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FULL ARTICLE

Tourism and territorial growth determinants in insular regions: A comparison with mainland regions for some European countries (2008–2019)

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Abstract

The article investigates the different growth patterns of islands and mainland regions by looking at their tourism and territorial characteristics differences. We considered *per capita* income and employment growth patterns in a panel data model focused on 74 regions in seven European countries from 2008 to 2019. The results show how the importance of some growth factors, especially those related to tourism and environmental sustainability, varies between islands and mainland regions. The article suggests specific policy implications for island regions in line with the European Union guidelines. Our findings support the need to pursue different approaches to sustain growth in islands and mainland regions, particularly for the tourism industry.

KEYWORDS
growth, insular regions, tourism industry

JEL CLASSIFICATION
O15, P52, L83, R11

1 | INTRODUCTION

The relationship between territorial factors and regional growth has been largely discussed in the literature (see, for example Camagni & Capello, 2010; Capello et al., 2015). In addition to traditional growth factors, such as those

identified by the neoclassical and the endogenous growth theories (i.e., saving rates, population dynamics, physical capital accumulation, human capital and technological endowment), an increasing number of contributions to regional and local development has identified additional factors that may reinforce regional economic growth. We refer mainly to infrastructure endowment (Calderón & Servén, 2004), institution quality (Ketterer & Rodríguez-Pose, 2018; Rodríguez-Pose & Garcilazo, 2015; Rodríguez-Pose & Ketterer, 2019), and agglomeration (Brakman et al., 2015; Duranton & Puga, 2014). As pointed out by Martin et al. (2015), local and territorial determinants can play a significant role also in regional resilience to economic shocks. Recent scientific literature has analysed the specific determinants of regional and local resilience (see Martin & Gardiner, 2019 for a broad review). For example, Brakman et al. (2015) focus on the role of urbanization in regional reaction to shocks. Pizzuto (2020) investigates the role of regional competitiveness in shaping employment resilience of European regions to the Great Recession. Martin et al. (2016) concentrate on the role of economic structure in the UK, while Crescenzi et al. (2016) also take into account macroeconomic conditions. The role of regional policies as determinants of growth has also been investigated. As known, regional policy is designed to promote convergence, increase regional competitiveness and reinforce the attractiveness of lagging regions, with the ultimate goal to strengthen the economic and social cohesion of the European Union (Bachtler et al., 2016, 2019). The empirical evidence on its role (i.e., through European development funds) in fostering growth and reducing regional disparities is mixed, though most of the studies tend to suggest that structural funds have helped the regional convergence process (Aiello & Pupo, 2012; Cappelen et al., 2003; Ederveen et al., 2003; Furceri et al., 2022). Recently, Di Caro and Fratesi (2022) estimated the impacts of cohesion policy on regional economic growth in EU regions, calculating sectoral specific effects in relation to the assistance received. They analyse the efficacy of structural funds depending on the sectoral endowment and productivity in the regions that are beneficiaries of the cohesion policy.

However, the regional growth and resilience literature has rarely considered the peculiarities of insular regions. Growth patterns in these regions are often very different from those in mainland areas (Deidda, 2016). The obstacles to growth in island regions can be divided into several categories: small size, isolation and remoteness, environmental vulnerability, and specific socio-economic factors (Briguglio, 1995; Licio & Pinna, 2021). Indeed, most of the goods and services consumed on islands cannot be locally produced in adequate quality and quantity. Islands have limited natural resources, and imports must satisfy most needs (Sharpley & Ussi, 2014). The existence of a small market for domestic products, as well as the dependence on foreign trade, leads to the impossibility of exploiting economies of scale. Furthermore, impediments to trade are also enhanced by high transport costs.

Other studies point out additional structural weaknesses in islands such as:

1. they are affected by structural problems and handicaps due to their insularity and geographical isolation (Wade, 2014);
2. they are vulnerable to external economic, social, land environmental factors, playing a critical role in the economic life of local communities (Fairbairn, 2007);
3. they have a fragile ecosystem often characterized by a single industry based on tourism and affected by seasonality (Cohen, 2020);
4. they have diffuse micro-enterprises with less equity capital, reduced profit margins, and limited competitiveness (Lloyd & Black, 1993);
5. they have a large informal economy, often ignored and not quantified in the official national statistics (Pounder & Gopal, 2021); and
6. their population has a low income *per capita*, often under the poverty threshold (Armstrong & Read, 2021; Croes & Vanegas, 2008).

In this context, the development of the tourism industry seems to be a primary condition for economic growth to overcome the structural constraints imposed by the islands' small size and physical needs. In addition to traditional drivers, tourism can play an essential role in driving growth and creating economic opportunities.

The tourism potential for islands' economic growth is well documented in the international literature (Bojanic & Lo, 2016; Couto et al., 2017; Croes, 2011; Croes & Rivera, 2010; Deidda, 2016; Ridderstaat et al., 2016). Many island growth strategies are often based on tourism, and some aspects could be comparable to other territorial contexts (Durbarry, 2004; Lanza & Pigliaru, 2000; Maloney & Montes Rojas, 2005). In contrast, there is a gap in the literature on the role of territorial conditions in affecting the relationship between the tourism industry and regional growth. This highlights the importance of also investigating territorial aspects in determining development and growth dynamics in the case of island regions.

Previous studies on the relationship between tourism and economic growth have often overlooked explicit territorial determinants for insular economies and their relative importance with respect to mainland territories. Some researchers have already paid attention to islands growth at the regional level (Mazzola et al., 2019), but it still remains a limitation in the literature regarding the possible differences between island and mainland regions. Other papers concentrate on single case studies or specific countries like Greece (which has more than 650 islands), analysing development indicators but not dividing the mainland from insular regions (Karkazis, 2021).

Islands often have a high level of sectoral specialization (Carlsen & Butler, 2011). The concentration on tourism is evident in most small and medium-sized islands (for example, in the Mediterranean), which influences the pattern of local economic growth (Sharpley, 2015). At the regional level, particularly for peripheral regions, the centrality of tourism is widely demonstrated (Paci & Marrocu, 2014). There is a wide range of regional scientific literature on the contribution of tourism to peripheral regions (Armstrong et al., 2012; Armstrong & Read, 2021; Wanhill, 1997). The distance from the principal hubs and the geographical isolation is often verified for peripheral islands and regions, with significant differences in inequality and divergent development patterns (Marrero et al., 2016). The European Commission's regional policy granted the peripheral regions with specific regional policies considering the tourism role in local and economic development (European Commission, 2018).

However, island economies may have additional peculiar features with respect to peripheral ones. This can be true from the theoretical point of view because some tourism and territorial growth determinants can display different intensity in islands. For instance, environmental quality in islands may be a specific concern since these economies may experience an unsustainable amount of tourist flows also concentrated in specific months, thus giving rise to the phenomenon of over-tourism. Transport infrastructure requirements in islands can be quite specific given the need of greater intermodality and the higher specific importance of particular means of transportation. Furthermore, determining the critical variables for islands' development can be important in order to offer new directions in EU insular policies. If the insular condition is critical, the policy should envisage different intervention instruments between island economies and mainland regions. Following non place-specific policies and ignoring islands' peculiarity may increase regional disparities. Specific adjustment measures should aim to "reduce development level disparities between different regions and delays in the most disadvantaged regions" (CESE, 2005: p. 25). Moreover, the tourism industry for islands is relevant and not always responsible for stable and sustainable growth due to economic and territorial conditions and limitations.

Starting from these considerations, our research hypothesis is that islands' growth determinants may differ, in type and intensity, from those in mainland regions and even from those in other regions with similar characteristics (i.e., coastal areas).

Consequently, the paper aims to cover this gap by analysing the effects of the different determinants of islands' performance in comparison with non-insular economies, with particular reference to the role of the tourism industry but also considering more general territorial determinants. The proposed model considers GDP *per capita* and employment rates of change as independent variables. The model also includes as regressors (explanatory variables) the local characteristics of the tourism industry in islands and mainland regions, considering other economic and territorial factors deemed relevant to the literature on growth. The aim is to evaluate the effect of such variables within a single model in which the specificity of the islands' context is adequately highlighted. The paper focuses on both insular and non-insular regions belonging to selected European countries. We focus on Mediterranean islands and compare their growth pattern with mainland regions belonging to the same set of European countries. After

summarizing the relevant literature, the paper describes the data used, and the methodology applied. Results obtained from the econometric estimation of the model are then presented, and specific policy implications for insular regions complete the analysis.

2 | LITERATURE BACKGROUND

Many studies have addressed the analysis of islands' economies but mainly concentrating on specific factors. Moreover, although considering tourism as a specific driver of growth, none of them has considered the growth pattern in insular regions by comparing it with that of non-insular regions. For example, the role of tourism demand and supply in influencing economic growth has been analysed in detail for small islands also considering the tourism industry's characteristics. Very often however, studies focus primarily on the so-called "Small Island Developing States" (SIDS) and the related literature on the determinants of growth emphasizes macroeconomic rather than regional determinants. Examples include Seetanah et al. (2009) and Seetanah (2011). They analyse the contribution of financial development to promote economic growth in 20 island nations and consider trade openness, economic freedom and tourism demand among the determinants of islands' economic growth. Congdon Fors (2014) focuses on the importance of institutional quality in affecting islands' performances. She finds that the relationship between island status and institutional quality is significantly positive. Moreover, Schubert et al. (2011) study the relationship between the development of the tourism industry and economic growth, finding that an increase in tourism demand leads to an increase in economic growth, which is a clear evidence of the so-called tourism-led growth hypothesis (Durbarry, 2004).

2.1 | Determinants of regional growth in island and mainland regions

Although the role of tourism demand and expenditure in influencing islands' economic growth (at the regional level) has been analysed (see for example, Psycharis et al., 2014 for Greek regions), less attention has been paid to other characteristics of the tourism industry and other territorial determinants within a unified context. Indeed, in the case of islands, territorial features tend to be essential to induce economic growth within the limits of the principles of sustainable development (Laws & Pan, 2004). These characteristics refer to the concept of territorial capital, defined as "the set of localised assets that constitute the competitive potential of a given territory" (Camagni & Capello, 2010). While the importance of the territorial capital has mainly been analysed at regional and provincial levels (see Martin & Gardiner, 2019 for a broad review), the relative importance of such endowments in regions with different characteristics (i.e., island vs mainland regions) has been often overlooked.

One of the first attempts to consider both territorial factors and tourism indicators within the same framework is the study by Romão and Nijkamp (2018). It finds a positive impact on growth from gross value added by tourism. At the same time, it detects no relevant impacts from tourism demand and a negative correlation with the endowment in natural resources. Instead, Mazzola et al. (2019) first analysed a similar issue specifically for selected Mediterranean islands by evaluating the relative importance of tourism versus other growth factors by considering the relative role played by the 2008 crisis period. Their findings support the tourism-led growth hypothesis for the selected insular economies, with tourism demand and accessibility playing a more significant role than supply. From a different perspective, Chingarande and Saayman (2018) analyse a set of critical territorial success factors in several countries, and their findings also support the tourism-led economic growth hypothesis.

Nonetheless, the analysis in a unified context of the different determinants of islands' performances compared to non-insular economies, with particular reference to the tourism industry, is still missing in the literature. Based on these arguments, we identify the main variables that may affect growth and must be assessed in island territories and other non-insular regions. As for the traditional engines of growth we include physical and human capitals and

agglomeration economies. To capture the local characteristics of the tourism industry as well as the factors related to tourism and environmental sustainability, we refer to tourism demand and supply, accessibility, tourism seasonality and air pollution.

Starting from the traditional drivers, the analyses of the effects of private fixed capital endowment on economic growth date back to the seminal papers on growth models (Solow, 1956). The limited evidence for islands (i.e., Seetanah, 2011; Seetanah et al., 2009) reinforces the traditional view ascribing positive effects of private investments on economic growth, though with declining importance in periods of economic crises (Mazzola et al., 2019).

Human capital is a further relevant factor, and its positive effects on economic growth have been widely debated at a regional level. Previous studies have claimed that a more qualified workforce can create and adopt new technologies and, by doing so, can promote economic growth (Crescenzi et al., 2016; Mazzola et al., 2018). Human capital is a key factor also in island contexts, and labour market actions to train and maintain a high-skilled workforce become strategic for such economies (Caparrós Alcaráz, 2018). Tugores (2012) shows that the percentage of employees with a university career is strongly correlated to better performance in tourism. Therefore, policies that encourage the adoption of new technologies and investment in human capital positively affect the competitiveness of regions heavily reliant on tourism. On the other hand, it is also true that excessively concentrated human capital in the tourism sector can have harmful effects since the shift of resources to tourism-related industries can undermine productivity gains in different sectors, which require an equally educated and skilled workforce (Kožić, 2019).

In addition to physical and human capital stocks, agglomeration economies are considered an important engine of economic growth and development. Indeed, agglomeration economies and growth have been seen as mutually self-reinforcing processes (Duranton & Puga, 2014). They arise when people and firms are located in industrial clusters and cities. This generally implies higher population or employment density, savings in transport costs, and increased knowledge spillovers that promote a self-reinforcing accumulation in the local endowment of knowledge. Compared with non-island economies, islands have a higher population density and a similar percentage of the population living in non-urban areas (Bojanic & Lo, 2016). Although population density may be beneficial for agglomeration economies, it can also increase congestion in small economies like islands and is likely to drive the phenomenon of over-tourism.

2.2 | Sustainability and tourism determinants

A growing literature has shown that tourism has become a significant driver of regional economic growth in Europe (i.e., Paci & Marrocu, 2014; Romão & Nijkamp, 2018; Sequeira & Maçãs Nunes, 2008) and especially for limited territories such as islands (Mazzola et al., 2019). However, some studies draw attention to the risk that excessive tourist pressure (that is the relationship between tourists and residents on the territory) may raise sustainability concerns. Saenz-de-Miera and Rosselló (2012) show that an increasing number of tourists are associated with higher traffic volumes. For this purpose, since tourist pressure affects the different development indicators, it requires more efficient planning. Simancas Cruz and Peñarrubia Zaragoza (2019), in this sense, suggest considering tourist pressure indicators to determine the optimal density of accommodation. From a different perspective, Chao et al. (2006) draw attention to the risk of islands overusing natural resources in the short term without considering the effects of tourist pressure in the long run. Leka et al. (2022) provide a load-bearing index of tourism focused primarily on environmental dimensions, and highlight the need for specific tools to guide decision-making. Sanromualdo-Collado et al. (2021) demonstrate the existence of relationships between tourism management decisions and ecological impacts on the territories with consequences on sustainability and development. Stavros et al. (2016) recall that environmental impacts are related to environmental and social wealth.

Environmental sustainability can indeed be crucial in sustaining or containing economic growth and cannot be neglected when comparing patterns of growth of island and mainland regions. The growing attention to environmental issues is also proven by the inclusion of indicators such as air pollution in growth models trying to evaluate its

economic costs. For example, OECD (2019) shows that higher air pollution translates into significant reductions in real GDP *per capita* at the NUTS 3 level (a 1 μg/m3 increase in fine particulates concentration causes a 0.8% reduction in real GDP *per capita* that same year). Indeed, theoretically, air pollution can affect economic output since it leads to lower labour and agricultural productivity and higher health expenditures (OECD, 2021) as well as damaging cultural and historical monuments and reducing the ability of ecosystems to perform functions which societies need, requiring money in remediation or restoration (UNECE, 2021). Therefore, especially in islands, the deterioration of air quality, also driven by unsustainable tourism, may represent a possible threat to the development of such economies in the long run. There is already some evidence in this respect. Azam et al. (2018) notice that tourism could significantly affect environmental pollution. As a result, tourism will stimulate short-term economic growth, jeopardizing long-run development at the same time. Silva et al. (2020) recognize the need to reduce overall tourism in some islands to contain pollution, which is also related to the type of transportation used. Saenz-de-Miera and Rosselló (2014) confirm that the daily stock of tourists is a significant predictor of air pollution concentration levels and that air pollution values should be used as explanatory variables in development models. Brtnický et al. (2020) analyse soil contamination in the islands determined by tourist flows by stressing that, at high values, the negative impact on local ecosystems, the quality of life and, eventually, regional development increases significantly.

A relevant aspect in driving growth through the tourist sector is also the temporal concentration of tourism demand. Seasonality of tourism demand is generally considered one of the tourism sector's major challenges, especially in coastal territories and islands. Arrivals that are not distributed uniformly over the year, but concentrated in a specific length of time, maybe insignificant or even detrimental to sustainable economic growth. The economic effects of high tourism seasonality arise from the inefficient use of resources and infrastructure in off-peak periods implying a loss of profits. On the other hand, periods of high concentration of tourists can affect service quality, jeopardizing the positive long-term relationship with tourists. High tourist pressure concentrated in specific seasons may also generate unfavourable social effects, including congestion generated by population increases, significant increases in the price of goods and services and the abovementioned negative effects on the environment. Recently, such findings have been widely discussed in the literature related to islands' growth. Agius and Briguglio (2021) show the causes and impacts of seasonality and the policies to achieve financial, social and environmental benefits by improving the well-being of local communities. Tsiotas et al. (2020), in their study on Cyprus, follow a quantitative approach by defining geographical seasonality indicators to define sub-regional development policies. In addition, Martín Martín et al. (2018) point out that houses owned for rent need to be considered because they can affect seasonality values by increasing the tourist pressure on territories. Ruggieri (2015) shows that seasonality is correlated to planning and development decisions. Indeed, island policy-makers develop plans and programmes for winter tourism to mitigate the concentration of tourists during the summer season.

In addition to the characteristics of tourism demand, we need to consider the supply structure (i.e., accommodation facilities, number of beds) and accessibility conditions. Tourism supply pertains to appropriate forms of accommodation, a variety of food service provisioning, entertainment and leisure activities. Kang et al. (2014) claim that tourism significantly impacts regional development if the enhanced demand from visitors is counterbalanced by an expanded supply of tourism infrastructure and transport access to and within tourism destinations. Carrying capacity (i.e., beds) and the presence of high-quality accommodation structures (four stars or more) were also considered critical determinants affecting tourist flows and expenditures in Italian provinces in 2012 (Pompili et al., 2019). The peculiar characteristics of the insular context attribute a strategic role to the local tourist industry's structure and articulation. The presence of accommodation facilities, number of beds, and average size by structure seem to affect the growth processes in islands (Ruggieri & Calò, 2022). Therefore, the analysis of the impact of tourism on regional development requires a closer look at what is offered within tourist destinations and the adequacy of the overall tourism infrastructure (Jere Jakulin, 2017; Sofronov, 2018).

Regarding the transportation system and the accessibility of the territories, the international literature shows a wide range of studies positively correlating the number of flights with regional development. Some studies connect the motivation to visit a place to the improvement of air transport connections to the destination (Bieger &

Wittmer, 2006). Pratt (2015) also demonstrates the positive impact on economic activity through the crucial role played by the transportation system. In a study of 39 islands, McElroy and Parry (2010) highlight the positive link between local tourism and airport infrastructure development through the quality and diversity of local tourism and connection services. The transportation system encourages the growth of tourism demand if there are efficient airport infrastructures. (Bieger & Wittmer, 2006). Other recent studies show that air connections affect tourism demand, particularly for island destinations, as long as they possess adequate tourism infrastructures (Mazzola et al., 2022).

Based on these arguments, the following section introduces the variables used as a proxy of the different determinants of growth discussed in this section and the empirical methodology adopted to investigate whether the relationship between the different strategic territorial and tourism explanatory variables and regional performances may depend on the condition of the insularity of some regions.

3 | DATA AND METHODOLOGY

Our empirical analysis is based on 74 insular and non-insular NUTS 2 regions belonging to seven European countries (Cyprus, Greece, Spain, France, Italy, Malta, and Portugal) and is carried out from 2008 to 2019 based on a 3 year panel growth model (2008–10, 2011–13, 2014–16, 2017–19). Table A1 in the Appendix shows the list of the regions included in the analysis.

Our primary data sources are Eurostat and the European Commission ARDECO databases. These datasets provide data on GDP *per capita*, employment, a set of explanatory variables capturing different strategic territorial elements and local characteristics of the tourism industry. The database is integrated with the information provided by national sources and the OECD database for the tourism and environmental sustainability variables.[1] Table A2 in the Appendix shows some descriptive statistics for the operational variables included in the analysis.

To analyse the effects of the different determinants on regional performance, a balanced panel equation was estimated, linking the performance variable to a vector of explanatory variables capturing both dimensions of the territorial capital as well as local characteristics of the tourism industry, which are believed to affect the economic performance of islands and mainland regions. The model is a fixed-effect specification:

$$y_{i,t} = \alpha_i + \beta_i \boldsymbol{X}_{i,t0} + \varepsilon_{i,t}, \quad (1)$$

$i = 1, \ldots, 74$; $t = 1, \ldots 4$,

where $y_{i,t}$ is, in turn, the average annual percentage change in GDP *per capita* and employment over a three year period; α_i are regional fixed effects and $\boldsymbol{X}_{i,t0}$ is the vector of explanatory variables. Standard errors are clustered at the regional level.

The estimation is based on a 3 year panel growth model (2008–10, 2011–13, 2014–16, 2017–19) for both GDP and employment. Thus, the outcome variable is the average annual percentage change over the 3 years of each subperiod. The vector of explanatory variables $\boldsymbol{X}_{i,t0}$ is taken at the beginning of each sub-period to address potential endogeneity issues. This procedure is standard in the empirical growth literature (Durlauf et al., 2009; Islam, 1995; Paci & Marrocu, 2014; Temple, 1999) and allow us to mitigate the influence of business cycle fluctuations, which would be reflected in year-on-year growth rates.

As key territorial factors, we considered the stock of physical capital as a share of the total gross value added (*K*),[2] the share of the population aged 25–64 with higher educational attainment (*HK*), the ratio of population to the area (population density) as a proxy of agglomeration (*AGGL*).

[1]The integration mainly concerned the monthly overnights to compute the tourism seasonality index and the air pollution indicator.

[2]The stock of physical capital is obtained from gross-fixed investments by means of the perpetual inventory method with a depreciation coefficient of 0.05 over the period 2008–2019 (see Bosworth & Collins, 2003 for further details on this approach).

Moreover, to capture the local characteristics of the tourism industry as well as the factors related to tourism and environmental sustainability, we included the ratio of overnights to the population as a proxy of tourism demand (*TOURDEM*), the ratio of the number of available beds to the number of establishments as a proxy of tourism supply (*TOURSUP*), the number of aircraft movements (in log) as a proxy of accessibility (*ACCESS*), the ratio of max/min values of monthly overnights to capture tourism seasonality (*SEASONALITY*), and the average level in fine particulate matter (PM2.5) in micrograms per cubic metre ($\mu g/m^3$) experienced by the population as a proxy of air pollution (*AIR POLLUTION*). Therefore, the model takes the following functional forms:

$$\Delta y_{i,t} = \beta_{0,i} + \beta_1 K_{i,t0} + \beta_2 HK_{i,t0} + \beta_3 AGGL_{i,t0} + \beta_4 TOURDEM_{i,t0} + \beta_5 TOURSUP_{i,t0} + \beta_6 ACCESS_{i,t0} + \beta_7 SEASONALITY_{i,t0} + \beta_8 AIRPOLLUTION_{i,t0} + \varepsilon_{i,t}, \quad (2)$$

$i = 1, \ldots, 74$; $t = 1, \ldots 4$.

4 | RESULTS

This section describes the main findings of the paper. First, we present the results of the baseline model for all regions. Then, we provide evidence of islands' specificity by analysing the effects of the different determinants of regional performance in the islands in comparison with non-insular economies, with particular reference to the tourism industry. We compare islands with all mainland regions in the same countries and we carry out a specific estimation comparing insular and coastal regions. Finally, we present a wide range of robustness checks that support our main findings.

4.1 | Baseline

Table 1 summarizes the baseline results concerning the estimation of the model for GDP *per capita* and employment growth of all the 74 NUTS 2 regions in 2008–2019. Column (1) shows that the coefficient of tourism demand is

TABLE 1 Baseline

	(1) GDP *per capita*	(2) Employment
Stock of physical capital/total gross value added	1.107** (1.998)	−0.221* (−1.720)
Share of the population aged 25–64 with higher educational attainment (ISCED level 5–8)	0.289*** (3.506)	0.175** (2.502)
Population/area	−0.011 (−1.625)	0.003 (0.599)
Overnights/population	0.160** (2.082)	0.142** (2.212)
Number of beds/number of establishments	0.001 (0.070)	0.000 (0.029)
Air movements (log)	0.858** (2.288)	0.056 (0.218)
Air Pollution in PM2.5	−0.473*** (−5.475)	−0.314*** (−4.275)
Seasonality, overnights—max/min monthly overnights	−0.007 (−0.293)	−0.044** (−2.040)
Observations	273	273
R-squared	0.657	0.466

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

significant at a 5% level for GDP *per capita* growth, in line with the tourism-led growth hypothesis (Balaguer & Cantavella-Jorda, 2002; Dritsakis, 2004; Mazzola et al., 2019; Paci & Marrocu, 2014; Schubert et al., 2011). The tourism supply indicator coefficient (average number of beds in hotels) is less relevant and not significant at a 10% level. The presence of a supply structure characterized by a restricted number of large establishments (with a relatively large number of beds), opposite to one characterized by a large number of relatively small establishments, managed locally and spread over the region, seems not beneficial for economic growth. The rising demand for experiential tourism and the related desire to interact with the territory may help to explain the declining importance of large structures in stimulating economic growth. Moreover, the development model based on large structures is often characterized by large inflows of foreign direct investments (FDIs) from global hotel companies that are interested in creating international tourism centres (many islands, such as Cyprus, Malta, Ibiza, and Crete, have experienced this development model). On the one hand, higher FDI intensity points out the attractiveness of each region (in this case of its tourism sector) and, in turn, may promote improvements in technological endowment, productivity and general performances (Monastiriotis & Jordaan, 2010; Smarzynska, 2004), which may results in higher quality, though standardized, supply. On the other hand, by definition, multinational corporations are less tied to the territory, tend to outsource production of certain goods to cheaper labour-cost economies and, due to the free movement of capital, they are more prone to sudden disinvestment when market conditions become more favourable in other parts of the world.

In line with Pratt (2015), accessibility, as measured by aircraft flights (in log), also appears to impact positively regional growth in the period under analysis. Other economic and territorial growth factors (such as physical and human capital) also play an important role (Mazzola & Pizzuto, 2020; Seetanah, 2011), while agglomeration does seem to not provide a significant effect in stimulating economic growth. Interestingly, in line with OECD (2019), the environmental sustainability variable seems to affect the economic growth of the regions negatively, while higher tourism seasonality is not significantly related to economic growth (Agius & Briguglio, 2021).

In column (2), results are replicated using employment growth as a dependent variable. It is acknowledged (Fingleton et al., 2012) that employment growth may differ considerably from GDP growth in terms of synchronization intensity of the effects. In our case, the results are very similar and broadly unchanged with respect to those obtained using the growth in GDP *per capita*. The main exceptions are represented by the proxy of accessibility, that turns out to be not significant, the stock of physical capital, which becomes negatively associated with employment growth, and, more critical, tourism seasonality, which is negatively and significantly related to average employment growth in the medium run.

4.2 | Islands vs mainland regions

Our main argument in this paper is that the relationship between the different strategic territorial and tourism explanatory variables and regional performances may depend on the condition of the insularity of some regions. To test this hypothesis, we augmented Equation (1) and estimated the following model:

$$y_{i,t} = \alpha_i + D_i\beta_i \mathbf{X}_{i,t0} + (1 - D_i)\beta_i \mathbf{X}_{i,t0} + \varepsilon_{i,t}, \quad (3)$$

i = 1, ...,74; t = 1, ... 4;

where D_i is a dummy variable that takes value one for island regions and zero in the case of mainland regions.

The results shown in Tables 2 and 3 suggest that the relative importance of some territorial and tourism factors differs considerably between islands and mainland regions. Specifically, the physical capital stock as a share of total GVA seems most relevant for mainland regions. This result may partly depend on the industrial structure of islands and their relative small size and the likely larger negative effects played by the economic crisis of 2008 on the importance of such factors for insular economies (Mazzola et al., 2019). In contrast, the positive effects of human capital

TABLE 2 Islands vs non-islands—GDP *per capita*

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.224*** (2.760)		0.285*** (3.442)	0.281*** (3.494)
Population/area	−0.009** (−2.107)	−0.012 (−1.233)		−0.010 (−1.279)
Overnights/population	0.181** (2.223)	0.153* (1.872)	0.162** (2.103)	
Number of beds/number of establishments	0.004 (0.369)	−0.000 (−0.035)	0.001 (0.110)	0.006 (0.515)
Air movements (log)	0.874** (2.457)	0.849** (2.238)	0.822** (2.171)	0.820** (2.217)
Air Pollution in PM2.5	−0.458*** (−5.525)	−0.486*** (−6.294)	−0.478*** (−5.580)	−0.466*** (−5.696)
Seasonality, overnights—max/min monthly overnights	0.004 (0.150)	−0.009 (−0.360)	−0.007 (−0.300)	0.010 (0.333)
Stock of physical capital/total gross value added		1.138** (2.112)	1.106* (1.965)	1.093* (1.824)
Stock of physical capital/total gross value added—islands	0.134 (0.561)			
Stock of physical capital/total gross value added—Non-islands	2.829*** (6.657)			
Share of the pop. aged 25–64 with higher educ. attainment—islands		0.319* (1.783)		
Share of the pop. aged 25–64 with higher educ. attainment—non-islands		0.270*** (3.795)		
Population/area—islands			−0.006 (−0.997)	
Population/area—non-islands			−0.029 (−1.482)	
Overnights/population—islands (overtourism per le isole)				0.113 (1.297)
Overnights/population—non-islands				0.336*** (2.994)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				
Seasonality, overnights—max/min monthly overnights—non-islands				
Observations	273	273	273	273
R-squared	0.696	0.657	0.658	0.661

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 2 (Continued)

	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.287*** (3.468)	0.311*** (5.001)	0.280*** (3.479)	0.271*** (3.232)
Population/area	−0.010 (−1.013)	−0.024*** (−3.141)	−0.015* (−1.767)	−0.010 (−1.602)
Overnights/population	0.160** (2.133)	0.123 (1.569)	0.131 (1.634)	0.181** (2.219)
Number of beds/number of establishments		−0.001 (−0.078)	−0.001 (−0.087)	0.001 (0.116)
Air movements (log)	0.834** (2.315)		0.835** (2.239)	0.827** (2.216)
Air Pollution in PM2.5	−0.472*** (−5.515)	−0.436*** (−6.004)		−0.479*** (−5.574)
Seasonality, overnights—max/min monthly overnights	−0.002 (−0.061)	−0.017 (−0.642)	−0.011 (−0.453)	
Stock of physical capital/total gross value added	1.085** (2.090)	1.359** (2.427)	1.100* (1.989)	1.053* (1.946)
Stock of physical capital/total gross value added—islands				
Stock of physical capital/total gross value added—Non-islands				
Share of the pop. aged 25–64 with higher educ. attainment—islands				
Share of the pop. aged 25–64 with higher educ. attainment—non-islands				
Population/area—islands				
Population/area—non-islands				
Overnights/population—islands (overtourism per le isole)				
Overnights/population—non-islands				
Number of beds/number of establishments—islands	0.009 (0.270)			
Number of beds/number of establishments—non-islands	−0.001 (−0.114)			
Air movements (log)—islands		7.160*** (4.112)		
Air movements (log)—non-islands		0.674* (1.834)		
Air Pollution in PM2.5—islands			−0.795*** (−2.811)	
Air Pollution in PM2.5—non-islands			−0.468*** (−5.100)	
Seasonality, overnights—max/min monthly overnights—islands				−0.013 (−0.514)
Seasonality, overnights—max/min monthly overnights—non-islands				0.289 (1.414)
Observations	273	273	273	273
R-squared	0.657	0.674	0.660	0.663

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 3 Islands vs non-islands Employment

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.172** (2.370)		0.168** (2.423)	0.166** (2.556)
Population/area	0.003 (0.635)	0.002 (0.326)		0.004 (0.813)
Overnights/population	0.143** (2.208)	0.139* (1.979)	0.145** (2.256)	
Number of beds/number of establishments	0.000 (0.045)	−0.000 (−0.024)	0.001 (0.102)	0.007 (0.636)
Air movements (log)	0.057 (0.220)	0.052 (0.202)	−0.006 (−0.025)	0.011 (0.041)
Air Pollution in PM2.5	−0.314*** (−4.292)	−0.321*** (−4.564)	−0.323*** (−4.645)	−0.306*** (−4.430)
Seasonality, overnights—max/min monthly overnights	−0.043** (−1.995)	−0.045** (−2.155)	−0.044** (−2.065)	−0.023 (−1.036)
Stock of physical capital/total gross value added		−0.205 (−1.336)	−0.222* (−1.705)	−0.237* (−1.742)
Stock of physical capital/total gross value added—islands	−0.272** (−2.175)			
Stock of physical capital/total gross value added—non-islands	−0.130 (−0.436)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.190 (1.452)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.166** (2.443)		
Population/area—islands			0.010** (2.273)	
Population/area—non-islands			−0.028 (−1.569)	
Overnights/population—islands				0.086 (1.409)
Overnights/population—non-islands				0.354*** (4.931)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				
Seasonality, overnights—max/min monthly overnights—non-islands				
Observations	273	273	273	273
R-squared	0.466	0.467	0.467	0.475

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 3 (Continued)

	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.175** (2.504)	0.187*** (2.922)	0.167** (2.424)	0.166** (2.330)
Population/area	0.003 (0.512)	−0.004 (−0.567)	−0.001 (−0.248)	0.003 (0.694)
Overnights/population	0.142** (2.207)	0.123* (1.790)	0.116 (1.561)	0.153** (2.242)
Number of beds/number of establishments		−0.000 (−0.049)	−0.001 (−0.118)	0.000 (0.052)
Air movements (log)	0.055 (0.220)		0.035 (0.141)	0.040 (0.153)
Air Pollution in PM2.5	−0.314*** (−4.266)	−0.295*** (−4.380)		−0.318*** (−4.328)
Seasonality, overnights—max/min monthly overnights	−0.044* (−1.686)	−0.049** (−2.132)	−0.047** (−2.265)	
Stock of physical capital/total gross value added	−0.222 (−1.576)	−0.089 (−0.525)	−0.227* (−1.745)	−0.249* (−1.925)
Stock of physical capital/total gross value added—islands				
Stock of physical capital/total gross value added—non-islands				
Share of the pop. Aged 25–64 with higher educ. attainment—islands				
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands				
Population/area—islands				
Population/area—non-islands				
Overnights/population—islands				
Overnights/population—non-islands				
Number of beds/number of establishments—islands	0.001 (0.035)			
Number of beds/number of establishments—non-islands	0.000 (0.019)			
Air movements (log)—islands		3.352 (1.273)		
Air movements (log)—non-islands		−0.040 (−0.168)		
Air Pollution in PM2.5—islands			−0.615** (−2.493)	
Air Pollution in PM2.5—non-islands			−0.310*** (−4.040)	
Seasonality, overnights—max/min monthly overnights—islands				−0.047** (−2.079)
Seasonality, overnights—max/min monthly overnights—non-islands				0.112 (1.237)
Observations	273	273	273	273
R-squared	0.480	0.466	0.476	0.472

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

on growth are slightly larger for insular economies, while agglomeration economies appear less important and not significant at a 10% level for mainland and island regions.

Moving to the local characteristics of the tourism industry and factors related to tourism and environmental sustainability, Table 2 shows that, as expected, air movements are far more critical for islands. The transportation system, including the frequency of air connections (Mazzola et al., 2022), has a crucial role in fostering the development of islands (see also Pratt, 2015, on the effects for SIDS). In contrast, our proxy of overall tourism demand appears to be significantly associated only with the economic growth of mainland regions. This finding may be related to the fact that the proxy used (the ratio overnights/population) likely also captures tourist pressure that, as discussed in previous sections, may interfere with the sustainable economic growth of small-sized economies such as islands. Indeed, when using a simpler proxy of tourism demand like the number of arrivals (log of) the coefficients turn out positive and statistically significant for both islands and mainland regions (Table A3 in the Appendix). Therefore, it is possible to conclude that the tourism demand *per se* is important for the economic growth of all regions, while higher tourism pressure may generate ambiguous effects related to over-tourism especially in islands. Finally, as in the baseline, the tourism supply indicator (average number of beds in hotels) appears less important in explaining the regional economic growth of both island and mainland regions as the associated coefficient is not significant at a 10% level.

On the contrary, air pollution seems more detrimental to the islands' economic growth since the associated coefficient is about two times larger than mainland regions. Finally, tourism seasonality is negatively related only to islands' GDP growth, though the coefficient is statistically not different from zero. Overall, the latest findings support the hypothesis indicating that sustainability is a key challenge for islands. The deterioration of air quality has a direct and larger negative effect on the economic growth of islands and, at the same time, risks jeopardizing future tourist flows since it affects cultural and historical heritage and represents a threat to ecosystems (UNECE, 2021).

Moreover, tourist flows concentrated in some months of the year appear not to be conducive to sustainable economic growth, especially for insular economies, as they may deteriorate the environment (Azam et al., 2018). Higher seasonality can also cause de-contextualization of heritage, disconnection with the local community, congestion, discomfort and commodification, the so-called Disneyfication of cultural heritage (see for example Hampton, 2005; Rodzi et al., 2013).[3] All these effects represent additional threats to the development of such economies in the long run.

The results are mostly confirmed when looking at employment growth. Some notable differences are related to agglomeration and tourism seasonality. The former turns out to be positively and significantly associated with islands' employment growth. This indicates that higher population pressure seems beneficial to islands' employment growth. We may conclude that for islands' employment dynamics, the advantages of urbanization economies may counterbalance the risk of congestion effects. The pollution variable still shows a significant and more negative coefficient than for mainland regions. Tourism seasonality is negatively and significantly associated with islands' employment growth, further confirming that tourist flows concentrated in some months of the year are not conducive to sustainable economic growth for insular economies.

4.3 | Islands vs coastal mainland regions

One possible concern with the approach presented in subsection 4.2 could be related to the inclusion in the sample of some inland regions that are generally characterized by a different type of tourism with respect to islands and coastal mainland regions. In order to further detect islands' specificities and make stronger our point we reiterated our analysis excluding inland regions from the sample, thus considering islands vs coastal mainland

[3]For a discussion on the importance of World Heritage Sites, see also Panzera et al. (2021).

TABLE 4 Islands vs non-island coastal regions—GDP *per capita*

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.217** (2.261)		0.276*** (2.760)	0.270*** (2.894)
Population/area	−0.008 (−1.550)	−0.010 (−1.048)		−0.009 (−1.367)
Overnights/population	0.149* (1.841)	0.124 (1.596)	0.125* (1.693)	
Number of beds/number of establishments	0.009 (0.898)	0.005 (0.485)	0.006 (0.553)	0.010 (0.852)
Air movements (log)	1.273** (2.667)	1.238** (2.330)	1.248** (2.368)	1.198** (2.333)
Air Pollution in PM2.5	−0.629*** (−6.635)	−0.659*** (−7.308)	−0.654*** (−6.390)	−0.643*** (−6.678)
Seasonality, overnights—max/min monthly overnights	0.008 (0.324)	−0.001 (−0.037)	−0.000 (−0.015)	0.014 (0.489)
Stock of physical capital/total gross value added		0.941* (1.746)	0.935* (1.696)	0.924 (1.556)
Stock of physical capital/total gross value added—islands	0.127 (0.449)			
Stock of physical capital/total gross value added—non-islands	2.636*** (6.283)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.282* (1.702)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.268*** (3.075)		
Population/area—islands			−0.010 (−1.626)	
Population/area—non-islands			−0.008 (−0.432)	
Overnights/population—islands (overtourism per le isole)				0.088 (1.070)
Overnights/population—non-islands				0.281*** (2.769)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				
Seasonality, overnights—max/min monthly overnights—non-islands				
Observations	202	202	202	202
R-squared	0.756	0.721	0.721	0.725

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 4 (Continued)

	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.273*** (2.828)	0.299*** (4.253)	0.267*** (2.903)	0.263** (2.660)
Population/area	−0.009 (−1.034)	−0.021** (−2.605)	−0.013 (−1.544)	−0.009* (−1.740)
Overnights/population	0.125* (1.753)	0.093 (1.240)	0.109 (1.411)	0.140* (1.787)
Number of beds/number of establishments		0.004 (0.386)	0.004 (0.454)	0.006 (0.560)
Air movements (log)	1.204** (2.480)		1.225** (2.356)	1.181** (2.185)
Air Pollution in PM2.5	−0.654*** (−6.454)	−0.613*** (−7.334)		−0.654*** (−6.457)
Seasonality, overnights—max/min monthly overnights	0.004 (0.126)	−0.009 (−0.350)	−0.003 (−0.115)	
Stock of physical capital/total gross value added	0.913* (1.799)	1.162** (2.066)	0.928* (1.682)	0.897 (1.643)
Stock of physical capital/total gross value added—islands				
Stock of physical capital/total gross value added—non-islands				
Share of the pop. Aged 25–64 with higher educ. attainment—islands				
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands				
Population/area—islands				
Population/area—non-islands				
Overnights/population—islands (overtourism per le isole)				
Overnights/population—non-islands				
Number of beds/number of establishments—islands	0.012 (0.372)			
Number of beds/number of establishments—non-islands	0.004 (0.431)			
Air movements (log)—islands		6.578*** (3.404)		
Air movements (log)—non-islands		0.932* (1.871)		
Air Pollution in PM2.5—islands			−0.844*** (−3.181)	
Air Pollution in PM2.5—non-islands			−0.649*** (−6.018)	
Seasonality, overnights—max/min monthly overnights—islands				−0.004 (−0.171)
Seasonality, overnights—max/min monthly overnights—non-islands				0.196 (0.957)
Observations	202	202	202	202
R-squared	0.721	0.735	0.722	0.724

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 5 Islands vs non-island coastal regions—Employment

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.182** (2.088)		0.169* (1.968)	0.177** (2.232)
Population/area	0.004 (1.289)	0.004 (0.742)		0.006* (1.678)
Overnights/population	0.120* (1.830)	0.120* (1.711)	0.125* (1.885)	
Number of beds/number of establishments	0.003 (0.242)	0.002 (0.239)	0.002 (0.215)	0.008 (0.756)
Air movements (log)	0.439 (1.158)	0.438 (1.159)	0.351 (0.909)	0.381 (0.991)
Air Pollution in PM2.5	−0.368*** (−4.102)	−0.368*** (−4.274)	−0.374*** (−4.369)	−0.354*** (−4.216)
Seasonality, overnights—max/min monthly overnights	−0.040* (−1.828)	−0.040* (−1.908)	−0.040* (−1.851)	−0.022 (−0.985)
Stock of physical capital/total gross value added		−0.236 (−1.584)	−0.246* (−1.851)	−0.248* (−1.754)
Stock of physical capital/total gross value added—islands	−0.249* (−1.978)			
Stock of physical capital/total gross value added—non-islands	−0.208 (−0.645)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.183 (1.453)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.183** (2.058)		
Population/area—islands			0.009* (1.838)	
Population/area—non-islands			−0.022 (−0.933)	
Overnights/population—islands				0.072 (1.176)
Overnights/population—non-islands				0.320*** (4.311)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				
Seasonality, overnights—max/min monthly overnights—non-islands				
Observations	202	202	202	202
R-squared	0.499	0.499	0.504	0.513

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 5 (Continued)

	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.183** (2.155)	0.195** (2.510)	0.173** (2.072)	0.174* (2.004)
Population/area	0.004 (0.899)	−0.002 (−0.283)	0.000 (0.035)	0.004 (1.414)
Overnights/population	0.120* (1.830)	0.104 (1.483)	0.099 (1.329)	0.131* (1.873)
Number of beds/number of establishments		0.002 (0.152)	0.001 (0.096)	0.003 (0.240)
Air movements (log)	0.438 (1.219)		0.417 (1.161)	0.393 (1.007)
Air Pollution in PM2.5	−0.368*** (−4.078)	−0.347*** (−4.152)		−0.369*** (−4.104)
Seasonality, overnights—max/min monthly overnights	−0.040 (−1.556)	−0.045* (−1.926)	−0.043** (−2.037)	
Stock of physical capital/total gross value added	−0.236 (−1.610)	−0.118 (−0.650)	−0.244* (−1.809)	−0.263* (−1.947)
Stock of physical capital/total gross value added—islands				
Stock of physical capital/total gross value added—non-islands				
Share of the pop. Aged 25–64 with higher educ. attainment—islands				
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands				
Population/area—islands				
Population/area—non-islands				
Overnights/population—islands				
Overnights/population—non-islands				
Number of beds/number of establishments—islands	0.002 (0.121)			
Number of beds/number of establishments—non-islands	0.003 (0.224)			
Air movements (log)—islands		3.205 (1.160)		
Air movements (log)—non-islands		0.277 (0.848)		
Air Pollution in PM2.5—islands			−0.615** (−2.602)	
Air Pollution in PM2.5—non-islands			−0.362*** (−3.836)	
Seasonality, overnights—max/min monthly overnights—islands				−0.043* (−1.878)
Seasonality, overnights—max/min monthly overnights—non-islands				0.106 (1.115)
Observations	202	202	202	202
R-squared	0.499	0.508	0.504	0.503

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

regions.[4] Our point is that although both insular and coastal regions are mainly devoted to seaside tourism, the findings presented in subsection 4.2 are specific to island regions regardless we compare them with coastal or non-coastal regions.

The results, presented in Tables 4 and 5, provide support to our hypothesis and confirm our previous results, highlighting the importance of tourism and environmental sustainability especially for islands.

4.4 | Robustness checks

We subjected our results to additional robustness checks. First, since the period of analysis covers the years of the Great Recession, we tried to take into account the specific effects of the crisis in the baseline model by including a dummy for the first recessionary period (2008–2010) interacted with each explanatory variable. Our conclusions are mostly confirmed. When we control for the crisis period (Table 6), all the coefficients for the explanatory variables maintain the statistical significance and the expected sign. In contrast, the coefficients for the interactions are mostly negative and statistically significant. In line with Mazzola et al. (2019), these findings suggest that without altering the main results, the Great Recession has negatively affected the territorial and tourism factors for regional growth, regardless their insular or non-insular nature. The main findings are further confirmed with the use of employment growth as the dependent variable, though all the interacted coefficients appear not statistically significant (Table 7).[5]

Second, since two of the islands in the sample (Malta and Cyprus) are state islands and other two are large islands (Sicily and Sardinia in Italy), we decided to alternatively exclude them from the analysis to check whether their presence may have affected our results.[6] Our main results are confirmed in the restricted samples (Tables A4–A7 in the Appendix), suggesting that the differences from the institutional (administrative) point of view (insular *regions* vs insular *countries*) and in the relative dimension (area) do not affect our main conclusions.

Third, we adopted alternative indicators of the tourism-related factors. Specifically, we considered the ratio arrivals/population as a proxy for tourism demand. In contrast, we used the ratio of the number of beds to total area (in km^2) and the ratio of max/min monthly arrivals (instead of overnights) to capture tourism supply and seasonality, respectively. The results shown in Table A8 in the Appendix suggest the robustness of our main findings and that higher seasonality in tourism, captured in this case by tourism arrivals, may be beneficial for mainland regions but turns out to be not significant for the economic growth of islands.

Finally, we constructed an augmented model to control for variables proxying the sectorial specialization (e.g. share of GVA in industry, non-market services and wholesale and retail trade, transport, accommodation and food service activities). In this way, we took into account the role of the economic structure in influencing growth in islands and mainland regions as stressed by some literature (Belke & Heine, 2006; Martin et al., 2016; Romão et al., 2016). Alternatively, we included such variables in Equation 3, simply adding the industry-mix variable as a control and interacting it with a dummy variable taking the value of one for island regions and zero otherwise. The results shown in Tables 8–10 suggest that controlling for the industrial structure does not alter our main findings, confirming the crucial role of tourism and sustainability factors as key determinants of regional growth for islands. Moreover, such results allow us to provide some additional findings. First, the share of GVA[7] in wholesale and retail trade, transport, accommodation and food service activities is positively related to *per capita* GDP growth for all regions. This is particularly evident for islands since the coefficient for the interaction is larger and statistically

[4]Table A1 in the Appendix indicates the territorial typology of all the regions included in the analysis.

[5]We obtain very similar and broadly unchanged results when we extend the crisis period to 2011–2013 in light of the debt crisis that affected several EU countries. These results are available from the authors upon request.

[6]Following OTIE (2008) and Carlsen and Butler (2011) large islands are identified as insular territories (islands/archipelagos) having an area greater than 10,000 km^2. Sicily and Sardinia have an area of about 25,500 and 24,000 km^2, respectively.

[7]We obtain very similar results when using employment growth as a dependent variable. They are not shown for brevity and are available from the authors upon request.

TABLE 6 The impact of the Great Recession—GDP *per capita*

	(1)	(2)	(3)	(4)
Stock of physical capital/total gross value added	1.186*** (3.966)	0.446 (1.192)	1.080** (2.031)	1.033** (2.203)
Share of the population aged 25–64 with higher educational attainment	0.182** (2.341)	0.104 (1.408)	0.254*** (2.990)	0.223*** (2.926)
Population/area	−0.010 (−1.537)	−0.014* (−1.730)	−0.015* (−1.896)	−0.015** (−2.069)
Overnights/population	0.211** (2.544)	0.194** (2.641)	0.174** (2.222)	0.179** (2.316)
Number of beds/number of establishments	0.009 (1.009)	0.005 (0.657)	0.002 (0.246)	0.003 (0.307)
Air movements (log)	0.820** (2.250)	0.907** (2.576)	0.835** (2.206)	0.836** (2.242)
Air Pollution in PM2.5	−0.476*** (−5.903)	−0.553*** (−6.973)	−0.484*** (−5.702)	−0.510*** (−6.094)
Seasonality, overnights—max/min monthly overnights	−0.020 (−0.784)	−0.010 (−0.415)	−0.009 (−0.371)	−0.033 (−1.605)
Stock of physical capital/total gross value added*Dummy Crisis	−0.337*** (−5.129)			
Share of the pop. Aged 25–64 with higher educational attainment *Dummy Crisis		−0.083*** (−5.734)		
Population/area*Dummy Crisis			−0.001 (−1.352)	
Overnights/population*Dummy Crisis				−0.064*** (−3.720)
Number of beds/number of establishments *Dummy Crisis				
Air movements (log) *Dummy Crisis				
Air Pollution in PM2.5*Dummy Crisis				
Seasonality, overnights—max/min monthly overnights*Dummy Crisis				
Observations	273	273	273	273
R-squared	0.696	0.707	0.662	0.679

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 6 (Continued)

	(5)	(6)	(7)	(8)
Stock of physical capital/total gross value added	0.969* (1.992)	0.713* (1.780)	0.704 (1.563)	1.094* (1.909)
Share of the population aged 25–64 with higher educational attainment	0.203** (2.502)	0.159** (2.128)	0.221*** (2.761)	0.288*** (3.504)
Population/area	−0.016** (−2.089)	−0.015* (−1.866)	−0.014** (−2.019)	−0.011 (−1.628)
Overnights/population	0.178** (2.469)	0.196** (2.522)	0.186** (2.359)	0.159** (2.053)
Number of beds/number of establishments	0.010 (1.115)	0.009 (1.109)	0.008 (0.950)	0.001 (0.112)
Air movements (log)	0.751* (1.944)	0.844** (2.282)	0.813** (2.155)	0.862** (2.305)
Air Pollution in PM2.5	−0.525*** (−6.199)	−0.490*** (−6.036)	−0.442*** (−5.166)	−0.473*** (−5.475)
Seasonality, overnights—max/min monthly overnights	−0.011 (−0.477)	−0.017 (−0.725)	−0.012 (−0.488)	−0.009 (−0.350)
Stock of physical capital/total gross value added*Dummy Crisis				
Share of the pop. Aged 25–64 with higher educational attainment *Dummy Crisis				
Population/area*Dummy Crisis				
Overnights/population*Dummy Crisis				
Number of beds/number of establishments *Dummy Crisis	−0.009*** (−2.787)			
Air movements (log) *Dummy Crisis		−0.153*** (−5.461)		
Air Pollution in PM2.5*Dummy Crisis			−0.078*** (−4.024)	
Seasonality, overnights—max/min monthly overnights*Dummy Crisis				−0.002 (−0.248)
Observations	273	273	273	273
R-squared	0.673	0.697	0.681	0.657

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 7 The impact of the Great Recession—Employment

	(1)	(2)	(3)	(4)
Stock of physical capital/total gross value added	−0.233* (−1.669)	−0.290* (−1.950)	−0.213* (−1.680)	−0.238* (−1.771)
Share of the population aged 25–64 with higher educational attainment	0.192** (2.462)	0.156* (1.910)	0.185** (2.397)	0.160** (2.329)
Population/area	0.003 (0.608)	0.002 (0.495)	0.004 (1.040)	0.002 (0.354)
Overnights/population	0.134** (2.055)	0.146** (2.248)	0.138** (2.112)	0.147** (2.357)
Number of beds/number of establishments	−0.001 (−0.108)	0.001 (0.079)	−0.000 (−0.020)	0.001 (0.076)
Air movements (log)	0.062 (0.240)	0.061 (0.241)	0.062 (0.243)	0.051 (0.199)
Air Pollution in PM2.5	−0.314*** (−4.258)	−0.323*** (−4.114)	−0.311*** (−4.178)	−0.323*** (−4.333)
Seasonality, overnights—max/min monthly overnights	−0.042* (−1.929)	−0.044** (−2.050)	−0.043** (−2.005)	−0.050** (−2.505)
Stock of physical capital/total gross value added*Dummy Crisis	0.053 (1.087)			
Share of the pop. Aged 25–64 with higher educational attainment *Dummy Crisis		−0.009 (−0.694)		
Population/area*Dummy Crisis			0.000 (0.584)	
Overnights/population*Dummy Crisis				−0.015 (−0.928)
Number of beds/number of establishments *Dummy Crisis				
Air movements (log) *Dummy Crisis				
Air Pollution in PM2.5*Dummy Crisis				
Seasonality, overnights—max/min monthly overnights *Dummy Crisis				
Observations	273	273	273	273
R-squared	0.468	0.468	0.467	0.469

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 7 (Continued)

	(5)	(6)	(7)	(8)
Stock of physical capital/total gross value added	−0.198 (−1.552)	−0.215* (−1.686)	−0.069 (−0.490)	−0.185 (−1.388)
Share of the population aged 25–64 with higher educational attainment	0.189** (2.415)	0.177** (2.248)	0.201** (2.591)	0.176** (2.486)
Population/area	0.004 (0.894)	0.003 (0.643)	0.004 (1.059)	0.003 (0.662)
Overnights/population	0.139** (2.118)	0.142** (2.172)	0.132** (2.052)	0.145** (2.268)
Number of beds/number of establishments	−0.001 (−0.121)	0.000 (0.016)	−0.003 (−0.272)	−0.001 (−0.085)
Air movements (log)	0.074 (0.289)	0.056 (0.218)	0.073 (0.281)	0.044 (0.170)
Air Pollution in PM2.5	−0.306*** (−3.878)	−0.314*** (−4.216)	−0.326*** (−4.634)	−0.312*** (−4.225)
Seasonality, overnights—max/min monthly overnights	−0.043* (−1.975)	−0.044** (−2.017)	−0.042* (−1.957)	−0.040* (−1.970)
Stock of physical capital/total gross value added*Dummy Crisis				
Share of the pop. Aged 25–64 with higher educational attainment *Dummy Crisis				
Population/area*Dummy Crisis				
Overnights/population*Dummy Crisis				
Number of beds/number of establishments *Dummy Crisis	0.001 (0.519)			
Air movements (log) *Dummy Crisis		0.002 (0.082)		
Air Pollution in PM2.5*Dummy Crisis			0.029** (2.030)	
Seasonality, overnights—max/min monthly overnights *Dummy Crisis				0.007 (1.147)
Observations	273	273	273	273
R-squared	0.467	0.466	0.474	0.467

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 8 Controlling for the industry mix—wholesale and retail trade, transport, accommodation and food service activities

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.207*** (2.755)		0.280*** (3.613)	0.278*** (3.627)
Population/area	−0.007 (−1.427)	−0.013 (−1.191)		−0.009 (−1.015)
Overnights/population	0.138* (1.726)	0.108 (1.538)	0.128* (1.839)	
Number of beds/number of establishments	−0.002 (−0.233)	−0.007 (−0.669)	−0.004 (−0.375)	0.000 (0.009)
Air movements (log)	0.868** (2.524)	0.831** (2.149)	0.822** (2.152)	0.824** (2.215)
Air Pollution in PM2.5	−0.438*** (−5.543)	−0.489*** (−6.545)	−0.464*** (−5.668)	−0.455*** (−5.739)
Seasonality, overnights—max/min monthly overnights	0.015 (0.574)	−0.003 (−0.166)	−0.001 (−0.024)	0.012 (0.472)
Share of GVA in wholesale and retail trade transport, accommodation …	33.065*** (2.796)	26.291** (2.462)	24.074** (2.136)	22.800** (2.062)
Stock of physical capital/total gross value added		1.495** (2.029)	1.397* (1.812)	1.372* (1.748)
Stock of physical capital/total gross value added—islands	0.384 (0.905)			
Stock of physical capital/total gross value added—non-islands	3.494*** (8.490)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.349* (1.992)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.242*** (3.628)		
Population/area—islands			−0.006 (−0.787)	
Population/area—non-islands			−0.024 (−1.219)	
Overnights/population—islands (overtourism per le isole)				0.094 (1.201)
Overnights/population—non-islands				0.256** (2.212)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				

TABLE 8 (Continued)

	(1)	(2)	(3)	(4)
Seasonality, overnights—max/min monthly overnights—non-islands				
Share of GVA in wholesale and retail trade transport, accommodation …—islands				
Share of GVA in wholesale and retail trade transport, accommodation …—non-Islands				
Observations	273	273	273	273
R-squared	0.722	0.674	0.672	0.674

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 8 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the population aged 25–64 with higher educational attainment	0.285*** (3.544)	0.304*** (5.153)	0.277*** (3.670)	0.266*** (3.412)	0.285*** (3.725)
Population/area	−0.011 (−1.115)	−0.021** (−2.429)	−0.013 (−1.312)	−0.009 (−1.179)	−0.010 (−1.220)
Overnights/population	0.123* (1.756)	0.096 (1.315)	0.106 (1.507)	0.146* (1.939)	0.121* (1.783)
Number of beds/number of establishments		−0.005 (−0.487)	−0.005 (−0.516)	−0.003 (−0.379)	−0.005 (−0.510)
Air movements (log)	0.891** (2.486)		0.834** (2.198)	0.823** (2.198)	0.819** (2.227)
Air Pollution in PM2.5	−0.459*** (−5.509)	−0.428*** (−6.052)		−0.466*** (−5.624)	−0.451*** (−5.579)
Seasonality, overnights—max/min monthly overnights	−0.009 (−0.301)	−0.010 (−0.417)	−0.003 (−0.165)		0.001 (0.059)
Share of GVA in wholesale and retail trade transport, accommodation …	27.042*** (2.755)	21.562* (1.930)	23.434** (2.060)	23.817** (2.161)	
Stock of physical capital/total gross value added	1.471** (2.238)	1.595** (2.151)	1.385* (1.817)	1.344* (1.792)	1.391* (1.836)
Stock of physical capital/total gross value added—islands					
Stock of physical capital/total gross value added—non-islands					
Share of the pop. Aged 25–64 with higher educ. attainment—islands					

TABLE 8 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands					
Population/area—islands					
Population/area—non-islands					
Overnights/population—islands (overtourism per le isole)					
Overnights/population—non-islands					
Number of beds/number of establishments—islands	−0.019 (−0.619)				
Number of beds/number of establishments—non-islands	−0.001 (−0.163)				
Air movements (log)—islands		6.523*** (3.785)			
Air movements (log)—non-islands		0.686* (1.847)			
Air Pollution in PM2.5—islands			−0.701*** (−2.704)		
Air Pollution in PM2.5—non-islands			−0.456*** (−5.276)		
Seasonality, overnights—max/min monthly overnights—islands				−0.006 (−0.264)	
Seasonality, overnights—max/min monthly overnights—non-islands				0.278 (1.382)	
Share of GVA in wholesale and retail trade transport, accommodation …—islands					30.417** (2.628)
Share of GVA in wholesale and retail trade transport, accommodation …—non-Islands					19.186
Observations	273	273	273	273	273
R-squared	0.672	0.685	0.673	0.677	0.672

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 9 Controlling for the industry mix—industry

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.222*** (2.768)		0.283*** (3.460)	0.279*** (3.503)
Population/area	−0.015*** (−3.273)	−0.019* (−1.919)		−0.016** (−2.215)
Overnights/population	0.196** (2.435)	0.170** (2.112)	0.176** (2.336)	
Number of beds/number of establishments	0.005 (0.529)	0.001 (0.120)	0.002 (0.241)	0.007 (0.618)
Air movements (log)	0.995*** (2.822)	0.970** (2.502)	0.947** (2.457)	0.940** (2.502)
Air Pollution in PM2.5	−0.475*** (−5.859)	−0.500*** (−6.518)	−0.493*** (−5.864)	−0.482*** (−6.022)
Seasonality, overnights—max/min monthly overnights	−0.000 (−0.003)	−0.013 (−0.525)	−0.011 (−0.472)	0.005 (0.192)
Share of GVA in Industry	−20.228*** (−3.506)	−20.098*** (−3.179)	−19.827*** (−3.202)	−20.073*** (−3.233)
Stock of physical capital/total gross value added		1.236** (2.226)	1.209** (2.083)	1.198* (1.936)
Stock of physical capital/total gross value added—islands	0.240 (0.901)			
Stock of physical capital/total gross value added—non-islands	2.935*** (7.697)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.310* (1.800)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.272*** (3.740)		
Population/area—islands			−0.014** (−2.162)	
Population/area—non-islands			−0.032 (−1.522)	
Overnights/population—islands (overtourism per le isole)				0.129 (1.505)
Overnights/population—non-islands				0.348*** (2.983)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				

TABLE 9 (Continued)

	(1)	(2)	(3)	(4)
Seasonality, overnights—max/min monthly overnights—non-islands				
Share of GVA in industry—islands				
Share of GVA in industry—Non-Islands				
Observations	273	273	273	273
R-squared	0.708	0.669	0.670	0.673

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 9 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the population aged 25–64 with higher educational attainment	0.286*** (3.459)	0.309*** (4.929)	0.279*** (3.514)	0.269*** (3.245)	0.265*** (3.326)
Population/area	−0.017* (−1.772)	−0.029*** (−3.663)	−0.021** (−2.445)	−0.017*** (−2.714)	−0.031*** (−3.260)
Overnights/population	0.175** (2.334)	0.138* (1.800)	0.150* (1.883)	0.196** (2.448)	0.219*** (2.943)
Number of beds/number of establishments		0.001 (0.057)	0.001 (0.074)	0.002 (0.264)	0.001 (0.107)
Air movements (log)	0.966*** (2.661)		0.954** (2.509)	0.948** (2.510)	0.863** (2.307)
Air Pollution in PM2.5	−0.489*** (−5.802)	−0.453*** (−6.388)		−0.496*** (−5.903)	−0.484*** (−5.959)
Seasonality, overnights—max/min monthly overnights	−0.009 (−0.272)	−0.021 (−0.788)	−0.014 (−0.607)		−0.020 (−0.870)
Share of GVA in Industry	−20.068*** (−3.299)	−19.121*** (−3.178)	−19.503*** (−3.057)	−20.321*** (−3.242)	
Stock of physical capital/total gross value added	1.201** (2.289)	1.449** (2.500)	1.203** (2.101)	1.159** (2.066)	1.372** (2.344)
Stock of physical capital/total gross value added—islands					
Stock of physical capital/total gross value added—non-islands					
Share of the pop. Aged 25–64 with higher educ. attainment—islands					

(Continues)

TABLE 9 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands					
Population/area—islands					
Population/area—non-islands					
Overnights/population—islands (overtourism per le isole)					
Overnights/population—non-islands					
Number of beds/number of establishments—islands	0.006 (0.181)				
Number of beds/number of establishments—non-islands	0.001 (0.127)				
Air movements (log)—islands		7.037*** (3.943)			
Air movements (log)—non-islands		0.794** (2.162)			
Air Pollution in PM2.5—islands			−0.761** (−2.625)		
Air Pollution in PM2.5—non-islands			−0.484*** (−5.391)		
Seasonality, overnights—max/min monthly overnights—islands				−0.017 (−0.689)	
Seasonality, overnights—max/min monthly overnights—non-islands				0.288 (1.514)	
Share of GVA in industry—islands					−74.082*** (−3.028)
Share of GVA in industry—Non-Islands					−14.809** (−2.215)
Observations	273	273	273	273	273
R-squared	0.669	0.684	0.671	0.675	0.678

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 10 Controlling for the industry mix—non-market services

	(1)	(2)	(3)	(4)
Share of the population aged 25–64 with higher educational attainment	0.209** (2.476)		0.252*** (2.987)	0.251*** (3.107)
Population/area	−0.010*** (−2.761)	−0.015 (−1.523)		−0.012 (−1.553)
Overnights/population	0.204** (2.354)	0.191** (2.129)	0.203** (2.380)	
Number of beds/number of establishments	0.003 (0.282)	−0.001 (−0.152)	0.000 (0.002)	0.005 (0.435)
Air movements (log)	0.971*** (2.887)	1.002*** (2.792)	0.974*** (2.713)	0.975*** (2.810)
Air Pollution in PM2.5	−0.473*** (−5.663)	−0.509*** (−6.273)	−0.504*** (−5.779)	−0.489*** (−5.850)
Seasonality, overnights—max/min monthly overnights	0.000 (0.011)	−0.014 (−0.528)	−0.013 (−0.484)	0.005 (0.172)
Share of GVA in Non-market services	15.223 (1.077)	23.871* (1.687)	25.677* (1.787)	24.220* (1.750)
Stock of physical capital/total gross value added		1.032** (2.025)	0.991* (1.886)	0.985* (1.741)
Stock of physical capital/total gross value added—islands	0.116 (0.511)			
Stock of physical capital/total gross value added—non-islands	2.673*** (6.665)			
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.289 (1.659)		
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.241*** (3.239)		
Population/area—islands			−0.007 (−1.262)	
Population/area—non-islands			−0.037** (−2.028)	
Overnights/population—islands (overtourism per le isole)				0.150 (1.566)
Overnights/population—non-islands				0.379*** (3.454)
Number of beds/number of establishments—islands				
Number of beds/number of establishments—non-islands				
Air movements (log)—islands				
Air movements (log)—non-islands				
Air Pollution in PM2.5—islands				
Air Pollution in PM2.5—non-islands				
Seasonality, overnights—max/min monthly overnights—islands				

TABLE 10 (Continued)

	(1)	(2)	(3)	(4)
Seasonality, overnights—max/min monthly overnights—non-islands				
Share of GVA in non-market services—islands				
Share of GVA in non-market services—non-Islands				
Observations	273	273	273	273
R-squared	0.699	0.665	0.668	0.670

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 10 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the population aged 25–64 with higher educational attainment	0.257*** (3.084)	0.281*** (4.389)	0.248*** (3.067)	0.241*** (2.817)	0.263*** (3.139)
Population/area	−0.012 (−1.262)	−0.027*** (−3.781)	−0.019** (−2.123)	−0.013* (−1.935)	−0.013* (−1.949)
Overnights/population	0.197** (2.400)	0.161* (1.887)	0.167* (1.896)	0.219** (2.434)	0.184** (2.071)
Number of beds/number of establishments		−0.002 (−0.210)	−0.002 (−0.242)	−0.000 (−0.003)	−0.001 (−0.092)
Air movements (log)	0.985*** (2.873)		0.994*** (2.802)	0.981*** (2.798)	1.030*** (2.883)
Air Pollution in PM2.5	−0.495*** (−5.664)	−0.460*** (−6.056)		−0.502*** (−5.747)	−0.491*** (−5.547)
Seasonality, overnights—max/min monthly overnights	−0.006 (−0.184)	−0.023 (−0.809)	−0.017 (−0.646)		−0.011 (−0.411)
Share of GVA in Non-market services	24.004* (1.706)	25.163* (1.874)	25.313* (1.832)	24.107* (1.727)	
Stock of physical capital/total gross value added	0.975* (1.983)	1.254** (2.423)	0.986* (1.922)	0.945* (1.878)	0.990* (1.913)
Stock of physical capital/total gross value added—islands					
Stock of physical capital/total gross value added—non-islands					
Share of the pop. Aged 25–64 with higher educ. attainment—islands					

TABLE 10 (Continued)

	(5)	(6)	(7)	(8)	(9)
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands					
Population/area—islands					
Population/area—non-islands					
Overnights/population—islands (overtourism per le isole)					
Overnights/population—non-islands					
Number of beds/number of establishments—islands	0.009 (0.286)				
Number of beds/number of establishments—non-islands	−0.002 (−0.255)				
Air movements (log)—islands		7.493*** (4.463)			
Air movements (log)—non-islands		0.830** (2.431)			
Air Pollution in PM2.5—islands			−0.867*** (−2.850)		
Air Pollution in PM2.5—non-islands			−0.491*** (−5.284)		
Seasonality, overnights—max/min monthly overnights—islands				−0.018 (−0.668)	
Seasonality, overnights—max/min monthly overnights—non-islands				0.288 (1.485)	
Share of GVA in non-market services—islands					11.981 (0.463)
Share of GVA in non-market services—non-Islands					27.094* (1.702)
Observations	273	273	273	273	273
R-squared	0.665	0.683	0.669	0.672	0.666

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

significant at 5%. Instead, this coefficient is not significant for mainland regions (Table 8). This result further confirms the importance of the activities broadly related to the tourism sector for islands. Second, specialization in the industrial sector has negatively affected the economic growth of the regions analysed and particularly for islands (Table 9). In contrast, a larger public sector has been beneficial for economic growth (Table 10). Such effects may be related to the period under analysis that includes the Great Recession, which has been characterized by larger negative effects on manufacturing activities. In contrast, those regions having larger government spending on public administration were more sheltered than other economies in the case of external shocks (Fratesi & Rodríguez-Pose, 2016).[8]

5 | CONCLUSION AND POLICY IMPLICATIONS

In recent years, EU policy has recognized the insularity condition and, as a result, most countries have developed national plans and specific policies for island regions. Despite the diversity and uniqueness of each island, these regions share the same lasting handicap due to their isolation (Briguglio & Kisanga, 2004). The EU recognizes this condition as both a geocultural factor and a permanent obstacle due to additional constraints on the competitiveness of the affected areas. This is considered the main reason for developing policies specific to these areas.

Starting from these EU regional policy needs, the article shows that several studies have investigated the tourism sector's role in islands and its crucial role in supporting regional economic growth. However, none of them has considered the territorial capital and tourism industry's local characteristics in a unified context to disentangle the relative importance of such factors for the growth patterns of islands versus mainland regions. This article aims to fill this gap by simultaneously analysing a broad sample of 61 mainland European regions and 13 islands in the Mediterranean area belonging to the same countries, and comparing their main growth drivers in twelve years (2008–2019).

The econometric results show that growth factors for island economies are partly similar to those that characterize other regions (Crescenzi et al., 2016; Mazzola et al., 2018; Romão & Nijkamp, 2018), although some differences in critical characteristics are evident. The underlying assumption regarding a more significant role for the tourism sector in the growth process for islands seems to be supported by econometric estimates, although with some interesting caveats.

For non-tourism variables, the impact of physical capital endowment in influencing growth dynamics seems most relevant for mainland regions. On the contrary, human capital affects more insular economies' growth than mainlands'. This is likely related to the importance of tourism for islands, considering that tourism is a labour-intensive industry. In particular, the improvement in the labour force's human capital content affects the efficiency of that sector crucially.

Turning to variables that proxy tourism directly, tourism demand factors appear more relevant than those representing the tourism supply (i.e., large establishments) in driving economic growth for all regions. This result may be partly explained by the rising demand for experiential tourism and the related desire to interact with the territory, which can reduce the importance of large establishments in stimulating economic growth. Moreover, such large structures (with a relatively large number of beds) are often owned by multinational corporations that, by definition, are less tied to the territory. They tend to act in global value chains and are likely more prone to disinvest when market conditions become more favourable in other parts of the world.

As for islands, however, the article's findings show three relevant aspects. First, the importance of air flight connections to reduce these territories' remoteness. In the case of island regions, flights are also responsible for the growth of tourism demand, particularly for the international component. Second, balancing the more substantial

[8]When including a dummy variable in the model capturing the effect of the Great Recession, the results (not included in the text but available upon request from the authors) suggest that the importance of wholesale and retail trade, transport, accommodation and food service activities remains evident especially for islands. However, when looking at the industry and public sector specializations, the results become less clear (and not statistically significant) and seem to suggest the presence of a "crisis effect" in affecting the results presented in Tables 8–10.

tourist pressures with sustainable development is a major challenge. Islands cannot absorb the increasing tourism load as they have a limited territory and limited natural resources. Consequently, the concentration of tourism demand may become critical for economic growth. The mainland regions can better cope with overtourism and higher tourist pressure levels. As for islands, the higher tourist pressure values may result in a sudden halt in growth. This is also explained by the fragility of the islands' environmental system, whose approach to sustainability becomes fundamental for the entire ecosystem.

Finally, an interesting result regards the dynamics of tourism demand and the degree of temporal concentration. Especially for islands, increasing values in the concentration of tourism demand in some months of the year do not correspond to a positive impact on growth. This consideration is important for islands' growth and related tourism policies. Increasing tourism in seasonality peaks and focusing on bestseller tourist products do not contribute to sustainable growth and development. Therefore, overtourism can be contrasted, through tourist flows' temporal and spatial dispersion. It is acknowledged that islands face the dilemma between mass tourism and sustainable tourism. According to the research findings, the islands should try to strike a balance. Therefore they need to adopt and follow a regional strategic and operational tourism plan based on local development aspects and to abandon a policy merely based on tourism demand increase.

Plans need to consider selecting particular tourist products, particularly the ones that are adopted during the low season (Couto et al., 2017), and the cooperation between public and private operators (Jordan, 2007) to fix the right and sustainable goals while monitoring the key growth variables as shown in this article. For many decades, mass tourism has increased (Polo & Valle, 2016) without a plan based following growth determinants.

However, the stimulus for building tourism centres and large hotels and the excessive tourist pressure may affect development dynamics. Therefore, tourism policies on islands need a specific approach. In particular, policies to stimulate the tourism demand must be devoted to reducing over-tourism effects and defining employment policies that increase the values of sustainability (Bojanic, 2013). Moreover, air pollution control policies can significantly contribute to economic growth and can usefully complement other traditional structural policies.

Our results leave several questions open for future research. First, tourism activities are often characterized by large informality. Although, some studies at the country level seem to suggest a U-shaped relationship between tourism and informality (Lv, 2020), a better understanding of this phenomenon at the regional level and its implications in terms of economic growth would support a policy action more targeted to the needs of areas with larger tourist flows (such as islands). Second, there is growing evidence of the importance of institutional quality in explaining regional growth (Ketterer & Rodríguez-Pose, 2018) and the positive relationship between island status and institutional quality at the country level (Congdon Fors, 2014). Disentangling the contribution of institutional quality to the economic growth of insular regions by comparing it with that of non-insular regions is a relevant issue that should be addressed in further research.

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APPENDIX A

TABLE A1 List of regions included in the analysis

Nuts ID	Nuts name	Typology	Country
CY00	Kypros	Island region	Cyprus
EL30	Attiki	Coastal Mainland region	Greece
EL41	Voreio Aigaio	Island region	Greece
EL42	Notio Aigaio	Island region	Greece
EL43	Kriti	Island region	Greece
EL51	Anatoliki Makedonia, Thraki	Coastal Mainland region	Greece
EL52	Kentriki Makedonia	Coastal Mainland region	Greece
EL53	Dytiki Makedonia	Non-Coastal Mainland region	Greece
EL54	Ipeiros	Coastal Mainland region	Greece
EL61	Thessalia	Coastal Mainland region	Greece
EL62	Ionia Nisia	Island region	Greece
EL63	Dytiki Ellada	Coastal Mainland region	Greece
EL64	Sterea Ellada	Coastal Mainland region	Greece
EL65	Peloponnisos	Coastal Mainland region	Greece
ES11	Galicia	Coastal Mainland region	Spain
ES12	Principado de Asturias	Coastal Mainland region	Spain
ES13	Cantabria	Coastal Mainland region	Spain
ES21	País Vasco	Coastal Mainland region	Spain
ES22	Comunidad Foral de Navarra	Non-Coastal Mainland region	Spain
ES23	La Rioja	Non-Coastal Mainland region	Spain
ES24	Aragón	Non-Coastal Mainland region	Spain
ES30	Comunidad de Madrid	Non-Coastal Mainland region	Spain

(Continues)

TABLE A1 (Continued)

Nuts ID	Nuts name	Typology	Country
ES41	Castilla y León	Non-Coastal Mainland region	Spain
ES43	Extremadura	Non-Coastal Mainland region	Spain
ES51	Cataluña	Coastal Mainland region	Spain
ES52	Comunidad Valenciana	Coastal Mainland region	Spain
ES53	Illes Balears	Island region	Spain
ES61	Andalucía	Coastal Mainland region	Spain
ES62	Región de Murcia	Coastal Mainland region	Spain
ES70	Canarias (ES)	Island region	Spain
FR10	Île de France	Non-Coastal Mainland region	France
FRB0	Centre - Val de Loire	Non-Coastal Mainland region	France
FRC1	Bourgogne	Non-Coastal Mainland region	France
FRD1	Basse-Normandie	Coastal Mainland region	France
FRD2	Haute-Normandie	Coastal Mainland region	France
FRE1	Nord-Pas-de-Calais	Coastal Mainland region	France
FRE2	Picardie	Coastal Mainland region	France
FRF1	Alsace	Non-Coastal Mainland region	France
FRF2	Champagne-Ardenne	Non-Coastal Mainland region	France
FRF3	Lorraine	Non-Coastal Mainland region	France
FRG0	Pays-de-la-Loire	Coastal Mainland region	France
FRH0	Bretagne	Coastal Mainland region	France
FRI1	Aquitaine	Coastal Mainland region	France
FRJ1	Languedoc-Roussillon	Coastal Mainland region	France
FRJ2	Midi-Pyrénées	Non-Coastal Mainland region	France
FRK1	Auvergne	Non-Coastal Mainland region	France
FRK2	Rhône-Alpes	Non-Coastal Mainland region	France
FRL0	Provence-Alpes-Côte d'Azur	Coastal Mainland region	France
FRM0	Corse	Island region	France
ITC1	Piemonte	Non-Coastal Mainland region	Italy
ITC3	Liguria	Mainland region	Italy
ITC4	Lombardia	Non-Coastal Mainland region	Italy
ITF1	Abruzzo	Coastal Mainland region	Italy
ITF3	Campania	Coastal Mainland region	Italy
ITF4	Puglia	Coastal Mainland region	Italy
ITF6	Calabria	Coastal Mainland region	Italy
ITG1	Sicilia	Island region	Italy
ITG2	Sardegna	Island region	Italy
ITH1	Provincia Autonoma di Bolzano/Bozen	Non-Coastal Mainland region	Italy
ITH3	Veneto	Coastal Mainland region	Italy
ITH4	Friuli-Venezia Giulia	Coastal Mainland region	Italy
ITH5	Emilia-Romagna	Coastal Mainland region	Italy
ITI1	Toscana	Coastal Mainland region	Italy

TABLE A1 (Continued)

Nuts ID	Nuts name	Typology	Country
ITI2	Umbria	Non-Coastal Mainland region	Italy
ITI3	Marche	Coastal Mainland region	Italy
ITI4	Lazio	Coastal Mainland region	Italy
MT00	Malta	Island region	Malta
PT11	Norte	Coastal Mainland region	Portugal
PT15	Algarve	Coastal Mainland region	Portugal
PT16	Centro (PT)	Coastal Mainland region	Portugal
PT17	Área Metropolitana de Lisboa	Coastal Mainland region	Portugal
PT18	Alentejo	Coastal Mainland region	Portugal
PT20	Região Autónoma dos Açores (PT)	Island region	Portugal
PT30	Região Autónoma da Madeira (PT)	Island region	Portugal

TABLE A2 Descriptive statistics

Variable description	Obs	Mean	Std. dev.	Min	Max
GDP *per capita*—annual growth rate	273	0.89	3.23	−14.02	7.49
Employment—annual growth rate	273	0.48	1.89	−5.58	7.77
Stock of physical capital/total gross value added	273	3.93	1.53	2.08	16.58
Share of the population aged 25–64 with higher educational attainment (ISCED levels 5–8)	273	24.69	8.94	7.30	49.70
Population/area	273	200.09	255.56	22.62	1485.42
Number of overnights/population	273	10.57	14.04	1.14	77.41
Number of available beds/number of establishment	273	90.37	69.13	11.93	306.99
Maximum values of monthly overnights/minimum values of monthly overnights	273	10.36	1.71	4.49	13.61
Average level in fine particulate matter (PM2.5) in micrograms per cubic metre ($\mu g/m^3$) experienced by the population	273	13.56	4.36	3.91	29.89
Number of aircraft movements (flights) (in log)	273	12.74	28.38	0.00	199.10

TABLE A3 Islands vs non-islands using the number of tourists arrivals as a proxy for tourism demand

	(1) GDP *per capita*	(2)	(3) Employment	(4)
Stock of physical capital/total gross value added	1.177* (1.692)	1.193* (1.771)	−0.188 (−1.223)	−0.189 (−1.252)
Share of the pop. Aged 25–64 with higher educ. Attainment	0.248*** (2.817)	0.245*** (2.816)	0.150** (2.242)	0.150** (2.231)
Population/area	−0.012 (−1.655)	−0.013 (−1.556)	0.002 (0.349)	0.002 (0.340)
Arrivals (log)	3.677** (2.579)		2.781*** (3.218)	
Number of beds/ number of establishments	0.006 (0.531)	0.005 (0.436)	0.004 (0.409)	0.004 (0.412)
Air movements (log)	0.834** (2.297)	0.826** (2.256)	0.054 (0.211)	0.055 (0.215)
Air Pollution in PM2.5	−0.414*** (−5.183)	−0.420*** (−5.049)	−0.270*** (−3.934)	−0.269*** (−3.983)
Seasonality, overnights—max/ min monthly overnights	0.019 (1.377)	0.014 (0.823)	−0.019* (−1.966)	−0.018 (−1.412)
Arrivals (log)– Islands		4.203** (2.584)		2.745** (2.143)
Arrivals (log)– Non-islands		3.447** (2.033)		2.797*** (2.960)
Observations	273	273	273	273
R-squared	0.662	0.662	0.467	0.467

TABLE A4 Robustness checks—CY and MT excluded—GDP *per capita*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of the population aged 25–64 with higher educational attainment	0.260*** (3.086)	0.187** (2.311)		0.253*** (3.017)	0.253*** (3.083)	0.260*** (3.075)	0.284*** (4.413)	0.258*** (3.139)	0.241*** (2.800)
Population/area	−0.025 (−1.322)	−0.009 (−0.541)	−0.025 (−1.279)		−0.026 (−1.399)	−0.025 (−1.360)	−0.025 (−1.280)	−0.025 (−1.369)	−0.023 (−1.338)
Overnights/population	0.171** (2.119)	0.195** (2.314)	0.174* (1.963)	0.172** (2.211)		0.170** (2.131)	0.140* (1.761)	0.160* (1.853)	0.193** (2.252)
Number of beds/number of establishments	−0.003 (−0.295)	−0.001 (−0.112)	−0.002 (−0.246)	−0.004 (−0.432)	0.003 (0.251)		−0.004 (−0.387)	−0.003 (−0.347)	−0.002 (−0.277)
Air movements (log)	0.687* (1.861)	0.709** (2.078)	0.688* (1.854)	0.663* (1.816)	0.643* (1.765)	0.675* (1.893)		0.687* (1.856)	0.654* (1.780)
Air Pollution in PM2.5	−0.480*** (−5.536)	−0.466*** (−5.575)	−0.474*** (−6.286)	−0.486*** (−5.702)	−0.472*** (−5.755)	−0.479*** (−5.556)	−0.451*** (−6.185)		−0.488*** (−5.633)
Seasonality, overnights—max/min monthly overnights	−0.011 (−0.401)	0.000 (0.005)	−0.010 (−0.382)	−0.011 (−0.448)	0.007 (0.238)	−0.008 (−0.224)	−0.020 (−0.693)	−0.012 (−0.458)	
Stock of physical capital/total gross value added	1.097** (2.021)		1.083** (2.023)	1.048** (2.027)	1.089* (1.838)	1.087** (2.141)	1.297** (2.320)	1.094** (2.009)	1.038* (1.963)
Stock of physical capital/total gross value added—islands		0.039 (0.218)							
Stock of physical capital/total gross value added—non-islands		2.879*** (6.821)							
Share of the pop. Aged 25–64 with higher educ. attainment—islands			0.246 (1.386)						
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands			0.268*** (3.770)						
Population/area—islands				0.010 (0.093)					
Population/area—non-islands				−0.028 (−1.573)					
Overnights/population—islands					0.122 (1.325)				

(Continues)

TABLE A4 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Overnights/population—non-islands					0.353*** (3.045)				
Number of beds/number of establishments—islands						0.002 (0.053)			
Number of beds/number of establishments—non-islands						−0.004 (−0.386)			
Air movements (log)—islands							6.101** (2.636)		
Air movements (log)—non-islands							0.607 (1.626)		
Air Pollution in PM2.5—islands								−0.596** (−2.197)	
Air Pollution in PM2.5—non-islands								−0.478*** (−5.293)	
Seasonality, overnights—max/min monthly overnights—islands									−0.017 (−0.617)
Seasonality, overnights—max/min monthly overnights—non-islands									0.299 (1.434)
Observations		265	265	265	265	265	265	265	265
R-squared		0.706	0.661	0.662	0.667	0.661	0.670	0.662	0.669

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE A5 Robustness checks—CY and MT excluded—Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of the population aged 25–64 with higher educational attainment	0.170** (2.267)	0.167** (2.160)		0.133** (2.007)	0.161** (2.311)	0.170** (2.275)	0.171** (2.376)	0.167** (2.278)	0.160** (2.096)
Population/area	−0.011 (−0.696)	−0.011 (−0.673)	−0.011 (−0.718)		−0.013 (−0.795)	−0.011 (−0.716)	−0.011 (−0.695)	−0.012 (−0.792)	−0.011 (−0.669)
Overnights/population	0.140** (2.104)	0.141** (2.101)	0.141* (1.847)	0.146*** (2.752)		0.140** (2.111)	0.138* (1.955)	0.123 (1.541)	0.151** (2.136)
Number of beds/number of establishments	−0.000 (−0.046)	−0.000 (−0.039)	−0.000 (−0.040)	−0.006 (−0.664)	0.007 (0.626)		−0.000 (−0.051)	−0.001 (−0.123)	−0.000 (−0.033)
Air movements (log)	−0.076 (−0.308)	−0.076 (−0.303)	−0.076 (−0.308)	−0.206 (−0.865)	−0.132 (−0.523)	−0.084 (−0.352)		−0.077 (−0.312)	−0.093 (−0.371)
Air Pollution in PM2.5	−0.309*** (−4.264)	−0.309*** (−4.279)	−0.308*** (−4.649)	−0.342*** (−4.868)	−0.299*** (−4.461)	−0.309*** (−4.253)	−0.307*** (−4.424)		−0.313*** (−4.310)
Seasonality, overnights—max/min monthly overnights	−0.043* (−1.913)	−0.043* (−1.883)	−0.043** (−2.012)	−0.046*** (−2.844)	−0.020 (−0.865)	−0.041 (−1.546)	−0.044* (−1.904)	−0.045** (−2.127)	
Stock of physical capital/total gross value added	−0.208 (−1.513)		−0.210 (−1.336)	−0.463*** (−2.937)	−0.219 (−1.507)	−0.214 (−1.467)	−0.196 (−1.012)	−0.213 (−1.539)	−0.237* (−1.720)
Stock of physical capital/total gross value added—islands		−0.248* (−1.933)							
Stock of physical capital/total gross value added—non-islands		−0.141 (−0.479)							
Share of the pop. Aged 25–64 with higher educ. attainment—islands			0.167 (1.125)						
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands			0.171** (2.532)						
Population/area—islands				0.170*** (2.693)					
Population/area—non-islands				−0.028* (−1.690)					
Overnights/population—islands					0.079 (1.238)				

(Continues)

TABLE A5 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Overnights/population—non-islands					0.369*** (5.037)				
Number of beds/number of establishments—islands						0.002 (0.115)			
Number of beds/number of establishments—non-islands						−0.001 (−0.092)			
Air movements (log)—islands							0.244 (0.072)		
Air movements (log)—non-islands							−0.081 (−0.331)		
Air Pollution in PM2.5—islands								−0.498* (−1.971)	
Air Pollution in PM2.5—non-islands								−0.306*** (−4.035)	
Seasonality, overnights—max/min monthly overnights—islands									−0.046* (−1.957)
Seasonality, overnights—max/min monthly overnights—non-islands									0.112 (1.252)
Observations		265	265	265	265	265	265	265	265
R-squared		0.463	0.463	0.463	0.490	0.480	0.463	0.463	0.465

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE A6 Robustness checks—large islands excluded—GDP *per capita*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.228*** (2.779)		0.289*** (3.459)	0.285*** (3.515)	0.291*** (3.495)	0.316*** (5.083)	0.278*** (3.532)	0.275*** (3.248)
Population/area	−0.009** (−2.148)	−0.013 (−1.222)		−0.010 (−1.296)	−0.010 (−0.996)	−0.024*** (−3.192)	−0.017 (−1.664)	−0.010 (−1.623)
Overnights/population	0.184** (2.241)	0.155* (1.851)	0.164** (2.113)		0.162** (2.158)	0.125 (1.581)	0.121 (1.386)	0.183** (2.227)
Number of beds/number of establishments	0.004 (0.414)	−0.000 (−0.016)	0.001 (0.145)	0.006 (0.539)		−0.000 (−0.045)	−0.001 (−0.157)	0.001 (0.154)
Air movements (log)	0.876** (2.459)	0.849** (2.236)	0.823** (2.173)	0.821** (2.220)	0.833** (2.311)		0.828** (2.218)	0.828** (2.218)
Air Pollution in PM2.5	−0.452*** (−5.361)	−0.484*** (−6.058)	−0.473*** (−5.420)	−0.460*** (−5.524)	−0.466*** (−5.352)	−0.429*** (−5.821)		−0.474*** (−5.413)
Seasonality, overnights—max/min monthly overnights	0.003 (0.111)	−0.010 (−0.392)	−0.008 (−0.329)	0.009 (0.298)	−0.002 (−0.073)	−0.019 (−0.689)	−0.012 (−0.499)	
Stock of physical capital/total gross value added		1.133** (2.118)	1.100* (1.959)	1.089* (1.818)	1.078** (2.071)	1.365** (2.434)	1.070* (1.954)	1.047* (1.941)
Stock of physical capital/total gross value added—islands	0.119 (0.521)							
Stock of physical capital/total gross value added—non-islands	2.836*** (6.658)							
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.326* (1.753)						
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.272*** (3.766)						
Population/area—islands			−0.006 (−1.028)					
Population/area—non-islands			−0.029 (−1.482)					
Overnights/population—islands (overtourism per le isole)				0.116 (1.316)				

(Continues)

TABLE A6 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overnights/population—non-islands				0.336*** (2.965)				
Number of beds/number of establishments—islands					0.010 (0.291)			
Number of beds/number of establishments—non-islands					−0.001 (−0.090)			
Air movements (log)—islands						7.361*** (4.169)		
Air movements (log)—non-islands						0.673* (1.833)		
Air Pollution in PM2.5—islands							−0.917** (−2.176)	
Air Pollution in PM2.5—non-islands							−0.472*** (−5.284)	
Seasonality, overnights—max/min monthly overnights—islands								−0.014 (−0.543)
Seasonality, overnights—max/min monthly overnights—non-islands								0.289 (1.413)
Observations	265	265	265	265	265	265	265	265
R-squared	0.697	0.657	0.658	0.661	0.657	0.674	0.660	0.663

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE A7 Robustness checks—large islands excluded—Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of the population aged 25–64 with higher educational attainment	0.173** (2.372)		0.170** (2.428)	0.168** (2.565)	0.177** (2.509)	0.190*** (2.952)	0.164** (2.392)	0.168** (2.335)
Population/area	0.003 (0.622)	0.002 (0.309)		0.004 (0.800)	0.003 (0.501)	−0.005 (−0.644)	−0.003 (−0.409)	0.003 (0.677)
Overnights/population	0.145** (2.211)	0.141* (1.961)	0.147** (2.259)		0.144** (2.216)	0.123* (1.778)	0.106 (1.297)	0.155** (2.244)
Number of beds/number of establishments	0.001 (0.062)	−0.000 (−0.007)	0.001 (0.117)	0.007 (0.649)		−0.000 (−0.038)	−0.002 (−0.193)	0.001 (0.068)
Air movements (log)	0.060 (0.233)	0.055 (0.216)	−0.003 (−0.011)	0.014 (0.053)	0.057 (0.230)		0.032 (0.131)	0.043 (0.166)
Air Pollution in PM2.5	−0.310*** (−4.178)	−0.318*** (−4.387)	−0.320*** (−4.522)	−0.302*** (−4.306)	−0.311*** (−4.145)	−0.289*** (−4.239)		−0.314*** (−4.214)
Seasonality, overnights—max/min monthly overnights	−0.044** (−2.004)	−0.045** (−2.163)	−0.045** (−2.075)	−0.024 (−1.054)	−0.044* (−1.685)	−0.050** (−2.153)	−0.048** (−2.283)	
Stock of physical capital/total gross value added		−0.208 (−1.357)	−0.224* (−1.705)	−0.237* (−1.731)	−0.224 (−1.586)	−0.078 (−0.455)	−0.250* (−1.841)	−0.250* (−1.914)
Stock of physical capital/total gross value added—islands	−0.278** (−2.167)							
Stock of physical capital/total gross value added—non-islands	−0.123 (−0.412)							
Share of the pop. Aged 25–64 with higher educ. attainment—islands		0.191 (1.421)						
Share of the pop. Aged 25–64 with higher educ. attainment—non-islands		0.168** (2.440)						
Population/area—islands			0.010** (2.266)					
Population/area—non-islands			−0.028 (−1.574)					
Overnights/population—islands (overtourism per le isole)				0.088 (1.420)				

(Continues)

TABLE A7 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overnights/population—non-islands				0.355*** (4.920)				
Number of beds/number of establishments—islands					0.001 (0.058)			
Number of beds/number of establishments—non-islands					0.000 (0.027)			
Air movements (log)—islands						3.611 (1.362)		
Air movements (log)—non-islands						−0.042 (−0.176)		
Air Pollution in PM2.5—islands							−0.715* (−1.949)	
Air Pollution in PM2.5—non-islands							−0.315*** (−4.157)	
Seasonality, overnights—max/min monthly overnights—islands								−0.048** (−2.085)
Seasonality, overnights—max/min monthly overnights—non-islands								0.112 (1.242)
Observations	265	265	265	265	265	265	265	265
R-squared	0.465	0.465	0.473	0.478	0.464	0.475	0.471	0.468

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE A8 Robustness checks—alternative tourism indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	GDP *per capita*		**Employment**		**GDP *per capita***	
Stock of physical capital/total gross value added	1.083* (1.804)	1.102 (1.647)	−0.209* (−1.672)	−0.183 (−1.107)	1.109** (2.170)	1.079** (2.110)
Share of the pop. Aged 25–64 with higher educ. Attainment	0.290*** (3.480)	0.281*** (3.385)	0.167** (2.413)	0.155** (2.394)	0.283*** (3.699)	0.280*** (3.681)
Population/area	−0.012* (−1.731)	−0.010 (−1.196)	0.002 (0.403)	0.004 (0.820)	−0.012 (−1.305)	−0.010 (−0.942)
Overnights/population					0.155* (1.976)	0.154** (2.037)
Number of beds/number of establishments	0.001 (0.060)	0.006 (0.457)	0.001 (0.081)	0.007 (0.758)		
Air movements (log)	0.893** (2.378)	0.881** (2.349)	0.065 (0.254)	0.050 (0.190)	0.846** (2.367)	0.831** (2.327)
Air Pollution in PM2.5	−0.467*** (−5.401)	−0.448*** (−5.415)	−0.307*** (−4.149)	−0.281*** (−4.005)	−0.475*** (−5.488)	−0.468*** (−5.321)
Seasonality, overnights—max/min monthly overnights	0.006 (0.290)	0.020 (0.920)	−0.039** (−2.573)	−0.020 (−1.425)	−0.010 (−0.401)	−0.003 (−0.120)
Arrivals/population	0.535* (1.650)		0.610** (2.380)			
Arrivals/population– Islands		0.360 (1.127)		0.375** (2.114)		
Arrivals/population—non-islands		1.155** (2.174)		1.438*** (4.543)		
Number of beds/area (in km^2)					0.022 (0.340)	
Number of beds/area (in km^2)—islands						−0.008 (−0.103)
Number of beds/area (in km^2)—non-islands						0.100 (1.059)
Seasonality, arrivals—max/min monthly arrivals—islands						
Seasonality, arrivals—max/min monthly arrivals—islands						
Seasonality, arrivals—max/min monthly arrivals—non-islands						
Observations	273	273	273	273	273	273
R-squared	0.652	0.656	0.466	0.480	0.657	0.658

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE A8 (Continued)

	(7)	(8)	(5)	(6)	(7)	(8)
	Employment		**GDP *per capita***		**Employment**	
Stock of physical capital/total gross value added	−0.215* (−1.678)	−0.267** (−2.258)	1.043* (1.803)	0.865* (1.693)	−0.276 (−1.333)	−0.349 (−1.626)
Share of the pop. Aged 25–64 with higher educ. Attainment	0.170** (2.642)	0.165*** (2.648)	0.293*** (3.733)	0.273*** (3.550)	0.192*** (2.800)	0.184*** (2.655)
Population/area	0.001 (0.203)	0.005 (0.745)	−0.011* (−1.669)	−0.010* (−1.733)	0.002 (0.487)	0.003 (0.591)
Overnights/population	0.136** (2.140)	0.135** (2.308)	0.127 (1.352)	0.173 (1.597)	0.096 (0.931)	0.115 (1.028)
Number of beds/number of establishments			0.001 (0.083)	0.004 (0.441)	0.001 (0.141)	0.003 (0.276)
Air movements (log)	0.048 (0.190)	0.021 (0.086)	0.872** (2.324)	0.914** (2.535)	0.077 (0.294)	0.094 (0.366)
Air Pollution in PM2.5	−0.317*** (−4.245)	−0.304*** (−3.971)	−0.475*** (−5.565)	−0.441*** (−5.293)	−0.312*** (−4.274)	−0.298*** (−4.122)
Seasonality, overnights—max/min monthly overnights	−0.048** (−2.022)	−0.035 (−1.534)				
Arrivals/population						
Arrivals/population– Islands						
Arrivals/population—non-islands						
Number of beds/area (in km^2)	0.027 (0.623)					
Number of beds/area (in km^2)—islands		−0.024 (−0.614)				
Number of beds/area (in km^2)—non-islands		0.162* (1.825)				
Seasonality, arrivals—max/min monthly arrivals—islands			0.019 (0.209)		−0.054 (−0.530)	
Seasonality, arrivals—max/min monthly arrivals—islands				−0.012 (−0.114)		−0.067 (−0.611)
Seasonality, arrivals—max/min monthly arrivals—non-islands				1.228*** (3.663)		0.436** (2.096)
Observations	273	273	273	273	273	273
R-squared	0.467	0.474	0.657	0.687	0.455	0.465

Notes: Robust t-statistics in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

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Resumen. Este artículo investiga las diferentes pautas de crecimiento de las islas y las regiones continentales mediante un examen de sus diferencias en materia de turismo y características territoriales. Se consideraron los patrones de crecimiento de la renta *per cápita* y del empleo en un modelo de datos de panel basado en 74 regiones de siete países europeos entre 2008 y 2019. Los resultados muestran la variación de la importancia de algunos factores de crecimiento, especialmente los relacionados con el turismo y la sostenibilidad medioambiental, entre las islas y las regiones continentales. El artículo sugiere implicaciones políticas específicas para las regiones insulares de acuerdo con las directrices de la Unión Europea. Las conclusiones respaldan la necesidad de aplicar distintos enfoques para mantener el crecimiento en las islas y en las regiones continentales, en particular para la industria del turismo.

抄録: 本稿では、離島と本土地域の成長パターンの違いを、観光と土地の特性の違いから検討する。2008~2019年まで欧州の7カ国の74地域のパネル・データ・モデルにおいて、一人当たりの所得と雇用成長のパターンを考察した。結果から、いくつかの成長要因、特に観光と環境の持続可能性に関連するものの重要性が、離島と本土地域とでどう違うかが示された。本稿は、EUのガイドラインに沿った、島嶼地域に対する具体的な政策的含意を示唆するものである。本研究の知見は、成長の維持、特に観光産業のためには、離島と本土地域とで異なるアプローチを追求する必要性を支持するものである。