qualitative synthesis were further reduced to 27 papers, which represent the pool of studies that provide information required for a quantitative analysis: due to multiple estimates per paper, the analysis relies on 194 observations (figure 1).

[Figure 1 here about]

The studies included in the sample satisfy two general criteria: (i) first, they include information on consumers’ attitudes, or preferences, or intention to buy or pay for GL of agri-food products; (ii) second, they report comparisons between GL and other attributes of the same product. The first criterion allowed the identification of studies focused on consumers’ perspectives. The second criterion allowed the selection of articles from which it is possible to obtain valuations of the relevance of GL (either directly or as a function of reported parameters) with respect to other attributes of the product. The studies that did not meet the inclusion criteria were excluded from the sample. Moreover, conference proceedings were excluded to limit the focus to peer-reviewed studies. Finally, for sake of reproducibility, only papers published in English have been considered (Dias and Mendes, 2018).

2.2 Data extraction

Several data have been extracted from each study: (i) general information about the paper, (ii) information related to methodological issues, and (iii) information related to structural characteristics of the study. In particular, for each paper it have been retrieved the year of publication, the journal in which the study has been published, the subject area to which the journal belongs, the rank of the journal (as provided by Scimago Journal & Country Rank at the date of publication and referred to its subject area). Moreover, for each paper, information on the co-authorship of multiple papers was recorded: a dummy variable assumes value 1 if at least one of the authors of the paper is also author of one or more papers of the sample. Another dummy discriminates between recent and older papers (2010 has been used as threshold year of publication), and a numerical variable counts the cumulative number of papers published overtime.

As for information related to methodological issues, adopted methods (i.e., best-worst scaling, choice, conjoint, descriptive, focus group, hedonic price, latent classes, structural equation), and types of variables preferred to proxy the relevance of GL (share, mean, estimated coefficients, elicited willingness to pay) have been reported.

Information on the countries of origin (e.g. Argentina, Australia, Chile, European Union, Iran, New Zealand, Tunisia, United States) and on product categories (i.e. animal origin produces, cheese, fruit and vegetables, olive oil, wine, other products) have been gathered to account for geographical and cultural differences in the relevance of GLs.

In order to compare GL with other attributes, the identified attributes, other than GL (47 in total), were classified between intrinsic (28% of the total), extrinsic (30% of the total), and additional (43% of the total) attributes. Intrinsic attributes refer to characteristics directly related to the product while the extrinsic attributes refer to characteristics that are only indirectly related to the product. Furthermore, the additional attributes are related to the level of consumer's knowledge of (and involvement with) the product (Arancibia et al., 2015). The most frequently observed attributes in our sample are price and packaging (both extrinsic), followed by type and variety of the product (both intrinsic), brand name (extrinsic), distribution channel (additional), and appellations and medals (both extrinsic).

2.2.1 Measuring the relevance of geographical label for consumers

For each *i*-th observation (i.e., estimate) within the *j*-th reviewed study, the relevance of a generic attribute *k* (other than GL) is defined by a pairwise comparison between the attribute 'geographical label' with each attribute *k* of the product under investigation. The relevance of a generic attribute *k* is a (n*1) vector, $\boldsymbol{r}$, whose elements, $[r_{i,j}]$, may assume value equal to -1, 0, or 1 depending on the relevance of the attribute *k* as compared to the relevance of GL. In particular, 1 indicates that the GL is relatively more relevant than the attribute *k*, -1 indicates that the GL is relatively less relevant than the attribute *k*, and 0 indicates that there is no difference (i.e., the estimates are both statistically not significant) in terms of relevance between the attribute *k* and GL.

The relevance of GL as compared to other product's attributes is synthesised by the index $\boldsymbol{r}^{GL}$ computed as ratio between the sum of the relevance of each *k*-th attribute ($\boldsymbol{D} \cdot \boldsymbol{r}$) and the number ($K$) of attributes (other than GL):

$$\boldsymbol{r}^{GL} = \boldsymbol{D} \cdot \boldsymbol{r} \cdot K^{-1} \qquad (1)$$

where $\boldsymbol{r}^{GL}$ is a (n*1) vector whose elements, $[r_{i,j}^{GL}]$, are the relevance of GL for each *i*-th observation within the *j*-th reviewed study; $\boldsymbol{D}$ is a (n*n) diagonal matrix; $\boldsymbol{r}$ is a (n*1) vector of the relevance of a generic attribute k, as defined above; K^{-1} is a scalar indicating the maximum number of product's attributes other than GL. The index is a standardised measure of the relevance of GL: it is specific for each *i*-th observation (i.e., estimate) of the *j*-th study, and ranges between -1 and 1: the higher the index, the greater the relevance of GL as compared to the relevance of other attributes.

In order to clarify how the index works we present a clarificatory example: let's consider the paper (*j* = 1) by Dekhili and d'Hauteville (2009) that reports the relevance attributed by Tunisian and French consumers of olive oil to five attributes: region of origin (i.e., GL), olive variety, natural condition, human factor, price (figure 2).

[Figure 2 here about]

Table 1 summarises the approach used to model information in Dekhili and d'Hauteville (2009). First, the relevance of each attribute as compared to GL (i.e. $\boldsymbol{r}$) has been computed. For Tunisian consumers (*i* = 1), the elements of $\boldsymbol{r}$ equal -1 in all but one case: GL is less important than human factor (*cfr.* figure 2). For French consumers (*i* = 2), the elements of $\boldsymbol{r}$ equal 1 in all but one case: the price (*cfr.* figure 2). The sum of the relevance of each attribute, across observations, is as follows: $\boldsymbol{D} \cdot \boldsymbol{r}_{1,1} = (-1) + (-1) + (1) + (-1) = -2$ for Tunisian consumers, and $\boldsymbol{D} \cdot \boldsymbol{r}_{2,1} = (1) + (1) + (1) + (-1) = 2$ for French consumers.

[Table 1 here about]

The sum is normalised by the number of attributes (K^{-1}) other than GL: for olive oil $K = 4$ (i.e., olive variety, natural condition, human factor, price) so that the index measuring the relevance of geographical label will be as follows: $\boldsymbol{r}_{1,1}^{GL} = \boldsymbol{D} \cdot \boldsymbol{r}_{1,1} \cdot K^{-1} = \frac{-2}{4} = -0.5$ for Tunisian consumers; $\boldsymbol{r}_{2,1}^{GL} = \boldsymbol{D} \cdot \boldsymbol{r}_{2,1} \cdot K^{-1} = \frac{2}{4} = 0.5$ for French consumers. These values indicate that GL is (on average) relatively more relevant for French than for Tunisian consumers.

[Figure 3 here about]

Figure 3 shows the percent distribution and the kernel density of the relevance of GL in the sample. The distribution of the index, ranging between -1 and 1, is unimodal (with mode equal to 1) and negatively skewed (with skewness equal to -0.67). The index has a mean of 0.34 (median of 0.52) and a standard deviation of 0.64.

2.3 Quantitative analysis of data

In order to investigate drivers of the relevance of GL, a meta-regression analysis (MRA) has been run, following the seminal paper by Stanley et al. (2013). The index measuring the relevance of GL ($\boldsymbol{r}^{GL}$) has been regressed on its accuracy (i.e., sample size) and on the sets Φ and Ω of variables. Using degrees of freedom (or sample size) gives a measure of the accuracy of the variable under investigation (Stanley et al., 2008): other MRAs on the issue follow a similar approach (e.g., Deselnicup et al., 2013). Information about the accuracy of the variable under investigation is relevant in MRAs in order to account for publication selection bias, that is the tendency to observe similar results in published papers (Stanley, 2005). Publication selection may distort evidence from literature, undermining the external validity of inferences and implications. Biases from publication selection may occur if certain results are more likely to be published (e.g., statistically significant results, estimated coefficients of certain sign or magnitude). The empirical model is as follows:

$$\boldsymbol{r}^{GL} = \boldsymbol{A} + \boldsymbol{s}\boldsymbol{A}_0 + \boldsymbol{\Phi\Gamma} + \boldsymbol{\Omega\Delta} \quad (2)$$

where $\boldsymbol{r}^{GL}$ is a (n*1) vector of the index measuring the relevance of GL for consumers; $\boldsymbol{A}$ is a (n*1) vector of constant terms; $\boldsymbol{s}$, a (n*1) vector of sample size, is a proxy of the accuracy of the index that models and corrects publication selection bias; $\boldsymbol{A}_0$ is a (n*1) vector of parameters to be estimated; $\boldsymbol{\Phi}$ is a (n*n) matrix of regressors capable of affecting the magnitude of the publication selection bias; $\boldsymbol{\Omega}$ is a (n*n) matrix of regressors that are likely to influence the magnitude of the index and explain its variability; $\boldsymbol{\Gamma}$ and $\boldsymbol{\Delta}$ are (n*1) vectors of coefficients which reflect, respectively, the biasing effect of the publication process and the characteristics of the study.

In order to correct for heteroskedasticity and obtain efficient estimates, all but one vector of regressors (i.e., $\boldsymbol{\Phi}$) of equation (2) have been normalised by the accuracy of the index ($\boldsymbol{s}$). The rationale of the exclusion is that Φ-type moderator variables may influence the likelihood of acceptance of publication but should not be informative of the index. After normalisation, $\boldsymbol{A}_0$ tests for publication selection bias and $\boldsymbol{A}$ tests for the average value beyond the publication selection bias (Stanley et al., 2008). If statistically significant, $\boldsymbol{A}_0$ suggests the existence of publication selection bias, and $\boldsymbol{A}$ allows to conclude on the accuracy of the index (Santeramo and Shabnam, 2015). The model in equation (2) is estimated as Tobit, with a clustered error structure, assuming independence among studies (*j*) and dependence among observations (*i*) of each study.

2.3.1 Description of moderator variables

The model in equation (2) includes two vectors of variables ($\boldsymbol{\Phi}$ and $\boldsymbol{\Omega}$) (table 2): Φ-type moderator variables are related to the publication process, whereas the Ω-type moderator variables are referred to the specific characteristics of studies.

[Table 2 here about]

The vector of Φ-type moderator variables includes information on the publication process and models methodological heterogeneity. The presence of more than one paper published by the same author and the prestige of the journal have been taken into account: dummies control for papers published in journals in 25th (Q1), 50th (Q2), 75th (Q3) percentiles, according to the rank provided by Scimago Journal & Country Rank at the date of publication. Note that the sample does not include studies published in journal ranked as Q4. In order to control for the attention dedicated to the issue by the scientific literature, the cumulative number of papers published overtime is accounted for, and papers have been classified in papers published before and after 2010: the year 2010 has been adopted as threshold in that, in more recent years, the volume of studies published on the issue has become more frequent. As for methodological issues, dummy variables were used to control for methods (i.e., best-worst scaling, choice, conjoint, descriptive, focus group, hedonic price, latent classes, structural equation), and dependent variables (i.e., share, mean, estimated coefficient, theme, WTP).

The vector of Ω-type moderator variables models the structural heterogeneity (i.e., specific characteristics of a study). A set of dummy variables controls for specific product categories (i.e., animal origin produces, cheese, fruit and vegetables, olive oil, wine, other products), country of origin (i.e., Argentina, Australia, Chile, European Union, Iran, New Zealand, Tunisia, United States) and for the presence of certified labelling (e.g., geographical indications).

2.3.2 Test for collinearity

A majority of moderator variables are dichotomous variables. In order to avoid potential problems of collinearity, tests for collinearity have been conducted using the variance inflation index (VIF) and the condition number. As a rule of thumb, if VIF does not exceed 10 and the condition number is not lower than 15 there are no multicollinearity problems (Belsley et al., 1980). The analysis of correlation has allowed for the dropping of moderator variables with a strong correlation with other variables (i.e., 'theme' and 'Iran'). The diagnostic tests have also indicated collinearity among some moderator variables: those with VIF greater than 22.50 have been dropped (i.e., 'fruit and vegetables', 'structural equation model', 'cheese') (see table A.2 in the appendix); furthermore, moderator variables with VIF higher than 10.50 have been dropped (i.e., 'European Union', 'animal origin') (see table A.3 in the appendix). The collinearity diagnostic tests on the restricted set of variables do not detect further problems: the results obtained with and without collinear moderator variables are provided in table A.4 of the appendix.

3. Results and discussion

3.1 Description of the sample

The quantitative analysis includes studies (listed in table A.5 in the appendix) mostly published in peer-reviewed journals of high-medium prestige (13 papers in 25th percentile, 10 papers in 50th percentile). All studies fall into subject areas such as Agricultural and Biological Sciences (ABS, 10 papers), Business, Management and Accounting (BMA, 9 papers), Economics, Econometrics and Finance (EEF, 7 papers), and Nursing (1 paper). 5 out of the 10 most cited papers were published after 2010 (see table A.5 in the appendix), a signal of the great turmoil experienced by consumer studies on GL: one of the oldest study on the issue dates back to 2001 (van der Lans et al., 2001), and has been followed by an increasing number of empirical studies, so that two third of the studies have been published after 2010.

In the sample, more than half of the studies have at least one co-author in common: the author who has published the most (3 studies) is S. Mueller Loose (see table A.5 in the appendix). The studies on the

European Union represent the majority (13 papers): France (4 papers), Italy (3 papers), and Spain (3 papers). Studies on the United States (5) and Australia (4) follow. The origin is certified by a specific label (e.g. Protected Designation of Origin–DOP–, Protected Geographical Indication–PGI–, American Viticultural Area–AVA–) in 7 out of 27 studies. Wine is the most analysed product (14 papers), followed by olive oil (5 papers). Differences in studies' designs tend to be correlated with differences in the index of relevance of GL, whose average value is 0.34 (table 3). GL tends to be mostly relevant in studies conducted with the best-worst scaling method (0.81) or evaluating cheese (0.70), although these studies are the in small number (6% and 12%).

[Table 3 here about]

3.2 Quantitative analysis of data

A sensitivity analysis has been run to detect the existence of potential publication selection bias. The results of the Tobit models, estimated with different combinations of moderator variables, are reported in table 4.

[Table 4 here about]

The estimate for $\boldsymbol{A}_0$ is not significantly different from zero suggesting that the publication selection bias is not an issue in the sample of studies. The results are consistent across different specifications of the model. While the relevance of GL for consumers seems larger than other attributes, independently of the sample size (see coefficients estimated for $\boldsymbol{A}$), after controlling for specific characteristics of the studies (table 4, specifications (iii) and (iv)), the coefficient becomes statistically insignificant, a signal that GL is (on average) as relevant as other attributes, but its relevance varies across different studies. Such heterogeneity has been examined using Φ- and Ω-type moderator variables (table 5). The Φ-type moderator variables, which are related to the publication process and to methodological features, can influence the likelihood of acceptance of the paper, but not the magnitude of the relevance of GL. Vice-versa, Ω-type moderator variables, related to the other characteristics of the studies capture the variability in magnitude of the index, but are not correlated with the likelihood of acceptance of the paper.

[Table 5 here about]

GL is found more relevant in studies published after 2010 (+0.77%), possibly due to the greater interestof the topic, in the literature. GL also tends to be relevant in studies co-authored by skilled scholars (+0.20%), but less relevant in studies hosted in low-ranked journals (-0.66%). The greater the specific experience of the scholar on the topic, the higher the relevance index for GL tends to be: plausibly, a skilled scholar tends deepen on relevant aspects of GL (e.g., by analysing products for which geographical labels are appealing attributes, or by focusing on geographical regions with a well-established reputation). Similarly, Santeramo and Lamonaca (2019) argue that the authorship and prestige of hosting journals help in explaining the variability in studies' outcome.

Studies based on latent classes method tend indicate a lower relevance of GL (-0.46%), while other methodologies (e.g., conjoint, hedonic price) seems irrelevant. The results are in contrast with the findings of Deselnicup et al. (2013), who conclude on the positive correlation between adopting a conjoint method or the hedonic price method for origin-based labels.

Several other characteristics of the studies (i.e., structural differences) influence the relevance of GL. GL and certified indications for origins are positively correlated: on average, GL is 41.7% more relevant in studies concerning origin-based labels (e.g., geographical indications). Plausibly, adding regional certification labels (e.g., Protected Designation of Origin–DOP–, Protected Geographical Indication–PGI–, American Viticultural Area–AVA–) or regional information increases consumers' confidence on the product quality. As suggested by Marcoz et al. (2016), regional certification labels tend to have a leverage effect on consumers.

The relevance of GL is country-specific, possibly due to cultural differences (Marcoz et al., 2016). Exception made for studies on Chilean market, GL is relatively less important in studies related to Australia, New Zealand, and the United States. Put differently, country-specific factors (e.g., nationality, culture, image and reputation) matter the most. Notably, European consumers put great importance on the geographical indications of agri-food products, and benefit from indication schemes (e.g., DOP, PGI) that certify quality at different geographical levels (van Ittersum et al., 2007).

There are marked differences across products: while GL is 68.30% less relevant in studies on olive oil, it tends to be 37.90% more relevant in studies on wine. Notably, GL is one of the main criterion used by consumers to select wines (Arancibia et al., 2015): GLs help discriminating among alternatives, especially for expensive products (Deselnicup et al., 2013). On the contrary, , consumers tend to attribute more relevance to intrinsic (e.g., olive variety, colour) than to extrinsic attributes (e.g., geographical label, packaging), for olive oil (Dekhili and d'Hauteville, 2009).

All in all, the relevance of GL is more influenced by the structural characteristics of the studies and to a lower extent by the publication process.

4. Concluding remarks

The paper presents a systematic review on the relevance of GLs in consumer studies and a quantitative analysis, through a meta-regression approach, aimed at assessing the drivers of the differences across studies. Several control factors have been used to explain such differences in terms of characteristics of the studies (structural heterogeneity), methodological issues (methodological heterogeneity), and publication process.

The analysis allowed to conclude that publication selection bias is not an issue. The analysis also showed that GLs are effective differentiation tools in the agri-food markets, although their relevance varies across products and origins. For instance, GL is the main differentiation tool for wine, but it is of low relevance for low-prices products and in different national markets.

Several strategic implications may be derived: first, producers should take advantage of the power of GLs, especially when they are associated with a positive brand image. A remarkable example is the Tuscan Experience, a perfect combination of idealised self-created dietary renewal, lifestyle management, and rituals of imagined tradition and community (Bryła, 2015). Marketers should consider the benefits of a collaborative regional marketing programme. Similarly, policymakers should promote the development of strong brand images and support the creation and use of effective regional labels. As suggested in Atkin et al. (2017), a cohesive regional effort can result in growth and success.

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Tables

Table 1. Approach used to build the index synthesising the relevance of the geographical label.

Study	j	Observation	i	Olive variety (k = 1)	Natural condition (k = 2)	Human factor (k = 3)	Price (k = 4)	r^k	K	r^{GL}
Dekhili and d'Hauteville (2009, FQP)	1	Tunisian consumers	1	-1	-1	1	-1	-2	4	-0.5
Dekhili and d'Hauteville (2009, FQP)	1	French consumers	2	1	1	1	-1	2	4	0.5

Notes: *j*, *i*, and *k* index respectively study, observation, attribute; FQP stands for Food Quality and Preference.

Table 2. Descriptive statistics for regressors.

Variables	Mean (±Std. dev.)	[Min; Max]
Sample size	372.89 (±373.47)	[14; 1,700]
Φ-type moderator variables		
Weight of literature (cumulative number of published papers)	15.41 (±7.07)	[1; 27]
Recent papers (published after 2010)	0.72 (±0.45)	[0; 1]
Co-authorship	0.42 (±0.50)	[0; 1]
Journal in 25th percentile	0.51 (±0.50)	[0; 1]
Journal in 50th percentile (baseline)	0.43 (±0.50)	[0; 1]
Journal in 75th percentile	0.06 (±0.24)	[0; 1]
Method: best-worst scaling	0.06 (±0.24)	[0; 1]
Method: choice	0.08 (±0.27)	[0; 1]
Method: conjoint	0.19 (±0.39)	[0; 1]
Method: descriptive (baseline)	0.43 (±0.50)	[0; 1]
Method: focus group	0.01 (±0.07)	[0; 1]
Method: hedonic price	0.09 (±0.29)	[0; 1]
Method: latent classes	0.12 (±0.33)	[0; 1]
Method: structural equation	0.02 (±0.14)	[0; 1]
Dependent variable: share	0.41 (±0.49)	[0; 1]
Dependent variable: mean	0.40 (±0.49)	[0; 1]
Dependent variable: estimated coefficient (baseline)	0.16 (±0.37)	[0; 1]
Dependent variable: theme	0.01 (±0.07)	[0; 1]
Dependent variable: WTP	0.03 (±0.16)	[0; 1]
Ω-type moderator variables		
Product: animal origin produce	0.06 (±0.24)	[0; 1]
Product: cheese	0.12 (±0.32)	[0; 1]
Product: fruit and vegetables	0.04 (±0.20)	[0; 1]
Product: olive oil	0.13 (±0.34)	[0; 1]
Product: wine	0.58 (±0.50)	[0; 1]
Product: other (baseline)	0.07 (±0.25)	[0; 1]
Label: certified origin	0.25 (±0.43)	[0; 1]
Country: Argentina	0.13 (±0.34)	[0; 1]
Country: Australia	0.14 (±0.35)	[0; 1]
Country: Chile	0.02 (±0.14)	[0; 1]
Country: European Union	0.48 (±0.50)	[0; 1]
Country: Iran	0.02 (±0.14)	[0; 1]
Country: New Zealand	0.05 (±0.22)	[0; 1]
Country: Tunisia	0.04 (±0.20)	[0; 1]
Country: United States	0.09 (±0.28)	[0; 1]
Country: not specified (baseline)	0.03 (±0.16)	[0; 1]

Notes: The Φ-type moderator variables are related to the publication process, the Ω-type moderator variables are related to specific characteristics of studies.

Table 3. Descriptive statistics of the relevance of geographical label: detail by moderator variables.

Variables	Obs.	Min	Max	Mean	Std. dev.
Relevance of geographical label	100%	-1.00	1.00	0.34	0.64
Φ-type moderator variables					
Recent papers (published after 2010)	72%	-1.00	1.00	0.50	0.56
Co-authorship	42%	-1.00	1.00	0.30	0.69
Journal in 25th percentile	51%	-1.00	1.00	0.34	0.68
Journal in 75th percentile	6%	-0.33	1.00	-0.06	0.45
Method: best-worst scaling	6%	0.33	1.00	0.81	0.22
Method: choice	8%	-1.00	1.00	0.49	0.69
Method: conjoint	19%	-1.00	1.00	-0.03	0.61
Method: descriptive	43%	-1.00	1.00	0.49	0.55
Method: focus group	1%	1.00	1.00	1.00	-
Method: hedonic price	9%	-0.69	1.00	0.48	0.59
Method: latent classes	12%	-1.00	1.00	-0.04	0.71
Dependent variable: share	41%	-1.00	1.00	0.32	0.66
Dependent variable: mean	39%	-1.00	1.00	0.41	0.56
Dependent variable: estimated coefficient	16%	-1.00	1.00	0.26	0.74
Dependent variable: WTP	3%	-0.50	1.00	0.10	0.82
Ω-type moderator variables					
Product: Animal origin produce	6%	-0.43	1.00	0.39	0.43
Product: Cheese	12%	-1.00	1.00	0.70	0.51
Product: Fruit and vegetables	4%	-0.60	1.00	0.62	0.53
Product: Olive oil	13%	-1.00	1.00	-0.02	0.53
Product: Wine	58%	-1.00	1.00	0.32	0.69
Label: certified origin	25%	-1.00	1.00	0.35	0.63
Country: Argentina	13%	-0.69	1.00	0.46	0.57
Country: Australia	14%	-1.00	1.00	0.29	0.59
Country: Chile	2%	0.00	0.50	0.25	0.29
Country: European Union	48%	-1.00	1.00	0.37	0.64
Country: Iran	2%	-0.60	0.60	0.30	0.60
Country: New Zealand	5%	-1.00	0.67	-0.10	0.79
Country: Tunisia	4%	-0.50	0.83	-0.21	0.45
Country: United States	9%	-0.78	1.00	0.80	0.56

Notes: The percentages of observations are computed on the total number of observations (194). The Φ-type moderator variables are related to the publication process, the Ω-type moderator variables are related to specific characteristics of studies.

Table 4. The publication selection does not bias the relevance of geographical label.

Variables	Specification (i)	Specification (ii)	Specification (iii)	Specification (iv)
Publication selection bias ($\boldsymbol{A}_0$)	-0.001	-0.005	0.001	0.002
	(0.001)	(0.003)	(0.001)	(0.002)
Accuracy of the index ($\boldsymbol{A}$)	0.312 **	0.312 ***	0.165	0.012
	(0.123)	(0.074)	(0.118)	(0.159)
Φ-type moderator variables ($\boldsymbol{\Phi}$)	No	Yes	No	Yes
Ω-type moderator variables ($\boldsymbol{\Omega}$)	No	No	Yes	Yes
Sigma	0.008 ***	0.008 ***	0.007 ***	0.006 ***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	159	159	159	159

Notes: Tobit estimates of model in equation (2), using different combinations of regressors to detect the effects of publication selection bias. The Φ-type moderator variables are related to the publication process, the Ω-type moderator variables are related to specific characteristics of studies. Clustered standard errors are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

Table 5. The heterogeneity, characterising the relevance of geographical label, is mostly structural rather than methodological, or related to the publication process.

Variables	Marginal effect	p-value
Weight of literature (cumulative number of published papers)	**-.03%**	.041
Recent papers (published after 2010)	**.77%**	.002
Co-authorship	**.20%**	.056
Journal in 25th percentile	-.01%	.935
Journal in 75th percentile	**-.66%**	.004
Method: best-worst scaling	.04%	.855
Method: choice	-.05%	.798
Method: conjoint	-.03%	.780
Method: focus group	.04%	.830
Method: hedonic price	-.25%	.133
Method: latent classes	**-.46%**	.090
Dependent variable: share	.11%	.261
Dependent variable: mean	-.06%	.744
Dependent variable: WTP	-.16%	.204
Label: certified origin	**41.7%**	.002

Notes: Marginal effects computed on Tobit estimates of model in equation (2). Statistically significant marginal effects are in bold. The model controls for country-specific and sector-specific effects.

Figures

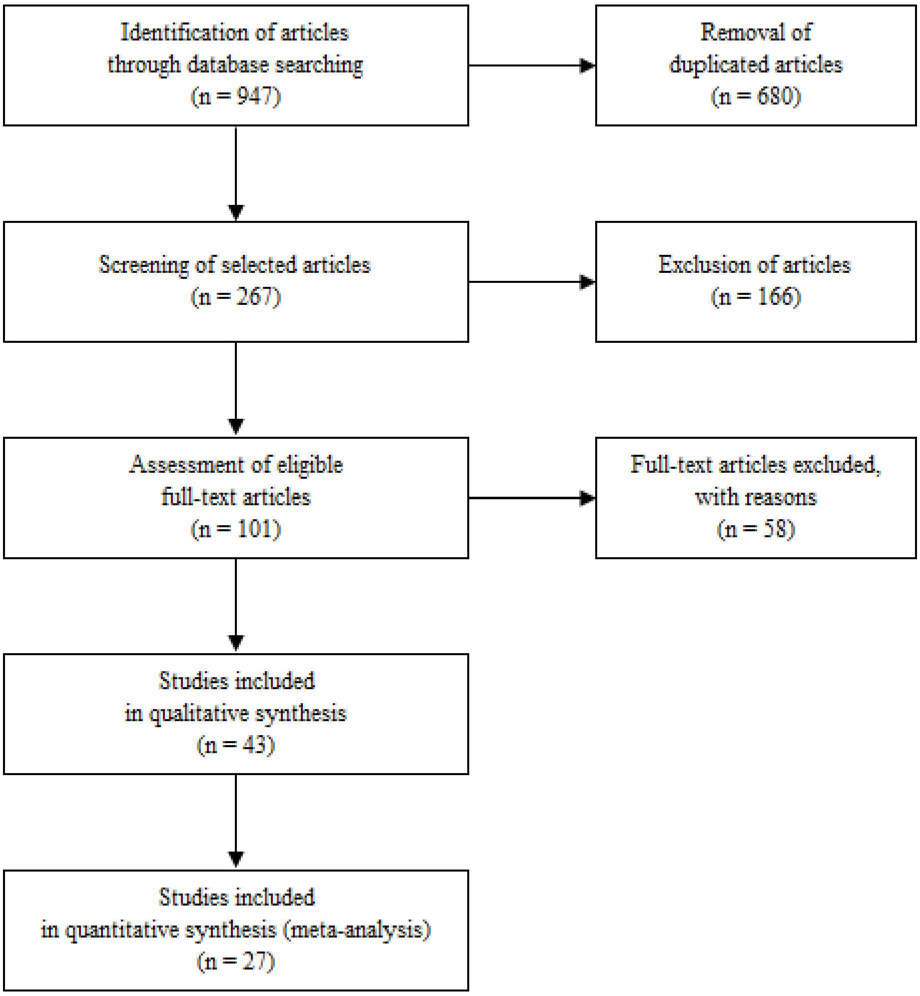

Figure 1. Flowchart of the systematic review and meta-analysis.

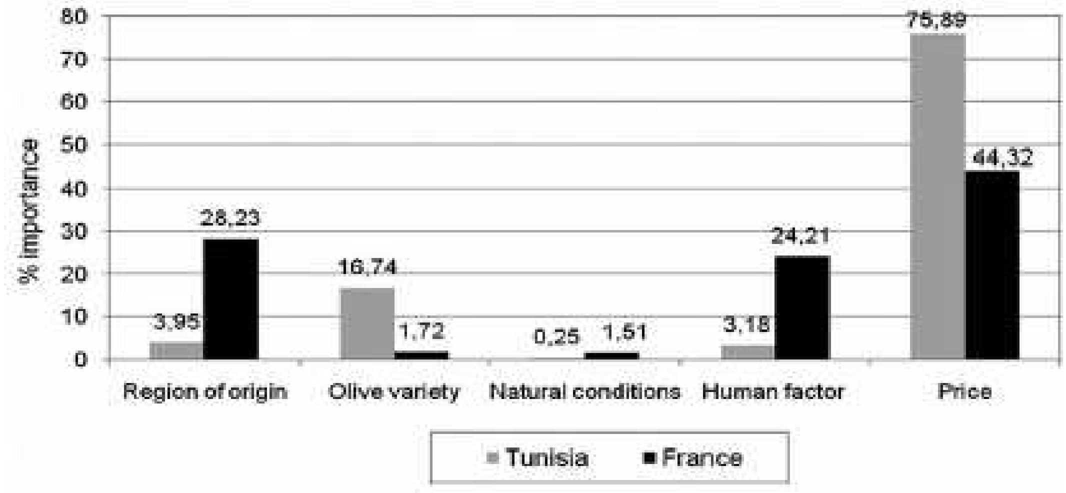

Figure 2. Importance of olive oil attributes for Tunisian and French consumers.

Source: Dekhili and d'Hauteville (2009, p. 530).

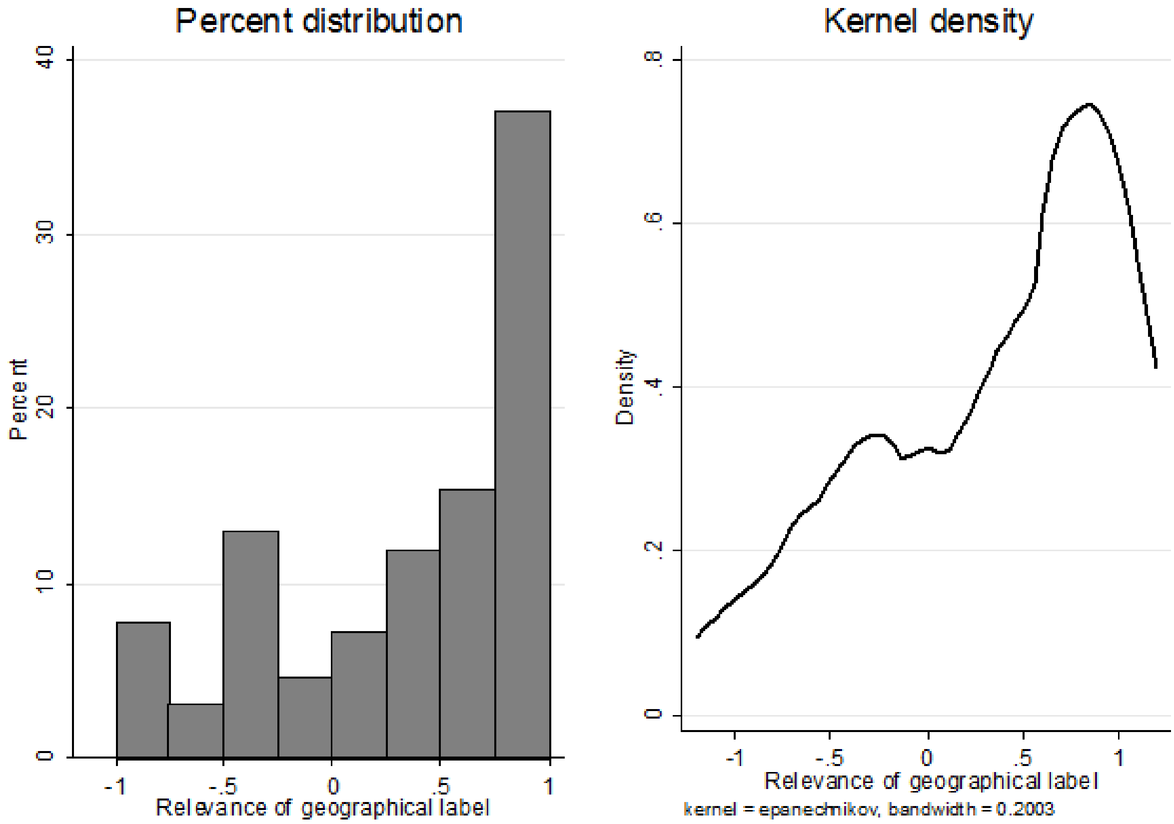

Figure 3. Percent distribution and kernel density estimate of relevance of geographical label.