Centralized vs Decentralized Tourism Policies: a Spatial Interaction Model Framework

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Abstract

The choice of centralizing tourism policies at the national level or, on the contrary, of decentralizing them at the regional or local level is widely discussed in the literature, highlighting the related pros and cons. In fact, potential competition/complementarity between regions in terms of their attractivity factors may imply a range of complex and competing interests at various geographical scales. In particular, in a framework of regional competition a central (national) policy may be necessary to offset or coordinate the competing and clashing regional interests. More profound insights into the problems and challenges of centralized *vs* decentralized tourism policies can be gained by examining the national-regional dialectic, in particular by using a different modelling framework, like the "normative" spatial interaction model framework.

Keywords: centralized and decentralized tourism governance; tourism policies; spatial interaction model; regional spillovers.
JEL codes: P48; L83; R12; R58; Z10.

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1. Introduction

The choice of centralizing tourism policies at the national level or, on the contrary, of decentralizing them at the regional or local level is widely discussed in the literature, highlighting the related pros and cons (see, e.g., Tosun and Jenkins 1996; Dredge and Jenkins 2003; Yüksel et al. 2005; Pforr 2006). At any one time, organizations at the national, regional and local level are actively engaged in promoting tourism destinations in order to attract tourists. Nevertheless, potential competition/complementarity between regions in terms of their attractivity factors may imply a range of complex and competing interests at various geographical scales. In particular, in a framework of regional competition a central (national) policy may be necessary to offset or coordinate the competing and clashing regional interests.

An increasingly important force of attraction for tourists (both domestic and international) is cultural tourism. For this reason, national and regional governments make great efforts to implement effective cultural tourism policies, for example to obtain an official certification for their historical/cultural attractions, like UNESCO's World Heritage Sites (WHS) list. The UNESCO endowment of the regions surrounding a tourism destination may have a negative effect on its inflows of tourists (Patuelli et al. 2013). Indeed, tourists consider, in forming their travelling choices, the UNESCO endowment of alternative destinations, generating a phenomenon of spatial substitution (competition). In such a framework of regional competition, a possible role for the central (national) policymaker could be justified in order to coordinate the competing tourism destinations.

This paper focuses on the choice between implementing tourism governance and policymaking at the central (national) or at the local (regional) level. The issue is raised by the following research question: (i) regional endowment (i.e., attractivity factors) may positively influence arrivals to tourism destinations, providing a justification for local policies (e.g., lobbying towards the national government for obtaining UNESCO's WHS designations); (ii) however, regional competition may reduce the positive direct effect, so that it may be necessary the intervention of the central (national) policy maker, to offset or coordinate the local (regional) policies.

This research question may be restated in a framework regional spillovers effects: (i) regions could use their attractivity factors to gain a competitive advantage over other regions, but (ii) at the same time they risk damaging the national interest to attract tourists and increase the international market share. It is therefore critical to correctly balance and coordinate the tourism policies between the national and regional levels in order to effectively manage the regional endowment and spillovers effects to cater to the cultural tourism demand.

Ultimately, in this paper a well-known issue is dealt with, the management of regional spillovers effects, but by using a different modeling framework: the "normative" spatial interaction model framework. The methodology used is based on three main points:

- the spatial interaction model, where push variables (push effect), pull variables (pull effect), and deterrence variables (distance) interact, applied to the tourism sector in a normative economics perspective;
- the tourism multiplier (Keynesian multiplier), which measures the economic impact of tourism policies;
- in a framework of regional economics, where the main issue is the management of regional spillovers effects.

Finally, the results of the model will be empirically tested by investigating a specific case study, the Italian domestic tourism, in order to find the optimal choice between centralizing or decentralizing tourism policies (e.g., for obtaining and managing the official UNESCO's designation). The choice of the Italian domestic tourism as a case study, is due to many reasons: (i) tourism is one of the fastest growing and most profitable sectors of the Italian economy (UNWTO 2011); (ii) domestic tourism in Italy represents the greatest share (up to 88 and 90 per cent of arrivals and overnight stays, respectively) of the entire tourism sector (Massidda and Etzo 2012); (iii) in Italy, regions take an active role in promoting tourism.

Thanks to the novel approach proposed in this study, more profound insights into the problems and challenges of centralized vs decentralized tourism policies can be gained by examining the national-regional dialectic, in particular by using a different modelling framework, like the "normative" spatial interaction model framework.

The paper is organized as follows. Section 2 briefly presents the original intuition of applying the spatial interaction model to tourism sector in a normative economics perspective and the underlying research question. Section 3 briefly presents the methodology used, consisting in the application of the spatial interaction model to tourism sector, in a framework of regional spillovers effects. Section 4 describes the first stage of the model solution, in a framework where only one region is specialized as a tourism destination, while Section 5 describes the second stage of the model solution, in a framework of multilateral interactions between regions which are at the same time origins and destinations of tourism flows. Section 6 presents the empirical test of the model, by describing data set, variables and estimation strategy used, and then presenting the empirical findings and their interpretation. Section 7 provides concluding remarks and future research directions.

2. The Normative Spatial Interaction Model Framework

In applied economics the spatial interaction model is a modelling framework that has been commonly linked to the theory of gravitation, so that it used to be named gravity model (for an overview, see Haynes and Fotheringham 1984; Sen and Smith 1995), but to the best of our knowledge has not been applied so far in a normative economics perspective[1]. The theory of gravitation states that gravitation is a force of attraction (g) that acts between two (or more) physical objects with matter (mass) or energy, so that it is a function of the product of their masses ($O > 0$ and $D > 0$) and an inverse function of the square of their distance (d). A generic formulation of the gravity model can be as follows: $g = OD / d^2$. The gravity model has been applied to spatial economics since the 1960s for analysing bilateral trade flows between origin (O) and destination (D) regions. A normative economics policy program, however, should explicitly point out the choice variables of the policy makers, both in origin and destination regions, which can affect the trade flows.

The model developed in this paper is an application of the spatial interaction model for studying tourism flows between regions, like already done in the literature (see, e.g., Uysal and Crompton 1985; Witt and Witt 1995; Khadaroo and Seetanah 2008), but with the novelty of applying a normative economics perspective. The corresponding policy analysis aims to compare the efficiency, at the national level, of local (regional) policies rather than central (national) policies. Under this point of view, this analysis concerns the application of the *principle of subsidiarity*[2] in local and national public policies in the tourism sector.

The theory of gravitation will be therefore applied in a framework where the local (regional) policy makers can affect tourism flows (decentralized or "subsidiary" policies) and a hierarchically superior central (national) policy maker can intervene to change the "economic distance" (i.e., the generalized interaction cost) between the local policy makers (i.e., the regions) and/or directly affect the tourism flows themselves (centralized policies). The central policy goal is to offset or coordinate the decentralized local policies in case they have an overall negative effect (at the national level) of modifying the existing equilibrium (*status quo*) or going away from the desired equilibrium.

[1] Normative economics (as opposed to positive economics) is a part of economics that states a normative judgment about what the outcome of the economy or goals of public policy ought to be (Caplin and Schotte 2008).

[2] Subsidiarity is an organizing principle of decentralization, stating that a matter ought to be handled by the smallest, lowest, or least centralized authority capable of addressing that matter effectively. The principle of subsidiarity refers to the idea that a central authority should have a subsidiary function, performing only those tasks which cannot be performed effectively at a more immediate or local level.

Moreover, among the local policy makers, as well as in the "Lucas islands model"[3], there is not any form of *ex ante* collaboration or communication, nor any possible announcement or cheap talk.

3. The Model: Regional Spillovers Effects and Tourism flows

Let's define T_{ij} the flows of tourists moving from the origin region i towards the destination region j and let's assume this movement yields a change in regional income (and hence in national income) as a consequence of the application of tourism multiplier (Candela and Figini 2012) to net tourism flows $\Delta_i = (T_{ji} - T_{ij})$ and $\Delta_j = (T_{ij} - T_{ji})$, that is to the differences between the regional incoming and outgoing tourism flows, which are used as proxies of tourism expenditures. Furthermore, let's define m_i and m_j the tourism multipliers of regions i and j, so that the effect of tourism flows on the corresponding regional incomes (e.g., regional tourism GDPs) can be represented by the following equations:

$$Y_i = m_i(T_{ji} - T_{ij}) = m_i \Delta_i \tag{1}$$

$$Y_j = m_j(T_{ij} - T_{ji}) = m_j \Delta_j \tag{2}$$

where $\Delta_j = -\Delta_i$.

Tourism flows depend on the spatial interaction between regions, i.e. they are described by the spatial interaction model as a function of repulsive forces/push factors at origin region *i* (O_i) and attractive forces/pull factors at destination region *j* (D_i), and an inverse function of the friction/distance between regions *i* and *j* (d_{ij}):

$$T_{ij} = O_i^{\alpha} D_j^{\beta} d_{ij}^{-\gamma} \tag{3}$$

where α, β and γ are the specific elasticities (weights) of push factors, pull factors and the distance respectively. More specifically, in the tourism context, repulsive forces/push factors are associated with leaving the origin region for tourism reasons (tourism outflows), while attractive forces/pull factors are related to going to the destination region for tourism reasons (tourism inflows).

[3] The "Lucas islands model" is an economic model formulated by Robert Lucas (Lucas 1972) whit the purpose to model the link between money supply and price and output changes in a simplified economy using rational expectations.

The two regions can affect their tourism flows by managing a set of unilateral or bilateral variables. Applications of the spatial interaction model to tourism (see, e.g., Armstrong 1972; Crampon and Tan 1973; Malamud 1973; McAllister and Klett 1976; Swart et al. 1978; Saunders et al. 1981) usually express bilateral tourism flows (T_{ij}) as a function of bilateral variables, e.g. the characteristics of regions i and j (factors that augment or distort tourism flows) and of distance, which acts as a proxy for transportation costs. Let's define x and y the tourism policy instruments (choice variables) enforced by the local policy makers of regions i and j respectively, while α and β the specific elasticities of push and pull factors respectively. In this way the local normative policy functions can be specified as:

- $O(x) = x^{\alpha}$ and $D(x) = x^{\beta}$ when i is the region of origin and destination respectively;
- $O(y) = y^{\alpha}$ and $D(y) = y^{\beta}$ when j is the region of origin and destination respectively.

and the corresponding spatial interaction equations become:

- $T_{ij} = x^{\alpha} y^{\beta} d^{-\gamma}$ for tourism flows from region i towards region j;
- $T_{ji} = y^{\alpha} x^{\beta} d^{-\gamma} = x^{\beta} y^{\alpha} d^{-\gamma}$ for tourism flows from region j towards region i.

4. The Region as a Specialized Tourism Destination

In order to gradually solve the model, in a first stage let's assume there is only one region i that is specialized as a tourism destination, while the other region j does not have any tourism attraction and hence does not receive any tourism inflows (i.e., it is specialized in a different economic sector). By this assumption, there are no tourism flows from region i towards region j ($T_{ij} = 0$) and consequently the tourism multiplier of region j is null ($m_j = 0$). In this way, equations (1) and (2) become:

$$Y_i = m_i T_{ji} \quad (4)$$

$$Y_j = 0 \quad (5)$$

Within this framework, the central policy maker's goal is to maintain steady tourism flows from the origin region j (tourism outflows) towards the destination region i (tourism inflows), according to the rule of thumb that the main policy goal of a country with a dichotomous economy is maintaining the *status quo*. For the sake of simplicity, let's also assume that the central policy maker can only modify the "economic distance" d, while the regional policy makers can only intervene on their policy instruments x and y. Hence, the central policy goal is to stabilize the destination region income:

$$Y_i^*(x, y|\alpha, \beta) = m_i T_{ji}^* = m_i (x^\beta y^\alpha d^{-\gamma}) \tag{6}$$

The central policy maker aims at stabilizing the value of Y_i^*, and therefore of T_{ji}^*, while local policy makers may only intervene on their regional variables. The possible combination of central and local policies, within the policy goal of stabilization, is described by the following total differential:

$$\beta x^\circ + \alpha y^\circ - \gamma d^\circ = 0 \tag{7}$$

where the superscript $^\circ$ stands for the rate of change of variables (for a generic variable *z*, $z^\circ = dz/z$).

In the case the local policy makers' choices ensure the *status quo* by themselves ($\beta x^\circ + \alpha y^\circ = 0$), the intervention of the central policy maker is not necessary any more ($d^\circ = 0$), otherwise a compensation central policy on the "economic distance" d can be justified, with the following rule:

$$\beta x^\circ + \alpha y^\circ = \gamma d^\circ \tag{8}$$

This spatial interaction model framework entails a normative economics perspective insofar as it gives hints regarding "what ought to be" the central or local policies. In fact, it is now possible to define the effectiveness of local policies (or, in terms of regional economics, to effectively manage the regional spillovers effects), and accordingly the need of implementing a central policy, just by focusing on the values of parameters α and β:

- if $\alpha = \beta = 0$, there is complete lack of regional spillovers effects, so that all regional policies are ineffective and regions are independent;
- if α or $\beta = 0$, only one region has spillovers effects, which means only one regional policy can be effective and there is unilateral interaction between regions (if $\alpha \neq 0$ and $\beta = 0$ only the origin region policy is effective, while if $\alpha = 0$ and $\beta \neq 0$ only the destination region policy is effective);

- if α and $\beta \neq 0$, both regions have spillovers effects, which means all regional policies can be effective and there is multilateral interaction between regions;
- if $\alpha = \beta$, regional spillovers have the same intensity, so that regional policies may compensate each other, regional policies being equal.

In the case regions are independent ($\alpha = \beta = 0$) it is not necessary neither an information system among regions nor the intervention of the central policy maker. The situation becomes more tricky if at least one region has spillovers effects (α and/or $\beta \neq 0$), so that at least one regional policy can be effective by intervening on policy variables ($x°, y° \geq 0$). Table 1 shows all possible combinations of local and central policies for the different values of α and β[4].

Table 1. Possible combinations of local and central policies (for $x°, y° \geq 0$)

	$\beta = 0$	$\beta > 0$	$\beta < 0$
$\alpha = 0$	Regions are independent (no central policy)	Compensation central policy ($\beta x° = \gamma d°$)	Compensation central policy ($\beta x° = -\gamma d°$)
$\alpha > 0$	Compensation central policy ($\alpha y° = \gamma d°$)	Coordination central policy (since $\beta x° + \alpha y° > 0$)	Discretionary central policy (if and only if $\beta x° + \alpha y° \neq 0$)
$\alpha < 0$	Compensation central policy ($\alpha y° = -\gamma d°$)	Discretionary central policy (if and only if $\beta x° + \alpha y° \neq 0$)	Coordination central policy (since $\beta x° + \alpha y° < 0$)

From Table 1 it is clear that without effective local policies ($\alpha = \beta = 0$, top-left case) it is not necessary any corrective central policy. This conclusion is clearly a tautology, while it is more interesting to observe that if at least one local policy can be effective (α or $\beta \neq 0$, first row and first column cases) a compensation central policy is always necessary to maintain the *status quo*. On the contrary, the core of Table 1 shows that a central policy is necessary to coordinate or offset the local policies if elasticity parameters have the same sign ($\alpha, \beta > 0$ or $\alpha, \beta < 0$), i.e. if local policies have similar effects, while a central policy is discretionary (depending on the casual event $\beta x° + \alpha y° \neq 0$), if elasticity parameters have different signs ($\alpha > 0$ and $\beta < 0$, or $\alpha < 0$ and $\beta > 0$), i.e. if local policies have opposite effects. In fact, without any information system or coordination of local policies, the condition $\beta x° + \alpha y° = 0$ is a completely casual parametric

[4] A similar Table can be done, with the necessary modifications, in the case of non-positive changes in policy variables ($x°, y° \leq 0$).

condition, which at least requires a monitoring at a national level. In summary, there are two cases in which a central policy is not necessary: $\alpha = \beta = 0$ and $\beta x^\circ + \alpha y^\circ = 0$. This last condition requires a coordination among local policy makers or at least a monitoring activity by the central policy maker.

These conclusions regarding the possible combinations of local and central policies are confirmed, with the necessary modifications, in the case of non-positive changes in local policy variables ($x^\circ, y^\circ \leq 0$) or in the case local policies go in different directions ($x^\circ \geq 0$ and $y^\circ \leq 0$, or vice versa). Overall, the possible central policies are: (i) no policy, (ii) compensation policy, (iii) coordination policy, and (iv) discretionary policy.

In conclusion, *the application of the spatial interaction model in a normative economics perspective enables to understand and solve the issue of the choice between centralizing tourism policies at the national (central) level or, on the contrary, decentralizing them at the regional (local) level. Hence, by this technique it is possible to endogenously define the boundaries of regional decentralization and the application of the principle of subsidiarity.* By assuming a fixed central policy goal, policy decentralization is possible if local policy makers' choices are completely independent (complete lack of regional spillovers effects), that is if there are not possible effective local policy instruments to change the overall *status quo*. Otherwise, the intervention of the central policy maker is necessary to maintain the *status quo* as a fixed policy goal, by a compensation policy, a coordination policy or a discretionary policy.

These results represent a confirmation of the literature on regional policies (see, e.g., Seabright 1996, Faguet 2004, Rubinchik-Pessach 2005, Lockwood 2006, Barankay and Lockwood 2007, Enikolopov and Zhuravskaya 2007, Feiock 2007, Cheikbossian 2008, Faguet 2014), except the case of discretionary central policy, when an active intervention is not necessarily required, but it's necessary at least a monitoring activity by the central policy maker. The multiplicative nature of the spatial interaction model is therefore very useful to discuss aspects of central/local economic policy planning. In addition, thanks to the spatial interaction models econometrics it is possible to measure the potential economic policy effects and analyze the strategic interdependence among local policy makers and between local and central policies, through the estimation of the parameters α and β (see Section 6).

5. Regional Interaction and Tourism Flows

After having described the first stage of the model solution, in a framework where only one region is a specialized tourism destination, let's now consider the spatial interaction model in its most general version. The model is now applied to regional bilateral trade flows, in a framework where each region is at the same time origin and destination of tourism flows.

In this second stage of the model solution, let's assume flexible policy goals (unlike in the first stage) which consist in regional income maximization (for local policies) or national income maximizing (for central policy). Since the spatial interaction model is a symmetric and multiplicative model, where policy goals are expressed in terms of pseudo-linear monotonic (increasing or decreasing) functions, it is solved by a bang-bang approach (corner solutions). As a result, the optimal policies are always restricted to be at the minimum or maximum values (exogenous bounds) of choice variables.

By applying the parameters α and β of equation (3) for both regions i and j, as specific elasticities of push factors and pull factors respectively, the spatial interaction model corresponds the model already introduced in Section 3:

$$T_{ij}(x, y|\alpha, \beta) = x^{\alpha} y^{\beta} d^{-\gamma} \geq 0 \tag{9}$$

$$T_{ji}(x, y|\alpha, \beta) = y^{\alpha} x^{\beta} d^{-\gamma} = x^{\beta} y^{\alpha} d^{-\gamma} \geq 0 \tag{10}$$

where parameters α and β, like in previous Section, can be positive, negative or null. Functions (9) and (10) have the following properties:

$$T_{ij}(.|0, \beta) = y^{\beta} d^{-\gamma} \; ; \; T_{ij}(.|\alpha, 0) = x^{\alpha} d^{-\gamma} \; ; \; T_{ij}(.|0,0) = d^{-\gamma} \tag{11}$$

$$T_{ji}(.|0, \beta) = x^{\beta} d^{-\gamma} \; ; \; T_{ji}(.|\alpha, 0) = y^{\alpha} d^{-\gamma} \; ; \; T_{ji}(.|0,0) = d^{-\gamma} \tag{12}$$

where in the case of unilateral interaction between regions (α or $\beta = 0$) the gradient of tourism flows (log-linearly) depends only on the signs of elasticity parameters α and β, i.e. on the effectiveness of regional policies:

$$\partial T_{ij}(.|0, \beta)/\partial x = 0 \; ; \; \partial T_{ij}(.|0, \beta)/\partial y = \beta y^{\beta-1} d^{-\gamma} \; ; \; \partial T_{ij}(.|\alpha, 0)/\partial x = \alpha x^{\alpha-1} d^{-\gamma} \; ; \; \partial T_{ij}(.|\alpha, 0)/\partial y = 0$$

$$\partial T_{ji}(.|0, \beta)/\partial x = \beta x^{\beta-1} d^{-\gamma} \; ; \; \partial T_{ji}(.|0, \beta)/\partial y = 0 \; ; \; \partial T_{ji}(.|\alpha, 0)/\partial x = 0 \; ; \; \partial T_{ji}(.|\alpha, 0)/\partial y = \alpha y^{\alpha-1} d^{-\gamma}$$

Instead, in the case regions are independent ($\alpha = \beta = 0$), it's only the distance between regions to affect tourism flows. More complex is the case of multilateral interactions between regions (α and $\beta \neq 0$):

$$\partial T_{ij}/\partial x = \alpha T_{ij}/x \; ; \; \partial T_{ij}/\partial y = \beta T_{ij}/y \quad \text{and} \quad \partial T_{ji}/\partial x = \beta T_{ji}/x \; ; \; \partial T_{ji}/\partial y = \alpha T_{ji}/y \tag{13}$$

Thus if α and $\beta \neq 0$ the effectiveness of each regional policy instrument depends on all the spatial interaction model parameters.

Finally, we assume that policy variables have upper and lower bounds for both regions i and j: $x_{\min} \leq x \leq x_{\max}$ and $y_{\min} \leq y \leq y_{\max}$. With this simple (log-linear) monotonic formulation of the spatial interaction model, our interregional model (1) and (2) becomes:

$$Y_i = m_i(x^\beta y^\alpha d^{-\gamma} - x^\alpha y^\beta d^{-\gamma}) = m_i d^{-\gamma}(x^\beta y^\alpha - x^\alpha y^\beta) = m_i d^{-\gamma}\Delta_i \quad (14)$$

$$Y_j = m_j(x^\alpha y^\beta d^{-\gamma} - x^\beta y^\alpha d^{-\gamma}) = m_j d^{-\gamma}(x^\alpha y^\beta - x^\beta y^\alpha) = m_j d^{-\gamma}\Delta_j \quad (15)$$

where net tourism flows are $\Delta_i = (x^\beta y^\alpha - x^\alpha y^\beta)$ and $\Delta_j = (x^\alpha y^\beta - x^\beta y^\alpha)$, and again $\Delta_i = -\Delta_j$. Note that in both cases of unilateral and multilateral interactions net tourism flows depend on both parameters α and β. Moreover, in the case regions are independent net tourism flows become $\Delta_i = \Delta_j = 0$.

Since the model (14) e (15) is solvable by a bang-bang approach (corner solutions), according to which the monotonic policy goals are defined on a limited set of possibilities, the optimal local policies are always restricted to be at the extreme values of policy variables ($x_{\min} / x_{\max}$ and $y_{\min} / y_{\max}$). Furthermore, the optimal policy is a function both of tourism multipliers signs, which are always positive ($m_i > 0$ and $m_j > 0$) by assumption since both regions have tourism attractions, and of the gradients of equations (14) and (15), that can be directly derived from properties (13):

$$\partial\Delta_i / \partial x = (\beta T_{ji} - \alpha T_{ij}) / x \text{ and } \partial\Delta_j / \partial x = -\partial\Delta_i / \partial x \quad (16)$$

$$\partial\Delta_j / \partial y = (\alpha T_{ji} - \beta T_{ij}) / y \text{ and } \partial\Delta_i / \partial y = -\partial\Delta_j / \partial y \quad (17)$$

These gradients can be positive or negative depending on the values of $(\beta T_{ji} - \alpha T_{ij})$ and $(\alpha T_{ji} - \beta T_{ij})$, that is on the relative importance and effectiveness of push and pull factors in the regions. The sign of equations (14) and (15) is univocally defined only in the cases α or $\beta = 0$. Moreover, in general local policy instruments x and y are completely ineffective in the case regions are independent ($\alpha = \beta = 0$), since net tourism flows become necessarily $\Delta_i = \Delta_j = 0$, while they are locally ineffective in the case of multilateral interactions between regions (α and $\beta \neq 0$) if and only if $\Delta_i = \Delta_j = 0$. With these analytical properties of functions (14) and (15) we can now analyze the issue of the optimal choice between centralizing or decentralizing tourism policies.

The analysis is carried out from the point of view of region *i*, but it can be replicated for region *j*, with the necessary modifications. Furthermore, the model is solved in sequential steps, by developing the analysis in three different theoretical scenarios:

- *unconditional optimal regional policies*, where by assumption each region can choose its own optimal policy and express a preference on other regions' policies, so that it can pursue its own exclusive interest; this is only a theoretical scenario, but is a necessary step to understand and solve the model (see Lemma 1);
- *conditional optimal regional policies*, where each region chooses only its own optimal policy, given the policies chosen by other regions (administrative decentralization), like it happens in a framework of decentralized governance (see Theorem 1);
- *optimal national policy*, where the central policy maker enforces a national policy in view of the national interest (maximization of national income), independently from the regional distribution of income (see Theorem 2).

Lemma 1 (unconditional optimal regional policies): In a scenario of bilateral interaction between two regions and where each region has the opportunity to choose its own optimal policy without any constraint, each region puts its own interest first and prefers for the other region to implement an opposite regional policy. The multilateral interaction between regions results in clashing regional interests.

Proof. In a spatial interaction model with two regions having bilateral interactions (so that $\Delta_i = x^\beta y^\alpha - x^\alpha y^\beta \neq 0$), if region i can choose both its own policy variable x and the other region's policy variable y, the global maximum will be the solution of the following maximization program:

$$\max_{x,y} \; Y_i = m_i d^{-\gamma}(x^\beta y^\alpha - x^\alpha y^\beta) = m_i d^{-\gamma}\Delta_i \tag{18}$$

where $m_i > 0$ and $d^{-\gamma} > 0$ by assumption. First order conditions are given by:

$$\partial Y_i / \partial x = \beta x^{\beta-1} y^\alpha - \alpha x^{\alpha-1} y^\beta = 0 \tag{19}$$

$$\partial Y_i / \partial y = \alpha x^\beta y^{\alpha-1} - \beta x^\alpha y^{\beta-1} = 0 \tag{20}$$

Since $x, y > 0$, we can divide first equation by $x^{\beta-1}y^{\beta}$ and second one by $x^{\beta}y^{\beta-1}$ in order to obtain:

$$\beta x^{\alpha-\beta} - \alpha x^{\alpha-\beta} = \varphi(x, y|\alpha, \beta) = 0 \quad (21)$$

$$\alpha y^{\alpha-\beta} - \beta y^{\alpha-\beta} = \phi(x, y|\alpha, \beta) = 0 \quad (22)$$

First order conditions (21) and (22) have opposite sign, $\varphi(x, y|\alpha, \beta) = -\phi(x, y|\alpha, \beta)$, so that function Y_i is monotonic both in x and y but with opposite gradients. As a result, the optimal values of the bounded policy variables correspond to opposite regional policies (minimum and maximum values of policy variables): at the optimal minimum value $x_{\min}$ corresponds the preferred maximum value $y_{\max}$, while at the optimal maximum value $x_{\max}$ corresponds the preferred minimum value $y_{\min}$ (Table 2)[5]. The same happens, with the necessary modifications, for region *j*: once defined its own optimal policy, the region prefers for the other region to implement an opposite regional policy.■

Table 2. Unconditional optimal regional policies, for region i ($\Delta_i \neq 0$ and $\beta > \alpha$)

	$\beta = 0$	$\beta > 0$	$\beta < 0$
$\alpha = 0$	Ineffective policies	$x_{\max}$; $y_{\min}$	$x_{\min}$; $y_{\max}$
$\alpha > 0$	$x_{\min}$; $y_{\max}$	$x_{\max}$; $y_{\min}$	$x_{\min}$; $y_{\max}$
$\alpha < 0$	$x_{\max}$; $y_{\min}$	$x_{\max}$; $y_{\min}$	$x_{\max}$; $y_{\min}$

According to Lemma 1 regions have clashing interests. However, by assumption regional policy makers do not communicate or coordinate with each other, and moreover in real administrative decentralized scenarios each region chooses only its own optimal regional policy, but can not condition the other regional policies: the choice of the policy is made given the behavior of other regions. This second scenario, named *optimal regional policies*, is analyzed by finding the optimal policies as a Cournot-Nash equilibrium.

[5] The optimal policy for region *i* is defined by choosing its own policy variable *x* and by stating a preference on the other region's policy variable *y*. In the cases ($\alpha < 0$; $\beta = 0$), ($\alpha = 0$; $\beta > 0$) and ($\alpha < 0$; $\beta > 0$) the optimal regional policy is ($x_{\max}$; $y_{\min}$). In the cases ($\alpha > 0$; $\beta = 0$), ($\alpha = 0$; $\beta < 0$) and ($\alpha > 0$; $\beta < 0$) the optimal regional policy is ($x_{\min}$; $y_{\max}$). In the cases (α ; $\beta > 0$) and (α ; $\beta < 0$) the optimal regional policy is ($x_{\max}$; $y_{\min}$) only if $\beta > \alpha$ (vice versa if $\beta < \alpha$). In the case ($\alpha = \beta = 0$) the optimal value of *x* is indifferent.

Theorem 1 (**conditional optimal regional policies**): In a spatial interaction model with bilateral interactions between two regions where each region chooses its own optimal policy in order to maximize its regional income, but takes as given the policy chosen by the other region, the interrelation of their individual choices produces the same regional policies.

Proof: If net tourism flows $\Delta_i \neq 0$, region i's policy goal is to maximize function (14):

$$\max_{x} \ Y_i = m_i d^{-\gamma} \Delta_i \ \text{ s.t. } \ x_{\min} \leq x \leq x_{\max} \ \text{and given } y \tag{23}$$

and correspondingly region j's policy goal is to maximize function (15):

$$\max_{y} \ Y_j = m_j d^{-\gamma} \Delta_j \ \text{ s.t. } \ y_{\min} \leq y \leq y_{\max} \ \text{and given } x \tag{24}$$

Recalling that $\Delta_i = -\Delta_j$, optimization program (24) becomes:

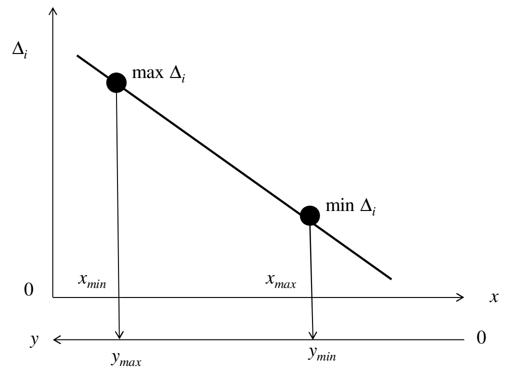
$$\max_{y} \ Y_j = m_j d^{-\gamma} \Delta_j = \max_{y} \ m_j d^{-\gamma}(-\Delta_i) = \min_{y} \ m_j d^{-\gamma} \Delta_i \tag{25}$$

Net tourism flows $\Delta_i = (x^{\beta} y^{\alpha} - x^{\alpha} y^{\beta})$ can be conditional to a given value of policy variable y, $\Delta_i(x|y) = (x^{\beta} \bar{y}^{\alpha} - x^{\alpha} \bar{y}^{\beta})$, or to a given value of policy variable x, $\Delta_i(y|x) = (\bar{x}^{\beta} y^{\alpha} - \bar{x}^{\alpha} y^{\beta})$. It is then straightforward that $\Delta_i(x|y) = \Delta_i(y|x)$ and policy variables have opposite sign, so that optimization program (25) becomes:

$$\min_{y} \ m_j d^{-\gamma} \Delta_i = \min_{-x} \ m_j d^{-\gamma} \Delta_i \tag{26}$$

Figure 1 shows that $\min_{-x} \ m_j d^{-\gamma} \Delta_i \approx \max_{x} \ m_i d^{-\gamma} \Delta_i$, i.e. optimization programs (23) and (24) are equivalent and have the same solution: either $(x_{\min}; y_{\min})$ or $(x_{\max}; y_{\max})$ depending on the gradient of the function Δ_i, i.e. depending on the values of elasticity parameters α and β. In conclusion, the two regions' optimization programs lead to the same regional policies in a typical Cournot-Nash equilibrium.■

Figure 1. Cournot-Nash equilibrium (Theorem 1)



As previously seen in Section 4, now the main issue is to verify if this decentralized regional equilibrium is consistent with the national policy maker's goal. Let's therefore focus on the *optimal national policy* (the above third scenario), where the central policy maker pursues the national interest of maximizing the national income (central policy maker's goal), regardless of the geographical distribution of income, even if the possibility of an ex-post regional redistribution based on equality (performed by compensatory regional transfers) is not excluded. Within the model, the national policy goal is therefore defined by the sum of regional incomes[6]:

$$W = Y_i + Y_j = m_i d^{-\gamma}(x^\beta y^\alpha - x^\alpha y^\beta) + m_j d^{-\gamma}(x^\alpha y^\beta - x^\beta y^\alpha) = m_i d^{-\gamma}\Delta_i + m_j d^{-\gamma}\Delta_j \tag{27}$$

Recalling that $\Delta_i = -\Delta_j$, the national policy goal $W(.)$ can be formulated in order for the multiplicative coefficient to be positive:

$$\text{if } m_i > m_j \text{ then } W = (m_i - m_j)d^{-\gamma}\Delta_i \tag{28}$$

$$\text{if } m_i < m_j \text{ then } W = (m_j - m_i)d^{-\gamma}\Delta_j \tag{29}$$

According to equations (28) and (29) it is possible to conclude that the national interest directly overlaps with the interest of the region with the higher tourism multiplier, so that for the central policy maker it is optimal to promote tourism in that region. Precisely, according to equations (28)

[6] In the case the central policy maker's goal ex-ante entails the equality principle, it would be sufficient to introduce exogenous weights for regional incomes, depending on regional redistribution choices. However, the model would remain substantially confirmed.

and (29) the national interest overlaps with region i's and region j's interest respectively. It may be interesting to point out that there are analogies between this result and some key aspects of the economic theory of physiocrats (Steiner 2003).

Theorem 2 (optimal national policy): In a spatial interaction model with bilateral interactions between two regions, the national interest, defined as the sum of regional incomes, always overlaps with the optimization program of the most favoured (in terms of tourism multiplier) region. As a result, the national interest requires the enforcement of opposite regional policies.

Proof. Considering the case (28), with $m_i > m_j$ [7], the proof of the theorem is straightforward, since by Lemma 1 the national policy maker's optimization program is:

$$\max_{x,y} \; W = (m_i - m_j) d^{-\gamma} \Delta_i \approx \max_{x,y} \; Y_i = m_i d^{-\gamma} \Delta_i \tag{30}$$

which is the same maximization program (18) of Lemma 1.

Given that $m_i > 0$ and $d^{-\gamma} > 0$ by assumption, and $m_i > m_j$ by construction, the result is the same of Lemma 1: the optimal national policy consists of opposite regional policies, and precisely the regional policies combination preferred by the region with the higher tourism multiplier.■

In conclusion, the optimal national policy depends on the difference between the regional tourism multipliers, since the national interest overlaps with those of the region with the higher tourism multiplier, such that it requires the enforcement of opposite regional policies (Theorem 2). Nevertheless, in a decentralized governance scenario, where each region can choose its own optimal regional policy but can not condition the other regional policies, every region would implement the same regional policies (Theorem 1). This strategy would clash with both the other regions' interests and the national interest, so that it is necessary a central (national) policy to coordinate or offset the regional policies in order to obtain the final result of opposite regional policies.

It is possible to perform a simulation of Theorems 1 and 2, conditionally to the signs of coefficients (elasticity parameters) α and β. By Theorem 1, the optimal regional strategies depend on the combination of policies shown in Table 3. It's clear that both regions from the point of view of their own exclusive interest want to implement the same regional policies, but at the same time the national interest requires the enforcement of opposite regional policies (Theorem 2). It follows

[7] The national policy maker's optimization program in the case (29), with $m_j > m_i$, can be defined in a similar way, with the necessary modifications.

that if there is unilateral or multilateral interaction between regions it is necessary a coordination of regional policies at a central (national) level: if each region pursues its own exclusive local (regional) interest it would damage the national interest.

Table 3. Conditional optimal regional policies, for both regions ($\Delta_i \neq 0$ and $\beta > \alpha$)

	$\beta = 0$	$\beta > 0$	$\beta < 0$
$\alpha = 0$	Ineffective policies	$x_{\max}; y_{\max}$	$x_{\min}; y_{\min}$
$\alpha > 0$	$x_{\min}; y_{\min}$	$x_{\max}; y_{\max}$	$x_{\min}; y_{\min}$
$\alpha < 0$	$x_{\max}; y_{\max}$	$x_{\max}; y_{\max}$	$x_{\max}; y_{\max}$

The optimal national policy, according to Theorem 2, in the case $m_i > m_j$ (region i's multiplier higher than region j's one) is shown Table 4, while the case $m_i < m_j$ (region j's multiplier higher than region i's one) is shown Table 5.

Table 4. Optimal national policy, in the case $m_i > m_j$ ($\Delta_i \neq 0$ and $\beta > \alpha$)

	$\beta = 0$	$\beta > 0$	$\beta < 0$
$\alpha = 0$	Ineffective policies	$x_{\max}; y_{\min}$	$x_{\min}; y_{\max}$
$\alpha > 0$	$x_{\min}; y_{\max}$	$x_{\max}; y_{\min}$	$x_{\min}; y_{\max}$
$\alpha < 0$	$x_{\max}; y_{\min}$	$x_{\max}; y_{\min}$	$x_{\max}; y_{\min}$

Table 5. Optimal national policy, in the case $m_i < m_j$ ($\Delta_i \neq 0$ and $\beta > \alpha$)

	$\beta = 0$	$\beta > 0$	$\beta < 0$
$\alpha = 0$	Ineffective policies	$x_{\min}; y_{\max}$	$x_{\max}; y_{\min}$
$\alpha > 0$	$x_{\max}; y_{\min}$	$x_{\min}; y_{\max}$	$x_{\max}; y_{\min}$
$\alpha < 0$	$x_{\min}; y_{\max}$	$x_{\min}; y_{\max}$	$x_{\min}; y_{\max}$

A comparison of Tables 4 and 5 with Table 3 shows that a decentralized (regional) tourism policy always overlaps with the central tourism policy only in the case $\alpha = \beta = 0$, that is when there is complete lack of regional spillovers effects. On the contrary, in all other cases there can not be perfect overlapping between centralized and decentralized tourism policies, in order to pursue the maximum national income (due to the tourism development), since regional spillover effects are so widespread to prevent the overlapping.

Centralized and decentralized tourism policies can instead overlap if and only if $\Delta_i = (x^{\beta} y^{\alpha} - x^{\alpha} y^{\beta}) = 0$, which is a parametric value implying $T_{ij} \equiv T_{ji}$, that is when two regions have similar tourism economic development and ultimately are one unique region. Moreover, the condition $\Delta_i = 0$ is always implied if regions are characterized by similar elasticities of push and pull factors: $\alpha \approx \beta$, i.e. if they have similar regional spillovers effects. In fact, in this case the effects of regional policies may compensate and neutralize each other, in terms of national policy, regional policies being equal.

In other words, in all cases $\alpha \neq \beta$, the mismatch between Tables 3, 4 and 5 and the differences between Theorems 1 and 2 are the justifications for the central policy maker's intervention, with the purpose to coordinate or offset the regional policies. The underlying political choice between the national and/or regional interest and the resulting choice between centralizing tourism policies at the national level or, on the contrary, decentralizing them at the regional or local level, represents an application of the principle of subsidiarity.

The only remaining case is the special case $m_i = m_j$, that is when regions have the same tourism multiplier. This condition implies that regional policies have the same effects on national income, such that the national policy maker becomes altogether disinterested in regional tourism policies $\forall \alpha, \beta$, and decentralizing tourism policies can thus be more efficient. Anyway, it represents a very rare situation, which can happen either by chance of because the two regions are part of a single tourism destination.

Finally, the national policy of modifying the economic distance between the regions of origin and destination has been ignored since in the model the distance variable is a fix factor. However, the introduction of the possibility to modify the distance[8] would not change the general results of coordination, compensation or discretionary central policies.

In summary, the application of the spatial interaction model in a normative economics perspective enables to endogenously define the choice of implementing tourism governance and policymaking at the central (national) or at the local (regional) level in the following ways:

- *centralized policies* are more efficient every time that $\alpha \neq \beta$ (multilateral spillovers effects) in order to coordinate or offset the clashing regional policies in view of the national interest, and precisely when, i) α or $\beta = 0$, i.e. only one region has spillovers effects and there is

[8] The national policy maker could change the economic distance, even if only in the long-term, with appropriate public investments.

unilateral interaction, and ii) α and $\beta \neq 0$, i.e. both regions have spillovers effects and there is multilateral interaction between them;

- *decentralized policies* are more efficient in the cases i) $\alpha = \beta$ (same regional spillovers effects) since regional policies compensate each other, regional policies being equal, even if the central policy maker still needs at least to monitor the condition $\alpha = \beta$; ii) $m_i = m_j$ (same tourism multiplier) since regional policies have the same effects on national income (very rare);
- *neither central nor local policies are effective* if $\alpha = \beta = 0$ (no regional spillovers effects).

6. Empirical Analysis: the Case Study of Italian Domestic Tourism

The theoretical results of the model have been tested by investigating the case study of the Italian domestic tourism, and specifically the 12-years panel (years 1998–2009) of domestic tourism flows between the 20 Italian regions. By relying on Patuelli et al.'s (2013) empirical framework and data set, the spatial interaction model has been tested by choosing some variables commonly used as push and pull factors (see, e.g., Sheldon and Var 1985, Lim 1997), such as regional GDP, population, price indices, crime indices, tourism specialization and deseasonalization.

In particular, to test the national-regional dialectic in a normative economics perspective, the elasticity parameters of the following policy variables (which can affect tourism flows) have been estimated:

- *UNESCO's World Heritage Sites (WHS)* regional endowment, which in Italy represents a very important element of regions' cultural offer;
- *public spending in recreational, cultural and religious activities*, representing the investment of regions towards attracting tourists, or at least attempting to face a potential medium-term scarcity in tourism demand;
- *tourism specialization* (share of value added by accommodation and restaurants, transports and communication, commerce, repairs) in order to account for the different tourism 'vocation' of regions, and their reliance on this sector;
- *museum quality* (number of visitors to state antiquities and arts museums per institute), measured by the cultural demand per state institute;
- *diffusion of cultural and recreational events* (number of tickets sold per inhabitant for theatrical and musical events) accounting for the quality of the regional cultural offer;

- *off-season tourism* (overnight stays in off-season months per inhabitant) which accounts for the regions' success in extending their period of touristic consumption, for example by diversifying their touristic offer;
- *prices index for hotels and restaurants*; which is used in the model also to control for the price dynamics in the origin and destination regions, to cope with variations in the costs of living;
- *small and violent crime* indices, since regions with high crime rates may be expected to show a diminished interest from tourists, all being equal, because of safety concerns.

The data regarding the dependent variable (regional arrivals in hotels and other accommodation outlets, from and to all Italian regions for the period 1998–2009) are provided by the Italian Statistical Agency (ISTAT), more precisely within the publication 'Statistiche del Turismo', and collected through the accommodation structures survey. The number of regional UNESCO sites is obtained directly from UNESCO's World Heritage Convention website (http://whc.unesco.org/), while all further explanatory variables are obtained by ISTAT, and are published on: 'Conti Economici Regionali', 'Prezzi al Consumo', and 'Banca Dati Territoriale per le Politiche di Sviluppo'.

The empirical estimation of the spatial interaction model (9) and (10) is done through the following equation:

$$T_{ijt} = \exp(\mu_{ij} + \delta year_t + \alpha x_{it} + \beta y_{jt}) + \varepsilon_{ijt} \tag{31}$$

where T_{ijt} is the flow of tourists from region i to region j, x_{it} and y_{jt} are the origin and destination-related variables, μ_{ij} are individual fixed effects, and $year_t$ are time fixed effects, while distance variable d_{ij} drops because of fixed effects. Finally, an equality test for the case $\alpha = \beta$ has been then performed, in the form of a chi squared test against $\mathrm{H}_0 : \alpha = \beta$. For further details on the empirical estimation method, and the complete list of explanatory variables, see Patuelli et al. (2013).

Empirical estimates of elasticity parameters α and β of equation (31) and $\alpha = \beta$ equality test, for any of the policy variables presented above, are provided in Table 6.

Table 6. Empirical estimates, for Italian domestic tourism

Variables	Coefficients	$\alpha = \beta$ test
1. UNESCO World Heritage Sites (WHS)	$\alpha < 0$* and $\beta > 0$	No
2. Public spending in recreational, cultural and religious activities	α and $\beta = 0$	**Yes**
3. Tourism specialization	$\alpha > 0$ and $\beta > 0$*	**Yes**
4. Museum quality	$\alpha < 0$* and $\beta > 0$	No
5. Diffusion of cultural and recreational events	$\alpha = 0$ and $\beta > 0$	**Yes**
6. Off-season tourism	$\alpha = 0$ and $\beta > 0$	No
7. Prices of hotels and restaurants	$\alpha = 0$ and $\beta < 0$	No
8. Small crimes	$\alpha > 0$ and $\beta = 0$	No
9. Violent crimes	$\alpha > 0$* and $\beta = 0$	**Yes**
* = marginally significant		

In order to interpret these empirical estimates, let's now recall the interpretative model of the elasticity parameters α and β in terms of optimal tourism policies (which are then shown in Table 7):

- a *national policy* is optimal when $\alpha \neq \beta$ (multilateral spillovers effects), to coordinate or offset the (opposite) regional policies, and the specific optimal policies to be implemented for each pair of regions depend on both coefficients α and β (Tables 4 and 5) and regional tourism multipliers (if $m_i > m_j$ the national policy overlaps with region i's policy, while if $m_i < m_j$, the national policy overlaps with region j's policy);
- a *regional policy* is optimal when $\alpha = \beta$ (same regional spillovers effects), since regional policies compensate each other, regional policies being equal, so that it is not necessary a national intervention;
- both *national and regional policies are ineffective* when $\alpha = \beta = 0$ (no regional spillovers effects).

Table 7. Optimal tourism policies, for Italian domestic tourism

Variables	Coefficients	$\alpha = \beta$ test	Tourism Policies
1. UNESCO sites	$\alpha < 0$* and $\beta > 0$	No	National (x_{max}; y_{min})
2. Public spending in recreational, cultural and religious activities	α and $\beta = 0$	Yes	*Ineffective policies*
3. Tourism specialization	$\alpha > 0$ and $\beta > 0$*	Yes	Regional (x_{max}; y_{max})
4. Museum quality	$\alpha < 0$* and $\beta > 0$	No	National (x_{max}; y_{min})
5. Diffusion of cultural and recreational events	$\alpha = 0$ and $\beta > 0$	Yes	Regional (x_{max}; y_{max})
6. Off-season tourism	$\alpha = 0$ and $\beta > 0$	No	National (x_{max}; y_{max})
7. Prices of hotels and restaurants	$\alpha = 0$ and $\beta < 0$	No	National (x_{min}; y_{max})
8. Small crimes	$\alpha > 0$ and $\beta = 0$	No	National (x_{min}; y_{max})
9. Violent crimes	$\alpha > 0$* and $\beta = 0$	Yes	Regional (x_{min}; y_{min})
* = marginally significant			

In summary, from the empirical estimate carried out for the Italian domestic tourism it's possible to conclude that in Italy the optimal tourism governance and policymaking should be organized as follows:

- national tourism policies are more efficient to manage UNESCO sites, museum quality, off-season tourism, prices of hotels and restaurants and small crimes;
- regional tourism policies are more efficient for the policies regarding tourism specialization, diffusion of cultural and recreational events and violent crimes;
- national and regional tourism policies are ineffective for public spending in recreational, cultural and religious activities.

A possible interpretation of one case of optimal national policy, i.e. the number of UNESCO sites, is that since $\alpha < 0$ and $\beta > 0$ they does appear to influence arrivals to tourism destinations for Italian domestic tourism, so that if on the one side the regional policy makers' lobbying towards the national government for obtaining UNESCO designation for additional cultural sites appears to be justified, on the other side regional policies need to be coordinated at a national level in order to avoid the overall negative effect (at the national level) due to the regional spatial competition effect (Patuelli et al. 2013).

7. Conclusions

The application of the spatial interaction model in a normative economics perspective, within the tourism sector and in a framework of regional spillovers effects, proved to be an useful methodology in order to endogenously define the choice of implementing tourism governance and policymaking at the central (national) or at the local (regional) level.

In particular, decentralization of tourism governance is more efficient when regions have the same regional spillovers effects, so that regional policies may compensate each other, or when they have similar tourism multipliers, so that regional policies may have the same effects on national income. On the contrary, all policy variables that cause multilateral spillovers effects should remain in the domain of national policies, in order to coordinate or offset the competing and clashing regional policies in view of the national interest.

The novel methodology used in this study enables to give two major contributions to the literature on tourism governance and policymaking:

i) an explanation of the role of decentralized tourism policies and the principle of subsidiarity;
ii) an endogenous definition of the optimal centralized and decentralized tourism policies.

Future extensions of this work may consist in evaluating the potential spatial competition or spatial complementarity between regions in terms of their attractivity factors, by introducing in the model the spatial lags of the variables of interest. Moreover it would be interesting to perform the empirical analysis also for different nations and for international tourism, and finally to apply the same modeling framework not only to tourism policies, but also to any other spatial interaction context (e.g., migration or commuting).

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