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Tourism attractiveness in Italy: Regional empirical evidence using a pairwise comparisons modelling approach

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Abstract

This paper aims at deriving a ranking for the Italian regions by modelling domestic (interregional) tourist flows, in order to compare their tourism attractiveness. To this aim, a Bradley–Terry modelling approach was used to make pairwise comparisons of competing territories. This approach allows the inclusion of covariates that are, in this case, factors that likely affect domestic tourism flows across competing territories. Consequently, we consider a wide range of determinants within the theoretical framework of destination attractiveness. Furthermore, the empirical findings have been used to assign an attractiveness score to each region on the basis of which a ranking can be done, together with a measure of variability.

KEYWORDS

ability variability, Bradley–Terry model, domestic tourism flows

1 | INTRODUCTION

Although representing only a part of the total tourism flows, domestic tourism is recognized as important for several reasons. In particular, more than international tourists, domestic tourists are interested in less developed or less promoted areas, including the ones that are difficult to reach, making domestic tourism an undisputed driver for the local development and the poverty alleviation (Athanasopoulos & Hyndman, 2008; Cortés-Jiménez, 2008; INRouTe, 2016; Pierret, 2011; Scheyvens, 2007; Seckelmann, 2002). Furthermore, studies on domestic flows are of interest when making important infrastructural and investment decisions (Kulgachev, Zaitseva, Larionova, Yumatov, & Kiriyanova, 2017) or for taxation policies because, unlike the foreign ones, domestic tourism is sensitive to the tourist tax (Biagi, Brandano, & Pulina, 2017).

Actually, domestic tourism is a key driver even in a mature country such as Italy: Domestic arrivals contributed for 51% of the total arrivals in 2016. The Italian government's recent strategic plan for tourism (MiBACT, 2016) explicitly includes domestic tourism in the targets and interventions related to reinforcing the positioning and attractiveness of the Italian brand (target C.1). In particular, the plan aims at promoting territories with high potential that are not recognized as "tourist destinations" but that might benefit from a better distribution of tourist flows (MiBACT, 2016, p. 60).

This paper aims at contributing to this field of research by measuring domestic attractiveness of the 20 Italian regions on an ordinal scale through a pairwise comparison approach defined in the Bradley–Terry (BT) framework (Agresti, 2002; Bradley & Terry, 1952). As tourism competitiveness and attractiveness are about the ability of a destination to attract tourists, this pairwise comparison approach by analysing origin–destination flows can be considered closely linked to tourism competitiveness and attractiveness analyses (Prideaux, 2005). The number of arrivals (or nights spent) is often used as a measure of tourism attractiveness though some authors do not completely agree, because of the complexity of the tourism system, and the necessity to also address sustainability issues (Crouch, 2011; Hall & Butler, 1995; Hall, Williams, & Lew, 2004). Nevertheless, tourist flows are seen as an indirect measure of economic returns from tourism activities, and for that reason, the issue of studying and explaining tourist flows has been addressed by a large number of contributions (Yang & Fik, 2014; Zhang & Jensen, 2007).

The present study proposes an alternative model in studying tourism flows that can provide two types of results: (a) a synthetic measure of attractiveness (the ability score) and (b) the effects of destination attractors included as covariates in the model. Furthermore, the study also investigates domestic tourism that has received minor attention in literature. From a theoretical point of view, the use of the BT model requires a discussion about its rationale within the logic of pairwise comparisons of tourism flows and its specificity with respect to the more commonly used gravity model. From an empirical point of view, the application of BT approach to model attractiveness is made by considering the domestic Italian tourism flows. The selection of the covariates is achieved looking at the literature on domestic tourism and destination competitiveness, with specific reference to the Dwyer and Kim (2003) framework.

In this study, tourist flows refer to the number of domestic arrivals in the Italian regions (NUTS 2 EU regions) and are provided by official statistics through a total survey on accommodation facilities (accommodation data). Data for model covariates are derived from several sources, both statistical and administrative.

2 | METHODOLOGY: THE BT MODEL

Pairwise comparison models can be used in several research fields because empirical application research can be interested in modelling the intensity and determinants of origin–destination flows (trade and labour mobility are just some examples).

Gravity models have often been used to analyse tourism flows (Durden & Silberman, 1975; Morley, Rosselló, & Santana-Gallego, 2014; Vietze, 2012), with extensions to panel data (Eilat & Einav, 2004; Keum, 2010; Massidda & Etzo, 2012) and spatial modelling (Marrocu & Paci, 2013, among others). Gravity models consider that bilateral flows between two countries are directly proportional to the countries' economic masses and inversely proportional to the distance between them. However, the availability of origin–destination flows also allows the use of alternative models. The best known model in the pairwise framework is the BT model (Bradley & Terry, 1952; Dittrich, Hatzinger, & Katzenbeisser, 1998; Varin, Cattelan, & Firth, 2016).

The BT model makes it possible to consider pairs of objects (regions) that can be competitors, providing an overall ranking (e.g., territories from which we observed mobility flows) in terms of the location of object parameters in a continuum. Furthermore, the introduction of covariates in the model allows an assessment of how the ranking of the objects (here, regions, in terms of attractiveness) changes according to their characteristics.

The pairwise comparison technique has been also used in multicriteria decision making or MCDM (Kou, Ergu, Lin, & Chen, 2016), an example being the PROMETHEE approach that has been recently applied also in studies of tourism competitiveness (Lopes, Muñoz, & Alarcón-Urbistondo, 2018; Nazmar, Eshghei, Alavi, & Pourmoradian, 2019). In MCM, paired alternatives are compared on the basis of different attributes (with different weights), and at the end, the ranking is obtained on the basis of the score obtained by aggregating these attributes. Instead, in the BT model, the flows (the dependent variable) are compared among all couples of regions, and variables representing the context and considered determinants of attractiveness are included in the model as covariates.

In the BT framework, we consider regional tourism attractiveness to be an unobservable variable that can be scaled on a continuum, based on the results of multiple assessments between pairs of competing regions. Specifically, the differences in the attractiveness parameter (measured by a fixed or random parameter shared by all pairs in which the same region is involved) are what lead tourists to prefer one region over another. In the standard BT model, the regions being compared are considered to be players (e.g., i and j) having different abilities. If the ability of region i (i = 1, … , M) is greater than the ability of region j (for all $j \neq i$), the number of times that i "beats" j is expected to be higher than the number of times that j "beats" i. In order to analyse tourism attractiveness of regions, this can be translated into "the number of times in which region i is preferred over region j." The BT model specifies the probability that i beats j ($i \neq j$, i,j = 1, … , M) as follows:

$$\mathrm{pr}(i \text{ beats } j) = \frac{\alpha_i}{\alpha_i + \alpha_j}, \tag{1}$$

where α_i and α_j are the "ability" parameters that measure the intensity of unobservable (latent) traits in the two players. In the *logit* form, Equation (1) becomes

$$\mathrm{logit}[\mathrm{pr}(i \text{ beats } j)] = \lambda_i - \lambda_j, \tag{2}$$

where $\lambda_i = \log(\alpha_i)$ can be fixed or random. The occurrences in which object i beats object j are realizations of binomial variables that are independent from other observations (i.e., the number of times player j beats player k).

In the standard BT model, λs are specified as fixed effects that can be estimated by routines for generalized linear models via maximum likelihood (by setting, for identification requirements, $\lambda_i = 0$ or $\sum_{i=1}^{M} \lambda_i = 0$).

The BT model allows generalizations in several directions (Turner & Firth, 2012). In particular, the player's "ability" can be specified as a function of relevant players' covariates (structured BT model). In that case, the parameters λ_i and λ_j are related to the p covariates as follows:

$$\lambda_i = \sum_{r=1}^{p} \beta_r x_{ir} + U_i,$$

and Equation (2) becomes

$$\mathrm{logit}[\mathrm{pr}(i \text{ beats } j)] = \sum_{r=1}^{p} \left(x_{ir} - x_{jr}\right)\beta_r + U_i - U_j \tag{3}$$

where U_i and U_j are normally distributed random terms that take into account the prediction error and the correlation between comparisons sharing a common player.

Finally, in order to make comparisons across regions, the results of the BT model are summarized using an overall rating index (ORI; Sulis & Porcu, 2015) that considers a synthesis of comparisons of each region parameter with all the others as the outcome measure. Specifically, the index considers only significant positive departures in attractiveness parameters by counting how many times the confidence interval of the attractiveness parameter of region *i* lies completely above the confidence interval of region *j*.

To quantify uncertainty correctly, we adopted the quasi-variance approximation (Firth, 2012; Firth & Menezes, 2004; Varin et al., 2016) in the confidence intervals formula of object ability. The confidence intervals are computed as $\widehat{\lambda}_i \pm 1.96\,\mathrm{qse}\left(\widehat{\lambda}_i\right)$, where $\widehat{\lambda}_i$ is the estimator of λ_i and $\mathrm{qse}\left(\widehat{\lambda}_i\right)$ is the quasi-standard error.

By indexing with I (*ij*), an indicator variable that assumes 1 if the lower bound of confidence interval of λ_i does not overlap the upper bound of the confidence intervals of λ_j, the ORI index for each region *i* is specified as follows (higher values, higher performance):

$$ORI_i = \sum_{j \neq i}^{M} Iij.$$

The index ranges between 0 and *M*-1 and has two interesting features: It helps to detect real divergences by taking into account the uncertainty of measures in pairwise comparisons, and it quantifies, for each region, how many have a significant worst.

The choice of the BT model is appropriate for analysing tourism attractiveness, as the BT model is suitable when ranking and estimating probabilities of possible outcomes are needed. Its popularity is due to its simplicity in conceptualization and efficiency in computation. The fundamental concept underlying this model is that each player (individuals, firms, or a sport team) is compared with each winning potential. Furthermore, the conceptualization of attractiveness as a “relative factor” (see the following paragraph) is embraced in the logic of the BT model as it deals with covariate differentials between couples.

In conclusion, although the gravity and BT models analyse origin–destination flows, the two models are very different primarily in that the gravity model, compared with the BT one, (a) models a flow and not a probability, as it belongs to the category of models with complementarity (not competition); (b) takes into account the distance between origin and destination; (c) evaluates the effect of distance to each destination on attractiveness by including random slope effects for the distance between origin and destination; (d) can also consider within flows (flows of tourists that move inside each region); (e) includes covariates of origin and destination in a bilateral framework rather than in terms of differentials (Giambona, Dreassi, & Magrini, 2018).

3 | LITERATURE REVIEW

The concept of destination attractiveness is linked to the wider concept of territorial attractiveness, which can be viewed from three perspectives (Musolino & Volget, 2018; Servillo, Atkinson, & Russo, 2012): “revealed attractiveness,” which is mirrored by the size of incoming flows; attractiveness expressed by the endowment of the destination's tangible and intangible resources (supply-side view); and “perceived attractiveness,” which reflects how individuals evaluate a particular area (demand-side view). Of course, those perspectives depend upon the different typologies of flows a territory can attract (among others, labour forces, investments, and tourists). Furthermore, attractiveness is not conceived to be an “absolute value” of the territories but rather a “relative factor” of spatial differentiation (European Spatial Planning Observation Network, 2013, p. 15). Therefore, a territory can become more attractive because it has acquired more attraction factors or because other territories have lost some of theirs.

Turning to tourism studies, a destination is more attractive if it is more likely to be chosen by tourists. Attractiveness encourages people to visit and spend time at the destination. A destination's level of attractiveness reflects tourists' beliefs and opinions about the destination and depends on the relationship between the attractions and their perceived importance (Formica & Uysal, 2006; Huang & Hsu, 2009; Huybers, 2003; Kwang-Hoon, 2016).

Factors affecting tourism attractiveness are generally based on the push–pull factors theory (Crompton, 1979; Klenowsky, 2002). Push factors fundamentally relate to individual motivations and perceptions of the destination's quality of life and image; pull factors are mainly related to destination-side variables such as natural attractions, cultural resources, recreational activities, and so on. Push and pull factors can be conceived, respectively, as demand and supply components of the tourist's decision-making process. In order to model tourist flows, Zhang and Jensen (2007) referred to trade theory and stated that tourism attractiveness is mainly dominated by supply-side perspectives (i.e., pull factors).

The literature on competitiveness can further support the identification of attractiveness factors. In fact, attractiveness is a component of competitiveness as the increase of tourism flows is one target of competitiveness: “tourism competitiveness for a destination is about the ability of the place to optimize its attractiveness for residents and non-residents, to deliver quality, innovative, and attractive tourism services to consumers and to gain market shares on the domestic and global market places …” (Dupeyras & MacCallum, 2013, p. 7).

The operationalization of competitiveness through the construction of composite indicators (Mendola & Volo, 2017) and through the estimation of regression or latent variable models (among others, Assaker, Hallak, Vinzi, & O'Connor, 2013; Cvelbar, Dwyer, Koman, & Mihalič, 2016; Mazanec, Wöber, & Zins, 2007, Mazanec & Ring, 2011; Weldearegay, 2017) is useful in selecting attractiveness attributes. The most widely used theoretical framework for the operationalization of competitiveness is that of Ritchie and Crouch (2003) with its re-elaborations and improvements, along with the Tourism and Travel Competitiveness Index scheme (Crouch, 2007; Crouch, 2011; Dwyer & Kim, 2003; Dwyer, Mellor, Livaic, Edwards, & Kim, 2004; WEF, 2017). In particular, Dwyer and Kim developed a valuable operationalization of the competitiveness concept starting from the contributions of Crouch and Ritchie. The analysis of the literature on competitiveness is beyond the interest of this paper; in any case, we will turn to Dwyer and Kim's model in section 5, as that framework is used for selecting the covariates to be included in the BT model.

Attractiveness towards domestic tourists is an important component of destination competitiveness as domestic tourism represents a high percentage of tourist arrivals and effective national policy planning requires a deep understanding of domestic tourism activities at the subnational level (INRouTe, 2016, p. 37). According to the Organization for Economic Cooperation and Development definition, *domestic tourism is the tourism of resident visitors within the economic territory of the country of reference* (Organization for Economic Cooperation and Development glossary of statistical terms), and it is characterized by some specific features that are different from international tourism ones.

Many national and regional economies depend heavily on the tourism industry, and consequently, studies of regional economies have focused on domestic flows. For several years, the literature on tourism economics neglected the analysis of domestic tourism as a development factor, an exception being Archer (1978). This is likely due to the lack of extensive databases that enable the study of territorial/regional flows with sufficient statistical reliability. Later, several studies have focused on specific markets or destinations (Australia, China, UK, Kenya, Turkey, Italy, Norway, and Galicia, among others), as described in Guardia, Muro, and Such-Devesa (2014).

Table 1 summarizes the main features of those recent contributions to domestic tourism, which made use of origin/destination (O/D) flow matrices. Table 1 systematizes and updates the review by Dominguez Perez (2016). A common denominator is (a) the use of gravity and spatial autoregressive models for explaining bilateral flows of arrivals, trips, or receipts and (b) selection of the attraction variables from the supply-side perspective. The inclusion therein of supply-side variables of both origin and destination would be in line with the push–pull factor theory, although the push variables are not referred to individuals—with the exception of Patuelli, Mussoni, and Candela (2013), who also included the satisfaction index for train service—but to the place of origin.

Table 1 shows that different types of flows were analysed, with nonmonetary flows being prevalent (arrivals and number of trips), as only two teams of scholars (De la Mata & Llano-Verduras, 2012; Haddad, Porsse, & Rabahy, 2013) studied household expenditures. The statistical sources of O/D data were, alternatively, household surveys (monetary flows and number of trips) or accommodation data (arrivals). Regional-level data were most frequently used with the exception of Marrocu and Paci (2013), who referred to a higher territorial granularity (107 provinces).

Only two out of nine contributions attempted the construction of a composite indicator of attractiveness (Dominguez Perez, 2016; Stracqualursi & Agati, 2017), and one (Haddad et al., 2013) proposed the use of the O/D matrix and the input/output framework for appreciating the territorial distribution of the economic impact of tourism. The other articles are concerned with the use of gravity models and augmented formulations (spatial autoregressive), even on panel data. Although not always explicitly quoted, the push–pull factor theory is the reference framework for specifying the model's covariates.

De la Mata and Llano-Verduras (2012) applied alternative models (gravity models with border effects and separate intraregional effects, spatial autoregressive models, and Tobit spatial autoregressive models) to explain interregional monetary flows by the type of accommodation during journeys (tourist establishments, second homes, and total). It is worth mentioning the use of gross values added for the hotel industry in the region of origin as a measure of the capacity to absorb internal tourist demand. In modelling total flows, significant distance and border effects were found.

Massidda and Etzo (2012) studied bilateral flows of Italian regions using a panel data gravity model. They basically referred to the literature on modelling tourist flows (Zhang & Jensen, 2007) and gave emphasis to supply-side variables as valuable determinants of tourists' decisions. The model estimated on full sample data (20 regions) also includes the covariate "number of international trips," from which the presence of competitiveness between domestic and international destinations emerged. The models for the two macroregions (Centre-North and South) confirm the predominant role of price differentials and the GDP of the region of origin. In summary, that research also proved the significant effects of environmental variables, accessibility, safety, public expenditure in culture, and even of the lagged term, revealing the presence of habit persistence and loyalty.

Marrocu and Paci (2013) analysed bilateral flows among the 107 Italian provinces using a gravity model. However, as Italian National Statistical Institute (ISTAT) publishes flows of domestic tourism disaggregated by province of destination and region of origin, the authors estimated tourist flows by province of origin starting from the regional data. The novel contribution is the assessment of separate spillover effects generated by destination, origin, and the interaction between origin and destination. The underlying assumption is that bilateral tourism flows do not depend only on the characteristics of the origin province, destination province, and on their distance but also on the characteristics of their neighbouring provinces. The authors found grounded evidence of the existence of both origin and destination spillovers of neighbouring provinces, which amplify the impact of attractions variables on tourists flows.

Patuelli, Mussoni, and Candela (2013) investigated the importance of the regional endowment in terms of United Nations Educational, Scientific and Cultural Organization's (UNESCO's) World Heritage Sites (WHS) on domestic tourism, using a 12-year panel of domestic arrivals of the 20 Italian regions. The research issues are concerned with whether an origin region's WHS endowment encourages its inhabitants to travel more/less and whether a destination region's WHS endowment attracts more tourists. They modelled the bilateral number of arrivals through a gravity model, with covariates related to both origin and destination, and spatial lags of WHS variables. Their empirical findings highlight that regional inflows are influenced positively by supply factors (museum offer, cultural events, and number of WHS, as well) and negatively by the prices of the restaurant/accommodation sector.

Guardia et al. (2014), after developing a tourist attraction index, modelled bilateral flows (number of trips) using a gravity model on panel data with random effects. Selected covariates are population size, transportation costs, relative prices, and number of secondary homes. The main findings confirm the validity of the basic assumptions of the gravity model as there is a direct effect of population and an inverse effect of distance between territories.

TABLE 1 Recent studies on domestic O/D flows matrices

Criteria	de la Mata and Llano-Verduras (2012)	Massidda and Etzo (2012)	Haddad et al. (2013)	Marrocu and Paci (2013)	Patuelli et al. (2013)	Guardia Gálvez et al. (2014)	Dominguez-Perez (2016)	Stracqualursi and Agati (2017)	Cafiso et al. (2018)
Aim	Determinants of regional monetary flows	Determinants of domestic tourism	Regional disparities (inequalities)	Spillover effects of origin and destination places	Impact of UNESCO World Heritage Sites	Building a tourist attraction index. Determinants of domestic tourism.	Building a tourism attraction index	Building an indicator of tourism inflows and investigating its determinants	Effect of distance on domestic tourism during the period of economic crisis
Flows type	Expenditure in restaurants, accommodation, and travel agencies	Arrivals	Expenditure	Arrivals	Arrivals	Trips	Trips	Arrivals	Arrivals
Country	Spain	Italy	Brazil	Italy	Italy	Spain	Uruguay	Italy	Italy
Territorial level	Regions (17 autonomous communities)	Regions (20) and macroregions (Centre-North vs. South)	Macroregions (5)	Provinces (107)	Regions (20)	Regions (17 autonomous communities)	Regions (19 departments)	Regions (20)	Regions (20)
Data source for tourist flows	Official statistics (various sources—household survey data)	National official statistics (accommodation data and other sources)	National official statistics (household survey)	National official statistics (household survey on travel and vacations). Partially imputed data	National official statistics (accommodation data)	National official statistics (household panel survey FAMILITUR)	National official statistics (Ministry of Tourism)	National official statistics (accommodation data)	National official statistics (accommodation data)
Time	2001 and 2007	2004–2007	2007	2009	1998–2009	2004–2008	Total over 3 years (2010–2012)	2012	2000–2012
Selected covariates	VA hotel industry (O), GDP (D), Km beaches (O/D), island dummy (O/D), capital city	Population density (O&D), distance, per capita GDP (O), CPI ratio (D on O), # international trips	No covariates	Population density (O&D and intraprovince), per capita GDP (O&D and intraprovince), accessibility index,	Distance, # WHS (O&D and surrounding regions). All control variables for both O&D: per	Population (O&D), GDP per capita (O&D), territorial contiguity (dummy) relative prices, PPP, trips	No covariates	# towns, # outlets, # theme parks, # hospitals, # hotel facilities, # other accommodation facilities, #	Distance, year dummies, and interaction. All control variables for both O&D: population, per

(Continues)

TABLE 1 (Continued)

Criteria	de la Mata and Llano-Verduras (2012)	Massidda and Etzo (2012)	Haddad et al. (2013)	Marrocu and Paci (2013)	Patuelli et al. (2013)	Guardia Gálvez et al. (2014)	Dominguez-Perez (2016)	Stracqualursi and Agati (2017)	Cafiso et al. (2018)
	dummy (O/D), temperature index (O), interregional migration stock, distance, contiguity dummy	(O), regional endowment (D), regional expenditures in cultural activities (D), visitors at national museums (D), highways Km (D), crime index (D), CO_2 emissions (D), yearly dummies, lagged term		low-cost flights, protected areas, size of protected areas, museums, visitors to museums, restaurants with at least 1 Michelin star, beach quality, distance	capita GDP, specialization in tourism, share of PA spending in recreational, cultural activities, price index of hotels and restaurants, population, visitors to museums, theatres and shows tickets, share of coast unsuitable for bathing, nights spent in off-season, satisfaction of train service	to second homes, insularity (dummy), time trend		exhibition/ conference centres, # food services	capita GDP, Km railways, roads, highways; # ports, # airports; # theatres, # cinemas; Putnam index for social capital; presence of UNESCO sites, cumulated public spending for tourism (1996 to 2007), thefts and robberies, hectare of protected natural areas, Km of coastline
Methodology (model, etc.)	Gravity model with separated interregional and intraregional effects, Bayesian or Tobit spatial autoregressive model	Dynamic panel data gravity model	Input–output model for quantifying the impact of O/D flows	Gravity model (base model) and spatial autoregressive model	Panel data gravity model (negative binomial regression)	Panel data gravity model with random effects	Descriptive	Beta regression model and network analysis	Panel data gravity model

Abbreviations: D, destination; O, origin; PPP, purchasing power parity; VA, Value Added; GDP, Gross Domestic Product; CPI, Consumer Price Index; WHS, World Heritage Site; PA, Public Administration.

Cafiso, Cellini, and Cuccia (2018) applied a gravity model to a time series of regional data of arrivals for assessing whether the recent economic recession forced tourists to choose nearer destinations. The interaction of distance with yearly dummy variables made it possible to estimate how the effect of distance changed with time, during the years of the recession. In line with other studies, the authors found that economic crises lead tourists to closer destinations. Therefore, remote destinations are more affected by a crisis, as remoteness has a more significant cost.

Finally, it is worth mentioning other empirical studies on the territorial attractiveness of Italy, although they do not analyse O/D matrices.

Cracolici and Nijkamp (2009) assessed the relative attractiveness of southern regions by analysing microdata on individual visitors' perceptions. They directly connected attractiveness to individual tourist well-being and destination competitiveness, stating that the success of tourist destinations vitally depends on their quality profile. Furthermore, they compared the attractiveness index derived from microdata with a competitiveness index built on macrodata in a previous analysis, and they concluded that both approaches (micro and macro) must be used in order to develop appropriate strategies.

Later, Cugno, Grimmer, and Viassone (2012) derived a synthetic measure of attractiveness of Italian provinces by applying multivariate techniques on a set of provincial data related to both drivers and outcomes (arrivals, nights spent, and expenditures) of the tourist activity.

Bernini, Cracolici, and Nijkamp (2016) applied a demand-side (push) perspective in the analysis of a pseudo-panel of repeated household cross-sectional (quarterly) microdata. They investigated the participation and expenditure in tourism by also distinguishing between the decision to travel domestically and internationally, with the use of a double hurdle model. Household level data are augmented with the characteristics of the origin location and socio-economic context variables. A key issue investigated in the paper is the difference between northern and centre-southern household behaviours. The main findings show that the decision pertaining to consumption of tourism is strictly limited by household budget constraints, which are more significant for people living in the Centre-South.

That North/South divide was also found by Bernini and Cracolici (2016), who applied a demand-side perspective in analysing household survey data on tourism. Major participation in tourism on behalf of the northern families is due not only to better economic conditions but also to easier access to a transport system. On the whole, domestic tourism is a necessary good (income elasticity lower than 1), but tourism expenditure does not seem to be a necessity for the poorest households.

4 | TOURISM TREND, DATA, AND EMPIRICAL FINDINGS

In this section, we present an overview of tourism trend in Italy, the data, and empirical results from the BT model estimation. Regional origin–destination flows (arrivals) derived from the total survey on accommodation facilities are used.

4.1 | Domestic tourism in Italy: Main trends and figures

From a statistical point of view, the volume of domestic flows is difficult to measure because, more than foreign tourism, it is related to purposes such as visiting friends and relatives, staying at a secondary home, and so on. In Italy, an origin–destination matrix of tourism flows can be obtained by two data sources provided by the ISTAT according to EU Regulation 692/2011 (European Commission, 2011; Eurostat, 2014).

1. The survey *Viaggi e vacanze degli Italiani in Italia e all'estero* provides household microdata (demand-side data); the basic unit is "trip" (with at least one overnight stay) that can be classified as a "vacation trip" or "business trip." Since 2014, that survey uses a different sample design, whereas the concepts and operating definitions of tourism phenomena (trips, overnight stays, usual environment, etc.) are unchanged, with both household surveys (the old and the new one). With these data, it is possible to distinguish between trips made for professional reasons and those made for personal purposes.
2. The total survey on accommodation facilities (supply-side data) provides data on tourist flows: The basic unit is arrival (and overnight stay), referring to all customers of accommodation structures. Therefore, travels for nontourism purposes are included, as well.

Household survey data should be preferred when analysing origin–destination flows because it also comprises sociodemographic variables, making such data appropriate for the study of factors determining tourism flows (INRouTe, 2016). However, those surveys are not designed for providing estimates of regional tourist flows, and in fact, many sampling zeroes occur in the interregional flow matrix. Thus, accommodation data are more commonly used in analysing destination attractiveness, because of their greater territorial detail and because attractiveness is linked more to a comparison of tourist areas.

ISTAT data from accommodation facilities show that tourism flows began increasing rapidly after a slowdown in the years 2008–2011, with a major contribution from foreign arrivals (Figure 1). Total arrivals

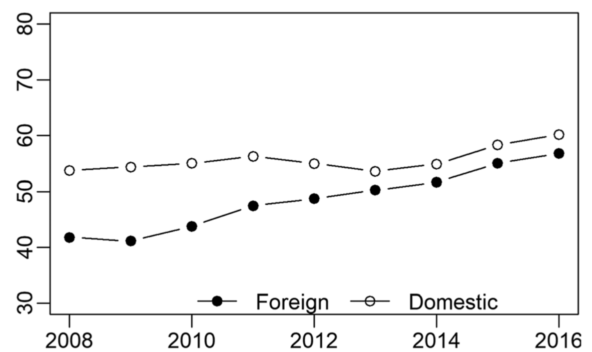

FIGURE 1 Time plot of domestic and incoming (from abroad) flows (million arrivals) in Italy 2008–2016 (Source: Our processing of ISTAT data)

(domestic and incoming from abroad) reached 116.9 million in 2016 (22% increase from 2008). Domestic flows increased as well from 53.7 million in 2008 to 60.2 million in 2016 (+12%), after a slight decline in 2012 and 2013

Although the aggregate trend is positive, several regions performed differently. Figure 2 shows the regional changes (base year: 2008) in the number of arrivals. The increase is remarkable in certain cases, notably, Basilicata (BAS) with Matera, the UNESCO Heritage city selected as European Capital of Culture of 2019, as well as Puglia (PUG) and Sardinia (SAR), renowned for their coastal areas. Another notable fact is the peak in domestic flows in 2015 for Lombardy (LOM), certainly due to EXPO 2015 in Milan (Cavallo, Di Sante, & Petrei, 2016).

ISTAT household surveys provide information on the propensity of Italian residents to travel to an Italian region. Figure 3 shows the

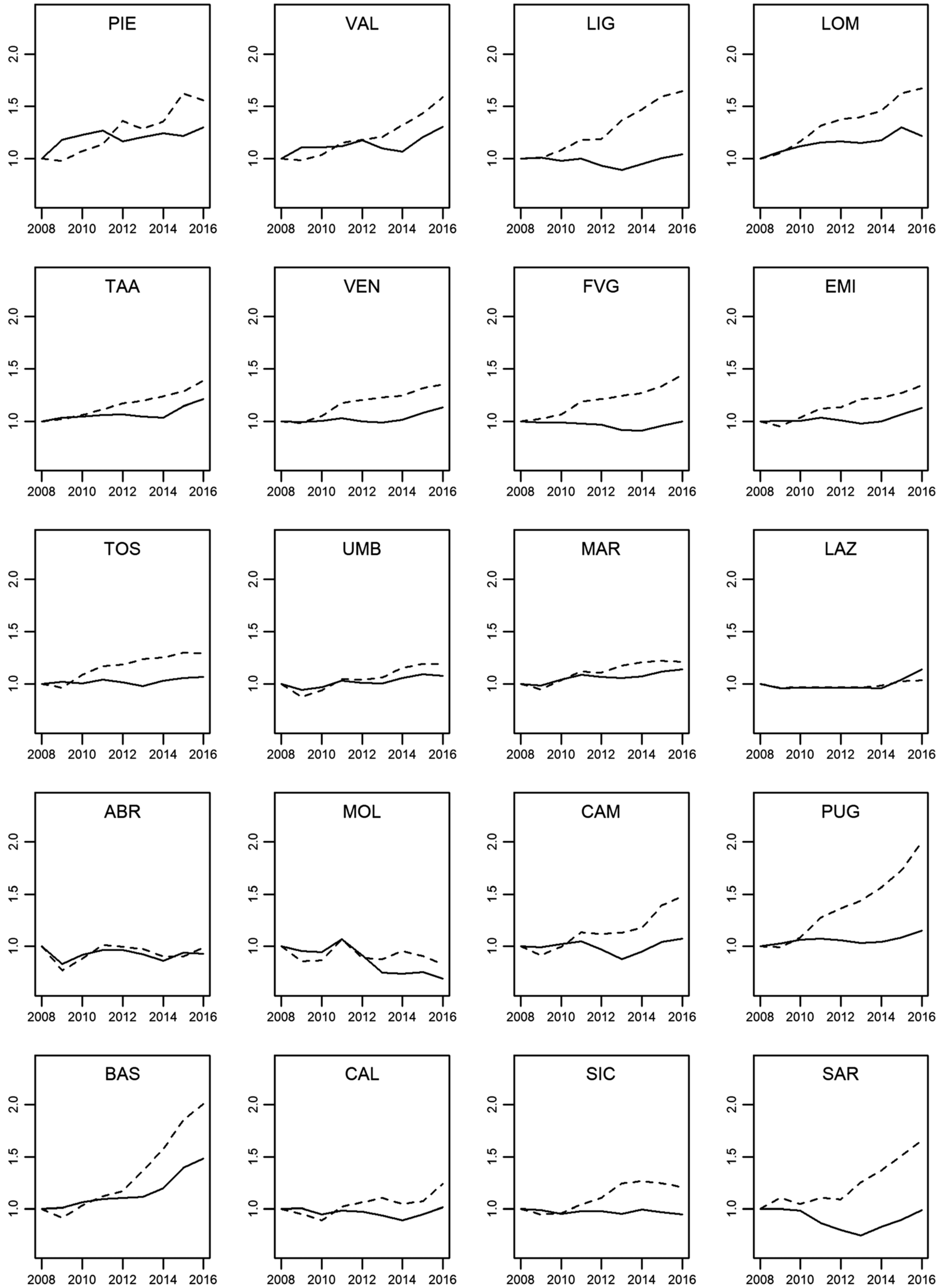

FIGURE 2 Time plot of domestic and foreign arrivals in Italian regions 2008–2016.Index numbers, base year 2008. Dashed line: foreign; straight line: domestic (Source: Our processing of ISTAT data)

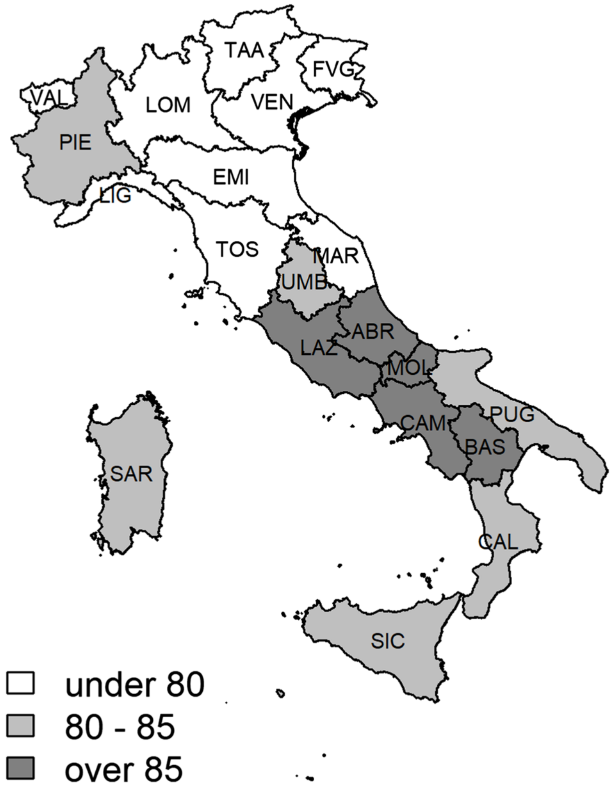

FIGURE 3 Percentage of trips to domestic destinations in 2012 (Source: Our processing of ISTAT data)

percentage of trips (with at least one overnight stay) to a domestic destination. The percentage is higher in southern regions and lower in areas close to the Italy's administrative borders (northern regions).

More attractive regions took greater advantage than others of the growing arrival flows. In fact, the normalized Herfindahl–Hirschman index shows a progressive increase in the concentration of incoming domestic flows across regions: from 0.387 in 2008 to 0.438 in 2016.

4.2 | Data and empirical findings

The analysis considers n = 20 regions in 190 comparisons based on the interregional matrix of arrivals derived from accommodation data. In fact, if each possible paired comparison is performed, the total number on comparisons is obtained as $N = n\ (n - 1)/2$ (Cattelan, 2012). We first estimated a BT model (denoted MOD0) without considering the effect of covariates (attractiveness factors) but with population size constraint. In fact, the number of arrivals from a region is strictly dependent on the resident population in that region (Pearce, 1993), and this fact becomes an actual numerical constraint in the BT framework.

If we want to develop arguments about the possible determinants of such flows, we can learn it from the estimation of a structured BT model (denoted MOD1). MOD1 allows to assess how much of the variability in the attractiveness parameters of the regions is due to the differences in tourism attractors.

Table 2 presents the covariates of the BT model. The theoretical framework of Dwyer and Kim (2003; Table 1) was the reference list for finding actual data from statistical and nonstatistical sources. Table 2 gives also evidence of the correspondence with the dimensions and subdimensions of the Dwyer and Kim model.

The data used are provided by ISTAT except for the information on low-cost carriers produced by Ente Nazionale per l'Aviazione Civile and DRIVETIME built from Google Maps API. In particular, most data come from the BES project (BES: Benessere Equo e Sostenibile, ISTAT) and the ASTI special database on territorial infrastructures (Atlante Statistico Territoriale delle Infrastrutture, ISTAT). The remaining variables are derived from the current statistical surveys conducted by ISTAT.

In Table 2, we can also recognize alternative indicators for heritage, environment, and other relevant aspects, so that the present analysis can be also useful for discriminating among alternative operational measures. The analysis is concerned with the year 2012, as data for a large number of candidate covariates are available.

4.2.1 | Endowed resources

We used indicators on the size of protected areas in the regions (PROA and PROC), whereas NAT refers to a special network of environment protection and LANDSCAPE is a composite indicator of landscape. We can expect a positive effect for all covariates. For the heritage and culture subdimension, CULTURENDOW expresses the density of cultural heritage (museums and archeologic areas), recording the number of museums, archaeological and architectural sites and monuments per 100 km^2. This index is produced through the cataloguing activity, which registers listed historical and cultural resources. This information is updated continuously; therefore, we assume that its current value at time t is proportional to actual regional cultural resources. After all, that activity is not merely administrative but can be considered as a part of destination's promoting strategies. Anyway, we also considered the number of museums and archaeological areas, also normalized by population size (MUS, MUSPOP) and the yearly number of visitors to museums (VISIT), which is assumed to reflect the relevance of those attractors. Finally, the number of UNESCO World Heritage Sites (UNESCO) was considered, as well. We can expect a positive effect for all covariates.

4.2.2 | Supporting factors

We considered healthy factors (MED), technologies for financial transactions and communications (ATM, POS, and HOUSCON), transportation infrastructures (HIGHW, ROAD, and RAILWAY) including special type of air transport (CHARTER and LOWCOST). In this case, as well, we can expect a positive effect for all covariates.

4.2.3 | Created resources

These relate to accommodation facilities, food services, and theme attractions. Here, we considered the level of tourism specialization

TABLE 2 Candidate covariates of the Bradley–Terry model

D&K dimension	D&K subdimension	Label	Description	Source
Endowed resources	Natural parks and nature reserves	PROA	% protected internal areas	ISTAT-ASTI
		PROC	% protected coasts	ISTAT-BES
		NAT	% protected areas (“Rete Natura” network)	ISTAT-BES
	Wonders and scenery	LANDSCAPE	Composite indicator of landscape	ISTAT-BES
	Heritage sites and museums	CULTENDOW	Cultural endowment index (counts/100 km^2)	ISTAT-BES
		MUS	# museums	ISTAT-ASTI
		MUSPOP	# museums, archeologic areas, monuments, etc./population (100,000 inhabitants)	ISTAT-ASTI
		VISIT	# visitors of museums	ISTAT-ASTI
		UNESCO	# UNESCO World Heritage Sites	UNESCO
Supporting factors	Health and medical facilities	MED	# medical doctors per capita (medical facilities)	ISTAT-ASTI
	Currency exchange facilities	ATM	# ATM	ISTAT-ASTI
		POS	# POS	ISTAT-ASTI
	Telecommunication system	HOUSCON	% households with broadband connection	ISTAT-ASTI
	Local transport system	HIGHW	km highways/total regional area (km^2)	ISTAT-ASTI
		ROAD	km local (provincial) roads/total regional area (km^2)	ISTAT-ASTI
		RAILWAY	km^2 served/total regional area (km^2)	ISTAT-ASTI
	Flight connections	CHARTER	% passengers of domestic charter flights	ISTAT
		LOWCOST	% passengers of low-cost flights	ENAC
Created resources	Tourism infrastructures	BEDS	# beds/# inhabitants	ISTAT
		HOTEL	# beds in hotels and similar (thousands)	ISTAT
	Range of activities	COAST	# municipalities specialized in sea tourism	ISTAT
		MOUNT	# municipalities specialization in mountain tourism	ISTAT
		HIST	# historical cities	ISTAT
Destination management	Reputation	GOOGLE	Google Trends score (“Visit <region>,” 2011–2012 average)	Google
Situational conditions		POP	Resident population (thousands) adjusted for outgoing flows	ISTAT
	Business environment	BFIRM	% firms with 50 and more persons employed	ISTAT
	Travel time from major markets	DRIVETIME	Driving time (min) from major markets (Milan, LOM)	Google
	Level of visitors' safety	ACC	# deaths in road accidents/resident population (×1,000)	ISTAT
		HOMICIDE	Homicide rate (100,000 inhabitants)	ISTAT
		SAFETY	Composite indicator of safety	ISTAT-BES
Market performance	Price competitiveness	PPP	Regional purchasing power parity (2010)	ISTAT
	Employment	UNEMP	Unemployment rate	ISTAT
	Per capita income	GDP	Per capita GDP	ISTAT
		EXPENSE	Monthly household consumption expenditure (thousand Euro)	ISTAT
	Economic growth	DGDP	Per capita GDP change 2012/2010 (constant 2010 prices)	ISTAT

Abbreviations: ASTI, Atlante Statistico Territoriale delle Infrastrutture; BES, Benessere Equo e Sostenibile; D&K, Dwyer and Kim; ENAC, Ente Nazionale per l'Aviazione Civile; ISTAT, Italian National Statistical Institute.

expressed by the percentages of municipalities specialized in tourism, as derived from the ISTAT classification “circoscrizioni turistiche.”[1] This classification provides seven categories of tourism offer (historical city, capital city, spas, coastal tourism, mountain, lake, and religious) plus a category of municipalities not specialized in tourism. Thus, COAST and MOUNT are the number of municipalities specialized in coastal tourism and mountain tourism within the region. HIST is the number of historical cities. The other covariate is the number of bed places in hotels (HOTEL) related to the size of the more traditional tourism industry, and the number of beds per inhabitant (BEDS). We expect a positive effect for all covariates.

4.2.4 | Destination management

We referred to the Google Trends application. The query “visit < region>” was entered for obtaining monthly Google score for each region (GOOGLE). The information quality of this indicator can be questionable for three main reasons: (a) The data depend on the entered query and Google learning machine; (b) Google Trends application provides only a sample of the queries actually processed; (c) Google receives only part of all searches done on the web, because of the widespread use of alternative web resources (e.g., social media, special searching engines for travelling purposes, and new searching engines that do not trace searches and protect users' confidentiality). Anyway, we computed the mean of 24 monthly Google Trends scores related to 2011 and 2012. We expect a positive effect for that covariate.

4.2.5 | Situational conditions

They work in the broader external environment and concern economic, social, cultural, demographic, environmental, regulatory, and technological aspects. We included population size adjusted for outgoing flows: (POP). POP values are computed by multiplying the actual resident population in the region by the proportion of trips to Italian destinations made by residents in that region of origin. Basically, POP is conceived as a proxy of the population in the region that is interested in domestic tourism. In addition, we considered driving time from the major market (DRIVETIME). As far as the safety level in the destination is concerned, we believe that it is of minor importance in the case of domestic tourism. Nonetheless, three indicators were considered: homicide rate (HOMICIDE), a composite indicator of safety (SAFETY), and the number of deaths due to road accidents (ACC). In fact, land transport dominates in Italy with over 75.6% of domestic holiday travel being by car and 10.7% by train (2016 data; Italian National Statistical Institute, 2017). Even the business environment at the destination is important. The presence (or the percentage: BFIRM) of large local units (with 50 or more persons employed) is intended as a proxy of business intensity that can be an attracting factor. Moreover, that variable is important as arrivals of official accommodation facilities also include travellers for professional purposes. In all, we expect a negative effect for all covariate, except SAFETY and BFIRM.

Weather and climate conditions were not considered, as may be of little interest because we use annual data and carry out an intracountry analysis. On monthly data, Bigano, Goria, Hamilton, and Tol (2005) found that climate conditions affect domestic tourism in Italy, but the direction of the effect is different depending on the season (e.g., negative influence of high temperatures in skiing season). Moreover, they found a low territorial variability of temperature, especially in the extreme seasons.

Distance between destinations was not considered. Although distance is an important determinant of destination choice, it is a context-specific variable in the logic of pairwise comparison. Therefore, its effect on ability would be the same for both competing regions and would be cancelled out (Turner & Firth, 2012).

4.2.6 | Market performance indicators

We include some classical economic indicators: PPP (the purchasing parity index, which is available at regional level only in 2010), UNEMP, GDP, and DGDP (see Table 1). In addition, we also consider the monthly consumption expenditure by households as an indicator of expenditure capacity (EXPENSE).

4.2.7 | Results

Table 3 presents the results of the estimation steps on 2012 data, and Table 4 shows some descriptive statistics of the covariates of the estimated structured BT model. Consider that 2012 is still a year in the recession phase, as discussed in Section 4 (see Figure 2). MOD0 is the BT model with the sole covariate POP and it is the baseline model for assessing the effects of the other covariates. The sign of POP is negative, as expected. The (log) abilities derived from MOD0 are based only on POP predictor; thus, smaller regions occupy the top places in the overall ranking (lowest values of log abilities in Table 6): VAL, TAA, UMB, MOL, and BAS. Conversely, more populated regions appear at the bottom of the ranking (LOM, CAM, LAZ, and SIC).

TABLE 3 MOD1: Estimation results

D&K dimension	Covariate	Estimate	*SE*	*z* value	*p* value
Endowed resources	PROA	4.322E−02	8.22E−03	5.261	1.44E−07***
Endowed resources	MUSPOP	4.996E−02	8.48E−03	5.89	3.87E−09***
Created resources	HOTEL	5.801E−03	1.33E−03	4.363	1.28E−05***
Destination management	GOOGLE	3.360E−02	8.86E−03	3.794	0.000148***
Situational conditions	BFIRM	2.394E+00	8.32E−01	2.876	0.004022**
Situational conditions	POP	−1.865E−04	3.82E−05	−4.887	1.02E−06***
Supporting factors	HOUSECON	1.135E−01	1.92E−02	5.919	3.23E−09***
Market performance	EXPENSE	−2.476E−03	5.45E−04	−4.546	5.46E−06***
Random error		0.2295	0.0489	4.69	2.73E−06***

Abbreviation: D&K, Dwyer and Kim.

*$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 4 Descriptive statistics of MOD1 covariates (2012 data)

Statistics	PROA	MUSPOP	HOTEL	GOOGLE	BFIRM	POP	HOUSECON	EXPENSE
Mean	11.2	13.7	112.5	16.3	0.542	2,396.6	47.5	2,456.2
Median	8.6	10.4	99.2	14.5	0.507	1,504.1	49.4	2,519.5
SD	7.6	13.5	82.7	8.2	0.175	1,980.4	5.6	381.4

Source: Our processing of secondary data (Table 2).

When estimating MOD1, the candidate covariates of Table 2 enter into the model, given the presence of POP. We also assessed the effect of variable transformations (i.e., normalization with respect to population size or regional surface).

All covariates show highly significant effects ($p < .01$), even POP that accounts for population size (as discussed above). The sign of the coefficients is as expected. The seven additional covariates explain more than 70% of the residual standard deviation of MOD0, which is 0.7702. However, MOD1 explains only a part of the individual variability, as it remains a residual heterogeneity across units, that is, heterogeneity that is not included in subject-specific covariates. In fact, the variance of the random component is significantly different from zero. The individual heterogeneity not explained by the model may be attributed to any omitted attraction variables but also to push variables and, in particular, the propensity to travel out of the region.

The model covariates are representative of local resources, both environmental and cultural (PROA and MUSPOP), supporting factors (HOUSCON), and destination management (GOOGLE), whereas HOTEL describes the size of the tourism industry and BFIRM the business environment (situational conditions). According to other studies, even the role of economic variables (i.e., EXPENSE) does emerge although the price differentials between regions (PPP) is not significant. However, the supply-side (pull factors) perspective dominates although the final model includes a demand-side covariate (push factor).

The linear predictor and the subsequent exponentiation allows the computation of covariates' contribution to the odds ratio. Table 5 offers a comparison between TOS and three regions: two can be direct competitors for territorial contiguity, and/or for endowed resources, Emilia Romagna (EMI) and Veneto (VEN), and the other (Lombardy: LOM) is chosen as it is the major origin market and has a high percentage of medium–large local units. We remind that the odds ratio of preferring region i to region j is exp $(\lambda_i - \lambda_j)$, and it is the product of the single covariates' contributions in Table 5.

TABLE 5 Pairwise comparison of regional attractiveness through MOD1

Covariate	TOS vs. LOM	TOS vs. VEN	TOS vs. EMI
PROA	1.023	1.047	1.089
MUSPOP	1.706	1.523	1.217
HOTEL	0.949	0.894	0.544
GOOGLE	2.025	2.316	2.094
BFIRM	0.389	0.489	0.519
POP	2.392	1.156	1.101
HOUSECON	0.628	0.628	0.688
EXPENSE	2.246	1.458	2.096
Odds ratio	4.8540	1.7096	1.2415

Table 5 tells us that TOS has an odd of (approximately) 1.7 of being preferred to VEN, whereas 1.2 to EMI and 4.8 to LOM. The strengths of TOS are cultural endowments and reputation (Google score). Comparatively with LOM, we can appreciate the weakness of TOS in terms of BFIRM. The single odds ratio can effectively help in defining strategic policies aimed to attract visitor from specific origin markets.

Based on MOD1 results, comparisons across the regions' attractiveness parameters (log abilities) are made through their quasi-variance standard errors (Firth & de Menezes, 2004; Firth, 2012; Turner & Firth, 2012) and the related 95% confidence intervals that are of different size depending on data (see Figure 4).

Figure 4, in which regions are arranged (from left to right) by increasing ability, shows the highest position of Trentino-Alto Adige (TAA) followed by Valle d'Aosta (VAL). The values of the ORI index (Table 6 and Figure 5) allow a more solid ranking of regions that puts VAL and TAA in the first place, followed by Marche (MAR) and Sardinia (SAR) with and Abruzzo (ABR) and Tuscany (TOS). At the bottom of the list, we find Molise (MOL).

The ORI broadly identifies four clusters of regions: nine regions with ORI between 0 and 3; five regions (LIG, VEN, FVG, EMI, and UMB) with ORI = 6 and 7; four regions (TOS, MAR, ABR, and SAR) with ORI = 10 and 11; and finally, VAL and TAA with ORI greater than 15. Figure 5 offers a territorial representation of the ORI values, in which we see a better position of central Italy, besides VAL and TTA. The two regions doubtlessly possess natural landscapes and scenery that are unique in the world, which are valuable comparative advantages, with the growth of tourism linked to nature. But their attractiveness is probably also determined by the proximity to strong competitors (France, Switzerland, and Austria) attracting Italian tourists, which forces VAL and TAA to offer high quality products and services (competitive advantages). Moreover, the territory of VAL and

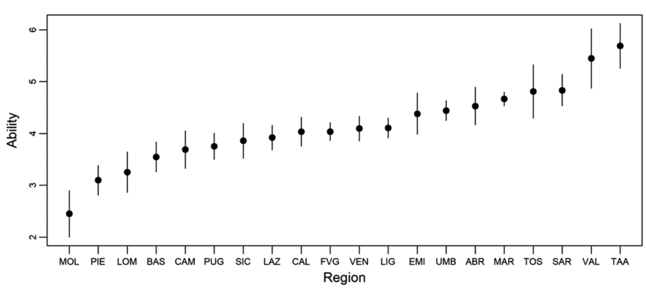

FIGURE 4 MOD1: Caterpillar plot

TABLE 6 Abilities predicted by the Bradley–Terry model (higher rank, higher attractiveness)

Region	MOD0 log ability	MOD0 ranking	MOD1 log ability	MOD1 ranking	MOD1 ORI
PIE	−0.5118	6	1.6356	2	1
VAL	−0.0137	20	3.8807	19	17
LIG	−0.1725	13	2.4831	10	6
LOM	−1.0882	1	1.6631	3	1
TAA	−0.1072	16	3.9605	20	18
VEN	−0.5213	5	2.6088	11	7
FVG	−0.1174	15	2.7604	12	7
EMI	−0.4832	8	2.9286	14	7
TOS	−0.4085	9	3.1448	18	10
UMB	−0.1043	17	2.7662	13	7
MAR	−0.1735	12	3.0148	16	11
LAZ	−0.7012	3	2.0250	4	1
ABR	−0.1626	14	2.9536	15	10
MOL	−0.0411	19	0.5477	1	0
CAM	−0.7337	2	2.0532	5	1
PUG	−0.4948	7	2.0664	6	1
BAS	−0.0769	18	2.1309	7	1
CAL	−0.2352	10	2.4095	9	3
SIC	−0.6167	4	2.3766	8	3
SAR	−0.2020	11	3.1281	17	11

Abbreviation: ORI, overall rating index.

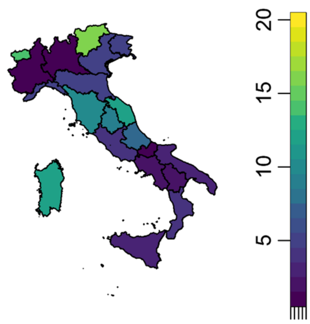

FIGURE 5 Territorial representation of the ORI values [Colour figure can be viewed at wileyonlinelibrary.com]

TAA is divided into three autonomous provinces: Aosta in VAL (as VAL coincides with the provincial territory), Trento, and Bolzano in TAA. That situation is favourable for tourism policies and strategic planning as it avoids possible problems relating to departmental and administrative fragmentation for the territorial organization of tourism.

In accordance with other studies, the results show a definite North/South divide (having the southern/islands region, except ABR and SAR, an ORI index between 0 and 3). In particular, the relative low attractiveness of those regions could be also determined by the economic weakness of their closer origin markets that are precisely the southern/islands regions (55% of arrivals).

Based on the results of this analysis, a number of considerations can be proposed. The sustainability of environment (PROA) and the historical and cultural resources (MUSPOP) are key drivers of regional attractiveness. In this respect, the significant effect of GOOGLE could suggest policy makers to raise the awareness of domestic tourists to those regional resources. Moreover, the economic situation is proved to affect domestic tourism (EXPENSE); thus, destinations are called upon to face a greater reduction in incoming flows from economic disadvantaged regions, during periods of economic recession. Finally, the significant effect of HOTEL might imply the attracting power of a structured tourism industry. This finding could also foreshadow that alternative accommodation facilities have to pay a greater attention to professionalism. In this respect, the importance of human resources in tourism has gradually imposed itself, both in the literature and in the awareness of entrepreneurs (Baum, 2006; Wessels, du Plessis, & Slabbert, 2017).

5 | CONCLUSIONS

Although domestic tourism represents only a part of total tourism flows, it remains a key driver of competitiveness in Italy. Recent economic crises have revealed a weakness of domestic tourism, which has undergone a period of stagnation and decline, recovering only since 2013 and only in some regions.

In this contribution, a measurement of domestic attractiveness for the 20 Italian regions is proposed based on an analysis of regional origin–destination tourism flows, using a modelling approach that, to the best of our knowledge, is novel in that context.

Interregional flows of tourist arrivals were analysed using a BT model. This model considers regional attractiveness as parameters located along a continuum, on the basis of multiple paired comparisons. The present approach appears suitable for analysing tourist flows because it assumes that a region with a greater attractive power (in comparison with others) will have a higher probability of being preferred by tourists, in the multiple comparisons of pairs of competitor regions. The proposed approach also assessed the effects of attractiveness determinants providing indications for tourism policy and planning. Empirical findings show the importance of factors related to the tourist industry and cultural attractors, and some explanatory power is provided by background variables also related to economic conditions and business environment.

Furthermore, the attractiveness information was summarized using an ORI that takes into account only significant differences in point estimates of regional abilities. The resulting ORI values reflect the Italian context characterized by less developed areas in the South and more developed ones in the Centre and North. Furthermore, a comparison between MOD0 and MOD1 results emphasized the weak attractiveness of MOL that pass from the top positions of MOD0 to the bottom position in MOD1 and of LOM that remain among the last destinations in both the MOD0 and MOD1 rankings.

From a policy point of view, our findings may have the following implication: As the model involves differentials and provides a ranking of destination, policy makers can consider the relative position of the destination with respect to more direct competitors, instead of looking at the absolute size of attraction factors. Furthermore, this attractiveness ranking is obtained taking into account a set of covariates assessed in tourism literature as attractiveness factors. The odds ratio can guide them in this task, but perhaps more advanced skills are required for a correct interpretation in comparison with the gravity model structure (Giambona et al., 2018).

In all, the analysis returns reasonable results, and the covariates in MOD1 (see the odds ratio) express a valuable discriminating power among regions, although some findings are quite disappointing: in particular, the low position of Lombardy (LOM), Lazio (LAZ) Puglia (PUG), and Campania (CAM). Indeed, a significant individual variability persists across regions with the same covariates, as the effect of the random component is significant.

The availability of a more detailed tourist flows matrix (at the provincial level, for example) could be useful to investigate more deeply the determinants of tourism attractiveness locally. However, at present, provincial information are recorded only for the destination of the trip, that is, we have only region–province tourism flows.

In conclusion, it is important to remind the main limitations of the present study.

The regional attractiveness measure here derived through the (log) ability or ORI only deals with interregional flows. Furthermore, we have used the data published by ISTAT as authoritative description of the tourist flows of the reporting regions. We are aware that accommodation data account only a part of the actual tourist flows; thus, we probably underestimate the attractiveness of those regions where nonofficial forms of accommodation (i.e., second home and visiting friends) are remarkable.

As far as the selection of covariates is concerned, we have considered a larger dataset than the one here presented. More than 60 variables were tested—even with normalization by surface or population size—and only a subset of them is presented in Table 2. Although we have researched extensively, there may be other socio-economic and environmental variables that would be shed further light on the characteristics of the competing regions. Moreover, the use of normalized variables can introduce spurious correlation in the data; thus, the specification search in this case is actually a hard task. Finally, another particular concern is that the model does not account for the fact that, when objects have more than one aspect of interest, different aspects may prevail in different comparisons.

In conclusion, we are aware that the mechanism of pairwise comparison implied by the BT model could sound as a strong assumption in describing tourists' behaviour but that was not the aim of the paper. Rather, the BT model is proposed as an alternative approach to derive composite indicators in the logic of competing alternatives, which is well tuned for the analysis of destination attractiveness and competitiveness.

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