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Title: Spatial analysis of the tourism supply, in Portugal, at NUTs III level

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Abstract

The tourism in Portugal has been an important contribution to the economic development of the country, namely in zones where is difficult to implement others activities, specifically the manufacturing. The objective of this work is to analyze, for the period 2002-2011, with spatial econometric techniques (using the GeoDa informatics program), the statistic data, available in the Statistics Portugal (INE), of some variables related with the tourism in the NUTs III of Portugal Continental, namely: capacity (N.º) in accommodation establishments; capacity in accommodation establishments per 1000 inhabitants (N.º); nights (N.º) in accommodation establishments; nights in accommodation establishments per 100 inhabitants (N.º); accommodation establishments (N.º); average stay (N.º) in accommodation establishments; customers (N.º) in accommodation establishments; proportion of foreign customers (%); and net rate of bed occupancy (%) in accommodation establishments. The first, third, fifth, sixth, seventh and ninth variables were further disaggregated for the several forms of accommodation establishments, as following: all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments. The data was used in average and the econometric analyses were cross section. There are some signs of spatial autocorrelation in some variables and some forms of accommodation establishments.

Keyword: Spatial econometrics; Tourism supply; Portuguese NUTs III.

JEL Classification Codes: C21; L83; O18.

1. Introduction

Analyzing data related with the tourism using econometric spatial techniques is not usual and there are not many research works about these subjects. Because this, the study presented here is a relevant contribute to the scientific literature and to the public and private tourism operators, helping them in the political and management decisions.

Understand the spatial dynamics of the tourism sector is crucial to plan correctly the activities related, where the customers have high mobility. Using econometric techniques, Mata and Llano-Verduras (2012), analyzed the intra and interregional trade flows of the Spanish accommodation, restaurant industry and travel agency, for the period 2001-2007. They concluded that there are some signs of preference for the intraregional trade of tourism and in some situations the trade flows are influenced by the distances.

The spatial specialization of the economic activity and, as well, of the tourism sector is fundamental to better recognize the interrelationship between the several sectors and the regional growth and development. Considering data for the period 1995-2001, Gülcan et al. (2009) developed a work to the Aegean Region, in the Turkey, investigating the significance of the tourism activities and the impact of the public investment in the touristic sectors. They found that the Aegean Region is highly specialized in the tourism, considering the spatial distribution of the hotels, and the public policies improved the performance of the sector.

The tourism in Portugal experimented in the recent years a significant modernization and innovation following the international tendencies. There are some studies about the tourism in Portugal, considering different perspectives. For example, Andraz and Rodrigues (2010) concluded that the difficulties in the sector can influence the decisions of the customers, with possible changes of plans, and the effects in the tourism sector are delayed in time. Meneses and Teixeira (2011), using a direct survey on the Portuguese tourism enterprises, intended show that the Portuguese tourism has an innovative performance. Leitão (2010) estimated the demand equation for the tourism in Portugal, using tourist inflow data for the period 1995-2006 and found that bilateral trade, immigration, geographical distance between Portugal and the county of origin, population and income are determinants factors, more that the prices. Daniel and Rodrigues (2010) concluded, for the Portuguese

tourism, that is important find new products, improve the competitiveness, find new centers of attraction, new markets and look to the needs of the customers and to the human resources. Corfu et al. (2006) analyzed the impact of the two decades of European Union membership on Portugal, as a touristic country. The statistics show an increase in the arrivals of tourists, but the revenue increased slower. It is a determinant to find new products and other strategies to attract more tourists and induce them to spend more.

2. In this section it will be analyzed the statistical data and the global (for all Portugal Continental) and the local (for each NUT III of Portugal Continental) spatial autocorrelation of the several variables considered (capacity (N.º) in accommodation establishments; capacity in accommodation establishments per 1000 inhabitants (N.º); nights (N.º) in accommodation establishments; nights in accommodation establishments per 100 inhabitants (N.º); accommodation establishments (N.º); average stay (N.º) in accommodation establishments; customers (N.º) in accommodation establishments; proportion of foreign customers (%); and net rate of bed occupancy (%) in accommodation establishments) for the period 2002-2011.

For the first, third, fifth, sixth, seventh and ninth variables, considering the availability of statistical data in the INE, were further disaggregated in the several forms of accommodation establishments, as following: all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively.

The consideration of these variables, this period and this spatial disaggregation level is because the availability of the statistical data related with the tourism in Portugal Continental.

The global spatial autocorrelation will be analyzed with the statistics Moran's I, where a positive value signifies spatial autocorrelation for the variable considered in the all country. In other words this indicates that the values of the variable considered are linked with the values of the same variable in the neighbors spatial unities.

The local spatial autocorrelation will be observed for each individual spatial unity considered (NUTs III) through maps of Portugal Continental, having implicit, also, the statistics Moran's I. In these maps the NUTs III with colors dark blue are unities with local spatial autocorrelation for the low values of

the variable analyzed and with the dark red are unities with spatial autocorrelation for the high values.

The colors light blue and light red represent no local spatial autocorrelation

In this analysis the distances between the different spatial unities are important variables, because it is expected a stronger autocorrelation between the NUTs III closest. In this context was built a distance matrix with the GeoDa informatic program for Portugal Continental.

In the next sub-section will be analyzed, through figures (presented in horizontal order for the several forms of establishments) built with the GeoDa, the statistical data (with cross-section approaches considering averages for the period 2002-2011) for each variable presented before and related with the Portuguese tourism.

2.1. Capacity (N.º) in accommodation establishments

Considering the figure 1, in a global perspective for the all accommodation establishments (first map) the littoral NUTs III, namely those near Lisbon and Oporto, and the Algarve are the spatial unities of Portugal Continental with more capacity in accommodation establishments. More or less the same for the hotels (second map in the horizontal way). The pensions and guesthouses have some expression also in the interior North (third and fourth maps in the horizontal). The inns have more relevance in the Alentejo and littoral North. The motels, hotels-apartments, holiday villages and tourist apartments (last four maps in horizontal) have the more important incidence, namely in the Algarve.

From the figure 2 and 3 there are positive global spatial autocorrelation for the inns in the Alentejo, which is in line with what was referred before. From the figure 3 is possible to observe some signs of local spatial autocorrelation, for low values, namely in the interior of Portugal Continental.

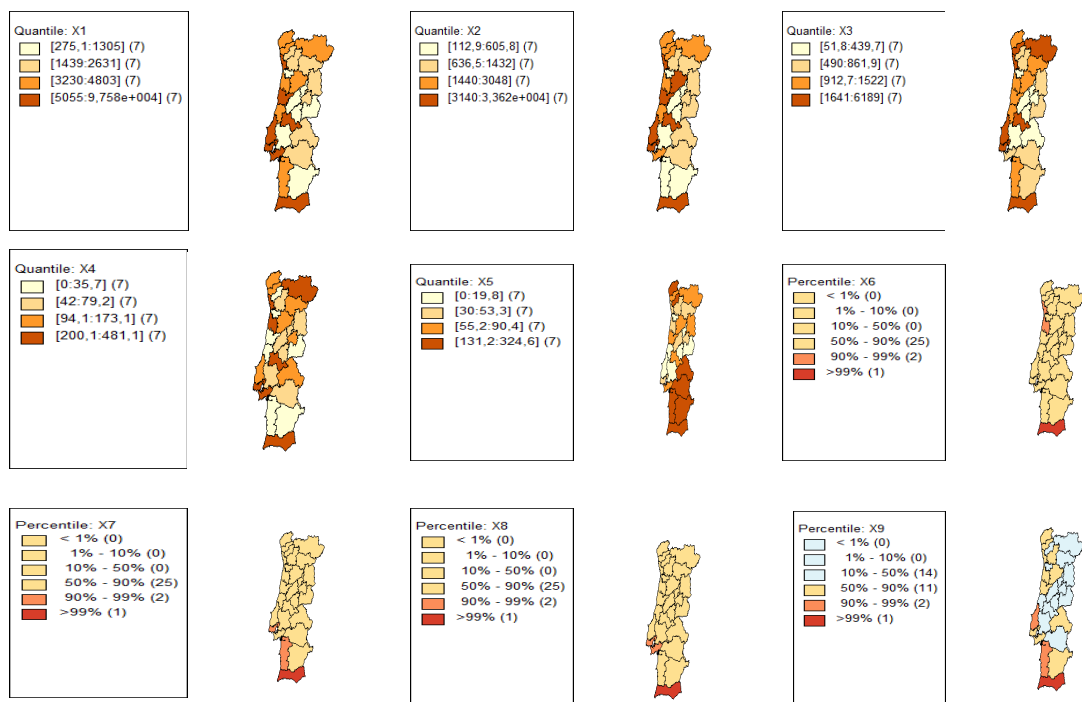


Figure 1: Average (2002-2011) capacity (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

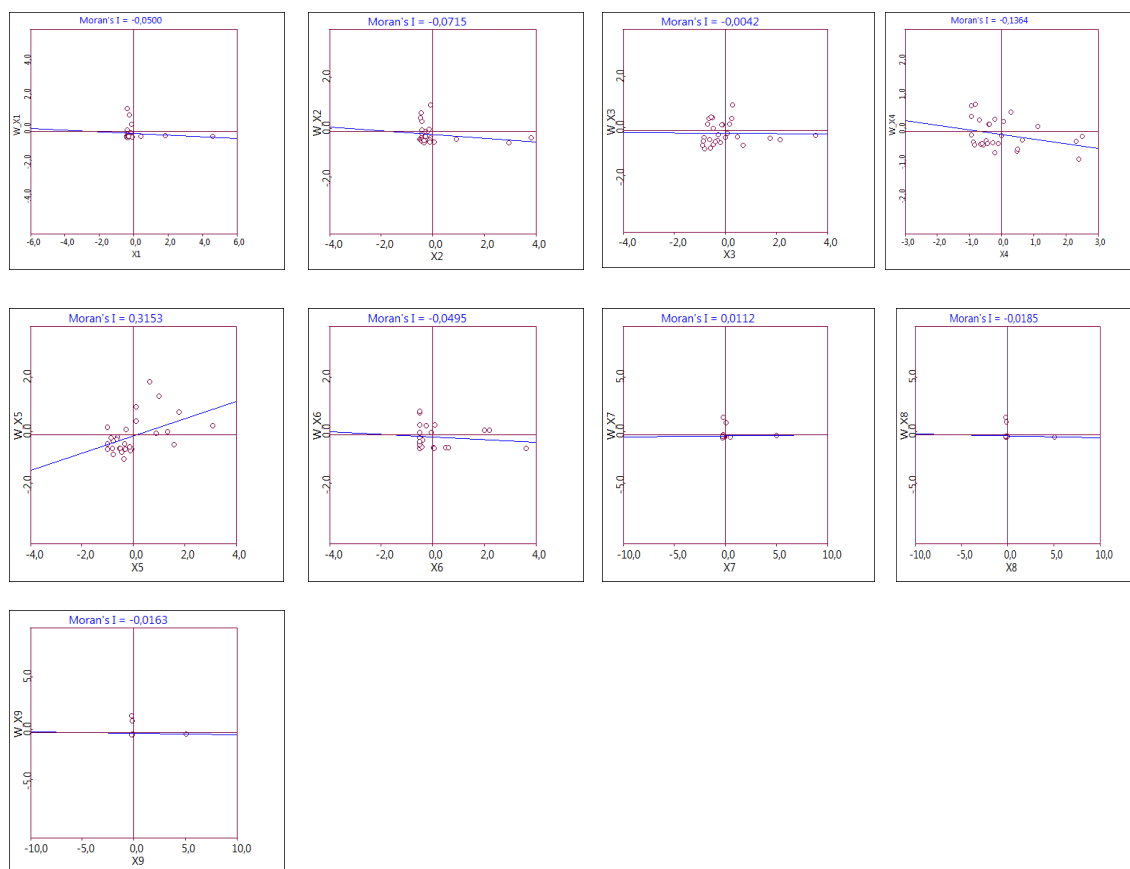


Figure 2: Global autocorrelation (Moran's I) relative to the average (2002-2011) capacity (N.) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

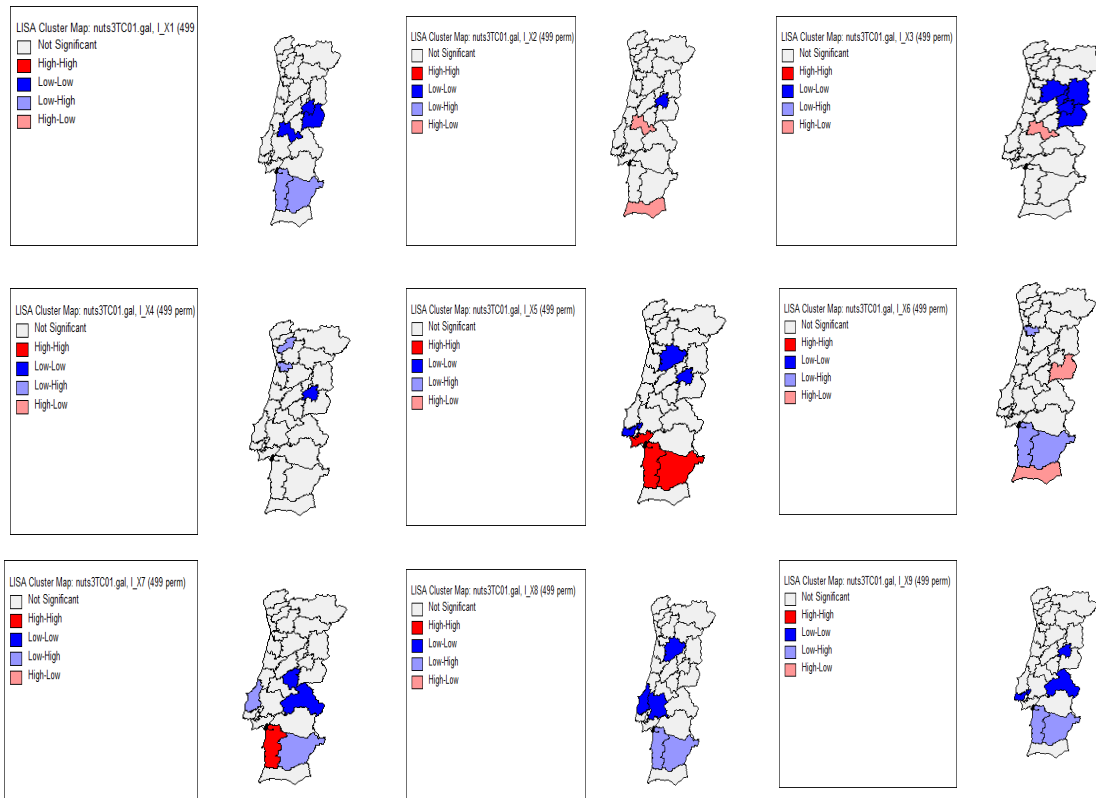


Figure 3: Local autocorrelation relative to the average (2002-2011) capacity (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

2.2. Capacity in accommodation establishments per 1000 inhabitants (N.º)

The capacity in accommodation establishments per 1000 inhabitants (considering all accommodation unities) have some significance in the interior North and Centre, in Lisbon, in the Alentejo littoral and in Algarve.

This variable presents some signs of global spatial autocorrelation and signs of local spatial autocorrelation for low value in the interior North and for high values in the littoral Alentejo.

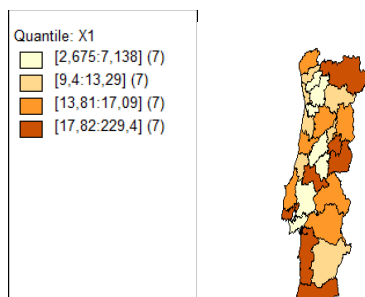


Figure 4: Average (2002-2011) capacity in accommodation establishments per 1000 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

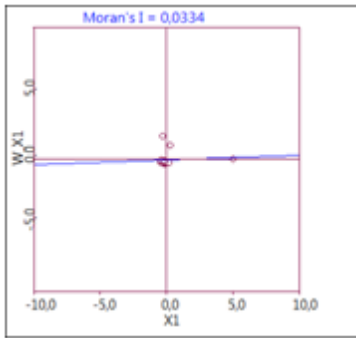


Figure 5: Global autocorrelation (Moran's I) relative to the average (2002-2011) capacity in accommodation establishments per 1000 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

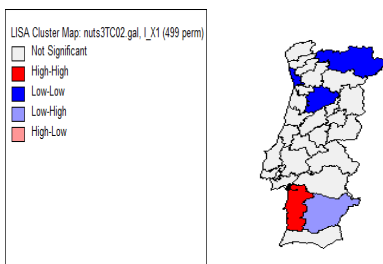


Figure 6: Local autocorrelation relative to the average (2002-2011) capacity in accommodation establishments per 1000 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

2.3. Nights (N.º) in accommodation establishments

The littoral and the Algarve, again, with large importance for the nights spent in the accommodation establishments in the all accommodation unities and in the hotels. The interior North with some importance in the pensions. The guesthouse relevant in the Algarve, the inns in the interior Alentejo, the motels in the Oporto and the remainder forms of accommodation in the Algarve.

Again the inns with local spatial autocorrelation with high values in the Alentejo. The region around Lisbon shows, more one time, signs of local spatial autocorrelation for low values in the holiday villages and tourist apartments.

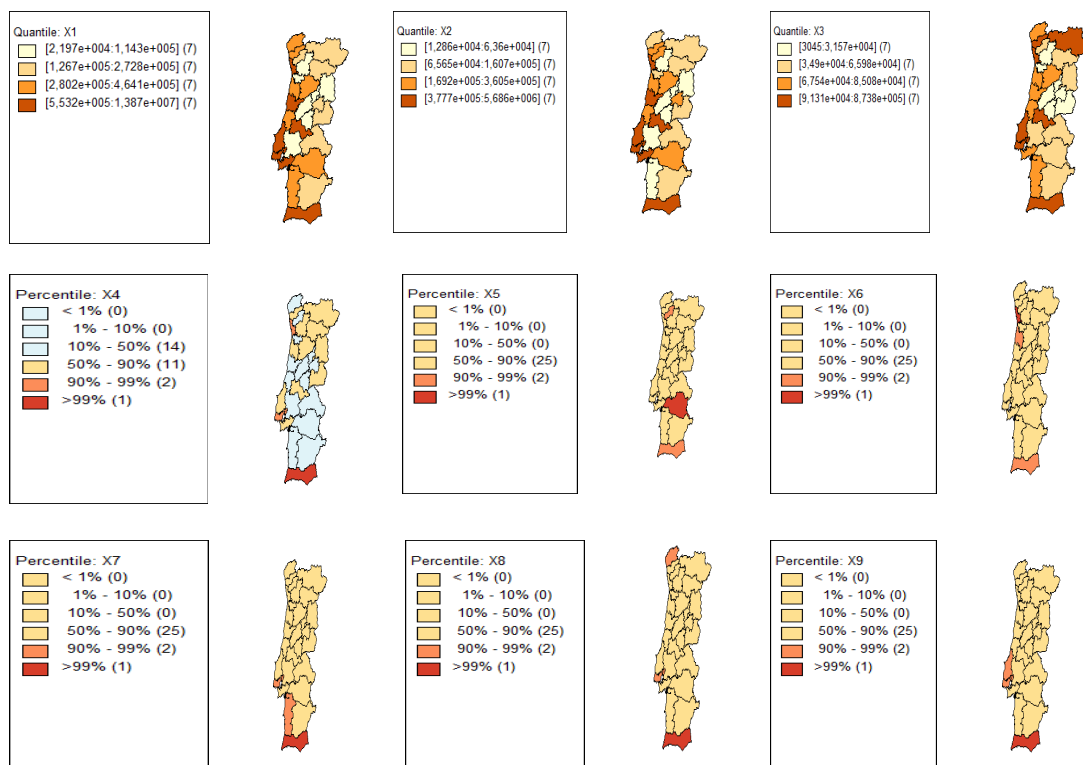


Figure 7: Average (2002-2011) nights (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

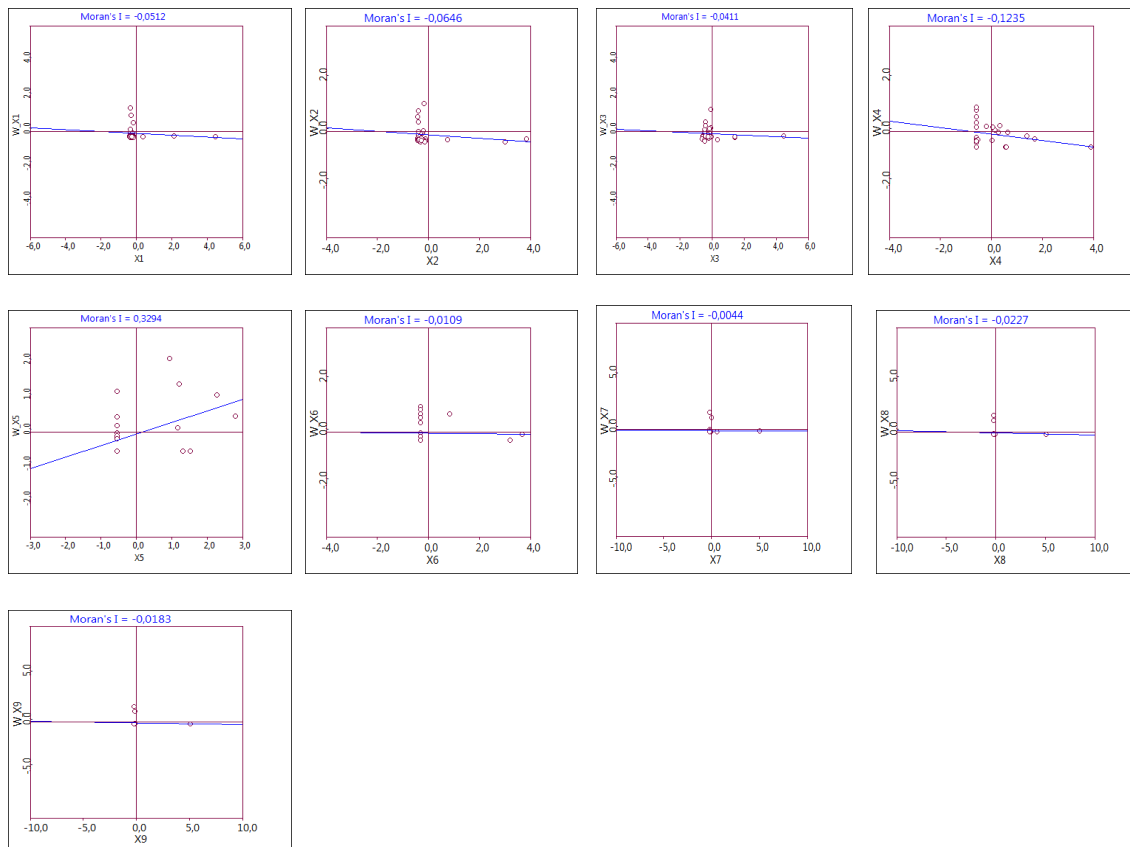


Figure 8: Global autocorrelation (Moran's I) relative to the average (2002-2011) nights (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

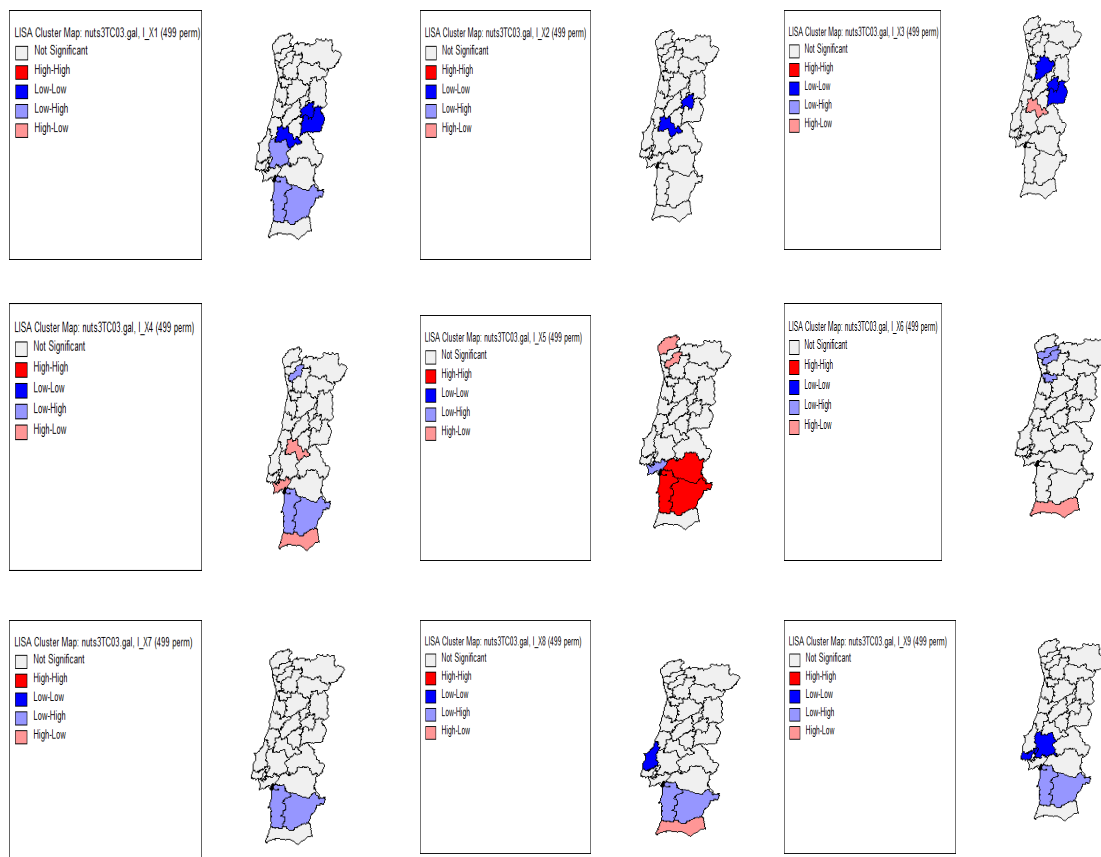


Figure 9: Local autocorrelation relative to the average (2002-2011) nights (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

2.4. Nights in accommodation establishments per 100 inhabitants (N.º)

Lisbon, the littoral of the Center and Alentejo and the Algarve are the regions with more nights in accommodation establishments per 100 inhabitants. There are few signs of global spatial autocorrelation and the local for the high values is in the Alentejo littoral. For the low values is in the interior North (including Oporto) and in the Center (namely near Lisbon).

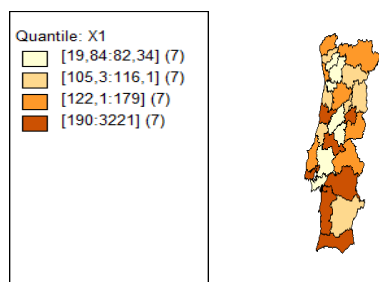


Figure 10: Average (2002-2011) nights in accommodation establishments per 100 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

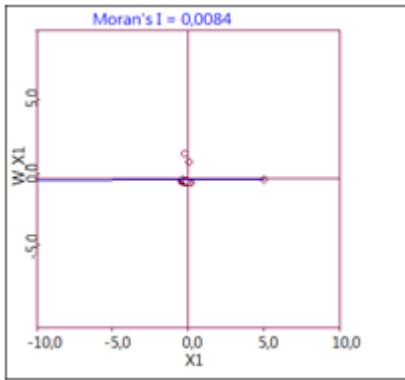


Figure 11: Global autocorrelation (Moran's I) relative to the average (2002-2011) nights in accommodation establishments per 100 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

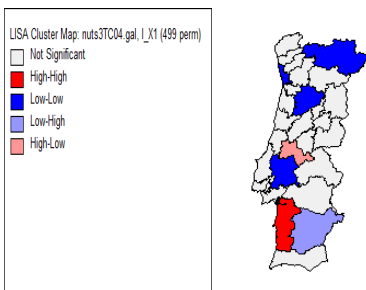


Figure 12: Local autocorrelation relative to the average (2002-2011) nights in accommodation establishments per 100 inhabitants (N.º), in the Mainland of Portugal, for all accommodation establishments

2.5. Accommodation establishments (N.º)

For this variable, in general, the figures 13, 14 and 15 show more or less the same evolution, among the different Portuguese NUTs III, already referred before for others variables, with the littoral, the interior North, the Alentejo and the Algarve with the best values for the number of accommodation establishments.

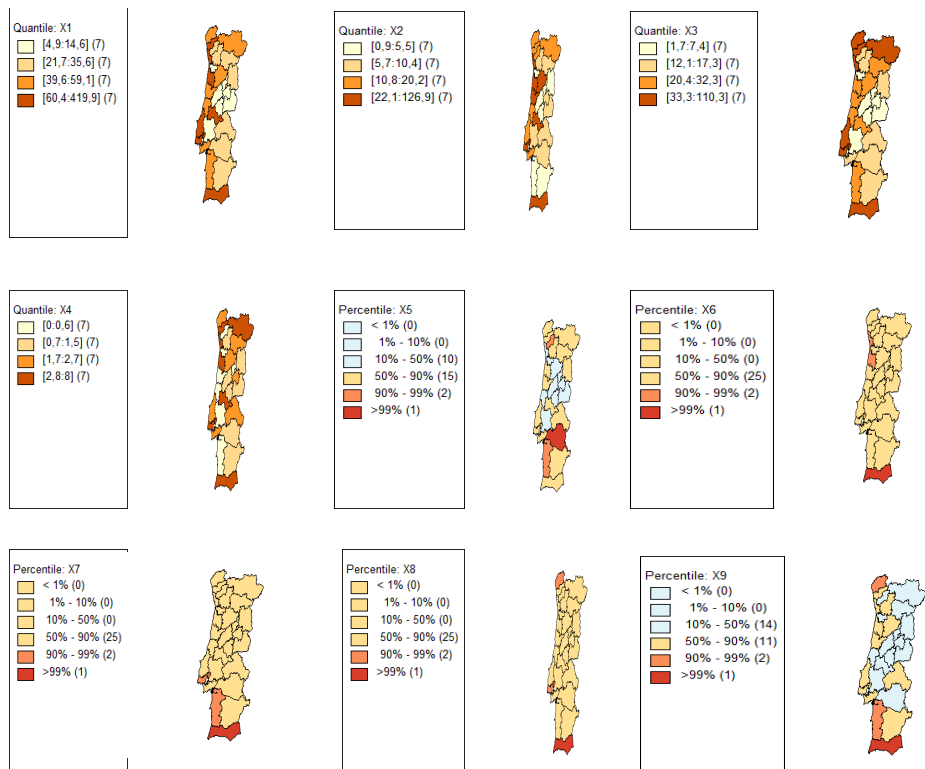


Figure 13: Average (2002-2011) accommodation establishments (N.º), in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

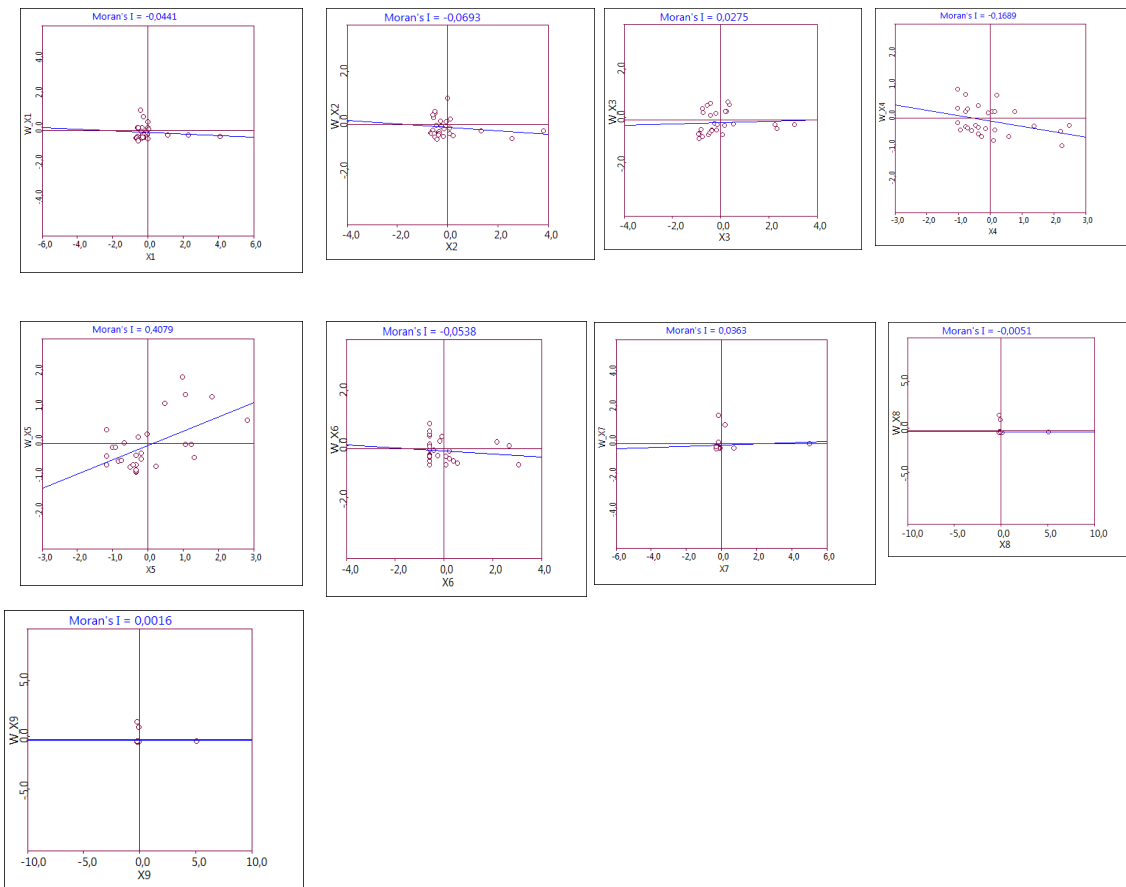


Figure 14: Global autocorrelation (Moran's I) relative to the average (2002-2011) accommodation establishments (N.º), in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

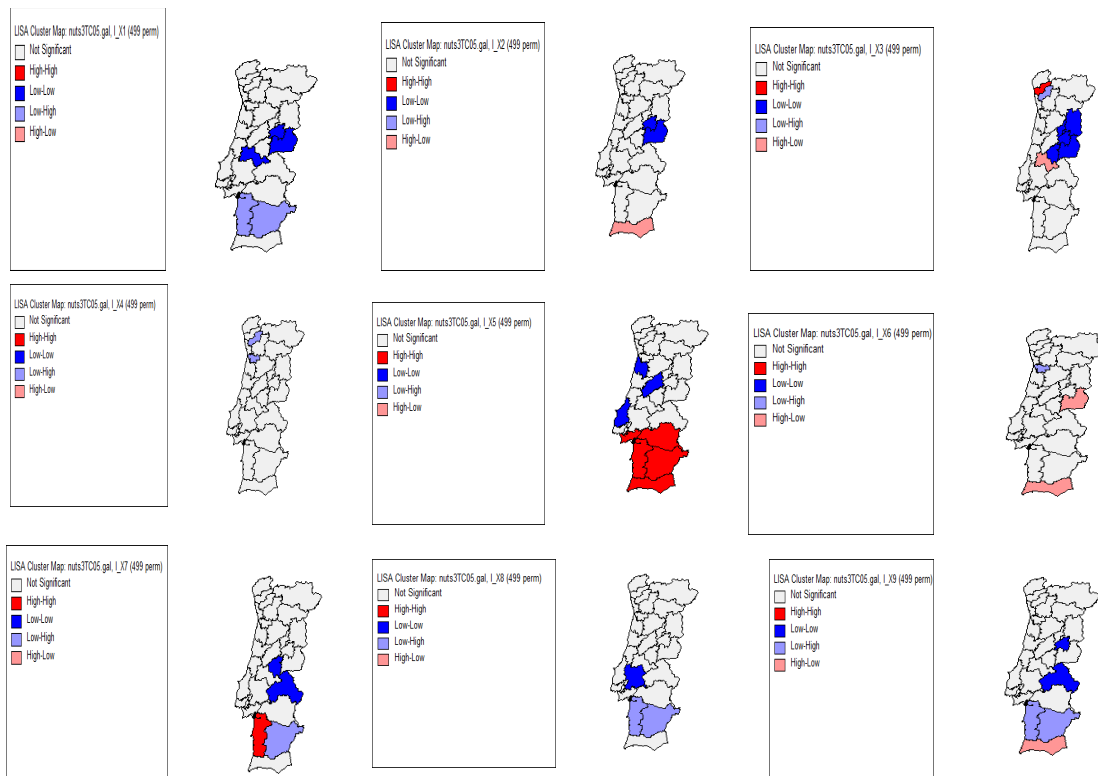


Figure 15: Local autocorrelation relative to the average (2002-2011) accommodation establishments (N.º), in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

2.6. Average stay (N.º) in accommodation establishments

In this variable the novelty is the relevance of the Center, namely in the pensions, and the relevance of the Oporto in the tourist apartments.

Relatively to the global spatial autocorrelation there are more signs for several forms of accommodation, namely for all accommodation, inns, hotels-apartments and tourist apartments. For the local spatial autocorrelation, with high values, the Alentejo, namely the littoral, and the North, interior and littoral, present strong signs in many forms of accommodation.

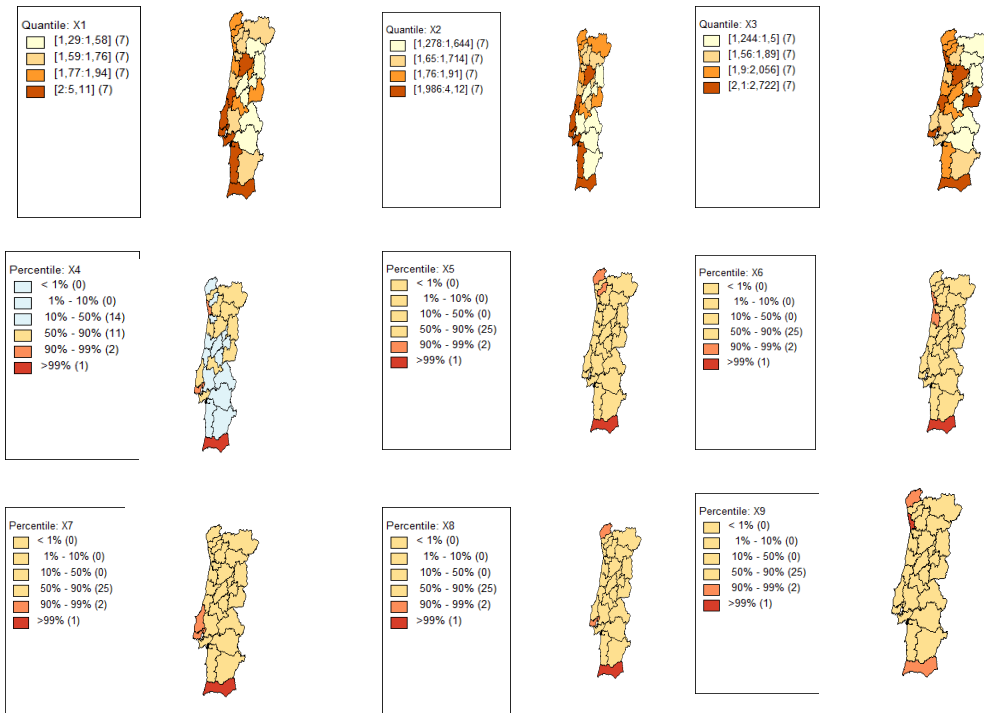


Figure 16: Average (2002-2011) of the average stay (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

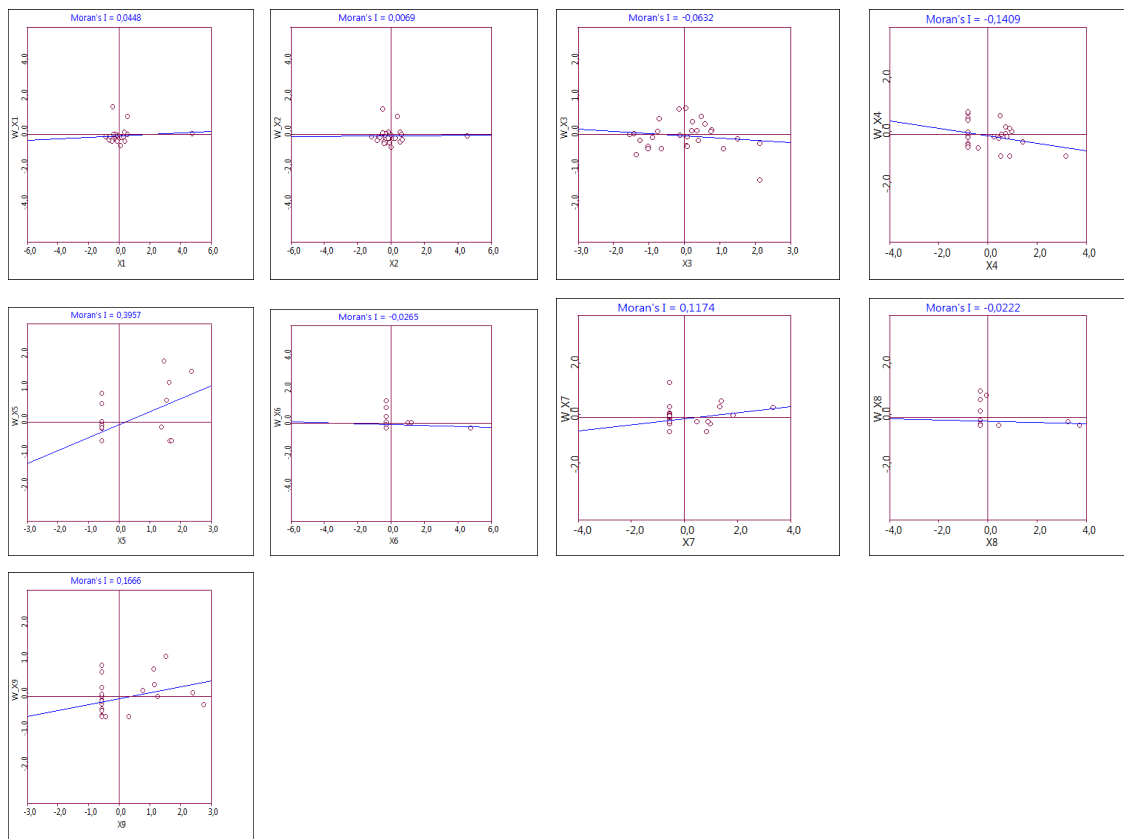


Figure 17: Global autocorrelation (Moran's I) relative to the average (2002-2011) of the average stay (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

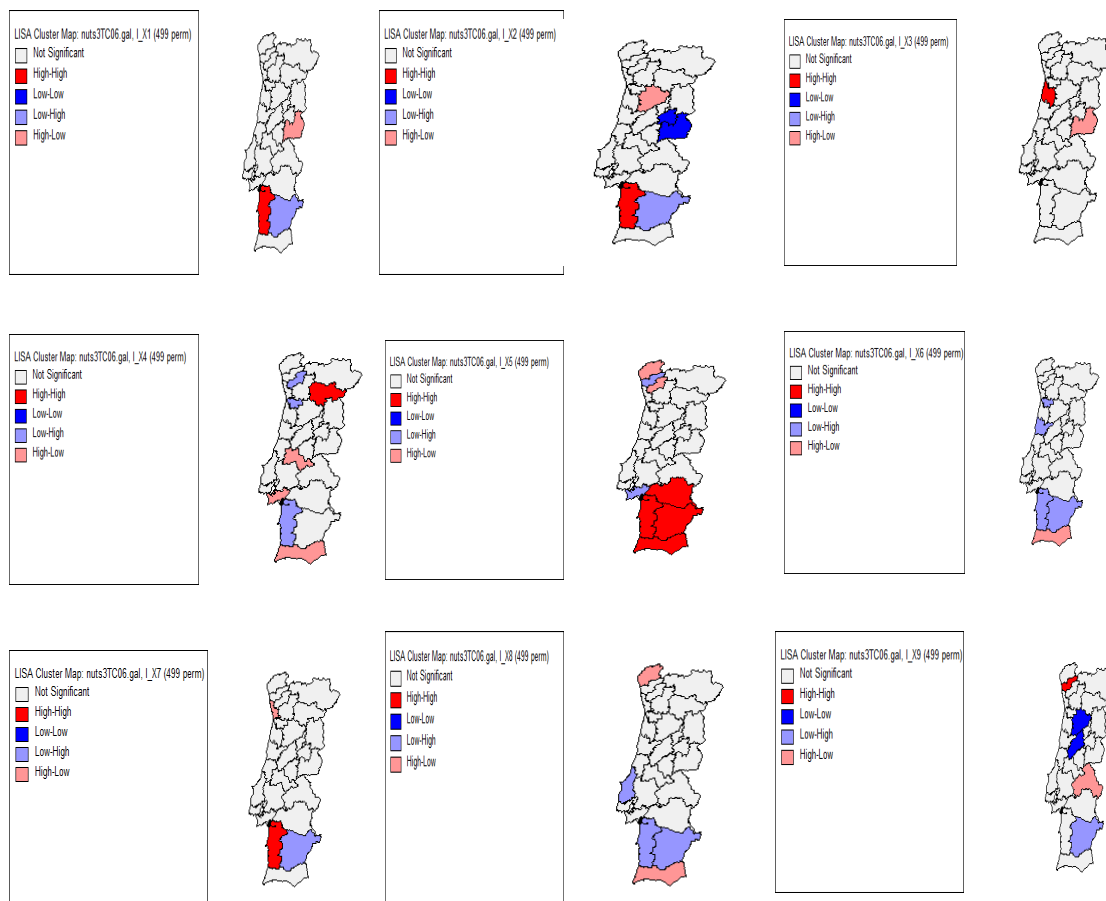


Figure 18: Local autocorrelation relative to the average (2002-2011) of the average stay (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

2.7. Customers (N.º) in accommodation establishments

The statistical values for the number of customers in accommodation establishments are very similar with those found and analyzed for the first five variables.

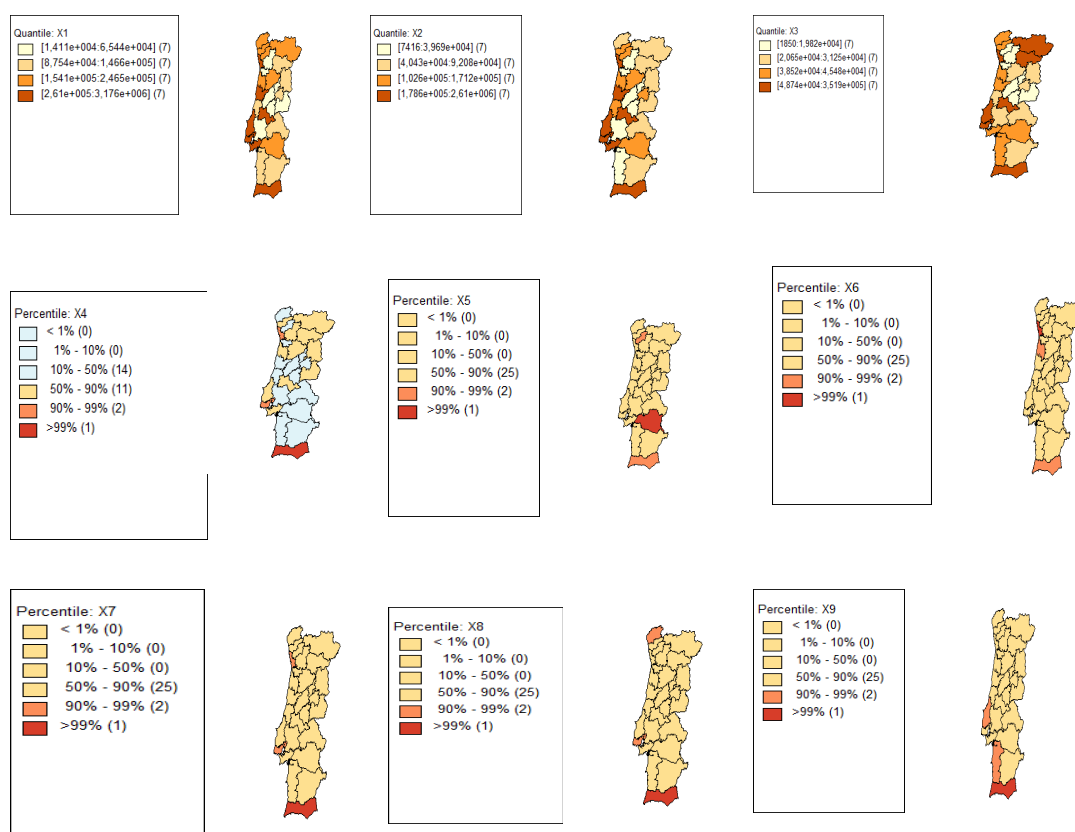


Figure 19: Average (2002-2011) customers (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

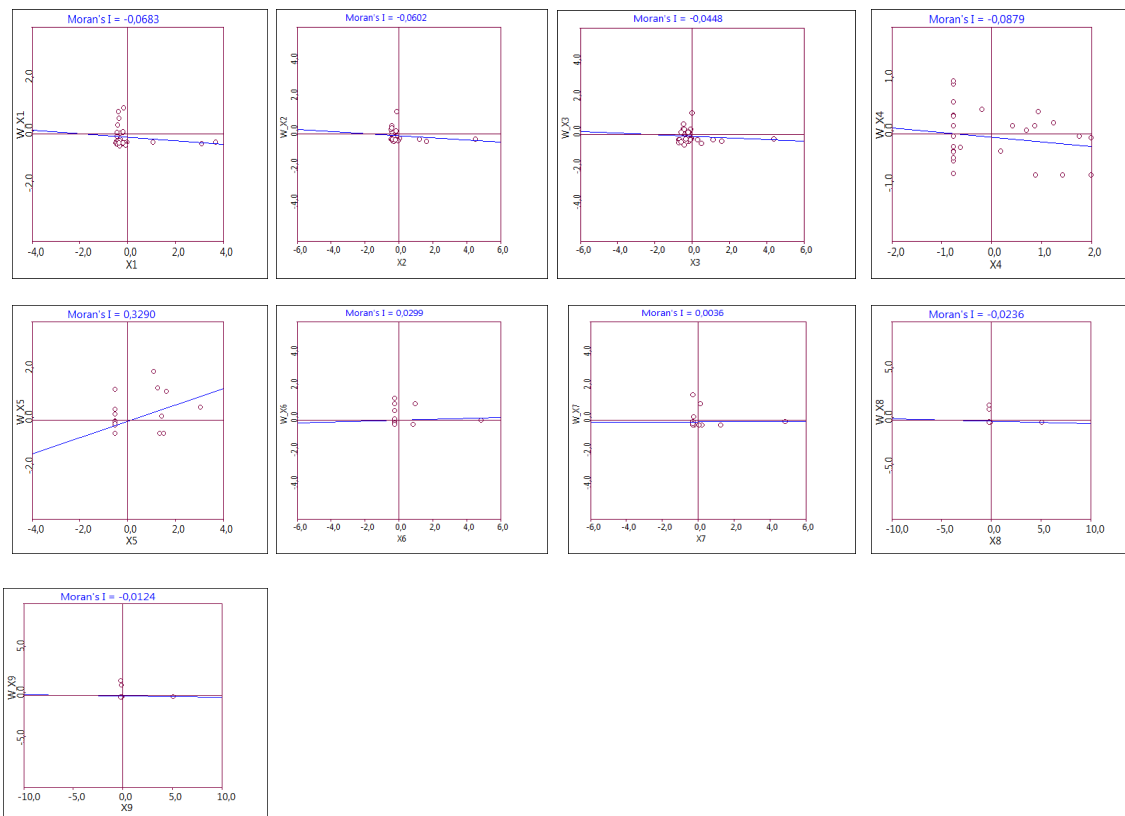


Figure 20: Global autocorrelation (Moran's I) relative to the average (2002-2011) customers (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

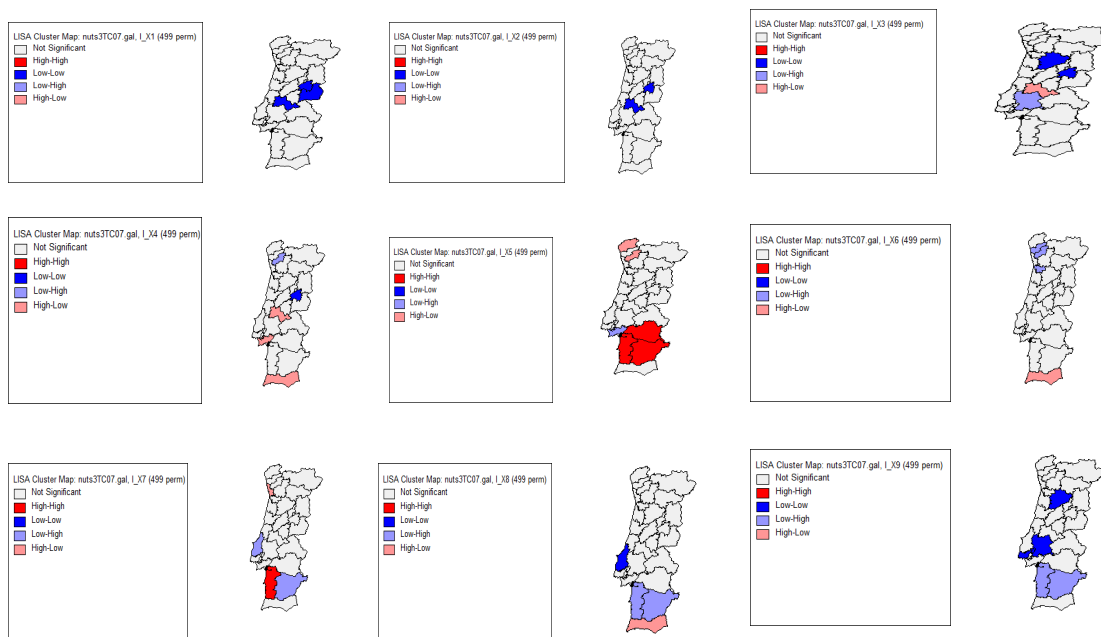


Figure 21: Local autocorrelation relative to the average (2002-2011) customers (N.º) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

2.8. Proportion of foreign customers (%)

The foreign customers have a large proportion in the littoral North and Center, in the regions around Lisbon and in the Algarve.

There is evidence of spatial autocorrelation, with low values in the interior (North and Center) and with high values in regions close to Lisbon.

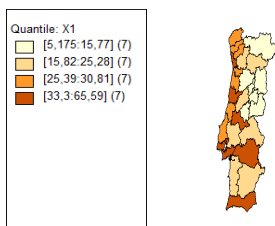


Figure 22: Average (2002-2011) proportion of foreign customers (%), in the Mainland of Portugal, for all accommodation

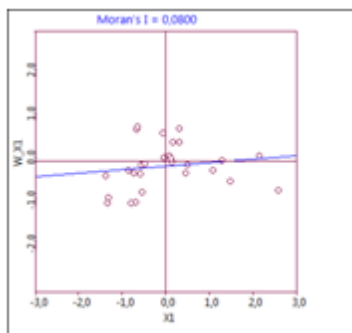


Figure 23: Global autocorrelation (Moran's I) relative to the average (2002-2011) proportion of foreign customers (%), in the Mainland of Portugal, for all accommodation

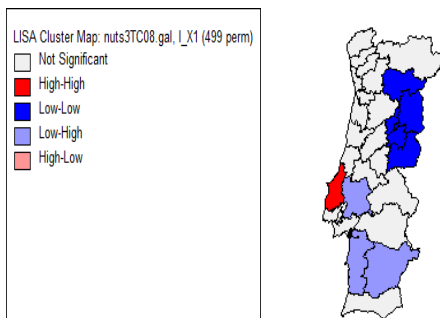


Figure 24: Local autocorrelation relative to the average (2002-2011) proportion of foreign customers (%), in the Mainland of Portugal, for all accommodation

2.9. Net rate of bed occupancy (%) in accommodation establishments

The Oporto region, the Center, the regions near Lisbon and the Algarve are the locals with more importance for the net rate of bed occupancy.

The inns and the touristic apartments are the establishments with more global spatial autocorrelation.

The interior Alentejo is the region with more local spatial autocorrelation for high values for the all accommodation and for the hotels. The inns show again local spatial autocorrelation in all Alentejo.

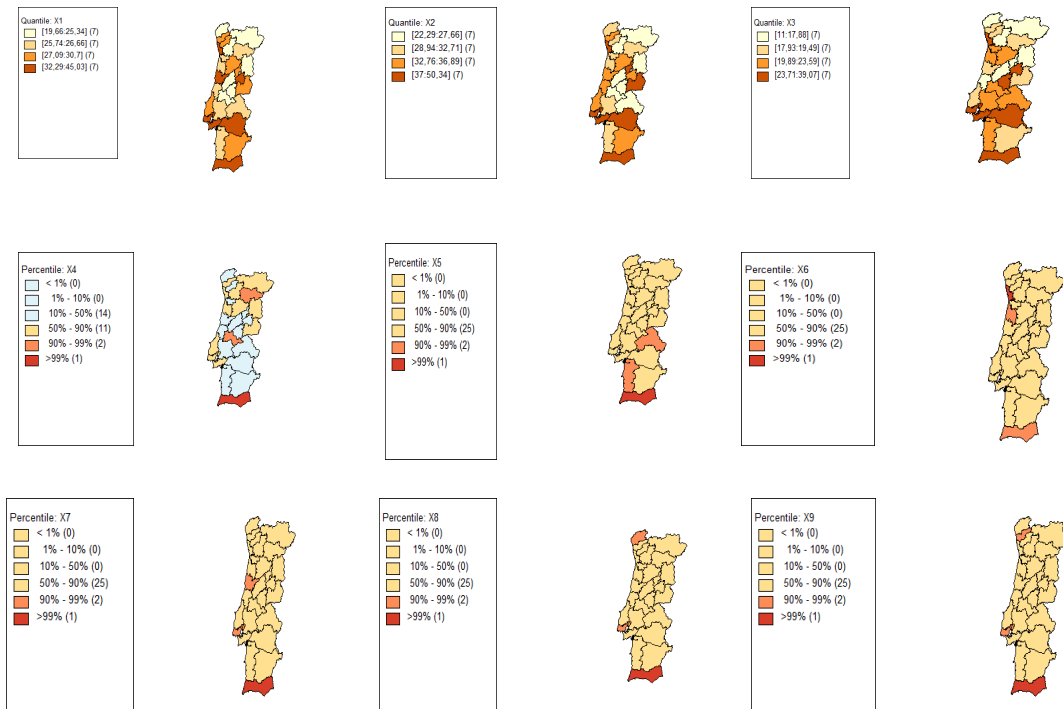


Figure 25: Average (2002-2011) net rate of bed occupancy (%) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

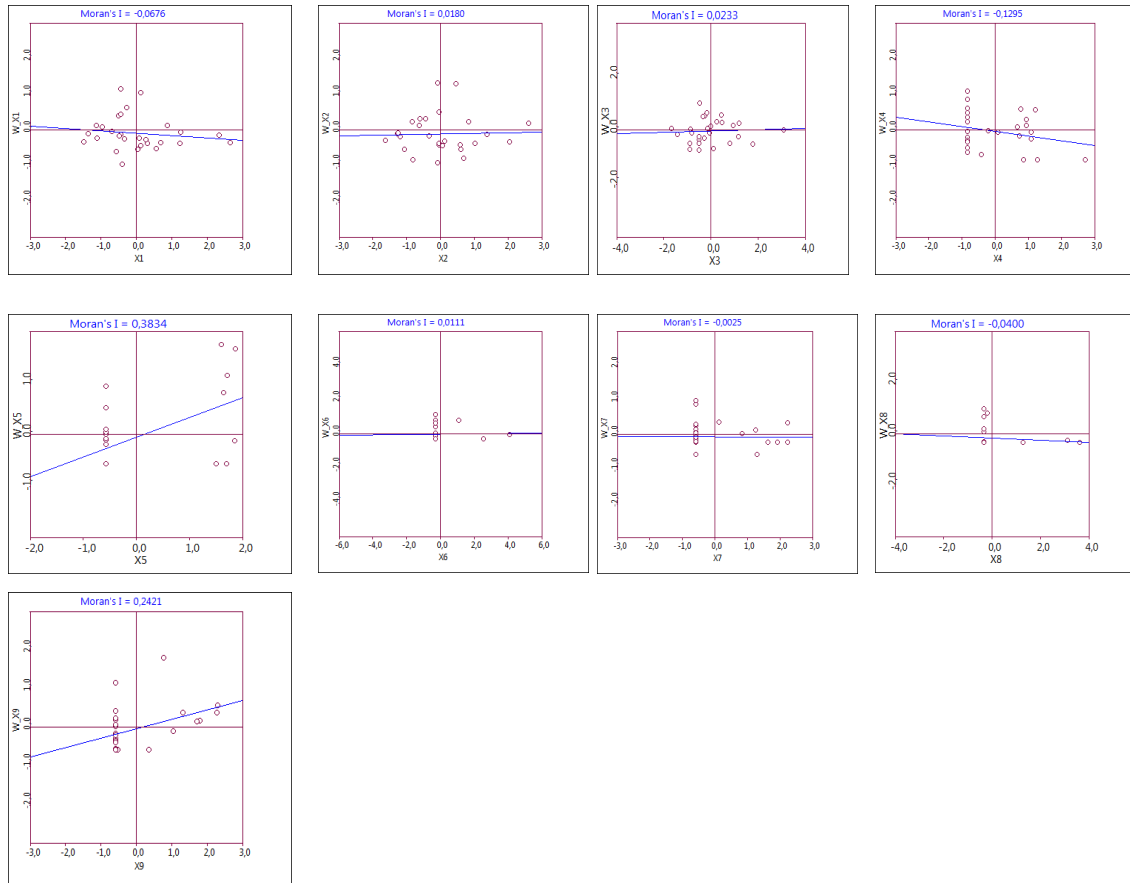


Figure 26: Global autocorrelation (Moran's I) relative to the average (2002-2011) net rate of bed occupancy (%) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

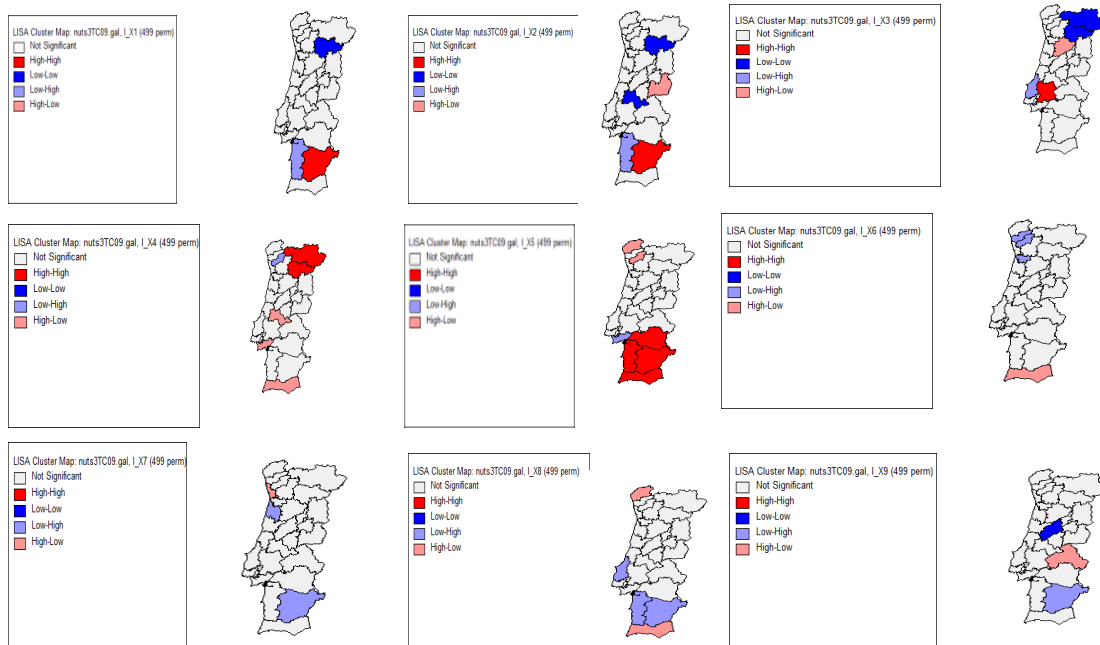


Figure 27: Local autocorrelation relative to the average (2002-2011) net rate of bed occupancy (%) in accommodation establishments, in the Mainland of Portugal, for the several form of accommodation (all accommodation establishments; hotels; pensions; guesthouses; inns; motels; hotels-apartments; holiday villages; and tourist apartments, respectively)

3. Conclusion

In general, is the littoral, the Alentejo and the Algarve the regions, of Portugal Continental, more relevant for the tourism in the Portuguese Mainland, considering the period 2002-2011 and the variables taking into account. However, the regions around Lisbon, Oporto and Algarve are the more attractive zones for the tourism.

Considering the different forms of establishments, are the hotels the type of accommodation with more importance in Portugal Continental. The pensions, less the guesthouses, have some relevance, if it is considered, for example, a distribution, for the several variables, in many regions. The inns have incidence mainly in the Alentejo and the others forms principally in the regions of Oporto, Lisbon and Alagarve.

The variables related with average stay (N.º) in accommodation establishments and net rate of bed occupancy (%) in accommodation establishments have a relative different evolution comparatively with the others seven variables. This means that the regions with more capacity of accommodation, with more establishments and with more nights spent are not the same with more average stay and net rate of bed occupancy.

Finally, the global and local spatial autocorrelation are present in all variables, principally in the Alentejo and for the inns. The conclusion with that referred in the last paragraph must be taken into account by the sector and by the institutions related with the sector, namely those with competences to define strategic policies.

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