

Paci, Raffaele; Marrocu, Emanuela

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Tourism and regional growth in Europe

Raffaele Paci and Emanuela Marrocu

University of Cagliari, CRENoS

Abstract

The paper aims at analysing the impact of domestic and international tourism on the economic growth process for 179 regions in ten European countries, which are highly representative of total tourism flows. The econometric analysis is carried out for the period 1999-2009 and it is based on a spatial growth regression framework, where the growth rate of GDP per capita at the regional level depends on tourism flows in addition to the traditional production inputs like physical, human and technological capital. Besides controlling for the initial conditions, we also include covariates for geographical, industrial, social and institutional features of the regions. Results, robust to several robustness checks, show the positive effect of domestic and international tourism flows on regional growth.

Keywords: regional economic growth; tourism flows; spatial dependence; Europe

JEL: R11, L83, C31

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1. Introduction

Tourism represents one of the most relevant and fast growing industry in the world. The decrease of the travel cost, the launch of large inbound markets like Russia and China, the boost of the point to point flights, the facility of acquiring information on the destinations are all elements which are making the tourism sector a significant source of external revenues and a key driver of economic growth for the local economies.

The economic literature has widely analysed the role of international tourism in the development process at the country level (Lanza and Pigliaru, 1994; Hazari and Sgro, 1995; Sinclair, 1998). More specifically, the so called Tourism-Led Growth (TLG) hypothesis has been supported by significant empirical findings in cross countries studies at the world level (Sequeira and Maças Nunes, 2008; Lee and Chang, 2008; Figini and Vici, 2010) and also in time series analysis of single countries in Latin America, Asia and Europe.¹ More specifically, the positive role of tourism in influencing the economic dynamics in Europe has been shown by Balaguer and Cantavella-Jordà (2002) and Capó Parrilla et al. for Spain, Dritsakis (2004) for Greece and Proença and Soukiazis (2005) for Portugal. The effectiveness of tourism in driving economic growth has proved particularly strong for the case of small economies specialized in tourism, like several island states (Brau et al., 2007). In general, the mechanisms behind such a positive relationship between international tourism and long-run growth are represented by significant inflows of foreign currency, stimulation of inter-industry linkages, incentive for public infrastructure and multiplicative effects on employment.

In the above literature the territorial unit of analysis is the country and therefore most contributions have focused on international tourism flows while neglecting the domestic ones because they do not represent an additional source of external revenue for the nation as a whole. However, it should be remarked that domestic tourists constitute the most important component of total tourism so that they are expected to influence considerably the performance of the local economy. According to the World Travel and Tourism Council (WTTC, 2012) domestic tourism flows (i.e. journeys of resident tourists within their own country) in 2011 have generated 70% of total tourism revenues. Considering Europe, in 2010 the holiday trips of EU residents within their own country rise above one billion and domestic tourist flows represent 77% of total trips (European Union, 2011).

Therefore, in order to fully evaluate the impact of tourism on the economy growth process, it is essential to consider both the domestic and the international tourists' flows and this can be done

¹ See Brida and Pulina (2010) for a recent comprehensive review of the Tourism-Led Growth hypothesis and Song et al. (2012) for a general overview of this approach.

when the regional level is chosen for the analysis. As a matter of fact, for a specific region, say Illes Balears, it is indifferent if a tourist arrives from another Spanish area, say Madrid or Barcelona – or from abroad, say Paris or New York. For the local economy this tourism arrival represents in any case a source of external revenues which enhance the performance of the local economy.² However, mainly due to a lack of regional data, so far only two studies have analysed the relationship between tourism and economic growth at the regional level: Proença and Soukiazis (2005) for the regions of Portugal and Cortés-Jiménez (2008) for the Spanish and Italian regions.³

The aim of this paper is to analyse the influence of domestic and international tourism on the economic growth rate over the period 1999-2009 for a wide and highly differentiated set of 179 regions belonging to ten European countries, namely Austria, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. The territorial breakdown is based on Eurostat's NUTS (Nomenclature of Territorial Units for Statistics) classification and we consider NUTS2, defined as the basic regions for the application of regional policies.

The econometric analysis is based on a simple growth regression framework, derived from an augmented Cobb-Douglas production function (Mankiw et al., 1992) where the growth rate of GDP per capita at the regional level depends, besides our variable of interest represented by tourism flows, on physical and human capital, on the initial level of GDP per capita and on a set of controls for the geographical, industrial, social and institutional features of the regions. The growth model is first estimated by using a two-period panel dataset, but we also estimate the model on the cross-section sample as a robustness test.

An important and original feature of this study is that we account for the potential spatial spillovers affecting the local growth process by including the spatial lags of the initial GDP level and of the tourism flows.

As a proxy for tourism flows we consider the number of nights spent in the region of destination by domestic and international tourists. Given the lack of information at the regional level on the monetary expenditures of tourists, this indicator is more appropriate since it accounts for the length of stay which varies across regions. However, to test for the robustness of our results, the empirical model is also estimated by using the number of arrivals.

The countries considered in this paper are highly representative of the tourism flows for the whole Europe since the tourists' nights for the 10 countries considered amount to more than 80% of total tourism in EU27. Thus, our analysis provides a wide-ranging and informative picture on the

² As it is well-known, tourists have different expenditure potential, preferences, interests and, for the destination management is important to differentiate among them. But, on average, for the aggregate revenue of the region a national visitor is as important as an international one.

³ Marrocu and Paci (2011) show that tourism arrivals affect positively the efficiency levels of the European regions since they bring valuable information on the external demand to the local economy.

relationship between tourism and growth since it focuses on countries with varying degrees of specialisation in tourism.

The paper is organised as follows. In section 2 we present the main features of tourism flows, which is our variable of interest in analysing the regional growth process. In section 3 the empirical model and the data are presented while section 4 discusses some estimation issues. The econometric results of the baseline model are presented in section 5 together with some robustness checks. Section 6 concludes.

2. Tourism flows in Europe

In this section we provide a brief overview of our variable of interest, tourism flows, which is considered as an additional driver of economic growth in the European regions. We start by analysing the main figures at the country level and then we examine in greater detail the regional patterns. It is important to remark that our set of countries is very differentiated since it comprises highly developed and industrialised nations, like Germany and France, together with small lagging-behind countries where the tourism sector play a significant role, like Greece and Portugal. Moreover, among the regions considered there are widely renewed tourism destinations like national capitals (Paris, London, Rome, Berlin and Madrid), cultural cities (Venice, Florence and Barcelona), “sea & sun” top localities (Illes Balears, Sardegna, Algarve, Andalucia and the Greek Islands) and mountains destinations in the Alpes (Bozen, Tirol, Rhône Alpes). At the same time our group includes several other regions, both fast and slow growing, where tourism is not particularly developed. Such high sample variability is important to correctly assess the role of tourism in determining the economic performance in the whole economy.

In Table 1 we report the number of nights spent by domestic and international tourists in the initial and final years of the period 1999-2009. The number of visitors’ presences (based on the nights) is the most general indicator of tourism flows since it also accounts for the length of the stay. Overall in the ten countries the total tourism presences in the year 2009 amount to 1.8 billion and the domestic component shows the highest share (62%), which is quite stable over the decade.

The country with the largest tourism flow is Italy (370 million in 2009), followed by Germany (314) and France (290). It is immediately evident from these sizeable values that tourism has an important impact on the economic activity. For instance, the WTTC (2011) estimates that in 2009 in Italy the tourism sector has directly generated a revenue of 50 billion euro (3% of GDP), which increases to 130 billion (8% of GDP) when the indirect and induced effects are also included.

The composition of total tourism flows is strongly differentiated among countries: the domestic share ranges from a very low level in Greece (29%) and Austria (30%) to a very high level

in Sweden (76%) and Germany (83%), while Italy and Spain show a more balanced composition between domestic and international tourists flows.

To fully appreciate the relevance of the different tourists' flows composition it is important to remark that according to the international definitions (United Nation World Tourism Organization, Eurostat) a "tourist" is defined as a person who spends at least one night in tourist accommodation establishments. Therefore in the official statistics it is not possible to distinguish between business and leisure tourists. According to WTTO (2012) this latter component accounts for 78% of total tourism revenues in the European Union.. In the rich and populated European countries like, for instance, Germany the higher share of domestic tourism can be partly explained by the presence of a large business component.

Table 1 also reports the dynamics of tourism nights over the last decade showing an overall annual average growth rate equal to 1.4% for the domestic component and to 1.6% for the international one. Again, there is a high variability among countries and components. The highest growth rate is shown by domestic tourism in Spain (5.2%) and Greece (3.9%), due to the improved economic conditions registered in that period in the two countries. International tourism shows a huge increase in Germany (4%) and in Spain (3.4%), while the Netherlands and Portugal show a small decrease.

In Map 1 and Map 2 we report the regional distribution of tourism presences for the domestic and international components for the year 2009, while the top ten regions are listed in Table 2. A visual inspection of the maps reveals that both domestic and international tourism flows exhibit a well-defined geographical pattern. To formally test for the presence of spatial association in the regional distribution of tourists we have performed the Moran's *I* test using as spatial weight matrix the distance in kilometres between any pair of regions. The Moran's *I* test, equal to 3.65 for domestic flows and to 4.28 for the international ones, is highly statistically significant in both cases. This means that touristic destinations are spatially associated, which may be the result of the presence of natural elements (like being on the coasts or on the mountains), but also of communication spillovers determined by previous tourist flows. In the econometric estimation we will control for the spatial association presented in the data by introducing the spatial lag of the tourism flows.

Considering the regional ranking of tourism destinations two interesting results emerge. First, there are remarkable differences between the domestic and the international ranking. Some destinations are clearly specialized in internal tourism, like Emilia Romagna in Italy, Mecklenburg in Germany, Dorset and Somerset in UK or Provence in France. Other regions appear among the top destinations only for international tourism, like Illes Balears (which is the most attractive

destination in Europe with 48 million presences in 2009), London and the Italian region Lazio, where the capital city Rome is located. Only few areas are able to be highly attractive for both domestic and international tourists: Île de France for the world renowned destination of Paris and other regions (Cataluña, Veneto, Toscana and Andalucía), which combine the attractiveness of cultural cities (Barcelona, Venice, Florence, Seville) with the sea and sun holiday product.

The second result refers to the high variability shown by the tourism destinations in terms growth rate of domestic and international tourism over the period 1999-2009. The strong competition among destinations induces several changes in the rankings, especially for domestic tourism, as predicted by the tourism product life cycle (Butler, 1980). A relevant example of such remarkable changes in tourism destinations is given by traditional coastal destinations around Wales in the UK, where we observe the highest reduction of domestic tourism in Europe: East Wales (-7.4% annual average change over the decade 1999-2009) and Dorset and Somerset (-3.4%), accompanied by a huge increase in the nearby alternative destinations, like West Wales (10.8%) and Gloucestershire (9.6%). Also the dynamics of the international component of tourism shows a great variability: among the most popular destinations there are cases exhibiting a very positive performance, like Berlin (18.7% annual average) and Sardegna (10.2%), in sharp contrast with the remarkable decline of other destinations, like Algarve (-2.1%) and Bretagne (-2%).

Map 3 displays the share of the domestic component over total tourism at the regional level in 2009. As already remarked, there are regions almost completely specialised in domestic tourism, like for instance Mecklenburg in Germany, which has a relevant level of total tourism flows (25 million nights), composed by domestic tourists for the 97%. Similar figures are found for other German regions because of the relevant number of domestic flows activated by business trips. More related to the traditional presence of domestic leisure tourism is the case of some UK destinations, like Cornwall (domestic share equal to 94%) and Dorset (92%). On the other hand, there are popular destinations where the share of domestic tourism is very low, like the Austrian mountain destination of Tirol (9%) or the islands of Kriti (9%) in Greece and Illes Balears (13%) in Spain.

Finally, in Map 4 we report the regional specialisation pattern in the tourism sector. The specialisation index is computed from a supply side perspective as the number of available beds in tourist accommodations (see section 3 for a detailed description of the specialisation index). It takes a value above 1 if the region is relatively specialised in tourism activities and below 1 if it is non-specialised. Among the highly specialised tourism regions we find several islands in Greece (Notio Aigaio, Ionia Nisia, Kriti), Spain (Illes Balears), France (Corse), Italy (Sardegna) and a coastal region of Portugal (Algarve), which are essentially summer destinations for sea and sun

holidays. We also find small mountain regions in the Alpes (Bolzano, Trento, Valle d'Aosta, Tirol, Karnten), which are attractive destinations for both winter and summer seasons. From the visual inspection of Map 4 it is clear that the tourism specialised regions (the 83 regions in the highest two classes) show a high degree of spatial association since for most regions their specialisation in tourism activities is determined by common geographical features like being located on the coast or on the mountains. As before, we compute the Moran's I test (5.98), which turns out to be highly significant confirming that the tourism specialised regions are spatially clustered. Finally, we can notice that the tourism specialised regions are also characterised by a relatively higher GDP growth rate (0.37%) with respect to the other regions (-0.03).

It is important to remark that our sample includes several regions where the tourism industry is very small compared to other economic activities. This regional variability is essential in the econometric analysis to assess the role played by tourism on regional economic performance not only in the tourism specialised areas, but more generally in the whole set of the European regions.

3. Empirical model and data description

3.1 The empirical framework

The role played by tourism on regional economic dynamics is analysed within a growth model derived from a human capital-augmented Cobb-Douglas aggregate production function à la Mankiw-Romer-Weil (1992). Besides the standard explanatory variables represented by the productive factors, we explicitly include a tourism variable and we also consider a set of controls at both regional and national level. The model is specified in the per capita log-linearized form as follows:

$$\dot{y}_{i;t-t-\tau} = \beta_1 y_{i;t-\tau} + \beta_2 \text{tourism}_{i;t-\tau} + \beta_3 \text{hk}_{i;t-\tau} + \beta_4 k_{i;t-\tau} + \gamma X_{i;t-\tau} + \phi \text{countries}_j + \delta_t + \varepsilon_{i;t-t-\tau} \quad (1)$$

where $i=1, \dots, N=179$ regions, $t=2004$ and 2009 , $\tau=5$, $j=1, \dots, C=10$ countries and $\varepsilon_{i;t-t-\tau}$ is the error term. Our sample comprises regional observations for the time period 1999-2009; in order to avoid the undue influence of business cycle fluctuations the growth rate of per capita GDP is computed by averaging over five-year periods, 1999-2004 and 2004-2009, so that model (1) above is estimated by pooling the two resulting time observations for the 179 regions. The dependent variable ($\dot{y}_{i;t-t-\tau}$) is the annual average growth rate of real per capita GDP, expressed in 2000 prices. Following the standard approach adopted to estimate growth models, the right-hand side variables are included in the model lagged at their initial period values, in our case this implies to consider a five year lag ($\tau=5$); all variables are expressed in per capita terms.

We include the initial period level of per capita GDP ($y_{i,t-\tau}$), physical capital stock ($k_{i,t-\tau}$), human capital ($hk_{i,t-\tau}$), tourism nights ($tourism_{i,t-\tau}$), a set of controls gathered in the matrix $X_{i,t-\tau}$, a set of time invariant dummies ($countries_j$) for the 10 countries considered in this study and, finally, time dummies (δ_t) to account for common shocks. The controls considered are the regional settlement structure, the endowments of technological and social capital, the degree of cultural diversity, the pattern of productive specialisation and first nature factors. The country dummies are included to account for institutional factors, common to regions belonging to the same State, and for unobservable heterogeneity at the national level. In the next subsection we provide detailed definitions of the variables considered in the empirical analysis, along with a brief description of their main characteristics.

3.2 Data description

For the sake of simplicity the description refers to the whole period considered, 1999-2009. The summary statistics are shown in Table 3, while the detailed sources and definitions of the variables are reported in the Appendix 1.

From the statistics reported in Table 3 it emerges that the annual average growth rate of real per capita GDP exhibits a very differentiated dynamics across regions. It ranges from the minimum negative value of -2.6% in the Austrian region of Vorarlberg to the maximum of 4.4% in Attiki (Greece). The high variability of GDP growth rate is also signalled by the variation coefficient, which exhibits the highest value compared to the other variables.

Following a well-established literature, in the growth model we include the initial level of GDP to account for the convergence process, and physical and human capital as main production inputs. Since all variables are included in per capita term the labour input is omitted. The total stock of physical capital is calculated for each region by applying, over a long period starting in the year 1985, the perpetual inventory method based on gross investment in the previous year and assuming an annual depreciation rate equal to 10%. This is a general measure which includes both private and public capital stock. The human capital variable accounts for the accumulation of intangible knowledge, which has proved to affect significantly the economic dynamics at both country (Benhabib and Spiegel, 1994) and regional level (Dettori et al., 2012). Human capital is expressed as thousands of economically active individuals that have attained at least a tertiary education degree (ISCED 5-6).

Our variable of interest, discussed in details in section 2, is represented by tourism flows measured by number of nights, for which we consider both the domestic and international components. As argued before, this variable is to be preferred with respect to the number of

arrivals, as it allows for a more thorough assessment of the tourism activities contribution to the overall economic performance. However, for robustness we also estimate our preferred model specifications by including tourism flows measured in terms of arrivals.

The growth process may also be influenced by other factors that characterize the local environment and thus we include these potential determinants in the preliminary general specification of our model.

The first variable considered, the settlement structure typology index, refers to the demographic characteristics of the region and it defines six groups of regions according to the population density and the city size. The resulting territorial hierarchy thus comprises regions with the least densely populated areas without urban centres, for which the index takes value one, up to regions with very densely populated areas and large cities, for which the index assumes the maximum value of six. For this variable we expect a positive correlation with the growth rate since a high concentration of people implies a higher local demand and a wider supply of local public services, which are expected to enhance firms productivity growth (Ciccone and Hall, 1996).

The second factor is the technological capital which may be considered, at least partially, a public good generating external spillovers (Griliches, 1979). Therefore, firms located in areas with intense technological activities exhibit a higher productivity growth and this in turn is expected to increase the performance of the entire local economy. As an indicator for technological capital we use the number of patent applications presented to the European Patent Office by inventors resident in the regions considered.

The economic performance in a region may also be influenced by its degree of social capital – a complex mixture of shared norms, ties and trust – which is expected to improve the economic growth of the local society by decreasing the transaction costs and by facilitating the coordination among agents (Knack and Keefer, 1997). In this paper as a proxy for regional social capital we use the level of “trust” measured by the share of population who state their belief in people’s helpfulness, as reported by the European Social Survey.⁴

Another variable related to the concept of social capital is the level of tolerance, which signal the presence of an open society able to accept external population, to attract innovative firms and highly educated and skilled people, who ultimately are expected to enhance the economic performance (Florida, 2002). As a measure of tolerance we compute the share of population which

⁴ Note that such indicator is time-invariant and for Germany, France and the United Kingdom it is available only at the NUTS1 level, therefore we assume the same value for all NUTS2 regions included in the corresponding NUTS1 area. A similar proxy has been used by Marrocu and Paci (2012), where it turned out to affect positively regional growth for the case of 29 European countries.

has not mentioned the item “don’t like as neighbours: immigrants/foreign workers” as a possible answer to the European Value Studies (EVS) questionnaire.

Moreover, we control for possible influences of first nature geography factors by including two additional variables. The first one considers the climate, it is proxied by the annual average temperature and it is expected to have a negative effect on regional performance. The second one is a binary variable taking value one for regions with coastal territories. Finally, as stated above we include a whole set of country dummies to control for the institutional characteristics of the regions.

In order to assess whether regions with a comparative advantage in the production of hospitality services are significantly characterised by different growth paths, we also consider a regional index of specialisation in tourism. As it is customary when constructing production specialisation indexes, we first compute the tourism specialisation index on the basis of the level of sectoral employment, in this case the NACE sector H, “Hotel, restaurant and bar”. However, this measure turns out to be inadequate because of the large incidence of restaurant and bar activities; in certain regions (as it is the case for pubs in the UK) such activities serve mainly local residents rather than external consumers, so that may not be directly associated to tourism. Therefore, we think it is preferable to compute the specialization index from the tourism supply side by looking at the regional share of beds available in tourist accommodation establishments relative to the regional GDP share.

4. Estimation issues

The estimation of model (1) entails facing two important methodological issues. The first one is related to regressors’ endogeneity and the second one to cross-sectional dependence, as the observation units are regions they usually exhibit significant association across space. In the case of empirical growth models the two issues are inherently intertwined and require a unique framework to tackle them both. The non-spatial empirical literature on economic growth has primarily focused on endogeneity issues, spatial matters were mainly addressed by including additional variable with a geographical content (Durlauf et al., 2009). Hence, a number of estimators have been suggested to deal with endogeneity problems, caused by a number of different sources, namely unobservable heterogeneity, measurement errors, reverse causality. The Generalized Method of Moments (GMM) estimator proposed by Arellano and Bond (1991) and its system variant advanced by Blundell and Bond (1998) have been proved to reduce remarkably the endogeneity bias (see the recent Monte Carlo study by Hauk and Wacziarg, 2009), but they require the model to satisfy a potentially large number of moment conditions. When they are violated the usual weak and endogenous instruments problem arises. Moreover, the GMM estimators, as it is also the case for

the fixed or random effects ones, are derived under the assumption that the error term could be correlated only within individuals but not across them. When individuals are spatial units, as it is the case for our sample, this last assumption is rarely satisfied given the likely presence of cross-regional correlation.⁵ Such correlation in space is the result of spillovers generated by the interactions among agents, firms and institutions. The existence of positive externalities brings about the concentration of economic activities in particular areas, where inputs are made more productive yielding increasing return to scale and growth effects, as predicted by the new economic geography models and the endogenous growth theory (Romer, 1986). However, the role of spatial spillovers in determining diversified growth paths and varying speed of convergence has been generally overlooked in non-spatial growth empirics. On the other hand, since the publication of the US regional convergence study by Rey and Montouri (1999) spatial models have been increasingly adopted to investigate regional growth issues. As emphasized by Abreu et al. (2005) and Fingleton and López-Bazo (2006), spatial dependence in long-run growth rates is mainly due to substantive economic mechanisms (factor mobility, knowledge diffusion, pecuniary externalities), whereas random shocks, which would entail a spatial error model, play a secondary role. Therefore, the empirical analysis based on the spatial econometric approach may benefit from the predictions advanced in the non-spatial theoretical and empirical growth theory, which have devoted remarkable efforts in identifying the different sources of externalities (Ottaviano and Thisse, 2004). From a model selection perspective, it is thus preferable to adopt spatial specifications which allow for substantive kind of dependence, as it is the case for the spatial autoregressive model and the cross-regressive model. The first one entails the inclusion of the spatial lag of the dependent variable, while the second one the inclusion of the spatial lag of the explanatory variables.

In recent studies on the role of tourism in driving growth outcomes the GMM approach has been largely adopted (see among others, Cortés-Jiménez, 2008; Seetanah, 2011). However, as stated above, this is methodologically correct only when the sample units can be assumed to be cross-sectionally uncorrelated. In the current study we do not apply the GMM approach because of the likely existence of spatial dependence among the European regions included in our sample. In our analysis we tackle the endogeneity problem by including the explanatory variables lagged five periods. For robustness our main results are contrasted with a cross-section growth model, where the explanatory variables are included with a ten year lag in order to further reduce potential endogeneity. It is worth highlighting that the results discussed in the subsequent section have to be interpreted very cautiously; as emphasized by Durlauf et al. (2009), in growth analysis it is

⁵ Note that the issue of spatial association has been neglected in previous studies carried out at country level, even if most of the tourism specialised countries are spatially clustered due to first nature geographical conditions and therefore the results provided are likely to be affected by omitted variable bias.

extremely difficult to identify proper causal effects because genuine sources of exogenous variability are very rare, almost every socio-economic factor can have an effect on growth and in turn can be influenced back by growth. However, the analysis of income dynamic processes is valuable since it contributes to unveil (or rule out) important correlations between growth and different economic factors.

In order to deal with the spatial issue, model (1) was first estimated by Generalized Least Squares (GLS) and the residuals were tested for spatial correlation or for the omission of the spatially lagged dependent variable by carrying out the robust version of the Lagrange Multiplier (LM) for spatial dependence. In performing the tests we make use of the weight matrix whose entries are inversely related to the bilateral geographical distance in kilometres for each pair of regions. The estimated model is reported in the first column of Table 4. Although the tests seem to favour the spatial autoregressive specification, the estimation of such model results in a non-significant coefficient for the spatially lagged dependent variable and in non-significant spillovers effects. Following Anselin (2003, 2010) and Fingleton and López-Bazo (2006), we consider the cross-regressive specification based on the inclusion of the spatial lag of the initial level of the per capita GDP; the relevance of this variable is directly linked to the existence of agglomeration and knowledge diffusion effects, as largely documented by the new economic geography models and the endogenous growth theory. In a preliminary analysis we also included the spatial lag of the other main explanatory variables, namely physical capital, human capital and tourism flows, but only the latter's spatial term turns out to be significant. This result may be attributed to the high level of spatial correlation featured by tourism flows (De la Mata and Llano-Verduras, 2012; Marrocu and Paci, 2013) due to interactions among visitors and among tourists operators at both origin and destination locations. Such interactions can be seen as another source of production externalities yielding positive growth effects. The model estimated with the additional spatial regressors does not exhibit any evidence of remaining residual spatial correlation, as indicated by the LM test reported at the bottom of column (2) in Table 4.⁶ For this model specification, which is the most general one, some control variables turned out to be not significant; this is the case for technological capital, social capital, cultural diversity and climate. For some of them we also consider alternative indicators, which, however, did not exhibit higher significance levels. For technological capital the alternative proxy was represented by the stock (rather than the flow) of patents cumulated over the last five years or by the GDP share of R&D expenditure. For culture diversity we consider the percentage of foreign born-population. The non-significant results for

⁶ We also estimate the spatial Durbin specification, but it was outperformed by the model reported in Table 6 because no evidence was found of global kind of spillovers.

some control variables may be due to the quality of the data, the proxies currently available for a large set of regions considered at the NUTS2 level may be not very accurate to describe the complex phenomena such as social capital or cultural diversity. On the other hand, since such factors are very persistent, it could also be the case that their effects are, at least in part, accounted for by the initial level of GDP and by its spatial counterpart term.

For parsimony our preferred specification excludes the non-significant control variable, so that the estimated model reported in the third column of Table 4 represents the starting point of the investigation, presented in detail in the next section, on the contribution of tourism activities to regional economic growth.

5. Econometric results

5.1 Baseline model and tourism flows components

In the model reported in the last column of Table 4 total nights spent by tourists exhibit a significant and positive coefficient (0.27) signalling that regional income per capita is notably correlated with hospitality activities. The latter, if we cautiously rely on a causal interpretation of the estimated parameter, could be considered a relevant additional source of economic growth, especially for territories that do not have a comparative advantage in other kinds of production, but are endowed with natural or cultural resources. We will tackle this issue more in depth in section 5.2 when discussing the evidence found for regions specialised in tourism activities. The effect of tourism is strongly enhanced by the flows of visitors recorded in nearby areas as the significant coefficient of the spatially lagged term is estimated in 3.65. This signals the relevance of the positive externalities occurring thanks to the flows of information associated with people journeys, which can activate further tourists flows and increase the demand for the products experienced at the destination sites (Marrocu and Paci, 2011; Brau and Pinna, 2012).

Focusing on the other results of the estimated model, we found that the coefficient of the initial level of per capita GDP, negative and highly significant, is consistent with the prediction of convergence and catching-up models. Its spatially lagged counterpart is also highly significant, with a positive and sizeable coefficient (1.23) it indicates the importance of being located within a wealthy area, where there is a high potential to acquire the beneficial effects of agglomeration and knowledge diffusion, ultimately resulting in an enhanced income dynamics. This result is reinforced for the regions that rank in the highest positions of the territorial hierarchy, as emerges from the positive and significant coefficient of the settlement structure typology variable. Regions densely populated with large centres are likely to attract the most innovative, high value-added kind of productions, and thus they are expected to exhibit a faster growth pace. As emphasized by the

wide empirical growth literature initiated by the seminal paper by Mankiw et al. (1992), human capital represents a very relevant driver of economic growth; in our estimated model it exhibit a significant and sizeable effect of 1.04. Highly educated people, especially those specialized in science and high-tech fields, tend to concentrate in large urban centres, where they play a crucial role in developing or enhancing the innovative productions discussed above (Marrocu and Paci, 2012). Finally, the stock of physical capital does not turn out to affect significantly the regional growth performance. Although not significant, we prefer to keep it in all the estimated models in order to maintain the empirical specification as derived from the theoretical production function framework. The non-significant result for both the physical and technological capital may be due to the fact that, since we are mainly considering the most advanced economies in Europe, they are likely to have only level effects and not additional growth ones. The latter, as it emerges from the discussion above, are mostly determined by the intangible factors or by particular activities, as it is the case for tourism, which are increasingly characterized by high degrees of innovativeness and high tech services to meet the more and more demanding preferences of heterogeneous consumers.

In Table 5 we report the models estimated to assess whether the components of tourism – domestic and international – exhibit different effects on growth. We recall that domestic tourists are people who spend at least one night in tourist accommodation within the country where they reside. In columns (1) and (2) of Table 5 we report the model which includes the domestic and the international component, respectively; note that we do not include both components in the same model because of multicollinearity problems. The main result is that the domestic component turns out to be more effective (0.30) with respect to the international one (0.20). As discussed in the second section, the domestic component represents on average more than 60% of total tourists nights and it displays a more stable pattern over time. Moreover, the domestic component is associated with a sizeable effect due to tourists visiting neighbouring regions, this result can be attributed to the intensity of information and knowledge flows that occur within the same country and it is reasonable to argue that they are facilitated by common norms and beliefs and by the absence of language barriers. In the case of the international component the same term is not significant since interactions among international tourists are supposed to be much more loose and volatile.

Additional growth effects are found for tourists visiting regions where the national capital city is located (specification 3 of Table 5 where, to save space, we report only the model that includes total tourists nights). This positive result (0.82), mainly driven by international tourists, is due to the European capital cities being the urban centres with the largest historical, artistic and cultural heritage in the world, where world-wide renowned museums, famous churches and unique

buildings (for instance, the Colosseo in Rome or the Acropolis in Athens) are located. Finally, note that for all the three models reported in Table 5 the evidence previously discussed for the determinants of regional growth other than tourism is confirmed.

5.2 Tourism specialisation

We further investigate the growth enhancing effects of tourism by analysing the role of productive specialisation in hospitality activities. We thus focus on the subsample of 83 regions which exhibit a value of the tourism specialisation index higher than 1.05 (the two highest classes in Map 4). As we explained in section 3 the specialisation index is measured in terms of regional share of beds available in tourist accommodation establishments relative to the regional GDP share. The results are reported in Table 6. It emerges that the effects are larger with respect to the ones discussed for the whole sample of regions: in the case of total nights the coefficient more than doubles, going from 0.27 to 0.79 (model 1 in Table 6); the largest effects is found for domestic tourists nights, which is four times as large as the one found for the entire set of regions (1.23 vs. 0.30), while for the international component the increase in the effect is estimated in half the overall coefficient (0.36 vs. 0.24). Moreover, for all the three models the spatial lag term of tourism nights is significant, the highest value is again found for the domestic component. Note that the spatial lag term is computed with respect to all other regions, regardless of their being specialised in tourism. This result indicates that for the sample of the most tourism specialised regions the interactions generating flows of knowledge and information are more effective. This is reasonably due to the spatial proximity displayed by tourism specialised regions as we discussed in section 2. In addition, in those regions the most popular and well-known tourism attractions are located, so that information on their characteristics, attractions and local productions is like to be a sort of public good common to regions located nearby (Yoon and Uysal, 2005), which therefore exhibit a high degree of geographical association. This, in turn, as discussed for our basic model (model 3, Table 4), creates externalities beneficial for the growth process.

It is important to highlight that regions highly specialised in tourism activities are on average characterised by lower levels of GDP per capita with respect to the whole sample. This is also signalled by the coefficient of the initial level of GDP, which for all the models reported in Table 6 is much lower with respect to the estimates reported in the previous tables for the whole sample. Moreover, less wealthy regions are often surrounded by regions with similar per capita income levels due to historical unfavourable agglomeration patterns, which have ruled out long-run growth kind of specialisations as the ones related to high-tech productions. In our estimated models this is indicated by a non-significant coefficient of the GDP initial level spatial lag and of the

settlement structure variable. Note that also human capital turns out to be less growth enhancing for regions specialised in tourism.

Since the pattern of productive specialisation is not neutral with respect to growth outcomes, it is important that regions with a comparative advantage in hospitality activities aim at a very careful management of their resources, in particular when these are represented by natural (park areas, well-preserved beaches) or historical endowments. As emphasized by Lanza and Pigliaru (1994) and Brau et al. (2007), territories specialised in tourism can charge high prices when supplying high quality “tourism products”, so that their terms of trade can move favourably and offset (at least in part) the growth losses due being not specialised in high-tech productions.⁷ Moreover, high quality tourism services could also trigger effective complementarities in enhancing local productions (food, restaurants, handcraft) and innovative knowledge intensive services (telecommunications, transport).

5.3 Robustness analysis

In the final part of our analysis we carry out some robustness checks on the main results discussed so far. In Table 7 we report the results obtained by estimating in terms of arrivals, rather than nights, our baseline model and its three variants, which alternatively include the domestic or the international component or the interaction term with respect to capital city visits. The main results on the effectiveness of tourism on growth are confirmed, both as regional internal productive activities and in terms of spillovers acquired from proximate regions. All the estimated coefficients are significant and their magnitude is larger than that reported for the case of the tourism nights models since each arrival accounts approximately for 3 nights. The evidence on the relevance of the other explanatory variables in shaping the regional growth process is also substantiated; the only exception is the spatial lag of the initial per capita GDP, which exhibits less robust evidence with respect to that discussed for the case of tourism nights.

Finally, in Table 8 we present the models for both the tourism nights and arrivals, estimated on the cross-section sample of regions. As recently argued by Hauk and Wacziarg (2009), the cross-section estimation tends to be less affected by endogeneity bias since it is mainly based on the between variation. In order to save space we report the results for the two components, domestic and international, of tourism nights and arrivals. Although the estimated coefficients are lower in magnitude with respect to the one discussed above, the cross-section results provide further

⁷ Biagi and Pulina (2009) find that tourists’ demand is significantly driven by quality supply for the case of Sardinia (Italy), a region highly specialized in coastal tourism, which makes it one of the most favourite destinations of both national and international tourism flows.

evidence on the positive and significant role of tourism activities in influencing regional economic growth.

6. Concluding remarks

The analysis presented in this paper has been motivated by the increasingly important role that the tourism industry is playing in the world economy. Thanks to the remarkable decrease in travel costs and the high demand from emerging economies, coupled with the facility of acquiring information on virtually all places in the world, the hospitality activities is constantly growing and it currently represents a relevant source of economic growth. The extensive empirical literature on the effects of tourism on long-run growth has largely analysed international flows since it has been mainly focused on studies at the country level. As a consequence domestic flows have been overlooked as they did not represent a source of external revenues at the national level.

At the same time, the European scenario is characterised by large income disparities among territories because of the existence of localised knowledge spillovers and networks, which induces economic activities to agglomerates in space. Therefore, both academic scholars and policy-makers have shifted the attention from the national to the regional level in analysing growth processes and in designing policy interventions aimed at sustaining long-run sources of economic development.

Consequently, in order to assess the potential growth enhancing effects of tourism flows in Europe, the most adequate territorial level of analysis is the regional one, where not only the international, but also the national component of visitors, can contribute significantly in driving growth outcomes. We investigate this issue within a spatial growth regression framework for a sample of 179 regions belonging to ten European countries over the period 1999-2009. By accounting for more than 80% of total tourism flows, the sample is highly representative of the larger EU27 area and it exhibits a remarkable variability since it includes regions with very different kinds of tourism (see&sun, mountains, natural and cultural destinations) and with varying degrees of specialisation in hospitality activities.

The main results point out that both domestic and international tourism components are significant drivers of regional economic growth in Europe. Moreover, for the domestic component, the effects are reinforced by the tourism flows of the neighbouring regions thanks to the existence of spatial spillovers generated by the interactions among visitors and tourism operators at both destination and origin places. Such interactions facilitate the flow of information, which, in turn, activates further visitors flows and increases the demand for goods produced in the touristic locations. Additional positive effects are found for tourists visiting the regions where the national capital cities are located.

Although the results have to be interpreted cautiously given that within an empirical growth framework it is particularly difficult to identify proper causal relationships because of the inherent and unavoidable endogeneity, they are consistent across a number of robustness checks. These entail different model specifications, the use of the alternative indicator of tourism arrivals and the inclusion of additional controls for geographic, industrial, social and institutional features. Significant correlations between economic growth and tourism indicators are also found when the models are estimated on the cross-section sample referring to the entire period instead of the panel sample comprising two five-year sub-periods.

Finally, a remarkable result is found when the analysis is carried out for the subsample of regions relatively more specialised in tourism services which exhibit, especially for domestic tourism, significant higher impacts with respect to the whole set of regions. This result implies that both hospitality operators and policies strategies should be carefully designed in order to preserve the high-quality value of the destinations' touristic assets, especially when they are represented by natural endowments or by cultural and historical heritage. This is expected to ensure a long-run source of growth and could offset the loss of the potential gains implied by other kinds of production specialisations, such as those in innovative manufacturing or knowledge intensive services.

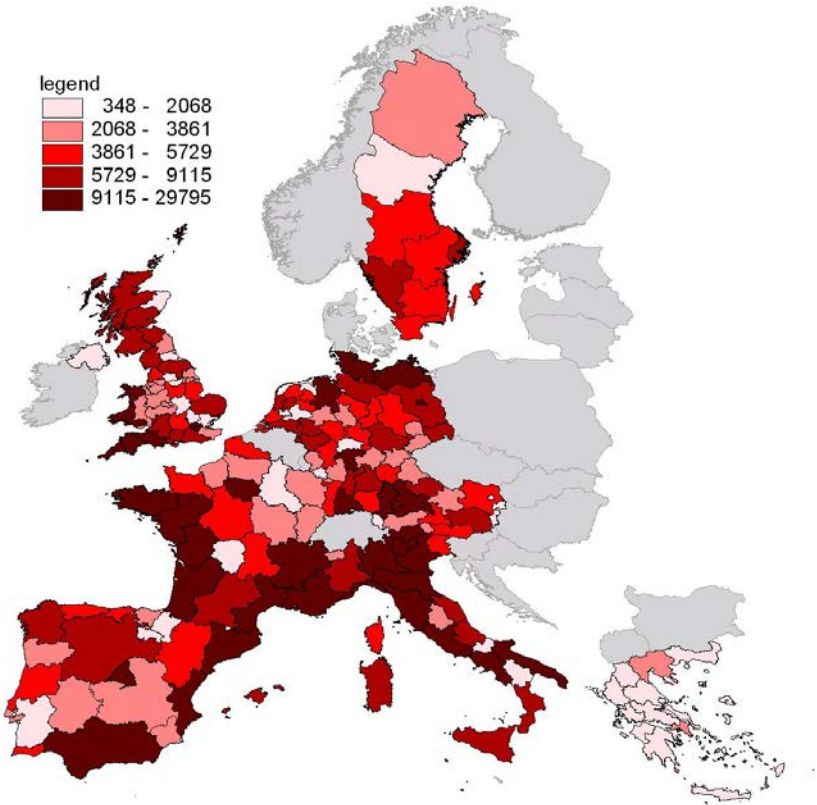
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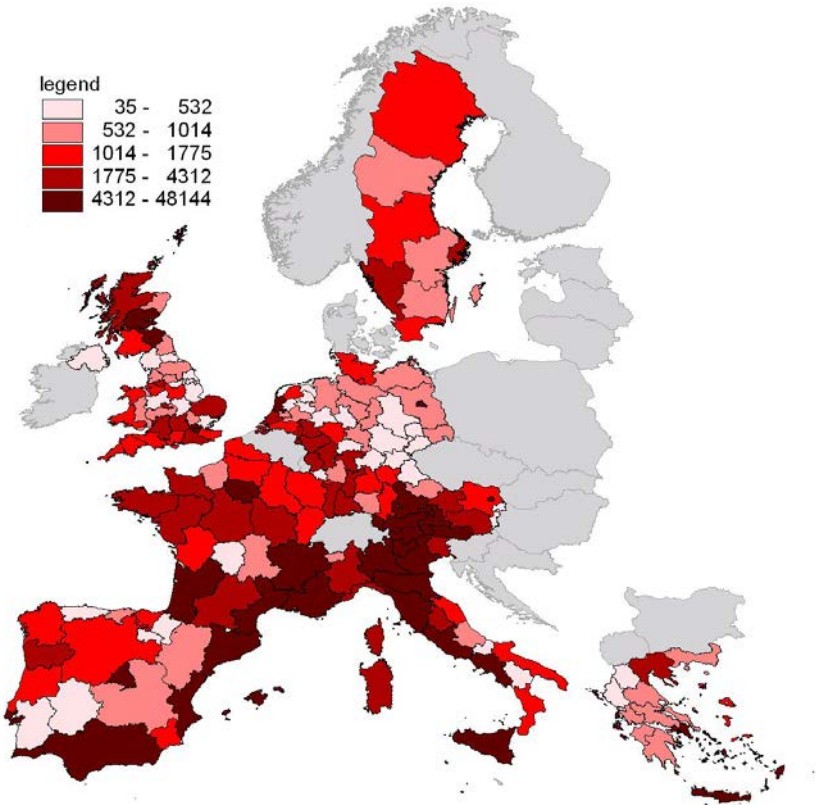
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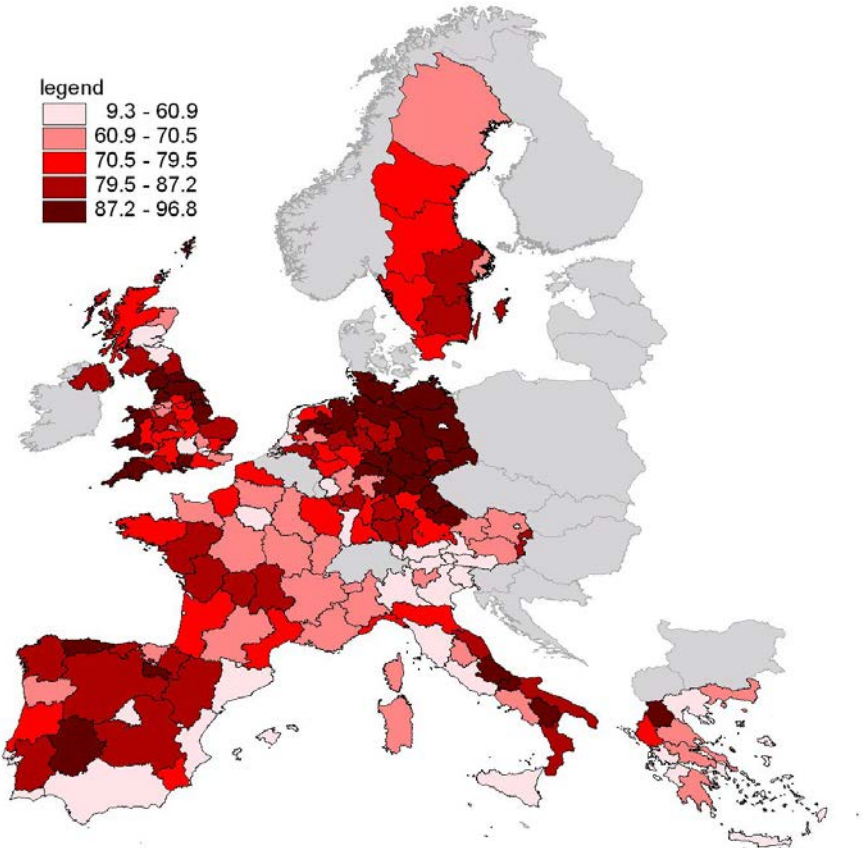
Map 1. Domestic tourism presences 2009 (thousand nights)



Map 2. International tourism presences 2009 (thousand nights)



Map 3. Share of domestic tourism presences 2009 (% over total tourism)



Map 4. Specialization in tourism sector 2009 (share of beds relative to share of GDP)

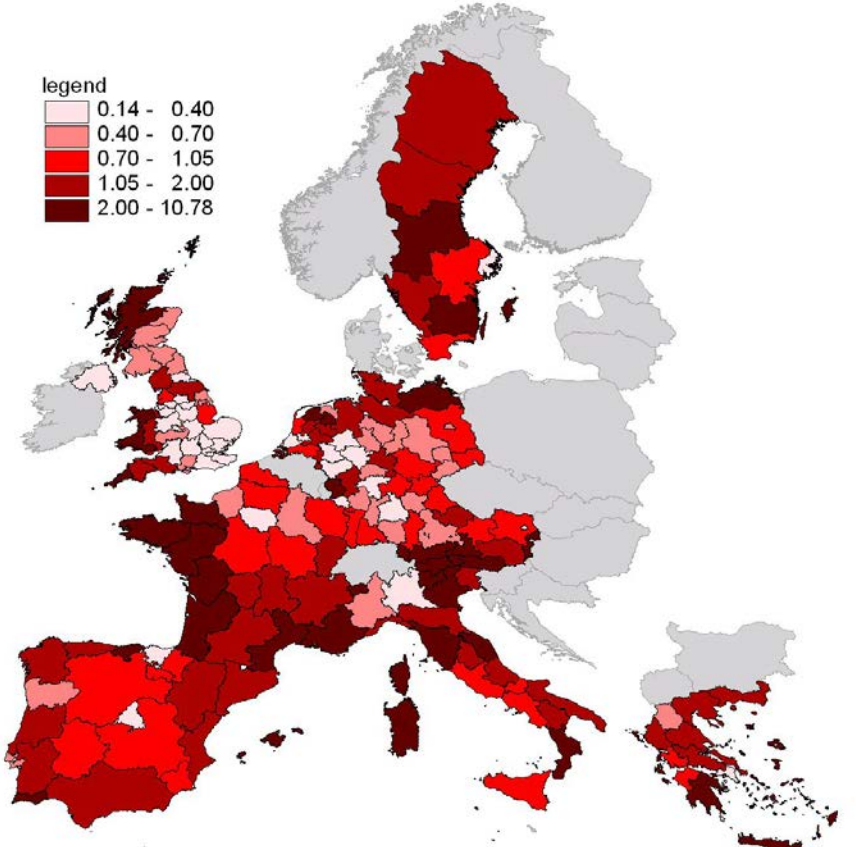


Table 1. Tourist nights by country

Code	Country	Domestic (million)		International (million)		Domestic over total (%)		Growth rate 1999-2009 (% annual average)	
		1999	2009	1999	2009	1999	2009	domest.	intern.
AT	Austria	25.5	30.6	63.8	72.2	28.5	29.8	2.0	1.3
DE	Germany	245.8	260.0	38.5	54.1	86.5	82.8	0.6	4.0
EL	Greece	13.9	19.3	42.0	46.7	24.8	29.3	3.9	1.1
ES	Spain	87.9	133.9	104.0	139.6	45.8	48.9	5.2	3.4
FR	France	158.8	192.8	99.3	98.1	61.5	66.3	2.1	-0.1
IT	Italy	181.6	211.3	126.7	159.5	58.9	57.0	1.6	2.6
NL	Netherlands	55.8	59.5	27.5	25.0	67.0	70.4	0.7	-0.9
PT	Portugal	15.2	17.9	20.7	19.9	42.2	47.3	1.8	-0.4
SE	Sweden	31.3	36.1	8.6	11.3	78.4	76.1	1.5	3.2
UK	United Kingdom	182.3	181.0	77.3	79.7	70.2	69.4	-0.1	0.3
	Total	998.1	1142.4	608.5	706.2	62.1	61.8	1.4	1.6

Table 2. Top ten regions for tourism flows (million nights)

Domestic							
Rank	Region	Country	1999	Rank	Region	Country	2009
1	Emilia-Romagna	IT	26.4	1	Île de France	FR	29.8
2	Oberbayern	DE	21.0	2	Emilia-Romagna	IT	29.5
3	Schleswig-Holstein	DE	19.3	3	Andalucía	ES	28.0
4	Toscana	IT	19.0	4	Veneto	IT	24.5
5	Île de France	FR	18.9	5	Mecklenburg	DE	24.5
6	Cataluña	ES	18.2	6	Cataluña	ES	24.3
7	Dorset, Somerset	UK	17.7	7	Toscana	IT	21.9
8	Veneto	IT	17.4	8	Provence-Alpes-Côte d'Azur	FR	21.4
9	Mecklenburg	DE	16.2	9	Valencia	ES	20.6
10	Andalucía	ES	16.0	10	Oberbayern	DE	20.0

International							
Rank	Region	Country	1999	Rank	Region	Country	2009
1	Illes Balears	ES	42.2	1	Illes Balears	ES	48.1
2	London	UK	36.3	2	London	UK	38.3
3	Île de France	FR	33.8	3	Cataluña	ES	36.7
4	Tirol	AT	27.0	4	Veneto	IT	35.9
5	Veneto	IT	26.5	5	Île de France	FR	33.8
6	Cataluña	ES	24.3	6	Tirol	AT	30.3
7	Andalucía	ES	17.0	7	Andalucía	ES	22.2
8	Toscana	IT	16.1	8	Lazio	IT	20.4
9	Bolzano	IT	15.2	9	Toscana	IT	19.0
10	Notio Aigaio	EL	14.9	10	Bolzano	IT	17.7

Table 3. Descriptive statistics

Variable	Min	Max	Mean	St. dev.	Var coeff.
GDP per capita , % annual average growth, 1999-'	-2.6	4.4	0.2	1.2	7.63
Domestic tourism, thousand nights	353.3	26379.8	5576.1	4823.9	0.87
International tourism, thousand nights	46.8	42182.8	3399.2	6375.7	1.88
Tourism specialisation index	0.1	10.8	1.5	1.8	1.16
Capital stock, per capita, thousand euro	14.2	75.0	35.7	11.2	0.31
Human capital , per capita, %	0.7	19.0	9.0	4.2	0.46
Technology, patents per million population	0.1	635.5	110.3	119.2	1.08
Trust, %	26.5	95.6	80.1	13.1	0.16
Tolerance, %	45.3	100.0	88.4	9.9	0.11
Climate, annual mean temperature	5.8	20.8	13.7	2.8	0.20

If not otherwise specified all explanatory variables refer to 1999

Table 4. Regional growth and tourism flows: baseline model specificatio

Dependent variable: GDP per capita, annual average growth rate

	1	2	3
GDP pc, initial level	-3.43 *** (-4.81)	-3.61 *** (-4.99)	-3.26 *** (-4.94)
Total tourism nights	0.34 ** (2.40)	0.27 * (1.90)	0.27 ** (1.96)
Physical capital	-0.10 (-0.21)	-0.11 (-0.23)	-0.10 (-0.23)
Human capital	0.95 *** (2.99)	0.95 *** (2.94)	1.04 *** (3.33)
Settlement structure typology	0.16 * (1.86)	0.18 ** (2.05)	0.17 ** (2.11)
Technological capital	0.24 * (1.73)	0.19 (1.32)	
Social capital: trust	-0.003 (-0.18)	-0.003 (-0.21)	
Cultural diversity: tolerance	-0.003 (-0.26)	0.000 (0.03)	
Climate	-0.10 (-1.37)	-0.07 (-0.94)	
Coast	0.03 (0.11)	-0.02 (-0.06)	
Spatial lag initial level GDP		1.13 ** (2.24)	1.23 *** (2.52)
Spatial lag tourism nights		3.02 ** (2.22)	3.65 *** (2.84)
r^2 (actual, fitted values)	0.49	0.50	0.50
Robust LM test no spatial lag, p -va	0.06	0.10	0.19
Robust LM test no spatial error, p -v	0.65	0.52	0.32

Observations: 179 regions; 2 time periods

The dependent variable is averaged over the periods 1999-2004 and 2004-2009

All explanatory variables refers to the inial year of each sub-period

Log-transformed variables: GDP pc, physical capital, human capital and tourism

Estimation method: Generalized Least Squares

All regressions include country and time dummies

The spatial weight matrix is the inverse distance matrix, max-eigenvalue normalized

t-statistics in parenthesis (computed with roboust standard errors)

Level of significance: *** 1%, ** 5%, * 10%

Table 5. Regional growth and tourism flows components

Dependent variable: GDP per capita, annual average growth rate

	1	2	3
GDP pc, initial level	-3.14 *** (-4.93)	-3.20 *** (-4.53)	-3.70 *** (-5.40)
Domestic tourism nights	0.30 ** (1.90)		
International tourism nights		0.20 ** (1.91)	
Total tourism nights			0.24 * (1.81)
Total tourism nights* dummy capital			0.82 ** (2.28)
Physical capital	-0.06 (-0.14)	-0.03 (-0.05)	-0.18 (-0.38)
Human capital	1.03 *** (3.30)	1.04 *** (3.26)	0.92 *** (2.91)
Settlement structure typology	0.17 ** (2.05)	0.12 (1.58)	0.11 (1.32)
Spatial lag initial level GDP	1.37 *** (3.21)	-0.06 (-0.30)	1.41 *** (2.86)
Spatial lag tourism nights	5.66 *** (3.69)	1.30 (1.36)	4.48 *** (3.37)
r^2 (actual, fitted values)	0.51	0.49	0.51

Observations: 179 regions; 2 time periods

The dependent variable is averaged over the periods 1999-2004 and 2004-2009

All explanatory variables refers to the inial year of each sub-period

Log-transformed variables: GDP pc, physical capital, human capital and tourism

Estimation method: Generalized Least Squares

All regressions include country and time dummies

The spatial weight matrix is the inverse distance matrix, max-eigenvalue normalized

t-statistics in parenthesis (computed with roboust standard errors)

Level of significance: *** 1%, ** 5%, * 10%

Table 6. Regional growth and tourism specialisation

Dependent variable: GDP per capita, annual average growth rate

	1	2	3
GDP pc, initial level	-6.36 *** (-5.64)	-5.91 *** (-5.77)	-5.48 *** (-4.62)
Total tourism nights	0.79 *** (4.25)		
Domestic tourism nights		1.23 *** (5.04)	
International tourism nights			0.36 *** (2.83)
Physical capital	-0.14 (-0.29)	-0.16 (-0.36)	-0.01 (-0.02)
Human capital	0.73 ** (2.16)	0.64 ** (1.93)	0.72 ** (2.03)
Settlement structure typology	0.09 (0.85)	0.13 (1.21)	0.03 (0.32)
Spatial lag initial level GDP	0.60 (0.92)	0.87 (1.52)	-0.31 (-0.95)
Spatial lag tourism nights	2.95 ** (1.97)	4.86 *** (2.75)	2.24 * (1.77)
r^2 (actual, fitted values)	0.54	0.56	0.50

Observations: 83 regions; 2 time periods

The dependent variable is averaged over the periods 1999-2004 and 2004-2009

All explanatory variables refers to the inial year of each sub-period

Log-transformed variables: GDP pc, physical capital, human capital and tourism

Estimation method: Generalized Least Squares

All regressions include country and time dummies

The spatial weight matrix is the inverse distance matrix, max-eigenvalue normalized

t-statistics in parenthesis (computed with roboust standard errors)

Level of significance: *** 1%, ** 5%, * 10%

Table 7. Regional growth and tourism arrivals

Dependent variable: GDP per capita, annual average growth rate

	1	2	3	4
GDP pc, initial level	-3.46 *** (-5.19)	-3.05 *** (-4.79)	-3.81 *** (-5.34)	-3.88 *** (-5.66)
Total tourism arrivals	0.38 ** (2.15)			0.320 * (1.81)
Domestic tourism arrivals		0.41 ** (1.97)		
International tourism arrivals			0.25 ** (2.08)	
Total tourism arrivals * dummy capital				0.86 ** (2.40)
Physical capital	-0.15 (-0.33)	-0.13 (-0.28)	0.01 (-0.13)	-0.22 (-0.48)
Human capital	0.97 *** (3.11)	0.95 *** (3.04)	0.96 *** (3.09)	0.83 *** (2.66)
Settlement structure typology	0.19 ** (2.33)	0.17 ** (1.94)	0.18 ** (2.32)	0.12 (1.43)
Spatial lag initial level GDP	0.37 * (1.61)	-0.11 (-0.54)	-1.22 *** (-3.21)	0.35 (1.52)
Spatial lag tourism arrivals	5.62 *** (3.49)	7.62 *** (3.44)	3.32 *** (3.78)	6.82 *** (4.07)
r^2 (actual, fitted values)	0.51	0.50	0.51	0.51

Observations: 179 regions; 2 time periods

The dependent variable is averaged over the periods 1999-2004 and 2004-2009

All explanatory variables refers to the initial year of each sub-period

Log-transformed variables: GDP pc, physical capital, human capital and tourism

Estimation method: Generalized Least Squares

All regressions include country and time dummies

The spatial weight matrix is the inverse distance matrix, max-eigenvalue normalized

t-statistics in parenthesis (computed with robust standard errors)

Level of significance: *** 1%, ** 5%, * 10%

Table 8. Regional growth and tourism - cross-section sample

Dependent variable: GDP per capita, annual average growth rate

	1	2	3	4
	nights		arrivals	
GDP pc, initial level	-1.74 *** (-5.16)	-1.79 *** (-4.81)	-1.69 *** (-5.01)	-1.98 *** (-5.19)
Domestic tourism nights	0.12 * (1.69)			
International tourism nights		0.06 (1.20)		
Domestic tourism arrivals			0.19 ** (2.06)	
International tourism arrivals				0.13 ** (2.10)
Physical capital	0.59 * (1.84)	0.61 * (1.87)	0.58 * (1.79)	0.69 ** (2.12)
Human capital	0.66 *** (2.60)	0.64 ** (2.47)	0.62 ** (2.41)	0.62 ** (2.42)
Settlement structure typology	0.08 ** (2.02)	0.07 * (1.80)	0.09 ** (2.12)	0.08 ** (1.97)
Spatial lag initial level GDP	0.63 *** (3.10)	0.21 ** (1.95)	0.22 ** (2.05)	0.04 (0.22)
Spatial lag tourism	1.70 ** (2.18)	0.77 * (1.68)	1.88 * (1.63)	0.56 (1.23)
r^2 (actual, fitted values)	0.73	0.72	0.72	0.73

Observations: 179 regions

The dependent variable is averaged over the periods 1999-2009

All explanatory variables refers to the inial year, 1999

Log-transformed variables: GDP pc, physical capital, human capital and tourism

Estimation method: Generalized Least Squares

All regressions include country dummies

The spatial weight matrix is the inverse distance matrix, max-eigenvalue normalized

t-statistics in parenthesis (computed with roboust standard errors)

Level of significance: *** 1%, ** 5%, * 10%

Appendix 1. Data sources and definitions

	Variable	Primary Source
GDP	Gross domestic product (GDP) at constant 2005 prices, per capita, thousand euro	Eurostat
TOUR NIGHTS DOM	Nights spent by country residents in tourist accommodation establishments	Eurostat
TOUR NIGHTS INT	Nights spent by international tourists in tourist accommodation establishments	Eurostat
TOUR ARRIV DOM	Arrivals of country residents in tourist accommodation establishments	Eurostat
TOUR ARRIV INT	Arrivals international tourists in tourist accommodation establishments	Eurostat
TOUR SPEC INDEX	Regional share of tourist accommodation establishments beds relative to regional GDP share	Eurostat
K	Capital stock, at constant 2005 prices, per capita, thousand euro	Own calculation
HK	Human capital, population with ISCED 5-6 tertiary education over active population, %	Eurostat
TECH	Technological capital, patents demanded at Epo, per million population	OECD, REGPAT
TRUST	Trust, population that feel people helpful (highest 3 scores), %	European Social Survey
TOL	Tolerance, population that do not dislike immigrants or foreigners as neighbours, %	European Values Study
CLIM	Annual mean temperature, centigrades	ESPON 2013 Program
COAST	Coastal regions, dummy variable =1 if the region is on the coast	Own calculation
SST	1=less densely populated without centres, 2=less densely populated with centres, 3=densely populated without large centers, 4=less densely populated with large centres, 5=densely populated with large centres, 6=very densely populated with large centres	ESPON project 3.1 BBR