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Full Research Article

On the relevance of the Region-Of-Origin in consumers studies

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Abstract. The existing literature on the consumers' attitude toward region-of-origin (RoO) provides numerous and varying evidence on the relative importance of this extrinsic attribute as compared to other product characteristics. The article aims at characterising the heterogeneity in the relative importance of RoO. We systematically review the literature on RoO and build an *ad hoc* indicator to measure the relative importance of RoO as compared to other attributes of agri-food products under investigation. We then explain, through a meta-analytical approach, how the relative importance of RoO varies according to factors related to publication process, methodological issues, and characteristics of articles. Findings reveal the limited influence of publication process and methodological issues on the relative importance of RoO. In contrast, we find a strong effect of characteristics of articles, with the relative importance of RoO being highly dependent on products and origins under investigation. The results also highlight that RoO is an effective differentiation instrument in the agri-food markets only if supported by geographical indication labels. Managerial implications are also provided.

Keywords. Agri-food, Consumer, Meta-analysis, Region-of-origin, Systematic review.

JEL codes. Q13, P46, M31.

1. Introduction

Regional imagery is increasingly being recognised as having a commercial value for agri-food products. It provides a subjective source of quality differentiation (Henchion and Mcintyre, 2000; Marcoz *et al.*, 2016). In fact, even though countries operate within an increasingly globalised context, the indication of the region-of-origin (RoO) of agri-food products still appears to be a relevant cue for both consumers and producers or marketers (Pucci *et al.*, 2017). The RoO of agri-food products still matters when examining consum-

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ers' product evaluations and buying behaviour (Chamorro *et al.*, 2015). For producers and marketers, RoO allows them to charge prices above marginal cost, thus achieving market power. By using a regional indication, producers and marketers are able to exploit existing associations consumers have with RoO and provide their product with an image (Bruwer *et al.*, 2012). Indeed, the strategic advantage of regional branding is that an agri-food product can be differentiated on the basis of geographic origin, an unique attribute difficult to reproduce and presumed to be a quality cue for the product (van Ittersum *et al.*, 2007; Chan and Marafa, 2013).

The existing literature on the consumers' attitude towards RoO provides numerous and varying evidences on the relative importance of this extrinsic attribute as compared to other product characteristics. The RoO effect has been analysed, among others, by Henchion and Mcintyre (2000), who concluded that RoO is an important consideration for two out of three Irish consumers when deciding to buy quality products and that products from rural areas are generally perceived to be of high quality. In addition, Stefani *et al.* (2006) showed that the narrower and more precisely defined the RoO, the higher the quality expectation of consumers supporting the role of origin as a quality cue. Empirical evidence shows that RoO effect on product evaluation is product-specific and varies depending on the characteristics of consumers. In particular, consumers from different countries tend to perceive RoO in a different manner and their knowledge influences the impact of RoO on their behaviour (Perrouty *et al.*, 2006). In this regard, Engelbrecht *et al.* (2014) demonstrated that RoO of wine plays a secondary role in influencing consumers when faced with a purchasing decision on its own, while Dekhili and d'Hauteville (2009) found that the image of RoO has a specific influence on consumers' selection behaviour for olive oil although with differences between consumers from different countries. Similarly, Dekhili *et al.* (2011) showed that French consumers tend to choose olive oil based on official signals, while Tunisian consumers mainly use RoO and sensory cues. Differences across consumers emerges also at the regional level, as in Aranda *et al.* (2015) who found that Spanish consumers tend to value La Mancha region less than Rioja region in choosing wine. Their findings suggest different level of importance for RoO, relative to other products' attribute under investigation. Overall, RoO has an effect if consumers perceive substantial differences between regions in terms of their product-origin associations (Marcoz *et al.*, 2016).

Literature on RoO is vast and fragmented, so we aim at characterising the heterogeneity in the relative importance of RoO. On the basis of a systematic review of the literature on RoO, we have built an *ad hoc* indicator to measure the relative importance of RoO as compared to other attributes of agri-food products under investigation. We have then explained, through a meta-analytical approach, how the relative importance of RoO varies according to specific factors related to publication process, methodological issues, and characteristics of articles. The meta-analysis is based on a sample of 27 papers, which differ by products and origins under investigation, and type of methodological framework. We have also expanded the study by Santeramo and Lamonaca (2020), who evaluated geographical label in consumers' decision-making process, by proposing a quantile regression analysis. The quantile regression allows us a better representation of the heterogeneity in the index measuring the relative importance of RoO. Indeed, the quantile regression estimator is robust, which means that the influence of outlying observations is bound.

Our analysis would identify patterns in heterogeneous results in the vast body of research that examines the regional branding construct and the various effects of RoO on consumer buying behaviour (e.g. Atkin *et al.*, 2017; Pucci *et al.*, 2017). The success of regional branding strategies and of regulations protecting regional products largely depends on consumers' evaluation of RoO that informs them on the authenticity of those products (van Ittersum *et al.*, 2007). Our contribution is to provide a finer granular overview of the RoO effects as relates to consumer product evaluations. A better understanding of consumers' evaluation of RoO may benefit producers and marketers in designing differentiation strategies that support the competitiveness of regional products more effectively. Furthermore, it may facilitate policymakers in developing RoO-based communication strategies and policies on the protection of regional products aimed at supporting rural economies, especially disadvantaged areas.

The reminder of the article is as follows. The next section describes the protocol adopted for the systematic review of literature on consumers' evaluation of RoO, as well as the quantitative methods used to examine determinants of heterogeneity in the relative importance of RoO across studies. The results, presented in section 3, describe the contribution of publication process, methodological issues and characteristics of studies in explaining heterogeneity in the index measuring the relative importance of RoO as compared to other attributes of the product under investigation. The last section concludes with implications for the food industry and policymakers.

2. Materials and methods

2.1 Systematic review and sample description

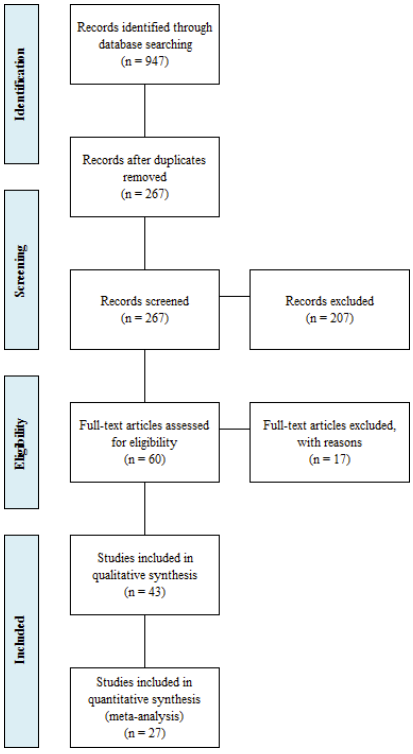
We systematically reviewed the literature based on RoO following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Moher *et al.*, 2009; Shamseer *et al.*, 2015). Our bibliographic research took place in July-September 2018 and focused on articles published in Scopus, including articles up to 2018[1].

In order to be included in the quantitative synthesis (i.e. meta-analysis), papers had to meet two general criteria. First, they had to deal with consumers' attitude, or preference, or intention to buy or willingness to pay for RoO of agri-food products. Second, papers had to provide a comparison between RoO and other products' attributes. Further inclusion criteria allowed us to select only peer-reviewed published studies, supposed to be validated knowledge with a potentially greater impact in the field, and papers in English, the foremost language used to spread scientific knowledge.

We identified an initial set of articles (n = 947) which contained all possible combinations of RoO-based, consumer-related, and sector-specific keywords in their title, abstract or keywords. In particular, we ran separate searches in Scopus using the following strings: ["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 (n = 680), two independent researchers screened 267 studies and selected eli-

[1] We do not set time limits in the bibliographic search.

Figure 1. PRISMA flow diagram.



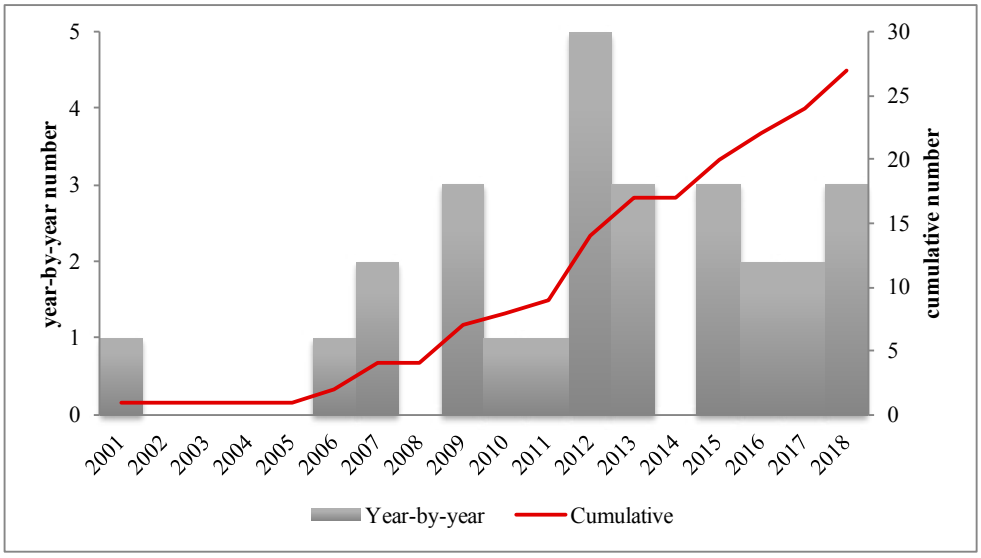
Source: Elaboration on Moher *et al*. (2009).

gible articles on the basis of information contained in the full text (n = 60). We excluded 17 full text articles with reasons[2]. The steps of the systematic review are synthesised in a PRISMA flow diagram (figure 1). The final sample includes 43 articles, of which 27 (listed in table 1) included in the quantitative synthesis for a total of 194 observations (articles may include more than one observation).

The vast majority of articles in the sample are published in peer-reviewed journals of high-medium prestige (48% in Q1, 37% in Q2); 37% of articles falls into the subject areas of Agricultural and Biological Sciences, 33% into Business, Management and Accounting, 26% into Economics, Econometrics and Finance. The first study was published in 2001 (van der Lans *et al.*, 2001), however the interest for the topic has grown progressively overtime. Indeed, about two thirds of articles (74%) were published after 2010, demon-

[2] A general review of place branding literature was excluded due to the lack of evidence on consumers' attitude, or preference, or intention to buy or willingness to pay for RoO of agri-food products. Other articles were excluded due to their focus, i.e. city brand not agri-food specific, private brands, physicochemical composition parameter and sensory attributes. Further articles not in English (3 out of 17) and not peer-reviewed published (8 out of 17) were excluded.

Figure 2. Evolution of the literature on Region-of-Origin.



strating the dynamic character of the literature on RoO (figure 2). More than half of the papers share at least one of co-authors, and the author with the most articles on the topic is S. Mueller Loose (author of 3 articles).

2.2 A measure of the relative importance of RoO

We identified 47 types of attributes within our sample, other than RoO. We ideally classified them in three categories (table 2): i) intrinsic attributes (13 types) which directly describe products; ii) extrinsic attributes (14 types) which indirectly characterise products (Dekhili and d'Hauteville, 2009); iii) additional attributes (20 types) which refer to the level of product knowledge and involvement (Arancibia *et al.*, 2015). The most frequent attributes in our sample are two extrinsic attributes, namely price and packaging, followed by two intrinsic attributes, namely type and variety.

In order to measure the relative importance of RoO as compared to other attributes of a product under investigation, we built an index specific for each *i*-th observation (i.e. estimate) within the *j*-th reviewed study. The index ($z_{i,j}^{RoO}$) is equal to the ratio between the sum of the relative importance of each *k*-th attribute ($z_{i,j}^{k}$) and the number of attributes other than RoO ($K_{i,j}$):

$$z_{i,j}^{RoO} = \frac{\sum_{k=1}^{K} z_{i,j}^{k}}{K_{i,j}} \tag{1}$$

where $z_{i,j}^{k}$, the relative importance of the *k*-th attribute compared to RoO, may assume the following values:

Table 1. List of articles included in the meta-analysis.

Reference	Journal	Journal rank	Journal subject area
Arancibia *et al.* (2015)	Agricultural Economics Review	Q2	ABS
Atkin *et al.* (2017)	Wine Economics and Policy	Q1	EEF
Bernabéu *et al.* (2012)	British Food Journal	Q1	BMA
Bruwer *et al.* (2012)	Journal of Foodservice Business Research	Q3	ABS
Bryła (2015)	Appetite	Q1	Nursing
Dekhili and d'Hauteville (2009)	Food Quality and Preferences	Q1	ABS
Dekhili *et al.* (2011)	Food Quality and Preferences	Q1	ABS
Fernandes-Ferreira-Madureira *et al.* (2013)	International Journal of Wine Business Research	Q2	BMA
Grebitus *et al.* (2018)	Agribusiness	Q2	EEF
Hollebeek *et al.* (2007)	Food Quality and Preferences	Q1	ABS
Johnson and Bruwer (2007)	International Journal of Wine Business Research	Q3	BMA
Marcoz *et al.* (2016)	International Journal of Tourism Research	Q1	BMA
McCutcheon *et al.* (2009)	International Journal of Wine Business Research	Q2	BMA
Mtimet *et al.* (2013)	Journal of International Food and Agribusiness Marketing	Q2	BMA
Mueller Loose and Szolnoki (2012)	Food Quality and Preferences	Q1	ABS
Mueller Loose *et al.* (2013)	Food Quality and Preferences	Q1	ABS
Mueller Loose and Szolnoki (2010)	Food Quality and Preferences	Q1	ABS
Nunes *et al.* (2016)	Wine Economics and Policy	Q1	EEF
Perrouty *et al.* (2006)	Agribusiness	Q2	EEF
Rahnama and Fadei (2017)	Journal of Food Products Marketing	Q2	BMA
Resano-Ezcaray *et al.* (2012)	Food Policy	Q1	EEF
Robertson *et al.* (2018)	Journal of Wine Research	Q3	ABS
Sanjuán-López *et al.* (2009)	Spanish Journal of Agricultural Research	Q3	ABS
Scarpa *et al.* (2015)	Agribusiness	Q2	EEF
Schnettler *et al.* (2018)	British Food Journal	Q1	BMA
Sutanonpaiboon and Atkin (2012)	Journal of Food Products Marketing	Q2	BMA
van der Lans *et al.* (2001)	European Review of Agricultural Economics	Q2	EEF

Notes: The rank, provided by the Scimago Journal & Country Rank (SJR), refers to the date of publication for the corresponding SJR subject area. Abbreviations are Agricultural and Biological Sciences (ABS), Business, Management and Accounting (BMA), Economics, Econometrics and Finance (EEF).

$$z_{i,j}^{k} = \begin{cases} -1 \; if \; RoO < k \\ 0 \; if \; RoO = k \\ 1 \; if \; RoO > k \end{cases} \tag{2}$$

The index, $z_{i,j}^{RoO}$, measures the relative importance of RoO with respect to other generic attributes of a product, and ranges between -1 and 1: the higher the index, the

Table 2. Relative frequencies (RF) of intrinsic, extrinsic, and additional attributes in the sample.

Intrinsic	RF	Extrinsic	RF	Additional	RF
Type	0.53	Price	1.00	Distribution channel	0.39
Variety	0.45	Packaging	0.62	Frequency of choice	0.28
Appearance	0.26	Brand name	0.39	Accompaniment	0.23
Alcohol content	0.25	Appellation	0.33	Concerns for environment	0.21
Colour	0.23	Medal	0.32	Recommendation by others	0.16
Vintage	0.21	Label information	0.21	Concerns for health	0.07
Taste	0.20	Producer	0.20	Preparation format	0.07
Sensorial characteristics	0.15	Production process	0.14	Availability	0.06
Serving temperature	0.13	Organic label	0.13	Advertising	0.05
Hedonic liking	0.10	Country-of-origin	0.10	Consumption for specials	0.04
Product quality	0.09	Retailer	0.09	Nostalgia	0.04
Expiry date	0.03	Informed liking	0.06	Concerns for animal welfare	0.03
Smell	0.03	Concerns for safety	0.03	Curiosity	0.03
		State	0.02	Fashion of consumption	0.03
				Knowledge level	0.03
				Loyalty	0.03
				Pleasure of consumption	0.03
				Touristic issues	0.03
				Traceability	0.03
				Uniqueness	0.03

Notes: The relative frequencies are computed on a total of 194 observations.

greater the relative importance of RoO as compared to other attributes. The index is distributed with mean 0.34 and standard deviation 0.64, however the relative importance of RoO tends to vary according to structural and methodological differences across studies.

2.3 Meta-analytical approach and data description

We adopt a meta-regression approach to investigate the determinants of heterogeneity in the relative importance of RoO as compared to other attributes of products under investigation. We regress the index measuring the relative importance of RoO ($z_{i,j}^{RoO}$) on its accuracy (i.e. sample size[3]) and on a set of - and -type moderator variables:

$$z_{i,j}^{RoO} = \alpha + \alpha_0 N_{i,j} + \sum_{r=1}^{R} \gamma_r \mathrm{X}_r + \sum_{s=1}^{S} \delta_s \Psi_s + \varepsilon_{i,j} \tag{3}$$

[3] Stanley *et al.* (2008) suggest to use degrees of freedom (or sample size) as a measure of the accuracy of the variable under investigation. Other meta-analyses on the issue follow the same approach (e.g. Deselnicup *et al.*, 2013).

where the accuracy of the index ($N_{i,j}$) models and corrects publication selection bias[4]; X_r is a vector of R regressors thought to affect the magnitude of the publication selection bias[5]; Ψ_s is a vector of S regressors, related to relevant characteristics of a study, that influence the magnitude of the index and explain its systematic variation across the observations (i) of the reviewed studies (j); γ_r and δ_s are coefficients which reflect the biasing effect of publication selection and of study's characteristics; $\varepsilon_{i,j}$ is an independently and identically distributed error term.

The vector of X-type moderator variables includes information related to the publication process and methodological issues (table 3). It controls, through a dummy variable, for the presence of more than one article published by the same author (42% of observations). In order to account for the prestige of the journal, specific dummies control for articles published in Q1 (51% of observations), Q2 (baseline), and Q3 (6% of observations) journals, according to the rank provided by the Scimago Journal & Country Rank at the date of publication. The dynamic character of the literature on the issue is accounted for using a dummy that discriminates between articles published before and after 2010[6], whereas a numerical variable controls for the cumulative number of articles published overtime. As for methodological issues, dummies control for methods and reference variables adopted to assess the relative importance of RoO. In our sample, we observe articles based on best-worst scaling analyses (6% of observations), choice models (8% of observations), conjoint analyses (19% of observations), focus groups (1% of observations), hedonic price models (9% of observations), latent classes analyses (12% of observations), descriptive statistics (baseline). The reference variables mostly used are percentages in terms of importance of attributes (41% of observations), average importance of attributes (40% of observations), estimated willingness to pay (3% of observations), beta (baseline). The set of Ψ-type moderator variables includes dummies related to specific characteristics of studies, to account for heterogeneity in the relative importance of RoO (table 3). It controls for specific product category such as olive oil (13% of observations), wine (58% of observations), other products (baseline), and origin such as Argentina (13% of observations), Australia (14% of observations), Chile (2% of observations), New Zealand (5% of observations), Tunisia (4% of observations), United States (9% of observations), other countries (baseline). Lastly, a dummy identifies paper that associate a certified label, such as PDO or PGI, to RoO (25% of observations).

In order to correct for heteroskedasticity and to obtain efficient estimates, we normalised all but one elements (i.e. X_r[7]) of the equation (3) by the accuracy of the index, $N_{i,j}$.

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[4] Publication selection may distort evidence from literature, undermining the external validity of inferences and implications (Santeramo and Lamonaca, 2021). Biases from publication selection may occur if certain results are more likely to be published (e.g. statistical significant results, estimated coefficients of certain sign or magnitude) (Stanley, 2005).

[5] The X-type moderator variables allow us to capture the wide dimension of selection bias, which is a complex socio-economic phenomenon that goes beyond the mere publication selection (Stanley *et al.*, 2008).

[6] The year 2010 is the median year of the articles in the sample. In addition, 72% of observations are included in articles post 2010.

[7] The rationale of the exclusion is that X-type moderator variables may influence the likelihood of acceptance for publication, but should not be informative on the index.

Table 3. List and description of moderator variables.

Moderator variable	Type of variable	Mean	Std. dev.	Obs.
X-type moderator variables				
Sample size	Numerical	372.89	373.47	159
Authorship	Dummy	0.42	0.50	194
Q1 (journal prestige)	Dummy	0.51	0.50	194
Q3 (journal prestige)	Dummy	0.06	0.24	194
Post-2010	Dummy	0.72	0.45	194
Number of paper (cumulative)	Numerical	15.41	7.07	194
Best-worst scaling analysis (method)	Dummy	0.06	0.24	194
Choice model (method)	Dummy	0.08	0.27	194
Conjoint analysis (method)	Dummy	0.19	0.39	194
Focus group (method)	Dummy	0.01	0.07	194
Hedonic price model (method)	Dummy	0.09	0.29	194
Latent classes analysis (method)	Dummy	0.12	0.33	194
% (reference variable)	Dummy	0.41	0.49	194
Avg. (reference variable)	Dummy	0.40	0.49	194
WTP (reference variable)	Dummy	0.03	0.16	194
Ψ-type moderator variables				
Certified origin	Dummy	0.25	0.43	194
Argentina	Dummy	0.13	0.34	194
Australia	Dummy	0.14	0.35	194
Chile	Dummy	0.02	0.14	194
New Zealand	Dummy	0.05	0.22	194
Tunisia	Dummy	0.04	0.20	194
United States	Dummy	0.09	0.28	194
Olive oil	Dummy	0.13	0.34	194
Wine	Dummy	0.58	0.50	194

After the normalisation, the intercept and slope coefficients are reversed from the equation (3). The new intercept (α_0) is a test for publication selection bias and the new slope (α) is a test for the average value beyond the publication selection bias (Stanley *et al.*, 2008). If statistically significant, α_0 suggests the existence of publication selection bias, and α allows to conclude on the accuracy of the index (Santeramo and Shabnam, 2015).

We used Probit specifications to assess how determinants of heterogeneity in the relative importance of RoO influence the likelihoods of observing lower or higher values of the index $z_{i,j}^{RoO}$. These likelihoods are captured by two dependent variables defined as dummies, that distinguish between cases in which RoO tend to be less or more important for consumers as compared to other attributes of the product under investigation. The likelihood of observing lower values of the index equals to 1 for negative observations of $z_{i,j}^{RoO}$, and zero otherwise. The likelihood of observing higher values of the index equals to 1 for positive observations of $z_{i,j}^{RoO}$, and zero otherwise. Observations of $z_{i,j}^{RoO}$ equal to zero, indicating that RoO is important as much as a generic attribute of the product under investigation, serve as baseline.

The model in equation (3) is also estimated in a quantile regression fashion. These models allow us to identify factors determining more or less importance of RoO (observations of $z_{i,j}^{RoO}$ within 50th percentile), less importance of RoO (observations of $z_{i,j}^{RoO}$ within 25th percentile), more importance of RoO (observations of $z_{i,j}^{RoO}$ within 75th percentile). The quantile regression allows us to particularise the dependency of the index on determinant of heterogeneity in the relative importance of RoO for every quantile and, thus, it can be tailored to the extremes by conditioning on lower quantiles. In addition, the quantile regression estimator is robust, which means that the influence of outlying observations is bound. These properties lead to a better representation of the heterogeneity in the index $z_{i,j}^{RoO}$.

3. Results and discussion

The results of the Probit and quantile regression models are presented in table 4. The analysis of the constant term (α_0) and slope coefficient (α) allows us to detect potential publication selection bias. Looking at the results from Probit models, we find that publication selection bias is more likely to occur for higher values of the index, measuring the relative importance of RoO as compared to other product's attributes under investigation; in contrast, lower values of the index are less likely to be affected by publication selection bias. However, the results of the quantile regression reveal that the constant term is not significantly different from zero at any conventional level, suggesting that the publication selection bias is not a major issue in our sample. We conclude that publication selection does not distort evidence from the literature on RoO, or undermine the external validity of inferences and implications on the relative importance of RoO (Stanley, 2005). This implies that all the heterogeneity we observe in the index depends on publication process, methodological issues, and characteristics of studies. Given the absence of publication selection bias, values of the index within the 50th and 75th percentiles tend to be more accurate with the estimated coefficients being positive and significant at 1% level.

Reflecting on the publication process, the likelihood of having RoO more important increases for studies co-authored by experienced scholars (column A); in addition, the higher the values of the index (75th percentile), the greater the importance of RoO (column E). As for journal prestige, the quantile regression results show that the relative importance of RoO decreases in articles published in Q3 journals. This is true in particular for higher values of the index (within 50th and 75th percentile). A comparable result is found in Probit models, where the coefficients estimated for articles published in Q1 and Q3 journals are negative and significant in the specifications in column (B). The probability of having RoO more important decreases for studies published in medium-high prestigious journals. However, the probability of having RoO less important increases for studies published in journals with lower prestige (Q3, for which the estimated coefficient in the specification in column (A) is positive and significant). It is worth noting that, in our sample, the vast majority of articles published in Q3 journals are wine-based studies (e.g. Johnson and Bruwer, 2007; Bruwer *et al.*, 2012; Robertson *et al.*, 2018) that tends to be negatively correlated with the relative importance of RoO (negative and significant coefficient reported in column E). Overall, the relative importance of RoO tends to decrease with the prestige of the journal in which articles are published. Similarly, Santeramo and

Lamonaca (2019) argue that the authorship and the prestige of the publication outlet help in explaining the variability in studies' outcome. If articles are published after 2010, RoO less important is less likely to be observed; the opposite is true for RoO more important. This evidence support the idea that the importance of RoO is likely to increase when the background on the issue is based on a wider set of empirical evidence; indeed, evidences available on the issue show an increasing trend overtime (cfr. figure 2) and the vast majority of them, in our sample, are observed in articles published after 2010.

As for methodological issues, both methods or reference variables used in our sample tend to have a limited influence in determining the relative importance of RoO. The few exception are best-worst scaling and latent classes analyses. The former tends to be associated with higher relative importance of RoO (positive and significant coefficient reported in column E); the latter tends to provide evidence of lower likelihood of RoO more important (negative and significant coefficient reported in column B). Our results differ from Deselnicup *et al.* (2013), who find a positive influence of conjoint analysis and hedonic price model on the price premium for origin-based labels (not statistically significant in our specifications). The result is not surprising. In fact, estimation techniques may influence the estimated willingness to pay (WTP), whereas latent characteristics of specific sub-sample within the population under investigation are likely to affect the relative importance of RoO.

The characteristics of studies have a varying contribution on the relative importance of RoO. The relative importance of RoO decreases in country-specific studies (columns C-E), in particular for Australia and New Zealand for which the probability of having RoO less important increases (column A) and the probability of having RoO more important decreases (column B). As suggested in Dekhili *et al.* (2011), nationality or culture appears to influence consumers' perceptions of the importance of RoO as compared to other product's attributes. Similarly, Perrouty *et al.* (2006) show that consumers from different countries tend to perceive RoO in a different manner and their knowledge influences the impact of RoO on their behaviour. Verbeke *et al.* (2012) suggest the existence of substantial differences in consumers' awareness of geographical origin between countries with versus countries without a tradition of geographical indications in their agri-food quality policies. For instance, such awareness tends to be higher in countries with a strong tradition of using these quality schemes, e.g. Southern (Italy and Spain) and Western (France) Europe. We also find product-specific differences; the relative importance of RoO decreases in the analysis of olive oil (negative and significant coefficients in columns C-E), for which the probability of having RoO more important is decreasing (negative and significant coefficient in column B). In fact, consumers tend to judge olive oil more for intrinsic than for extrinsic attributes (Dekhili and d'Hauteville, 2009; Dekhili *et al.*, 2011). Lastly, the relative importance of RoO increases in studies where RoO is certified by an origin-based label. Our result is in line with findings from Deselnicup *et al.* (2013), who provide evidence of greater price premiums for product with certified origin than one using a non-regulated regional name. The interest in the origin of foods is a strong direct and indirect driver of consumers' use of labels (Verbeke *et al.*, 2012). Adding regional certification labels (e.g. Protected Designation of Origin –DOP–, Protected Geographical Indication –PGI–, American Viticultural Area–AVA–) allows to strengthen regional branding, in particular in the case of lesser known regions (Bruwer and Johnson,

Table 4. Probit model estimation: analysis of publication selection bias.

Variables	Probit estimates		Quantile regression estimates		
	Negative index (A)	Positive index (B)	25^{th} percentile (C)	50^{th} percentile (D)	75^{th} percentile (E)
Constant (α_0)	-1.291*	2.215***	0.001	-0.001	-0.001
	(0.729)	(0.841)	(0.004)	(0.00325)	(0.002)
Bias (α_0)	6.324	-21.900	-0.106	0.573***	0.591***
	(50.360)	(50.200)	(0.207)	(0.173)	(0.087)
Authorship	-0.845	1.892**	0.001	0.002	0.002**
	(0.597)	(0.762)	(0.003)	(0.002)	(0.001)
Q1 (journal prestige)	0.637	-1.061**	-0.001	-0.001	-0.001
	(0.577)	(0.511)	(0.003)	(0.002)	(0.001)
Q3 (journal prestige)	1.268*	-1.451*	-0.001	-0.012***	-0.004***
	(0.705)	(0.873)	(0.003)	(0.003)	(0.001)
Post-2010	-2.627***	4.590***	0.004	0.004	0.002
	(0.836)	(1.094)	(0.004)	(0.003)	(0.002)
Cumulative	0.146**	-0.235***	-0.0003	-0.0001	-0.00004
	(0.058)	(0.073)	(0.0003)	(0.0002)	(0.0001)
Best-worst (method)	Omitted	Omitted	0.003	0.001	0.004**
			(0.004)	(0.003)	(0.002)
Choice (method)	-0.798	-0.439	-0.0001	0.001	0.001
	(0.652)	(0.660)	(0.003)	(0.003)	(0.001)
Conjoint (method)	0.348	-0.358	-0.001	-0.001	0.001
	(0.501)	(0.503)	(0.003)	(0.002)	(0.001)
Focus group (method)	Omitted	Omitted	0.003	0.003	0.003
			(0.008)	(0.007)	(0.004)
Hedonic price (method)	0.192	-1.163	-0.001	-0.0003	-0.001
	(0.722)	(0.765)	(0.003)	(0.003)	(0.001)
Latent class (method)	0.816	-2.021***	-0.001	-0.002	-0.0002
	(0.689)	(0.655)	(0.003)	(0.003)	(0.001)
% (reference variable)	-0.479	0.254	0.002	0.001	0.001
	(0.361)	(0.332)	(0.002)	(0.002)	(0.001)
Avg. (reference variable)	-0.662	-0.598	0.002	0.001	0.001
	(0.567)	(0.650)	(0.003)	(0.003)	(0.001)
WTP (reference variable)	0.748	Omitted	-0.001	-0.001	-0.003*
	(0.498)		(0.004)	(0.004)	(0.002)
Certified origin	-0.327	0.330	0.440**	0.431***	0.409***
	(0.289)	(0.376)	(0.187)	(0.156)	(0.079)
Argentina	4.470	-4.236	-0.447	-0.106	0.250
	(3.187)	(3.338)	(1.469)	(1.228)	(0.618)
Australia	2.616***	-3.562***	-0.749***	-0.689***	-0.609***
	(0.730)	(1.001)	(0.253)	(0.212)	(0.107)
Chile	Omitted	1.642*	0.702*	-0.004	-0.123
		(0.929)	(0.396)	(0.331)	(0.167)

Variables	Probit estimates		Quantile regression estimates		
	Negative index (A)	Positive index (B)	25th percentile (C)	50th percentile (D)	75th percentile (E)
New Zealand	3.037**	-4.326***	-0.762**	-1.310***	-1.331***
	(1.253)	(1.291)	(0.342)	(0.286)	(0.144)
Tunisia	2.164	Omitted	0.960	0.154	-0.093
	(2.074)		(0.695)	(0.581)	(0.292)
United States	5.237	-11.470**	-0.915	-0.914	-0.043
	(5.005)	(4.921)	(1.912)	(1.598)	(0.805)
Olive oil	0.887	-1.733**	-0.950***	-0.825***	-0.379**
	(0.612)	(0.772)	(0.359)	(0.300)	(0.151)
Wine	-0.323	0.823	-0.132	-0.066	-0.216**
	(0.524)	(0.577)	(0.242)	(0.202)	(0.102)
Observations	142	137	159	159	159

Notes: Probit and quantile regression estimates of model in equation (3). The dependent variable is a dummy equal to 1 for negative observations of the index in specification in column (A), a dummy equal to 1 for positive observations of the index in specification in column (B), the index in specifications in columns (C), (D) and (E). Coefficients estimated for -type moderator variables, related to study characteristics, have been scaled by a factor of 10^2 in specifications in columns (A) and (B). The index is -0.001 in 25th percentile, 0.001 in 50th percentile, 0.003 in 75th percentile. Omitted variables in Probit models due to a perfect prediction of failure for observations different from zero.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

2010). Similarly, van der Lans *et al.* (2001) find that the RoO cue and PDO label influence regional product preferences through perceived quality.

In a nutshell, the relative importance of RoO is highly dependent on structural characteristics of studies and, to a lower extent, on issues related to the publication process and methodological issues.

The paper however is not exempt from limitations. The evaluation of the relative importance of RoO for consumers, through a meta-analytical approach, is based on information retrieved from literature, thus, it is highly dependent on the quality of each article. Although the comprehensive analysis of heterogeneity in the relative importance of RoO should minimise the biasing effect due to the quality of each article, further studies on the issue should consider to applying a quality assessment tool of articles included in the quantitative synthesis (e.g. Cox *et al.*, 2016).

4. Conclusions and implications

The existing literature on the consumers' attitude toward region-of-origin (RoO) provides numerous and varying evidences on the relative importance of this extrinsic attribute as compared to other product characteristics. In order to characterise the heterogeneity in the relative importance of RoO, we systematically reviewed a large number of

studies on the issue and provided a quantitative synthesis of empirical evidences on the consumers' perception of RoO. We explained the differences in the relative importance of RoO with several control factors related to publication process, methodological issues, and characteristics of articles.

The meta-regression results allowed us to conclude on the limited influence of publication process and methodological issues on the relative importance of RoO. In contrast, we found a strong effect of characteristics of articles, with the relative importance of RoO being highly dependent on products and origins under investigation. We can also conclude that RoO is an effective differentiation tool in the agri-food markets only if supported by geographical indication (GI) labels, such as Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), American Viticultural Area (AVA). For instance, it is well-known the higher propensity of consumers in attributing a great importance to GI labels for agri-food products; consumers benefit from GI schemes that certify quality at different geographical levels (van Ittersum *et al.*, 2007; Verbeke *et al.*, 2012). In this regard, it is worth of mention the positive relation between RoO and GI; the addition of regional information on a product label increases consumer confidence in the quality of that product (Bruwer and Jhonson, 2010).

Overall, our study suggests that protecting and marketing agri-food products with regional certification labels, such as PDO or PGI, may be beneficial for producers and marketers. They should fine-tune the differentiation of agri-food products through RoO, particularly when RoO have a positive reputation (Santeramo *et al.*, 2020a, b). Consider as a representative example the Tuscan Experience, characterised by a strong regional image (Stefani *et al.*, 2006; Bryła, 2015). It is therefore critical for policymakers to develop focused communication strategies towards consumers in order to convey attractive information about RoO that, as suggested in Verbeke *et al.* (2012), stimulates their interest in the origin of foods and builds favourable perceptions about quality and distinctiveness of products with RoO labels. For instance, Italian consumers stated that the label of origin "produced in Puglia" is considered the preferred attribute for mozzarella cheese due to the high reputation of this region for mozzarella production (Viscecchia *et al.*, 2019). The effectiveness of communication strategies should be enhanced by targeting different messages to different target markets (van Ittersum *et al.*, 2007; Marcoz *et al.*, 2016) and by a new concept of label in terms of contents and communication channels (Corallo *et al.*, 2019). Indeed, our analysis revealed that the importance of RoO for consumers tends to vary according to products and countries involved. Hence, communication efforts should stimulate consumers' interest in RoO, especially for wine and in countries without a strong tradition of geographical indications in their agri-food quality policies. Furthermore, policymakers should consider the benefits of a collaborative marketing program for regional products. Indeed, while many regional products are already under regional certification labels, many more remain out of the protection of an incisive regional logo. In this regard, examples of best practices come from Rural Development Programmes 2014-2020 implemented in the EU Member States, where the Measure 03 "Quality schemes for agricultural products and foodstuffs" allows local policymakers to support regional agri-food products in order to improve competitiveness of producers, create value added for agri-food products of high quality, promote regional products at the local, national and international level. The Measure 03 also compensate producers for costs arising from specific management activities

required to adhere to quality schemes. Similar policy approaches would benefit consumers, who obtain information on the authenticity of regional products, producers, who enhance competitiveness in marketing regional products, and overall rural economies, in particular disadvantaged areas. As suggested in Atkin *et al.* (2017), a cohesive effort in promoting strong regional labels may result in growth and success.

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