Regional tourism dynamics in Japan: An exploratory spatial analysis

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Abstract

Assuming tourism as a place oriented activity, where tourism flows often cross regional borders, local and global indicators of spatial autocorrelation can be useful tools to identify and explain different patterns of regional tourism dynamics and their determinants. These techniques recently became widely used in applied economic studies, as a result of their useful insights to understand spatial phenomena and benefiting from the existence of georeferenced data and adequate software tools. This tendency is also observed in the tourism sector in the last few years, although the application of these methodologies is still scarce in tourism studies. In this work, these methodologies are applied to the case of the Japanese Prefectures, leading to the identification of different patterns of spatial heterogeneity and agglomeration processes related to regional tourism dynamics in Japan, with a view on policy and managerial recommendations. The results clearly reveal the existence of such spatial effects, reflecting the importance of central areas of Japan in terms of tourism performance. It was also possible to observe that regions where tourism plays a more prominent role in terms of its importance within regional employment do not present a relatively high performance in terms of economic growth.
1. Introduction

Tourism attractiveness relies on a wide range of resources available in each destination: apart from the “traditional” services (transport, accommodation, food), other aspects like the existence of natural resources and cultural amenities or the interaction with local communities clearly influence the preferences of tourists. On the other hand, some characteristics of the provision of tourism services enhance the close connection between tourism and territory: co-terminality (direct interaction between producer and consumer), spatiality and temporality (consumption and production of tourism services occur in the same place at the same time) distinguish tourism from other economic activities. The notion of tourism destination as an amalgam of different products and services is clearly expressed by Buhalís (2000) or Romão et al. (2015), while Crouch and Richie (2003), Vanhove (2005) or Wall and Mathieson (2006) provide comprehensive analyses of the systemic character of tourism activities at destination level.

As a place-oriented activity (see e.g. Williams and Shaw, 2011, or Brouder and Eriksson, 2013), tourism has a high potential for the development of practice and place-based innovation strategies (as expressed by Hjalager, 2010, or the European Commission, 2006), aiming to integrate the unique and distinctive territorial characteristics that contribute to distinguish each destination from each other, in the context of a global competition for the attraction of tourists (see e.g. Hall and Williams, 2008, or Malakauskaite and Navickas, 2010). In fact, the development of information and communication technologies in the last decades transformed the tourism sector, enhancing the interoperability and interactivity between producers and users of tourism products and services (e.g. Buhalís and Law, 2008; Romão et al. (2015) or Wang, Yu and Fesenmaier, 2001).

It must be also noticed that tourism flows often cross regional borders. Tourists primarily visiting one region can also visit other places around their main destination, implying that the attractiveness of a place can also depend on the resources and dynamics registered in the neighborhood. These interactions between tourism destinations have important implications in terms of resource management, mobility or destination promotion, which should be addressed at policy or managerial levels. In this study, the spatial effects and interactions related to tourism activities in Japan will be analyzed at regional level, considering 46 prefectures, represented in the map in Annex 1 (Wakayama could not be included due to lack of some data).

Taking these aspects into consideration, spatial analysis and spatial econometric models can be useful tools in order to identify and to explain different patterns of regional tourism dynamics and their determinants. For the purposes of this analysis, Moran-I statistics (described in detail in Section 2) will be used for a univariate analysis (presented in Section 3) and a bivariate analysis (presented in Section 4), aiming to identify different spatial patterns, agglomeration process and spatial heterogeneity regarding tourism activities in Japanese prefectures. These analyses require the definition of a “weights matrix”, summarizing the impacts of each region on its neighbors. A brief explanation of the construction of this matrix is provided in the next section, while the full list of regions and correspondent neighbors is presented in Annex 2.

The data used for this study are presented in Annex 3. The values for the regional gross value added (GDP) and for the regional GDP in the tourism sector (GDPT) were divided by the number of inhabitants, in order to reduce the variability of the data and to increase the reliability of the estimations. The same has been done regarding the number of college graduate in the region (EDUC), a proxy for the qualifications of the labor force. The other variables directly related to tourism taken into consideration are the share of tourism within the regional GDP (GDPTS) and the regional employment (EMPTS), measuring the regional specialization in tourism, the nights spent in accommodation establishments (also per capita) (N), the share of foreigners within the nights spent in accommodation (NFS) and the length of stay of tourists (LS). The source of information for population, college graduates, employment, and employment in tourism was the "2010 Population Census", by the Statistics Bureau of Japan. Data for GDP and GDP in tourism was collected in the "Annual Report on Prefectural Accounts", published by the Cabinet Office of the Government of Japan. Finally, the
number of overnight stays (total and foreigners) and the number of visitors were found at the "Accommodation Survey" by the Japan Tourism Agency.

2. Local and global indicators of spatial autocorrelation

These techniques recently became widely used in applied economic studies, as a result of their useful insights to understand spatial phenomena and benefiting from the existence of geo-referenced data and adequate software tools. This tendency is also observed in tourism research in the last few years, although the application of these methodologies is still scarce (see e.g. Ma, Hong and Zang, 2015; Marrocu and Paci, 2013; Patuelli et al., 2013; or Yang & Fik, 2014). In the case of Japan, the data for tourism activities is not abundant, once only in 2012 the Japanese Tourism Agency started to collect information with harmonized criteria at Prefectural level. Thus, this study (based on data from 2010 presented in Annex 3) is a very exploratory work, based on a limited number of variables.

The existence of such spatial effects can be tested using Global and Local Indicators of Spatial Autocorrelation by introducing spatially lagged variables (Anselin, 1995). This analysis can be conducted for one specific variable (univariate analysis, with the value for one region – e.g. tourism demand - being compared with the average value for its neighbors), or establishing a relation between two variables (bivariate analysis, with the value for one variable in one region – e.g. tourism demand - being compared with the average value for a different variable in the neighborhood – e.g. natural parks).

A Local Indicator of Spatial Autocorrelation (LISA) is a statistic that gives, for each observation, an indication of the extent of significant spatial clustering of similar values around that observation. The sum of the LISAs for all observations should be proportional to a Global Indicator of Spatial Autocorrelation. In this case, the Moran-I statistic will be used, given by the following expression:

\[ I = z_i \sum w_{ij} z_j \]

where:

- \( z_i \) is the original variable \( x_i \) in “standardized form” or in “deviation form”;
- \( w_{ij} \) is the spatial weight.

The “spatial weight” measures the impact of a region in each other (see e.g. Elhorst, 2014; or Vega and Elhorst, 2013). Normally, it is assumed that this impact tends to decay with distance. There are several methods to define this proximity (geographic contiguity or geographical distance, but also other types of indicators, like the intensity of trade between regions). In this case, taking into consideration that tourism activities can spread among regions geographically close, a measure based on geographical distance is used. As the territory of Japan includes a large quantity, the contiguity criterion is not possible to be used, as many regions would have no neighbors. Thus, the neighborhood will be defined taking into consideration the closest 5 neighbors for each region, considering the geographical distance between the centroids of each region. With this information, a spatial weight matrix is defined, identifying which regions impact others. Annex 2 presents the list of the 5 “neighbors” for each region considered in this analysis.

In this case, the Moran-I statistic will be used for the univariate and the bivariate analysis to be conducted. In both cases, a Global Indicator of Spatial Autocorrelation will be computed, which is the average of the Local Indicators identified for the all regions. The statistical relevance of the scores obtained can be compared with a random spatial distribution, generated through a process of permutations (99, in this case). Based on this process, a z-score can be obtained, allowing to infer the statistical relevance of the spatial effects identified. In this work, a significance level of 5% will be taken into account, implying that spatial effects will be considered when the z-scores obtained for the Moran’s I statistic are above 1.96 (an informed and detailed explanation on these calculations is provided by Anselin, 1995; 2005).
The univariate analysis for the different variables included in this study will be presented in Section 2. For each variable, a Figure will show 3 components: a map on the left, with the distribution of the values observed for that variable (based on quintiles, with a similar number of observations in each class and darker colors representing higher values); a box-plot in the center, representing in a column the scores for the different regions, allowing to identify “outliers” (extreme values, observed when the score for one region is above or below the average plus or minus the standard deviation multiplied by 1.5); and a cluster map on the right, representing the type of local spatial autocorrelation identified for the regions where this was statistically relevant.

It is important to notice that the clusters identified in the map of the right hand are represented only by its center, which means that the cluster also includes the 5 neighbor regions. These clusters occur when the value obtained for the non-lagged variable is more similar (positive autocorrelation) or dissimilar (negative autocorrelation) to the value of the lagged variable (the weighted average of the neighboring values) than it would be in case of spatial randomness. They are represented by dark colors when a positive autocorrelation is identified (red when high values for one region and its neighbors are identified and blue for low values for a region and its neighbors). Light colors are used to represent negative autocorrelation (blue for low values in a region surrounded by regions with high scores and red for the inverse situation). The same type of representation will be used for the maps representing the bivariate analysis.

A bivariate analysis relating one variable (non-spatially lagged) to each of the other variables (spatially lagged) included in the study is presented in Section 3. Sub-section 3.1 presents the bivariate analysis assuming the regional gross domestic product of the tourism sector as the non-lagged variable, analyzing how the regional tourism performance is linked to the dynamics observed in the surrounding areas. In Sub-section 3.2, a similar analysis is conducted, assuming the regional (overall) GDP as the non-lagged variable, aiming to identify the impacts of tourism and territorial resources on the regional economic growth. In both case, figures with a map (on the left hand) and a diagram (on the right hand) will represent these relations.

3. Univariate spatial analysis

The first variable analyzed in this section is the regional gross domestic product, represented in Figure 1. The map representing the data (left hand) reveals a relative concentration of high scores in the central region of Japan. Nevertheless, the box-plot in the center reveals that the Prefecture of Tokyo is clearly above the average (represented by a red horizontal line) and also clearly above the average plus the standard deviation multiplied by 1.5 (represented by a black horizontal line). In fact, the GDP per capita in Tokyo almost reaches 7 million yen, while the next Prefectures in the rank (Aichi, where the city of Nagoya is located) has less than 4.5 million yen per inhabitant. Although the score obtained for the Moran’s I statistic is low (0.004, with a corresponding z-value of 1.008), suggesting the weakness of the global spatial effects, some local spatial effects are identified. Clusters of low scores are located in peripheral areas in the North (Hokkaido, Aomori, Akita) and South (Saga and Kagoshima), while high values cluster around the Prefectures of Gunma and Shizuoka. The Prefectures of Saitama and Chiba reveal relatively low scores, surrounded by regions where GDP per capita is relatively high.
In Figure 2, a similar analysis is conducted for the gross value added created in the tourism sector. In this case, the Moran’s I statistic has a score of 0.191, with a corresponding z-value of 3.440, clearly above the threshold of 1.96 and suggesting the existence of global spatial effects. Similarly to the previous case, the map on the left reveals a concentration of high-values in the central region, while the box-plot confirms the Prefecture of Tokyo as a positive outlier (0.43 million yen per habitant, while Kyoto and Osaka – the next in the rank – achieve around 0.27 million). The local indicators of spatial autocorrelation in the map on the right hand reveal clusters of low scores around the Prefectures of Shimane, Hiroshima, Yamaguchi and all the Northern regions, while high values concentrate mostly around Ibaraki, Chiba and Yamanashi. Relatively low scores surrounded by high values were identified around the Prefectures of Gumma, Saitama and Shizuoka.

Figure 3 represents the data related to the regional specialization in tourism activities, measured by the share of tourism in the regional GDP. The global spatial effects are low, as suggested by the score obtained for the Moran’s I statistic (0.042, with a corresponding z-value of 0.981), implying a reduced number of local spatial clusters. In this case, the map on the left shows a relative dispersion of values along the country, while the box-plot reveals that the Prefecture of Nara (with 9.3 of its GDP generated in the tourism sector) is clearly above all the other regions. Local spatial clusters with low scores are identified around the Prefectures of Shimane, Hiroshima and Yamaguchi, while high values only cluster around Osaka. Shiga and Wakayama reveal a low specialization in tourism compared to their neighbors, while the inverse situation occurs in Kochi (the other Prefecture where tourism represents more than 8% of the regional GDP).
Figure 3: Univariate Analysis
Share of tourism in the regional GDP

The regional specialization in tourism can also be analyzed taking into consideration its share in the regional employment, represented in Figure 4. In this case, the score for the Moran’s I statistics (0.271, with a corresponding z-value of 4.033) suggests the existence of global spatial autocorrelation, implying the existence of a relatively high number of spatial clusters, although, as it can be observed in the map on the left hand, very similar scores are registered along the country (higher score for Yamanashi – with more than 11% of the work force employed in tourism - and lower scores for Okayama and Tokushima – with less than 8.5% , but no outlier detected in the box-plot). Clusters of high values are found in Nagano, Tokyo and Kanagawa, while regions with relatively low scores cluster in Southern Western part of Japan (Shimane, Hiroshima, Tottori, Okayama and Kagawa). Saitama, Saga and Miyazaki are regions with relatively low weight of the employment in tourism, surrounded by regions where this weight is relatively high. The inverse situation occurs in Kyoto and Kochi, two regions where tourism is especially important for the regional economy and employment.

Figure 4: Univariate Analysis
Share of tourism in the regional employment

Tourism demand is represented in Figure 5, represented by the number of overnights stays in accommodation establishments, divided by the regional population. The global Moran I statistics (-0.032, with z-value of -0.047) suggests very low spatial effects. Despite some exceptions, the map on the left reveals some concentration of high scores in central regions of Japan, while the box-plot reveals Yamanashi as an outlier, clearly above the average (almost 6 nights spent by tourists per habitant). Clusters of regions with high tourism demand surrounded by regions where this score is low happen around Kyoto and Kochi, confirming the importance of tourism for these regions.
A different situation occurs when the share of foreigners within the overnights spent in accommodation establishments is taken into account. In this case, the score for the Moran I statistic (0.143, with a z-value of 1.946) is high, clearly suggesting the existence of spatial effects. High scores clusters around the Prefectures of Yamanashi and Kanagawa, while low scores occur in Akita, Iwate, Yamagata, Miyagi, Nigata and Fukushima. Gumma, Saitama, Shizuoka and Nara are regions where a lower proportion of foreign tourists is related to relatively high scores in the neighborhood. The box-plot reveals that Chiba, Yamanashi and Kyoto (more than 10% of foreigners), Osaka (15%) and Tokyo (20%) are clearly above the national average.

Low spatial effects are also identified when observing the length of stay of tourists (Moran’s I statistic of 0.093 and z-value of 1.346) [Fig. 7]. As it is observed in the map on the right hand, high values cluster around Ibaraki, Chiba and Kanagawa, while regions registering relatively low length of stay when compared with the neighbors cluster around Tochigi and Yamanashi. The inverse situation (high length of stay and low levels in the surrounding areas) is observed in the Southern regions of Hiroshima, Fukuoka and Kagoshima The box-plot reveals positive outliers for Tokyo and Kyoto (above 1.4 days per tourist), where visitors tend to stay for longer time than the national average.
Figure 7: Univariate Analysis
Length of stay of tourists

Although it does not have necessarily a direct relation with the performance of the tourism sector, the levels of the qualification of the regional population (represented in Figure 8) are generally assumed to have a positive impact on the economic dynamics of the region, the innovation capabilities or the quality of the services. In this case, the number of persons achieving the graduate level of education (as a proportion of the total population) is assumed as a proxy for the qualification of the labor force in each region. In this case, the score for the Moran’s I statistic (0.493, with a z-value of 5.579) reveals the existence of spatial effects. In fact, the map on the left clearly reveals higher scores in the center of Japan and lower scores in the peripheral areas, while the box-plot shows that Tokyo, Kanagawa (both around 20%) and Nara (with 18% of graduates within the regional population) are much above the national average for this indicator. The map on the right hand confirms this idea, with clusters of high values in Saitama, Chiba, Yamanashi, Tokyo, Kanagawa, Shizuoka, Osaka and Kyoto, while low scores concentrate around the Prefectures of North (Hokkaido, Aomori, Akita, Iwate, Yamagata and Miyagi) and South of Japan (Saga, Kumamoto and Kagoshima).

Figure 8: Univariate Analysis
Qualifications (share of college graduates in the regional population)

4. Bivariate spatial analysis

A bivariate spatial analysis is presented in this section, establishing a relation between a non-lagged variable (regional gross domestic product of the tourism sector per habitant in Sub-section 3.1 and overall regional gross domestic product per habitant in Sub-section 3.2) and a lagged variable (for each of the variables presented in the previous sections). A map representing the local indicators of spatial autocorrelation (the same type that was developed in the previous section) will be presented on the left hand of each figure. On the right hand, a bi-dimensional diagram representing the relation
between the non-lagged and lagged variable will show the type or relation established between the variables (high values for both variables will appear in the second quadrant, while low values for both will be in the third quadrant).

4.1. Bivariate Spatial Analysis – Gross Domestic Product in the tourism sector

As it was possible to expect, a positive relation between the Gross Domestic Product in the tourism sector and the share of tourism in the overall regional GDP (Figure 9) has been identified. The high score obtained for the Moran’s I statistic (0.166, with z-value of 2.450) clearly suggests the existence of spatial effects, represented in the map on the left hand. Nevertheless, despite the high score for the global spatial autocorrelation, only three clusters are identified at local level: high values around Kyoto and low scores around Shimane and Hiroshima. The diagram on the right hand shows a positive correlation between the variables and also reveals that the GDP per capita of the tourism sector is very high in Tokyo, although the share of tourism in the regional GDP is not the highest among the Japanese Prefectures.

Figure 9: Bivariate Analysis
(GDP in tourism and share of tourism in the regional GDP)

A positive correlation between variables, also with a clear evidence of the existence of global spatial effects (Moran’s I statistic of 0.191, with z-value of 2.827) has been identified for the relation between GDP in tourism and the share of tourism within the regional employment (Figure 10). In this case, it is possible to verify in the diagram that Kyoto appears with a proportion of the labor force employed in the tourism sector much above the other regions of Japan. Clusters of regions with high values for both variables were identified around the Prefectures of Nagano, Tokyo, Kanagawa and Miyazaki, while low scores for both variables cluster in Southern Western regions (Tottori, Okayama and Kagawa). Relatively high values for the GDP in tourism are correlated to low values of the share of tourism in the GDP in the neighborhood for Mie, Kyoto and Kochi, while the contrary situation occurs in Saitama, Shizuoka, Saga and Nagasaki.
A negative relation is identified between the GDP of the tourism sector in each region and the nights spent in accommodation establishments in the surrounding Prefectures, suggesting low regional spillover effects (Figure 11). The global Moran-I statistic obtained for this relation is very low (-0.033, with a z-value of -0.449) and clusters were identified only for Chiba and Kochi (high GDP in tourism with low tourism demand in the neighborhood).

The Moran’s I statistic scores very high (0.208, with a z-value of 3.288) when GDP in tourism is correlated with the lagged variable measuring the share of foreigners with the nights spent in accommodation establishments (Figure 12). The diagram on the right hand reveals a positive correlation between the variables and shows Tokyo as an outlier, with high GDP produced by tourism and not so high proportion of foreigners in the regional tourism demand. The map on the left identifies clusters of relatively low values for both variables in Hokkaido, Akita, Iwate, Yamagata, Miyagi, Niigata and Fukushima, Hiroshima and Ehime, where tourism is more related to national visitors. The
same happens in Kochi although, in this case, the GDP per capita generated by tourism is relatively high. Relatively high values cluster around Tokyo and Kanagawa, while Saitama and Shizuoka present a relatively low score in the GDP of the tourism sector, despite the existence of a relatively high share of foreigners within the tourism demand in the surrounding areas.

Figure 1: Bivariate Analysis (GDP in tourism and share of foreigners in tourism demand)

Assuming the visitor’s length of stay as the lagged variable also leads to a clear positive spatial autocorrelation with the GDP of the tourism sector (Moran’s I statistic of 0.149 with z-value of 2.657), although this does not happen if we only consider the duration of the visits of foreign guests. The diagram in Figure 13 also reveals Tokyo as an outlier, with a high GDP in the tourism sector despite the not so high duration of the trips in the surrounding areas. High values for both variables are found around Tochigi, Ibaraki, Chiba, Yamanashi, Kanagawa and Nara, while a high GDP in tourism is related to low duration of the trips around Fukuoka. The contrary happens in the Prefectures of Shizuoka and Wakayama.

Figure 13: Bivariate Analysis (GDP in tourism and visitor’s length of stay)
The last lagged variable where a global spatial autocorrelation has been identified regarding the GDP in tourism is the regional level of education (the Moran’s I statistic scored 0.326, with a z-value of 5.343). A large number of clusters is represented in the map in Figure 14, with high scores for both variables identified around Ibaraki, Chiba, Yamanashi, Tokyo, Kanagawa, Mie, Osaka and Kyoto. On the other hand, low values cluster around peripheral regions in the North (Hokkaido, Aomori, Akita, Iwate, Yamagata and Miyagi) and South of Japan (Kumamoto and Kagoshima), where the educational levels are lower. Low levels for the GDP in tourism related to high levels of education in the neighborhood were identified in Saitama and Shizuoka.

Figure 14: Bivariate Analysis
(GDP in tourism and level of education)

4.2. Bivariate Spatial Analysis – Gross Domestic Product

The final part of this analysis assumes the GDP per habitant in each region as the non-lagged variable, analyzing its spatial relation with the other variables included in the study, with a particular focus on the relation with tourism. In fact, a high score obtained for the global Moran’s I statistic (0.12, with a z-value of 2.643) when defining the GDP in the tourism sector as the lagged variable (Figure 14). The diagram in Figure 15 reveals this positive spatial autocorrelation, confirmed by the large number of spatial clusters identified in the map on the left hand. A large number of clusters with low scores for both variables has been found in Northern regions (Hokkaido, Aomori, Akita, Iwate, Yamagata and Miyagi) and also in Shimane, while relatively high scores cluster around the Prefectures of Gumma and Shizuoka. Low overall GDP despite the relatively high GDP in tourism in the surrounding areas was found around Saitama, Chiba and Kanagawa, while the inverse situation occurs in Hiroshima and Yamaguchi.
When assuming the share of tourism in the regional GDP as the lagged variable, it is also possible to identify a positive global spatial autocorrelation with the overall GDP (Moran’s I statistic of 0.135 and corresponding z-value of 2.136). The map in Figure 16 shows high values clustering around Osaka, while low scores for GDP per capita are related to a low share of tourism in the regional GDP in the surrounding areas of Shimane and Kochi. Hiroshima and Yamaguchi are the center of regional clusters with relatively high GDP with low share of tourism in the regional economy in the neighborhood. The inverse situation (relatively low GDP with relatively high share of tourism in the regional economy) is observed around Wakayama.

The other variable aiming to measure the regional level of specialization in tourism (share of tourism in the regional employment) also reveals a positive spatial autocorrelation with regional GDP per capita (Moran’s I statistic scoring 0.125 and a z-value of 2.013). Figure 17 shows high values for both variables were found around Nagano, Tokyo, and Shizuoka, while low values cluster in Southern
regions (Tottori, Shimane and Kochi). Negative spatial autocorrelation was found in Saitama and Kanagawa (relatively low GDP and high employment in tourism in the surrounding regions) and also in Mie, Okayama, Hiroshima, Kagawa and Tokushima (relatively high GDP with low employment in tourism in the neighborhood).

Figure 17: Bivariate Analysis
(GDP and share of tourism in regional employment)

A negative relation between regional GDP per capita is identified when assuming the nights spent in accommodation establishments as the lagged variable (diagram in Figure 18). In this case, the score for global indicator of spatial autocorrelation is very low (-0.033, with corresponding z-value of -0.429), suggesting the existence of few spatial clusters. Regions with low values for both variables cluster around Chiba and Kochi, while Mie and Okayama reveal high level for the GDP with low levels of tourism demand in the surrounding areas.

Figure 18: Bivariate Analysis
(GDP and nights spent in accommodation establishments)
On the contrary, a positive relation is identified in the diagram presented in Figure 19, relating regional GDP with a non-lagged variable measuring the share of foreigners within the regional tourism demand. In this case, the global Moran’s I statistic scores 0.106 and its corresponding z-value (1.834) is close to the significance level of 95%. In fact, a relatively high number of spatial clusters can be identified, with high values for both variables found around Ibaraki and Shizuoka. On the contrary, Akita, Iwate, Yamagata, Miyagi, and Ehime score relatively low in both cases. Negative autocorrelation can be found around Saitama and Kanagawa (low GDP with high share of foreigners among the visitors in the neighborhood) and also around Nigata, Hiroshima and Kagawa (relatively high GDP with low share of foreign visitors in the surrounding areas).

Figure 19: Bivariate Analysis
(GDP and share of foreigners within tourism demand)

The positive correlation identified between regional GDP and the visitor’s length of stay in the surrounding areas also reveals a low score for the Moran’s I statistic (0.081), with a corresponding low z-value (1.401), suggesting the existence limited spatial spillovers. High values for both variables cluster around Tochigi, Ibaraki, Yamanashi, Shizuoka and Osaka, while low values are found around Fukuoka. Negative autocorrelation is found around Chiba and Kanagawa, with relatively low scores for the regional GDP and long length of stay of the visitors in the neighborhood.
Positive global spatial effects were clear when the education level was taken into account (Moran’s I statistic of 0.265 and corresponding z-value of 4.455). Figure 21 represents the local clusters identified for the relation between these variables, with high values clustering in central regions of Japan (Ibaraki, Yamanashi, Tokyo, Shiga, Shizuoka, Osaka and Kyoto), while low values cluster in peripheral regions of the North (Hokkaido, Aomori, Akita, Iwate, Yamagata and Miyagi) and South (Fukuoka and Kagoshima) of the country. Regions with relatively low GDP per capita surrounded by neighbors with high levels of education were found around Saitama, Chiba, Kanagawa and Wakayama.

5. Results and discussion

This analysis clearly reveals the importance of the central regions of Japan – especially those around Tokyo Metropolitan area – both in terms of their GDP and also in terms of the GDP produced by the tourism sector. This is also revealed by the high education levels of the residents of these regions, when compared with the peripheral areas of Japan (North and South). Confirming this idea, the spatial analysis conducted revealed the existence of clusters of regions with high levels for the GDP in tourism around the central areas of Ibaraki, Chiba and Yamanashi, while regions where high GDP in tourism are positively correlated with high GDP for the overall regional economy cluster around Gumma and Shizuoka (also clearly related to the Tokyo Metropolitan area). In general terms, these are also the regions where foreigners assume greater importance within the overall visitors and also those where the length of stay tends to be larger.

In terms of tourism, it is interesting to notice that the high levels registered in Tokyo for the GDP per habitant in tourism do not have a similar correspondence in terms of tourism demand, suggesting that tourism products and services provided in this region have higher value added than in other regions of Japan and revealing higher levels of productivity. Despite its leadership among the Japanese Prefectures regarding the GDP of the tourism sector, Tokyo does not rank among the first positions when looking at the specialization in tourism, both when we consider the GDP or employment in the tourism sector within the overall regional economy. In terms of tourism policies, these results suggest
that non-central regions of Japan should aim to diversify their supply of tourism services in order to increase the length of stay of visitors.

It is also possible to observe that the Northern regions of Japan clearly reveal lower levels of economic development (GDP per capita) and also lower levels of GDP generated by the tourism sector, even when tourism is especially important for regional employment. One clear example is the most Northern region of Japan (Hokkaido), ranking in the first positions in terms of the share of the active population employed in tourism but revealing a much weaker position in terms of the contribution of tourism for the regional GDP. This clearly suggests that the region is providing services with relatively low value added and less economic impacts on the regional economy. This suggests that these regions can use tourism activity in order to promote stronger linkages with other economic sectors relevant at regional level, like those related to creative industries, food services, entertainment and culture or agriculture and fisheries.

The study also showed the importance of tourism for the areas around Kyoto and Osaka, where an high importance of tourism for the regional GDP is related to high levels of regional GDP or value added in tourism. On the other hand, the particular dynamism of the region of Kochi, with a high importance of tourism for the regional GDP and employment, which contrasts with the performance of its neighbors in the Southeast part of Japan. Nevertheless, this performance is also related to a relatively low level of the regional GDP (and education), suggesting the provision of low value added tourism products and services, with low productivity. Like Kyoto, Kochi is a region with a high tourism demand in contrast with the weak dynamism in the surrounding areas, but clearly dependent on the national visitors. In this case, promotional initiatives oriented to foreign tourists could be implemented.

Despite some interesting results - which confirm the relevance of spatial analysis for the analysis of regional tourism dynamics – this study is still extremely conditioned by the limited information available at Prefectural level. Nevertheless, the systematic collection of information implemented by the Japanese Tourism Agency in 2012, with harmonized criteria at Prefectural level, will allow the development of a more detailed and comprehensive analysis in the near future. Moreover, the availability of a series of data for some periods will create the necessary condition for a regression analysis, which will allow the estimation and quantification of the spatial effects among Japanese regions regarding tourism activities and their determinants.
References:


Annex 1: Map of Japan and identification of the Prefectures
Annex 2:

5 nearest neighbors for each Prefecture:

Hokkaido: Aomori, Iwate, Akita, Miyagi; Yamagata;
Aomori: Akita, Iwate, Miyagi, Yamagata, Hokkaido
Akita: Iwate, Aomori, Yamagata, Miyagi, Fukushima;
Iwate: Akita, Miyagi, Aomori, Yamagata, Fukushima;
Yamagata: Miyagi, Fukushima, Akita, Nigata, Iwate
Miyagi: Yamagata, Iwate, Fukushima, Akita, Tochigi;
Nigata: Gunma, Tochigi, Fukushima, Yamagata, Saitama;
Fukushima: Tochigi, Yamagata, Ibaraki, Nigata, Miyagi;
Ishikawa: Toyama, Gifu, Fukui, Nagano, Shiga;
Tochigi: Ibaraki, Fukushima, Saitama, Gunma, Tokyo;
Gunma: Saitama, Tochigi, Tokyo, Yamanashi, Niigata;
Nagano: Yamanashi, Toyama, Gunma, Gifu, Shizuoka;
Toyama: Ishikawa, Gifu, Nagano, Fukui, Aichi;
Ibaraki: Tochigi, Chiba, Saitama, Tokyo, Fukushima;
Gifu: Aichi, Fukui, Toyama, Ishikawa, Nagano;
Fukuoka: Shiga, Gifu, Kyoto, Ishikawa, Aichi;
Saitama: Tokyo, Kanagawa, Gunma, Yamanashi, Tochigi;
Chiba: Tokyo, Ibaraki, Kanagawa, Saitama, Tochigi;
Yamanashi: Shizuoka, Kanagawa, Nagano, Saitama, Tokyo;
Tokyo: Saitama, Kanagawa, Chiba, Yamanashi, Gunma;
Shiga: Fukui, Kyoto, Mie, Osaka, Nara;
Kanagawa: Tokyo, Saitama, Yamanashi, Chiba, Shizuoka;
Shizuoka: Yamanashi, Kanagawa, Aichi, Nagano, Tokyo;
Aichi: Gifu, Mie, Shiga, Shizuoka, Fukui;
Mie: Nara, Shiga, Osaka, Aichi, Wakayama;
Osaka: Nara, Kyoto, Wakayama, Hyogo, Shiga;
Nara: Osaka, Mie, Wakayama, Shiga, Kyoto;
Wakayama: Nara, Osaka, Mie, Tokushima, Kyoto;
Kyoto: Osaka, Hyogo, Shiga, Fukui, Nara;
Hyogo: Kyoto, Osaka, Tottori, Okayama, Kagawa;
Tottori: Okayama, Hyogo, Kagawa, Hiroshima, Shimane;
Shimane: Hiroshima, Yamaguchi, Okayama, Tottori, Ehime;
Okayama: Tottori, Kagawa, Hyogo, Hiroshima, Tokushima;
Hiroshima: Shimane, Ehime, Okayama, Kagawa, Tottori;
Yamaguchi: Okayama, Fukuoka, Shimane, Hiroshima, Ehime;
Kagawa: Tokushima, Okayama, Kochi, Tottori, Hyogo;
Tokushima: Kagawa, Kochi, Okayama, Wakayama, Hyogo;
Ehime: Kochi, Hiroshima, Kagawa, Tokushima, Yamaguchi;
Fukuoka: Saga, Oita, Kumamoto, Nagasaki and Yamaguchi;
Kochi: Ehime, Kagawa, Tokushima, Hiroshima, Okayama;
Oita: Kumamoto, Fukuoka, Yamaguchi, Miyazaki, Saga;
Saga: Nagasaki, Fukuoka, Kumamoto, Oita, Miyazaki;
Nagasaki: Saga, Fukuoka, Kumamoto, Kagoshima, Oita;
Kumamoto: Miyazaki, Oita, Fukuoka, Nagasaki, Saga;
Kagoshima: Miyazaki, Kumamoto, Nagasaki, Saga, Oita;
Miyazaki: Kumamoto, Kagoshima, Oita, Fukuoka, Nagasaki;
Annex 3:

Data for this study

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