

The spatial distribution and relationship of tourist flow in Turkey

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Abstract

Tourism is considered as back bone of Turkish economy with its greater share in GDP than many other economic sectors of the country. Present research is sought to analyse the spatial association and distribution of foreign and domestic tourist inflows in 81 provinces of Turkey through exploratory spatial data analysis (ESDA) technique. ESDA is one of very useful Geographic Information System (GIS) based spatial statistics techniques to analyse spatial patterns, identification of hotspots and visualization of spatial association among variables. Analysis of global Moran's I statistics results into a positive value that indicates presence of spatial autocorrelation among neighbouring provinces with high(low) number of both foreign and domestic tourist arrivals during years 2000-2016. This depicts positive and negative autocorrelation of places with geographical similarities and dissimilarities over the space. Moreover, Moran's significance maps help indicating hotspot areas of high and low tourist arrivals where high clusters are found in western coastal areas and lower clusters are associated to eastern inland areas. Furthermore, Moran's scatterplot analysis highlights the regional disparities within the country in terms of tourism development. This polarized spatial pattern of tourism is associated with differences in economic development and resource allocation between western and eastern provinces. This study is significant for policy makers by providing insights into spatial distribution of tourist flows for better resource allocation and management of hotspot areas. Besides, it also helps private sector and tour operators for economic utilization of tourist clusters and hotspots.

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Keywords: Tourism distribution, Exploratory spatial data analysis, Spatial Autocorrelation, Hotspots, Turkey.

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Introduction

Turkey is a popular tourist destination across the globe with many tourist attractions including transcontinental location, variety of historical and heritage sites, hot spas and seaside resorts along Aegean and Mediterranean

coasts. The steady growth of tourism industry has strong direct and indirect impacts on country's economy. The total contribution of tourism and travel (including direct, indirect and induced contribution) to country's GDP in 2016 was \$88 billion, that was 12.5% of GDP (higher

than global 10.2%), making it greater than many other economic sectors of the country. Moreover, travel and tourism sector also generated 2.1 million jobs, that makes 8.1% of total employments in the country (WTTC, 2017). The development of tourism industry, an important source of exchange product, in Turkey has gained momentum since 1980s and a rapid growth in number of tourists, tourism receipts and accommodation facilities has been observed during last three decades. A number of empirical studies have confirmed the validation of tourism led growth hypothesis for Turkey (Arslanturk, 2011; Katircioglu, 2009; Husein and Kara, 2011; Aslan, 2013; Gunduz and Hatemi, 2005; Ongan and Demiroz, 2005). Turkish government adopted incentive policy in tourism sector by making Tourism Encouragement Law of 1982 to achieve export-led industrialization by accelerating the mass tourism in the country. Out of many incentives included provision of long term leasing of public land, infrastructure and credits to the investors (Resmi Gazete, 1982). Tourism is acknowledged as an economic multiplier and highly supported by local administrations and communities in the country to derive economic benefits due to which tourism is given high priority in regional planning (Göymen, 2000; Tosun and Jenkins, 1996).

Inequalities in economic development and growth among countries and within different regions of a country persist all over the world and tourism sector is not an exception. These regional disparities in tourism development stem from many geographical, political, historical, economic and social factors. However, there is a lack of empirical studies focusing on spatial dimension of regional inequalities (James and Campbell, 2014; Rey, 2004) despite the sensitivity of spatial effects in tourism development. Regional disparities in Turkey is a long-debated issue and presence of spatial dualism between eastern and western regions of the country is highlighted in many tourism related studies (Sönmez, 1998; Seckelman, 2002; Tosun *et al.*, 2003; Gezici and Hewings, 2004). An evaluation of the official statistics reveals that three provinces Istanbul, Antalya and Mugla received 80% of international tourists in 2016, followed by Aydin, Izmir, Bursa, Canakkale and Denizli

provinces that received 14% of international tourists. Besides, average length of tourists' stay is also higher in these areas as compared to others (Ministry of Tourism, 2017). Regional disparities in distribution of local tourists is also observed though less than inbound tourists.

The primary objective of present study is to analyse spatial patterns and clustering of inbound and local tourist flows in Turkey to determine spatial dimension of regional inequalities among different provinces in terms of tourism development. Existed literature addressing the issue of regional disparities in tourism inflows have ignored the spatial dimension. Insights in spatial homogeneity and heterogeneity of tourism distribution is needed to reveal changes in the spatial patterns and clustering of tourist arrivals. The justification behind selection of Turkey as research areas is twofold. First, Turkey ranks in top 10 popular tourist destination in the world and tourism has a significant share in economy as an exchange product. Second, regional disparities in Turkey remains always a priority oriented issue to deal with in planning and strategy development division. Exploratory spatial data analysis (ESDA) technique has been used in this research to analyse patterns of distribution of international and domestic tourists flow from 2000-2016 in 81 provinces of Turkey. Identification of spatial autocorrelation is aimed at revealing regional disparities in tourists' flow among cities, choropleth mapping and geographical distribution of tourism activities around the space. Besides, hot spot analysis enables to identify the areas with mass tourism activities. The significance of this study is profound as the investigation of arrangements and patterns of tourists' distribution helps resource allocation and policy making in tourism sector. Moreover, this research can help planning infrastructure design, communication facilities and budget allocation regarding nationwide tourism development to abridge the regional disparities among cities.

Literature Review

Tourism is a continuous growing sector of world economy and many countries from developing world consider tourism as important source of export product. However, not all the countries and areas within a country receive

equal amount of tourist flow and thus regional disparities remain inevitable. Research on regional and spatial inequality in tourism has been conducted in many countries of world to analyse the patterns of tourist inflows. The results of these studies describe that unequal and diverse patterns of tourism demands and distributions are prevalent over the space (Lau, 2006; Lew and McKercher, 2006; Zhang, 2005, 2011; Yang, 2013). These spatial patterns show clustering of different regions according to degree of their popularity (Pearce, 1987, 1996; Gillmor, 1996). This concentration and clustering of tourist activities has different reasons ranging from economies of scales, socioeconomic development, industrial and technical facilitation to the regional choices of tourist operators (Gillmor, 1996). Besides, it is argued that concentration of tourism related activities have a strong association with complex system of spatial variations including planning of transportation facilities, promotion of products, and management of tourism effects (Lew and McKercher, 2006), physical characteristics and infrastructure, promotion of the area, inland and coastal regions (Pearce, 1987; Gillmor, 1996), cities with international airports (Wu and Carson, 2008) and areas of the country that have higher socioeconomic profile (Pearce, 1996).

Studies have also been conducted to evaluate and analyse regional inequalities in Turkey using different economic parameters (Balkir, 1995; Ates *et al.*, 2000; Gezici and Hewings, 2004). However, very few studies have analysed regional inequalities with special focus on spatial distribution of tourism. According to Göymen (2000), a clear divide between tourism based privileged and non-privileged areas of Turkey has been evolved where western coastal areas attract mass tourists as compared to interior eastern regions. The difference between these regions is a result of differences in resource and endowments, industrial, technical and communication development (Tosun, 1999; Tosun and Jenkins, 1996; Toson *et al.*, 2003). Unequal tourism growth in the country also reflects hegemony of Western and South-Western regions over East and South-East Anatolia (Seckelmann, 2002) while latter face bureaucratic formalities that serve as a barrier

to operate large tourism establishments (Sönmez, 1998; Toson *et al.*, 2003). Recent developments in computer aided programs, like Geographical Information System, not only help organize large body of data but also enables the researchers to conduct spatial analysis in more sophisticated way. The understanding of spatial arrangement patterns of places and phenomenon, their organization and appearance on the landscape, require mapping of spatial distribution. Map of spatial distribution helps explaining the causes of specific pattern of arrangements and relationships between different places. Spatial data depends on the distances that is the measured physical space between two places and the approachability along with transportation and communication connectivity among places. This phenomenon of spatial dependence is explained by Tobler (1970), according to which the places closer to each other show more resemblance than distant ones. This law has profound importance as no place on the earth is absolutely homogenous therefore spatial analysis is made on the attributes of relative and approximately homogenous characteristics. Spatial heterogeneity depends on spatial or regional differentiation that is based on exclusivity of each location. Spatial autocorrelation is the dependency of values of sampled variables at neighbouring locations with each other (Tobler 1970), in other words it is a systematic variability phenomenon found in a variable (Cliff and Ord, 1981; Anselin, 1988). Spatial autocorrelation helps understand and assess the correlation of a given variable to spatial location of neighbouring variables and calculates the similarities and dissimilarities among data for a specific variable (Griffith, 1987; Legendre, 1993).

In recent years, application of spatial autocorrelation has gained enormous importance in current studies of geography, econometrics, ecology and environmental sciences (Pace *et al.*, 1998; Fortin and Dale, 2005; Ping *et al.*, 2004; Sridharan *et al.*, 2007; Cracolici *et al.*, 2009). Moreover, a number of recent tourism related studies have also used analysis of spatial autocorrelation to find out the spatial pattern and relationship of tourist flows. Maria *et al.* (2018) have conducted research in Madrid, Spain to analyse spatial

patterns and concentrations of urban tourists using spatial autocorrelation technique on three datasets of sightseeing, consumption and connectedness through internet. Cluster analysis and spatial autocorrelation analysis were carried out to locate areas of tourist activities. Stankov *et al.* (2017) have used spatial autocorrelation analysis to describe spatial inequalities among municipalities of Serbia regarding tourist inflows. The study concluded with observation of different patterns in spatial clustering of inbound and domestic tourist inflows and suggested the feasibility of spatial approach in tourism policy development for Serbia. Hu *et al.* (2016) have used ESDA to analyse spatial patterns of tourist inflows in Chinese cities. The hotspot analysis resulted with no significant change of tourist destination during year 2001-2013. The study is found significant for policy making in tourism sector of China. Kang *et al.* (2014) have analysed the changes in distribution of domestic tourists in South Korea during period between 1989-2011 using spatial autocorrelation technique. They concluded that spatial distribution of tourists in South Korea are uneven and less concentrated, thus resulting uneven benefits of tourism. Chhetri *et al.* (2013) have used spatial autocorrelation in a study to analyse spatial patterns of tourism and hospitality employment clusters in Australia. The results of their analysis revealed five clusters of tourism and hospitality that had potential of creating business synergy in tourism sector. Yang and Wong (2013) have conducted a study to investigate tourist distribution and growth rate in Chinese cities by using ESDA and spatial autocorrelation technique. The hot spot areas and clustering of inbound and domestic tourists are found located near coastal areas of China. The results of study are projected useful for better allocation of resources. Yang *et al.* (2013) investigated time-based and spatial clustering characteristics of tourism economy in China, by using spatial autocorrelation technique. The study concluded that tourism economy is spatially clustered and interdependent. The availability of sophisticated statistical software has contributed a lot in the popularity of using autocorrelation to analyse spatial dependence of different variables of interest (Chhetri *et al.*, 2017). Most of tourism related studies in Turkey have focused on

determining the relationship between tourism and economic growth by using econometric approaches. A few studies have been conducted to investigate regional disparities within country by using spatial analytical techniques. Yüncü *et al.* (2016) used spatial autocorrelation to determine spatial distribution of tourist inflows in cities of Turkey. However, only mapping analysis was conducted to show the distribution of tourists at provincial level. The results suggested that western and south-western provinces received more tourist inflows as compared to other parts of the country. The expansion of tourist flows was observed towards inner part of country from western and southwestern parts. Celebioglu and Dall'erba (2010) have investigated regional disparities among 79 provinces of Turkey by using spatial autocorrelation analysis and found that western provinces are more developed than eastern and south eastern provinces in terms of growth rate, GDP per capita and public investment. Gezici and Hewings (2007) have analysed regional inequalities in Turkey at provincial and within three geographical regions. They found an overall decrease in inequalities but presence of spatial dependence of disparities. According to analysis the more developed provinces found contributing the inequalities. Kozak *et al.* (2008) have determined contribution of climatic factors of cities on supply indicators for tourism.

Literature review of related publications has revealed that there is a lack of such kind of research conducted in Turkey using application of ESDA to analyse spatial association of tourist flows. Although some researches have used statistical analysis to find out patterns of tourism distribution at regional and provincial level but they provide little insight into spatial association of tourism distributions. This study enables us to get more detailed and comprehensive insight of spatial distribution patterns of tourists and location of hot spot areas at province level. Thus, tourism disparities among provinces of different regions can also be observed and understood. Therefore, this study not only contribute in government planning and policy making regarding tourism development but private tourist operators and planners can also arrange

suitable tourism packages and arrangements of activities.

Methodology

ESDA provides set of spatial statistical tools that are used to analyse spatial patterns, measuring spatial distributions, modelling spatial relationships, rendering hotspots and spatial outliers and visualizing spatial homogeneity and heterogeneity in the spatial data. (Haining, 1990; Anselin, 1998). ESDA measures the spatial autocorrelation in two main statistical categories: first, universal map statistics that focus on processing all the cases for an attribute; second, local or focused map statistics that process spatially defined subsets of data by looking for evidence of local attributes of mapped data. ESDA has been found very useful technique in tourism pattern and growth analysis in various studies (Zhang, 2011; Hu *et al.*, 2016). In this study, the spatial distribution of inbound and local tourists flow is mapped followed by tourist clustering and hotspot patterns of global and local distributions.

Moran's I statistics measures the overall clustering in the dataset by means of checking a null hypothesis of random localities. Spatial autocorrelation is suggested to be present by rejection of this null hypothesis that shows non-random spatial patterns. Most precise and detailed insight of data distribution is enabled by looking at spatial autocorrelation like a box plot or quartile map. A positive spatial autocorrelation is associated with correlation of neighbouring high values with each other or neighbouring low values while a negative autocorrelation is related to tendency of location of high values next to low values. It means there is no spatial autocorrelation when the spatial distribution of data is completely random. Moran's I calculation is based on the spatial weighted matrix with features (provinces in these case) a and b . It measures spatial autocorrelation of features by considering location and value of feature. Global measure for Moran's I to check the null hypothesis is formulized as follows (Cliff and Ord, 1981):

$$I = \frac{n}{S_0} \frac{\sum a \sum b (w_{a,b})(y_a y_b)}{\sum a y_a^2}$$

In this equation n represents the total number of features (provinces) while S_0 denotes aggregate of all the spatial weights of features, w_{ab} is the spatial weight between province a and b and y_a is the deviation of log number of tourist for province a from its mean ($x_a - \bar{X}$). The range of values is -1 to 1. The value 1 of Moran's I shows a strong positive autocorrelation, value 0 shows no autocorrelation while value -1 shows a strong negative autocorrelation among spatial features. Rook's case adjacency weight matrix has been used to define neighbours in present study which considers provinces with common borders as neighbours to each other.

The global measure of Moran's I only indicates the spatial dependence in terms of autocorrelation, however it does not show location of clustering or hotspots in the data (Anselin, 1995). Therefore, to find out the local spatial association at local level in the data local indicator of significant spatial autocorrelation (LISA) is used in this research. LISA helps measure the rate of tourist inflow in each province in standardized manner and its nearness to the rates of tourist arrival its neighbours and national average. Besides, a global indicator of spatial association is proportional to sum of all LISA observations. Local and global Moran's averages are same because of use of row standardized matrix. Local Moran's calculations for each feature (province) a is given below (Anselin, 1996):

$$I = \frac{a}{\sum a^2} \sum b w_{a,b}(b)$$

Spatial clustering of same values is indicated by a positive value of local Moran's I while spatial clustering of different values is indicated by a negative value. Monte Carlo permutation approach is used to test the significance level by the assumption that the data are likely to be observed in any location equally. LISA was re-calculated for each permutation after shuffling the observed values in all locations randomly. A reference distribution is generated by using 9999 random permutations to determine the significance level of LISA. The Moran significance map is used to visualize high clustering patterns or hotspot areas of tourist distribution. Moran's significance map of tourist

cluster has shown five categories of provinces with tourism distribution; (1) High-High cluster of provinces with high tourist arrival shows a positive spatial autocorrelation, (2) Low-High cluster of provinces with low tourist arrival that are neighbours to provinces with high tourist arrival showing negative spatial autocorrelation, (3) Low- Low cluster of provinces with low tourist arrivals shows a positive spatial autocorrelation, (4) Low-High clusters of provinces with high tourist arrival that are neighbours of cities with low tourist arrival showing a negative spatial autocorrelation, and (5) Not Significant cluster of the provinces that show no spatial autocorrelation. Therefore, hotspot areas for international and domestic tourist flow can be visualized and identified by observations based on significance map. In this research ArcGIS and GeoDa software are used for analysis.

The analysis of Moran's scatter plot provides detailed understanding of spatial relationship among the cities regarding tourism distribution. The technique was introduced by Anseline (1996) in which log number of tourist arrivals in each city are placed on horizontal axis against the standardized spatial weighted log number of tourist arrival in neighbouring cities on the vertical axis. In other words, the scatters plot enables us to visualize the spatial relationship by expressing the variables (tourist arrivals in a given city and weighted average number of tourist in neighbouring cities) in more standardized way. Therefore, Moran's scatterplot allows to identify both global and local spatial association of each variable that is displayed in the form of dot.

Moran's scatter plot provides an insight into the structure of spatial autocorrelation among various years. LISA statistics is used for more extensive understanding of spatial association among different variables. It helps to reveal the presence of significant cluster and hotspot areas of foreign and domestic tourist distribution in the provinces of Turkey. Besides, it also provides visualization of spatial heterogeneity among variables. LISA statistics is applied to the foreign tourist arrivals during years 2000 and 2016 in the provinces of Turkey and calculations are described through significance maps. The LISA statistics identifies

and describe the spatial association of foreign tourists into five categories. The first category shows those provinces whose LISA statistics are not found significant according to Bonferroni 5% pseudo-significance level based on the 9999 conditional permutations in Geoda software. Other categories of LISA statistics are based on the Moran's scatterplot HH, LL, LH and HL categories that are described earlier.

Source of Data:

The data about number of international and domestic tourists is obtained from tourism statistics of years 2000-2016 provided by Ministry of Culture and Tourism Turkey. The Ministry of Culture and Tourism collects data on annual basis from all the accommodation facilities and tourism service areas by means of questionnaires. The questionnaire survey is conducted by regular mail or electronic mail. The questionnaire form is available at website of Ministry of Culture and Tourism, Turkey. It is mandatory for all the tourism facilities to maintain the records of tourist arrivals and provide all necessary information asked in the questionnaire. The statistics are available for all provinces and cities of Turkey. However, the data before year 2008 is only available at province level while city level data is not consistently available during that period. Therefore, present research is limited to analyse the data after 2000. This study covers all provinces in Turkey.

Results and Discussion:

The analysis of data is started with the choropleth distribution maps of inbound and domestic tourist arrival for the year 2016 in the provinces of Turkey (Figure 1-2). A clear core-periphery pattern can be observed where core provinces with high tourist arrival are shaded in darker colour, while lighter colour of periphery provinces received low number of tourists during that period. The maps also show a drastic difference in the spatial distribution of foreign and domestic tourists in the country. International tourists are concentrated in Western and South-Western provinces of the country especially in the coastal areas. The analysis of tourism statistics has found that 70% of international tourists visit only Antalya,

Istanbul and Mugla provinces that are in the west and south-west of the country.

The core-periphery pattern is clearer in domestic tourist distribution as compared to international tourist distribution. Domestic tourist distribution also depicts the regional disparities in terms of tourist distribution in the cities of Turkey. It is evident that cities from Provinces of Antalya, Istanbul, Mugla, Aydin

and Izmir have enjoyed the highest domestic tourist arrival. These regional disparities in terms of international tourist arrivals are associated with historical, geographical and political setups (Dinler, 1998), power relations reflected in socioeconomic situation among classes (Tosun *et al.*, 2003) and the lack of private investment (Balkir, 1995, Celebioglu and Dall'erba, 2010).

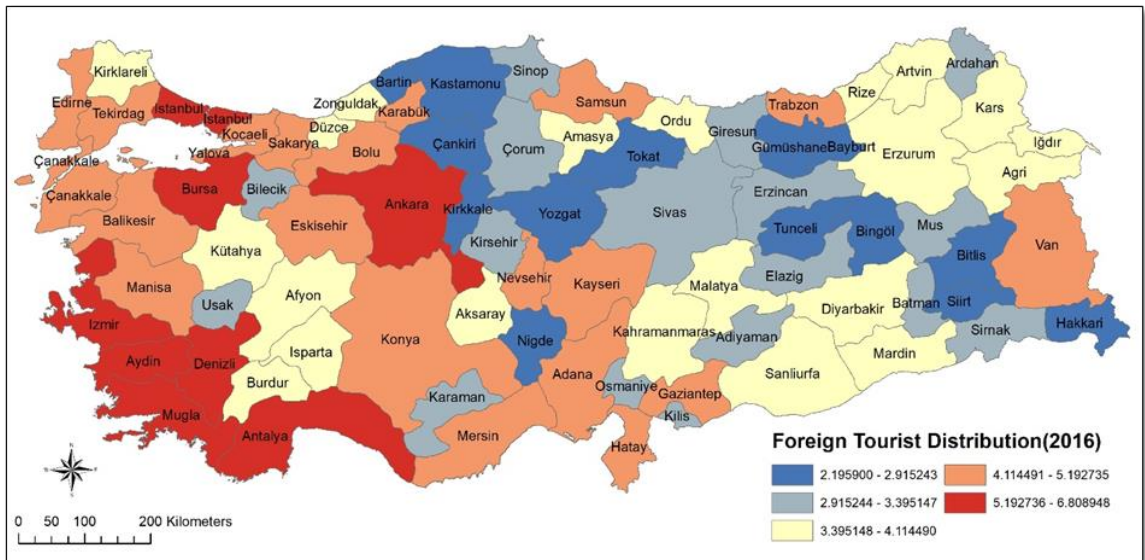


Figure 1. The choropleth map of foreign tourist arrival in Turkey (2016)

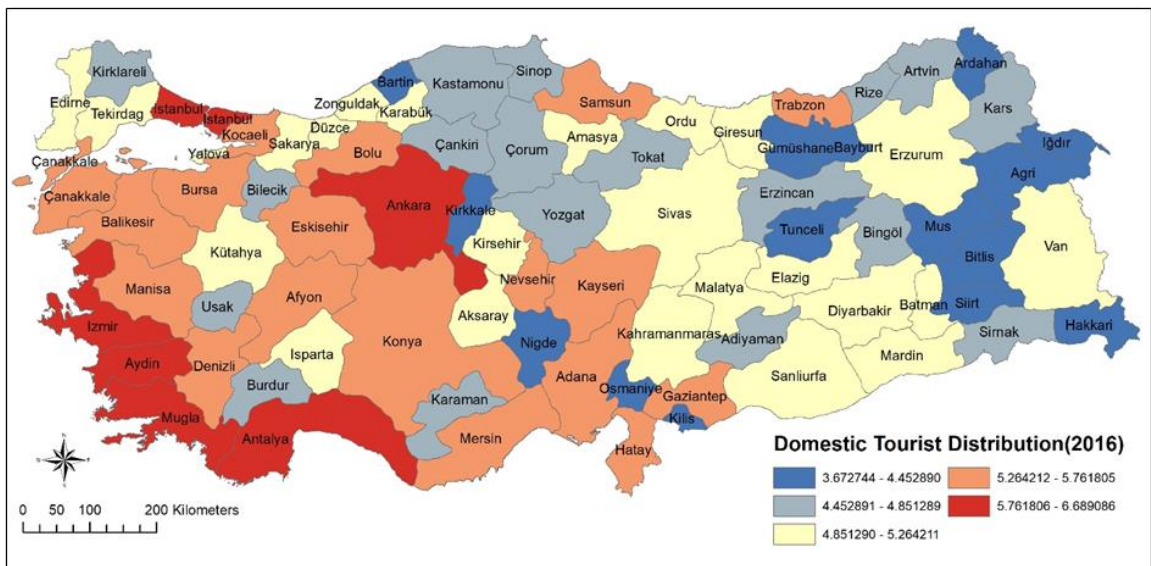


Figure 2. The choropleth map of domestic tourist arrival in Turkey (2016)

The values of Moran's I statistics for international and domestic tourist distribution in 81 provinces of Turkey over the period 2000-2016 are given in Table 1. Moran I values are found positive and statistically significance based on their p values in all the observations except one. Data analysis has revealed the presence of positive autocorrelation in both foreign and domestic tourist distributions in the country. Positive correlation portrays an inclination of tendency of regions with high(low) tourist arrivals to be clustered near the other regions with high(low) tourist numbers. It is found that spatial autocorrelation for both distribution shows a general increasing trend. However, difference in intensity of spatial association is observed in foreign and domestic tourists. Moran's I values of foreign tourists seem stable with high intensity of spatial association throughout the period with little fluctuations while increasing trend of values of domestic tourists shows a tendency towards stronger spatial association with time. As mentioned earlier that more than 70 percent of foreign tourists only visit four cities located in Mediterranean region of Turkey.

No change has observed in this pattern of

spatial association in terms of foreign tourist arrivals. There are several reasons behind this clustering of tourists in these cities including climate, presence of wide beach area, developed infrastructure, tour packages, advertisements and security. On the other hand low values of Moran's I for domestic tourists show that spatial association is not strong and similarities among cities are low. Besides, low values of spatial autocorrelation of domestic tourists might also show the emergence of newly formed tourist destinations.

Moran's scatterplot shows the spatial association of variables in four different quadrants. These are HH (High high), LL (Low low), HL (High low) and LH (Low high) quadrants based on the variable values surrounded by neighbour values. The areas located in HH and LL quadrants shows refer to a positive autocorrelation of similar values while areas located in LH and HL quadrants refer to a negative autocorrelation based on dissimilar values.

Moran's scatter plot of foreign tourists for the year 2000 and 2016 are given in the figures 3-4 respectively. The analysis of scatter plot

Table 1. Moran' I statistics for foreign and local tourists during period 2000-2016

Years	International Tourists		Domestic Tourists	
	Moran's I	St. Deviation	Moran's I	St. Deviation
2000	0.277**	0.074	0.037	0.074
2001	0.283**	0.074	0.13*	0.074
2002	0.307**	0.074	0.161*	0.074
2003	0.342**	0.074	0.15*	0.074
2004	0.312**	0.074	0.185**	0.074
2005	0.339**	0.074	0.219**	0.074
2006	0.381**	0.074	0.178*	0.074
2007	0.369**	0.074	0.211**	0.074
2008	0.284**	0.074	0.233**	0.074
2009	0.301**	0.074	0.229**	0.074
2010	0.3**	0.074	0.179*	0.074
2011	0.307**	0.074	0.224**	0.074
2012	0.329**	0.074	0.243**	0.074
2013	0.357**	0.074	0.275**	0.074
2014	0.339**	0.074	0.286**	0.074
2015	0.34**	0.074	0.302**	0.074
2016	0.377**	0.074	0.326**	0.074

* P-value <0.05 ** P-value<0.01

reveals that most of the Turkey's provinces are located in HH or LL quadrant (with percent of 27 and 34 respectively) which shows a tendency of positive autocorrelation regarding foreign tourist arrivals in these provinces. It means that provinces with similar inflow of foreign tourists are located to each other.

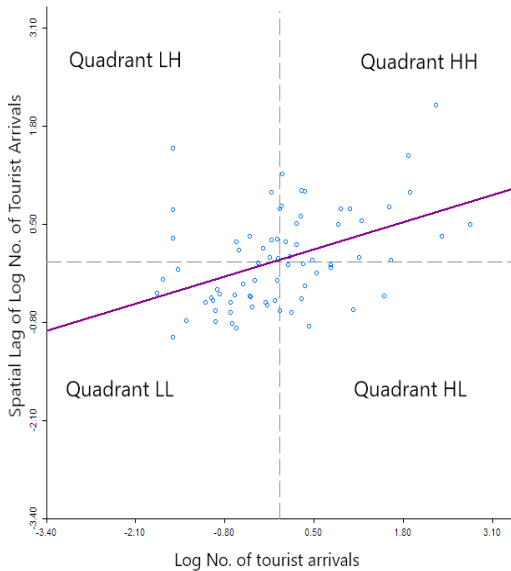


Figure 3. *Moran's Scatterplot for international tourists in year 2000*

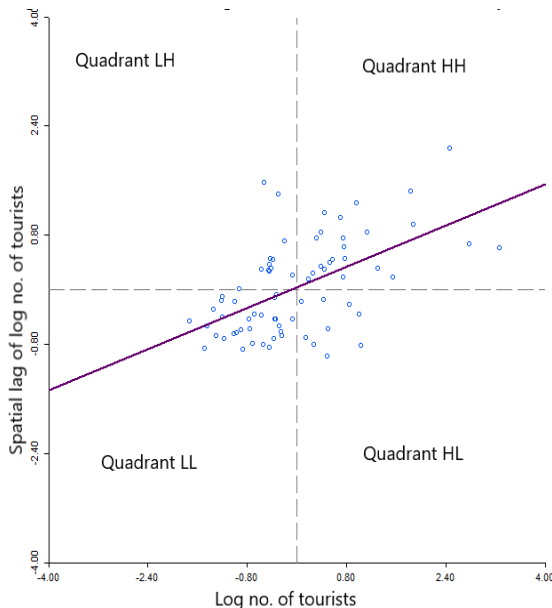


Figure 4. *Moran's Scatterplot for international tourists in year 2016*

The comparison of scatter plot results of different years reveals that most of the provinces located in HH or LL categories in the year 2000 also belongs to similar quadrant in the year 2010 and 2016 with a few exceptions. Provinces of Adana and Afyon were HL and LH in 2000 respectively that moved to HH in the year 2010 and 2016 while province of Kayseri was found in HH category in earlier periods that shifted to HL category in the year 2016. This depicts the increase of international arrivals in Adana and Afyon with passage of time. On the other hand, province of Kayseri faces a shortage of international arrivals as compared to its neighbouring province Nevsehir. Besides the positive spatial association, a number of cities also reveal negative correlation in terms of foreign tourist arrivals. These cities are located in LH and HL categories of scatter plot. LH quadrant shows the number of cities with small international tourist arrivals that are located near the high tourist arrival cities. Similarly, HL quadrant depicts number of cities with higher international tourist flow located near the cities with lower tourist flows. The number of cities located in LH and HL quadrants shows spatial heterogeneity.

Moran's scatterplot of domestic tourist distributions for the years 2001 and 2016 are given in figures 5-6 respectively. The results show a positive correlation as most of the cities are located in HH or LL quadrants for the above-mentioned years. However, the positive autocorrelation is not found stronger as compared to international tourist arrivals. It is found that 20% of cities were found in HH quadrant in 2001 that increased to 30% in the year 2016. On the other hand, 32% of cities were in LL quadrant in 2001 that increased to 35% in 2016. This situation reveals an increase in autocorrelation among cities with higher values of domestic tourist arrivals. The decrease in number of cities found in LH and HL quadrants reveals decrease in spatial heterogeneity with time.

Analysis of LISA statistics reveals that the maps of selected years are dominated by HH and LL values among the provinces where LISA statistics is found significant (Figures 7-8). This confirms the significant positive autocorrelation among cities with similar values

of foreign tourist arrivals as found in Moran's scatterplot.

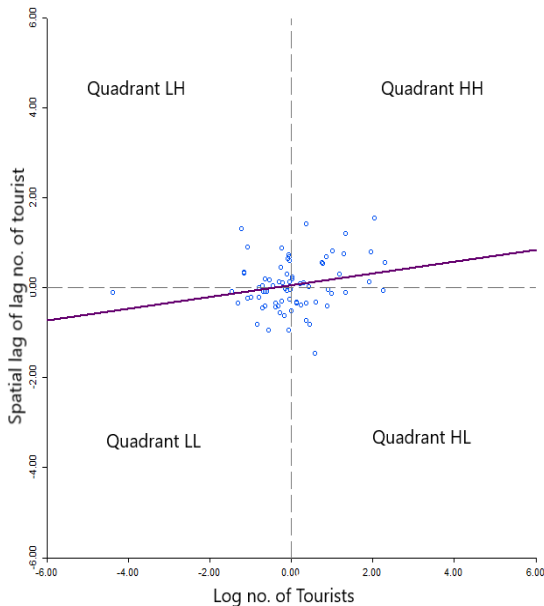


Figure 5. *Moran's Scatterplot for domestic tourists in year 2001*

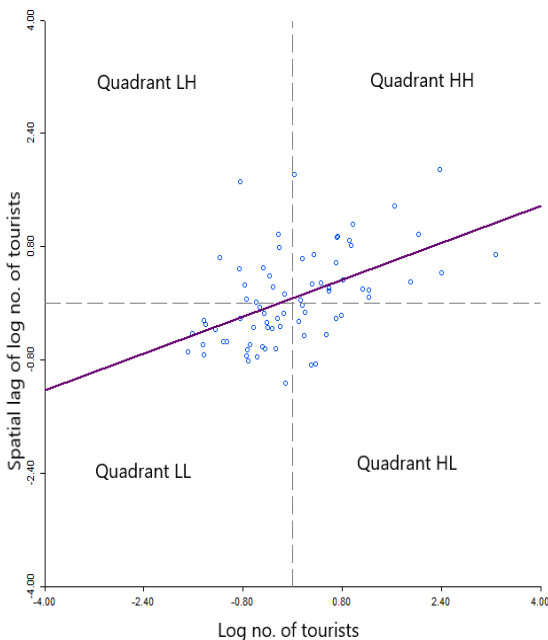


Figure 6. *Moran's Scatterplot for domestic tourists in year 2016*

In Turkey, three HH clusters are found regarding foreign tourist arrival in the year 2000, 2010 and 2016 that are not significantly

shifted during time. These clusters are Marmara Region cluster including Istanbul, Çanakkale and neighbouring cities. Second HH cluster is found in Aegean region including cities of Izmir, Aydın and Denizli while the third HH cluster is found in Mediterranean region including Antalya and Mugla provinces along with Konya from Central Anatolian region. These hotspot areas are remained persistent in all years' data. However, a small extension is found in the Mediterranean HH cluster with inclusion of Konya in the years 2010 and 2016. LL clusters are found in eastern and south-eastern areas of Turkey.

Most of the provinces located in South-Eastern Anatolian region and Eastern Anatolian region are clustered in LL category of Moran's significance map. LL cluster is found less stable with inclusion of more provinces in LL category with time. This situation shows a decline in foreign tourist arrivals in these provinces.

There are several reasons behind this formation of HH cluster in these regions. Istanbul is a gateway city of Turkey with many historical, geographical and cultural attraction. Therefore, a number of visitors chose Istanbul as their holiday destination to explore the city that is also known as gateway to Europe as it is located on the boundary of Asia and Europe. Çanakkale is also famous for its island tourism located in Marmara Sea and famous Dardanelles strait. Besides, Aydın, Izmir, Mugla and Antalya are preferred by tourists due to vast Mediterranean beach and warm climate. Denizli province receives a number of visitors because of white travertine areas in Pamukkale (Cotton Castle) and ancient cities of Hierapolis and Laodicea. Konya is well known for its association with famous Sufi poet Mevlana Rumi and attracts thousands of foreign and domestic tourists every year. Provinces with LL hotspots are linked with low development of the area, poor infrastructure and security problems.

LISA statistics for domestic tourist arrivals in provinces of Turkey is also calculated and presented in Moran's significance maps for the year 2001 and 2016 (Figures 9-10). Spatial autocorrelation is also found significance in terms of domestic tourist arrivals but is not as

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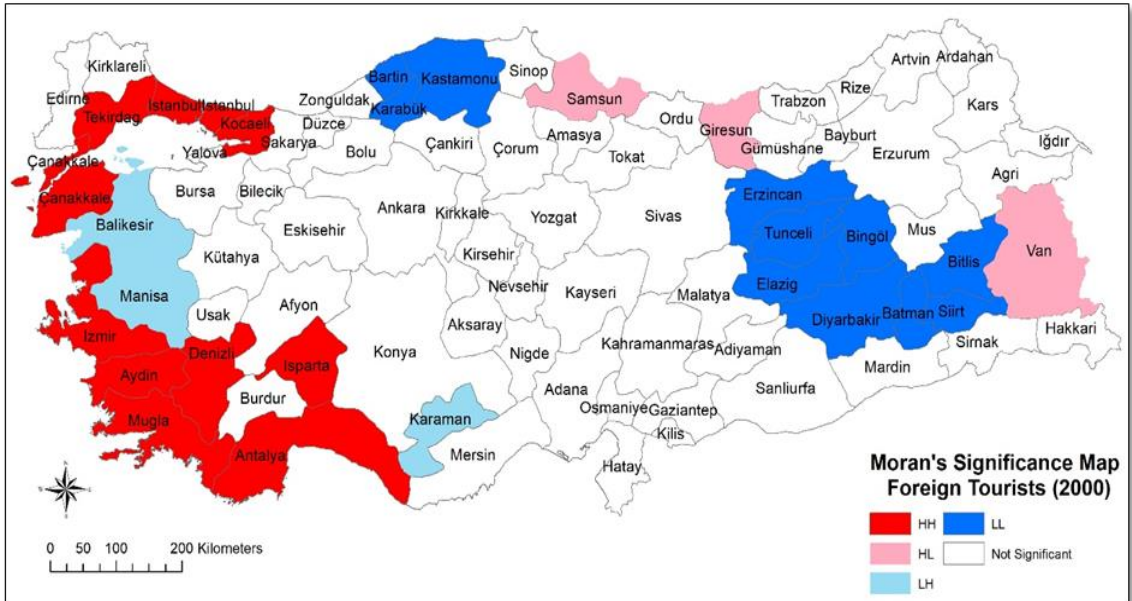


Figure 7. LISA Significant maps for international tourist arrivals in the year 2000

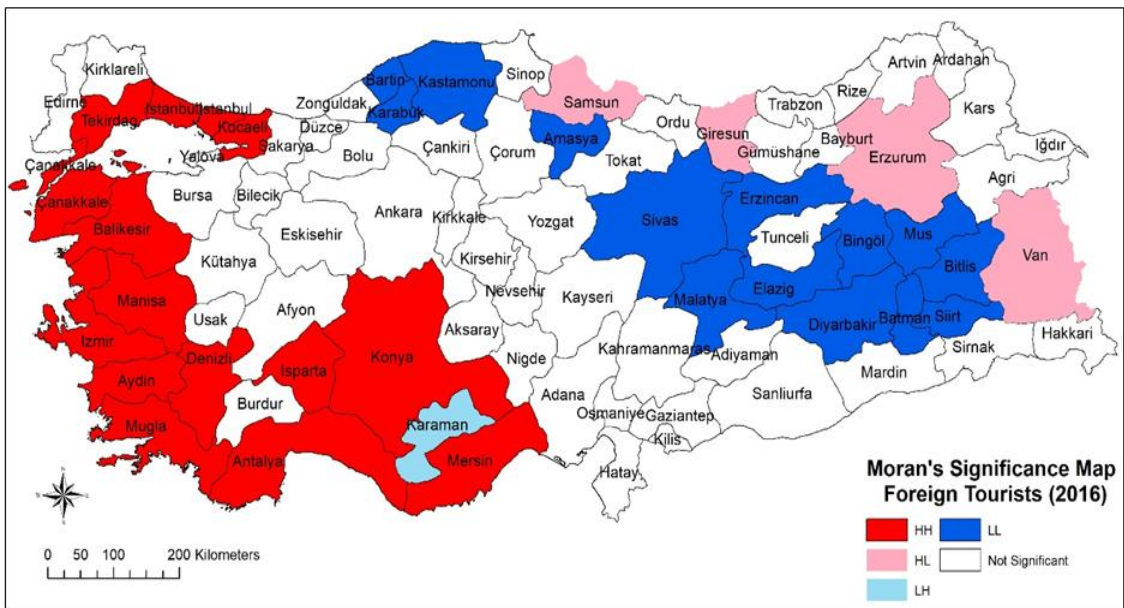


Figure 8. LISA Significant maps for international tourist arrivals in the year 2016

strong as of foreign arrivals. The LISA statistics significance maps show dominance of HH, LL and HL clusters in terms of domestic tourist arrivals in the given years. Moreover, HH and LL clusters are found less stable throughout time and a shift is also found.

Again, the western regions of Turkey are found important in receiving more domestic tourists while the eastern regions receive less domestic tourist inflow. Moreover, inclusion of Trabzon, Samsun and Erzurum in HL category indicates more domestic tourist inflow in Eastern Black Sea region of Turkey. This shift in domestic tourist flow can be associated with government

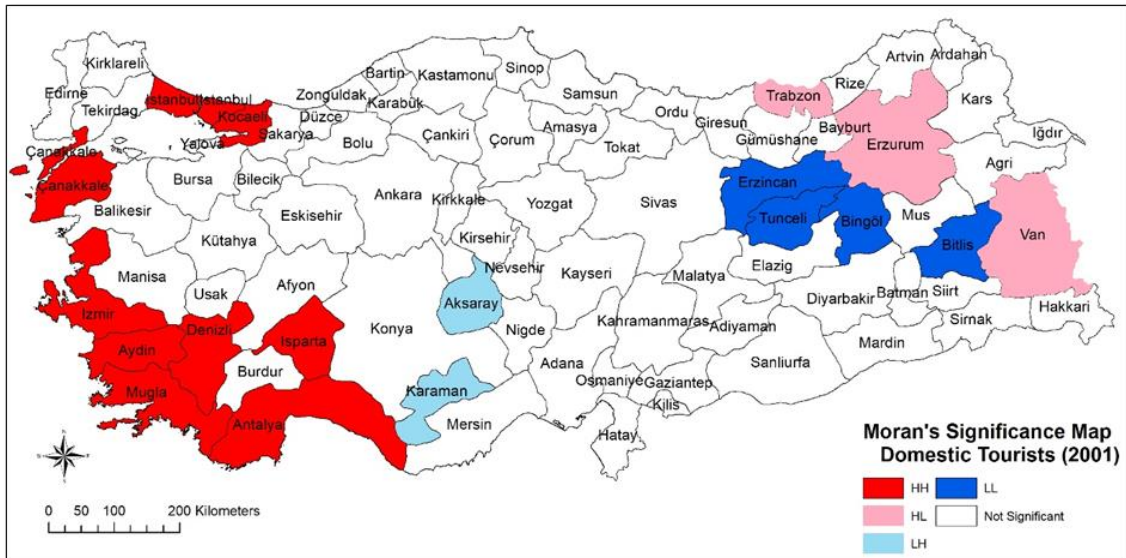


Figure 9. *LISA significant maps for domestic tourist arrival in 2001*

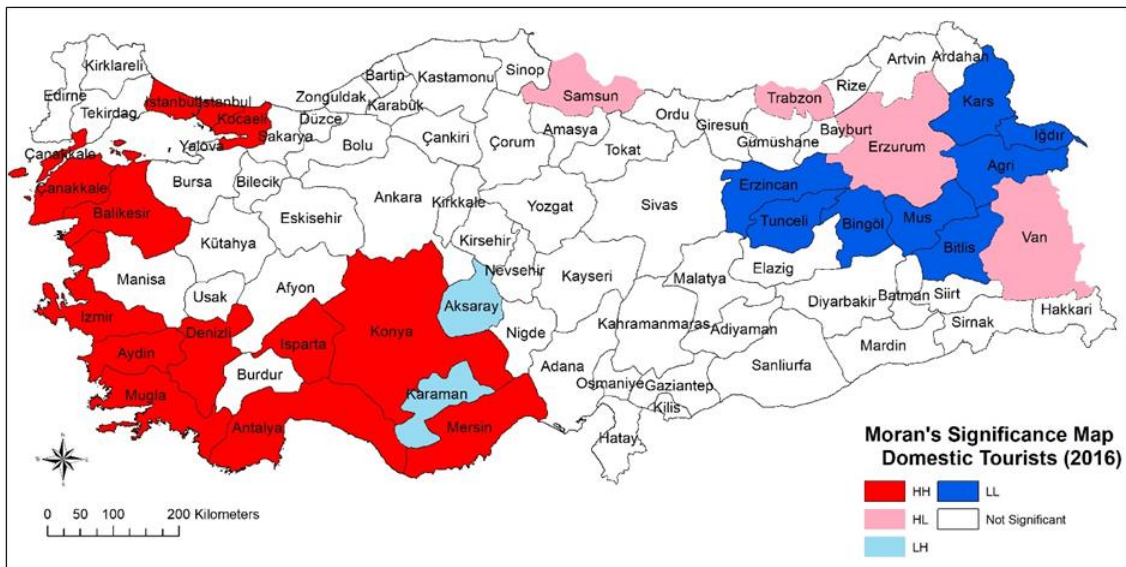


Figure 10. *LISA significant maps for domestic tourist arrival in 2016*

measure to promote tourism in these regions to decrease the disparities among provinces in terms of development and tourism growth.

Conclusion

Present study is sought to analyse spatial distribution of foreign and domestic tourist arrivals in provinces of Turkey using Explanatory Spatial Data Analysis technique. The research is aimed to explore spatial

association of tourist patterns in Turkey. For this purpose, spatial distribution of foreign and domestic tourist arrivals during period between 2000 and 2016 in Turkey is analysed. Results of Moran's scatterplot reveals that a positive spatial autocorrelation is present in terms of foreign and domestic tourist arrival in provinces of Turkey. It means provinces with high (low) values of tourist inflow and located near to other provinces with high (low) values of tourist

inflow. Besides, spatial heterogeneity is also observed regarding tourist inflow in which provinces with high (low) values were found located near low (high) tourist arrival values. This situation highlights the fact that tourism development in a given area is associated with development in its neighbouring areas. In other word, geographical similarities of places located close to each other have had a profound impact on tourism development.

LISA statistics further confirms the presence of positive spatial autocorrelation of provinces in terms of both foreign and domestic tourist inflows by visualization of phenomenon in significance maps. Moreover, LISA statistics also helps in identification of hotspot areas in terms of high and low tourist inflows. Marmara region, Aegean region and Mediterranean region of Turkey are found important with presence of HH hotspot while South East Anatolian region and Eastern Anatolian region are associated with LL hotspots regarding foreign and domestic tourist arrivals. It has been found that there is not a significant shift in HH and LL cluster over time as found in other similar researches (Gillmor, 1996; Zhang, 2011; Yang, 2013). This Core-Periphery pattern depicts a polarized spatial distribution of tourist arrivals in Turkey. Results of present study are found similar with studies conducted in other countries of world concluding the presence of polarized spatial patterns of tourist inflows (Ivy, 2001; Zhang, 2005; Zhang, 2011; Yang, 2013).

Turkey has started tourism as foreign exchange since 1980s and rapid development of tourist facilities are observed in the western provinces of the country. However, eastern and south-eastern provinces remained neglected in terms of tourism led growth policy. A number of factors are found responsible for this regional disparity within country in terms of tourism development. It has been found that Marmara and Aegean regions have remained important hubs of economic activity throughout history. Thus, provinces found in these regions have well established infrastructure as compared to eastern and south-eastern provinces. Besides, physiography and climate of Marmara, Mediterranean and Aegean regions also play significance role in attraction of tourists in these

areas. Moreover, infrastructure, security, education and development are also found effective in tourism development. Physical characteristics and natural resources also contributes in making any area as popular tourist destination. Availability of coastal areas with extended beaches of western and southwestern provinces of Turkey attract more tourists as compared to eastern ones. Besides climatic conditions also contribute in tourists' choice of holiday destination.

Regional disparities in terms of economic and social development in Turkey remained important issue in Turkish development policies for a long time. So is the case of tourism, as western and south-western provinces always enjoy mass tourism due to their location, moderate climate and availability of beach area. Tourism is considered an important source of foreign exchange in Turkish economy and therefore, given significant place in all the development plans. The regions with high clustering of tourism inflows are considered as "Tourism Cities" (Yüncü, 2016) and given special attention in development plans for investments in tourism sector and promotion of private sector. However, there is a strong need to promote different types of tourism, other than that of leisure tourism concentrated on beaches, in other areas of country to reduce the regional disparities. In recent years, Turkish government has started to develop and promote tourism in other regions of the country to reduce the gap among regions regarding development strategies. For this purpose, the infrastructure has been improved and rural tourism has been promoted in the Black Sea Region of Turkey. Besides, development projects other than tourism have also been started in East and South-Eastern Anatolian regions of Turkey.

ESDA explores the prevailing inequalities among difference provinces of Turkey in tourism development. It also confirms the results of previous studies conducted in Turkey highlighting the regional disparities among Western and Eastern regions of Turkey. (Tosun *et al.*, 2003, Balkir, 1995, Celebioglu and Dall'erba, 2010). The result of study contributes in policy making regarding budget allocation, provision of tourist facilities, infrastructure

development and provision of security in hotspot regions with high tourism demands. It also suggests priority areas in the form of LL clusters to improve the tourism development in order to fill the gaps of regional inequality in the country. There is strong potential of development of new forms of tourism in Turkey as the country is blessed with natural and cultural resources in the form of cultural heritage, natural canyons, summer mountain pastures and panoramic views. New forms of tourism including, nature tourism, eco-tourism, geo-tourism and cruise tourism should also be promoted to develop the tourism industry in inland areas of the country to lessen regional inequalities.

References

- Anselin, L. (1988). *Spatial Econometrics: Methods and Models*. Kluwer Academic Publishers.
- Anselin, L. (1995). Local Indicators of Spatial Association—LISA. *Geographical Analysis*, 27, 93–115.
- Anselin, L. (1996). The Moran scatterplot as an ESDA tool to assess local instability in spatial association. In M. Fisher, H. J. Scholten, and D. Unwin (Eds.) (2006). *Spatial Analytical Perspectives on GIS*, London: Taylor and Francis, 111–125.
- Arslanturk, Y., Balcilar, M., and Ozdemir, Z. A. (2011). Time-varying linkages between tourism receipts and economic growth in a small open economy. *Economic Modelling*, 28(1–2), 664–671.
- Aslan, A. (2013). Tourism development and economic growth in the Mediterranean countries: Evidence from panel Granger causality tests. *Current Issues in Tourism*, 17(4), 363–372.
- Balkir, C. (1995). Less development regions and regional development policies in Turkey. *European Urban and Regional Studies*, 2(3), 253–264.
- Celebioglu, F., and Dall'erba, S. (2010). Spatial disparities across the regions of Turkey: An exploratory spatial data analysis. *The Annals of Regional Science*, 45(2), 379–400.
- Chhetri, A., Arrowsmith, C., Chhetri, P. and Corcoran, J. (2013). Mapping Spatial Tourism and Hospitality Employment Clusters: An Application of Spatial Autocorrelation. *Tourism Analysis*, 18(5), 559–73.
- Chhetri, A., Chhetri, P., Arrowsmith, C. and Corcoran, J. (2017). Modelling tourism and hospitality employment clusters: a spatial econometric approach. *Tourism Geographies*, 19(3), 398–424.
- Cliff, A. D. and Ord, J. K. (1981). *Spatial Processes: Models and Applications*, London: Pion.
- Cracolici, M. F., Cuffaro, M. and Nijkamp, P. (2009). A spatial analysis on Italian unemployment differences. *Statistical Methods Applications*, 18, 275–291.
- Dinler, Z. (1998). *Bolgesel İktisat. Regional economics: Decreasing developmental gaps among regions in Turkey*. Ekin Kitapevi Yayinlari, Bursa.
- Fortin, M.J., and Dale, M. (2005). *Spatial Analysis: A Guide for Ecologists*. Cambridge, UK: Cambridge University Press.
- Gezici, F., and Hewings, G. (2004). Regional convergence and the economic performance of peripheral areas in Turkey. *RURDS*, 16(2), 113–132.
- Gezici, F., Geoffrey J. and Hewings, D. (2007). Spatial Analysis of Regional Inequalities in Turkey. *European Planning Studies*, 15(3), 383–403.
- Göymen, K. (2000). Tourism and governance in Turkey. *Annals of Tourism Research* 22 (10), 25–48.
- Griffith, D.A. (1987) *Spatial Autocorrelation: A Primer*. Resource Publications in Geography, The Association of American Geographers, Washington DC.
- Gunduz, L. and Hatemi, J. A. (2005). Is the tourism-led growth hypothesis valid for Turkey? *Applied Economics Letters*, 12, 499–504.
- Haining, R. (1990). *Spatial Data Analysis in the Social and Environmental Sciences*. UK: Cambridge
- Hu, Xi-sheung, Neelam, C. and Green, G. (2016). Spatial Analysis of International Tourism Growth in China's Cities. *Current Politics and Economics of Northern and Western Asia* 25(2), 149–175.
- Husein, J. and Kara, S. M. (2011). Research note: Re-examining the tourism-led growth hypothesis for Turkey. *Tourism Economics*, 17(4), 917–924.

- Ivy, R. L. (2001). Geographical variation in alternative tourism and recreation establishments. *Tourism Geographies*, 3(3), 338–355.
- James, R. D. and Campbell, H. S. Jr. (2014). The impact of space and scale on conditional convergence: Test results from the United States (1970–2004). *Annals of GIS*, 20(1), 11–21.
- Kang, S., Jinwon K. and Nicholls, S. (2014). National Tourism Policy and Spatial Patterns of Domestic Tourism in South Korea. *Journal of Travel Research*, 53(6), 791–804.
- Katircioglu, S. T. (2009). Revisiting the tourism-led-growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration. *Tourism Management*, 30, 17–20.
- Kozak, N., Uysal, M. and Birkan, I. (2008). An Analysis of Cities Based on Tourism Supply and Climatic Conditions in Turkey. *Tourism Geographies*, 10(1), 81–97.
- Lau, G., and McKercher, B. (2006). Understanding Tourist Movement Patterns in a Destination: A GIS Approach. *Tourism and Hospitality Research*, 7 (1), 39-49.
- Legendre, P. (1993). Spatial autocorrelation: trouble or a new paradigm. *Ecology*, 74(6), 1659–1673.
- Lew, A., and McKercher, B. (2006). Modelling tourist movement: a local destination analysis. *Annals of Tourism Research*, 33(2), 403–423.
- Liu, J., Nijkamp P., Huang X. and Lin, D. (2017). Urban livability and tourism development in China: Analysis of sustainable development by means of spatial panel data. *Habitat International*, 68, 99-107.
- María H.S., Juan C.G. and Javier G. (2017). Tourists' Digital Footprint in Cities: Comparing Big Data Sources. *Tourism Management*, 66, 13-25.
- Martin, J.M.S., Rivero, M. S. and Gallego, J.I.R. (2017). Analysis of the balance between tourist potential and supply of rural tourism accommodation using spatial statistical techniques. An application to the province of cáceres (Spain). *Cuadernos de Turismo*, 39, 699-702.
- Ministry of Tourism. (2017). *Bulletin of Tourism Statistics*. Ankara: Ministry of Tourism.
- <http://yigm.kulturturizm.gov.tr/TR,9851/turizm-istatistikleri.html> (accessed on 20-09-2017)
- Ongan, S., and Demiroz, D. M. (2005). The contribution of tourism to the long-run Turkish economic growth. *Journal of Economics*, 53(9), 880–894.
- Pace, R. K., Barry, R. and Sirmans, C. F. (1998) Spatial statistics and real estate. *Journal of Real Estate*, 17(1), 5-13.
- Pearce, D. G. (1987). Spatial patterns of package tourism in Europe. *Annals of Tourism Research*, 14(2), 183–201.
- Pearce, D. G. (1996). Domestic tourist travel in Sweden: A regional analysis. *Geografiska Annaler, Series B, Human Geography*, 78(2), 71-84.
- Resmi Gazete. (1982). *Turizm Tesvik Kanunu*, Sayı: 2634; Kabul Tarihi: 12/3/1982 [Tourism Encouragement Law no. 2634; Date of Acceptance: 12/3/1982]. Ankara: Resmi Gazete.
- Rey, S. (2004) Spatial analysis of regional income inequality. In: M.Goodchild and D. Janelle (Eds) (2004) *Spatially Integrated Social Science: Examples in Best Practice*, Oxford: Oxford University Press, 280–299.
- Seckelmann, A. (2002). Domestic tourism: A chance for regional development in Turkey? *Tourism Management* 23, 85–92.
- Sönmez, S.S. (1998). Tourism, terrorism, and political instability. *Annals of Tourism Research*, 25(2), 416-456.
- Sridharan, S., Tunstall, H., Lawder, R., and Mitchell, R. (2007). An exploratory spatial data analysis approach to understanding the relationship between deprivation and mortality in Scotland, *Social Science and Medicine*, 65, 1942–1952.
- Stankov, U. et al. (2017). Spatial Autocorrelation Analysis of Tourist Arrivals Using Municipal Data: A Serbian Example. *Geographica Pannonica*, 21(2), 106–14.
- Tobler, W. (1970). A Computer Movie Simulating Growth in the Detroit Region. *Economic Geography*, 46, 234-240.
- Tosun, C. (1999). An analysis of contributions of international inbound tourism to the Turkish economy. *Tourism Economics*, 5(3), 217–250.
- Tosun, C., Timothy, D.J., and Öztürk, Y. (2003). Tourism Growth, National

- Development and Regional Inequality in Turkey. *Journal of Sustainable Tourism*, 11 (2-3), 133-161.
- Tosun, J., and Jenkins, J.L. (1996). Regional planning approaches to tourism development: the case of Turkey. *Tourism Management*, 17(7), 51-53
- WTTC. (2017). Economic Impact 2017 Turkey. <https://www.wttc.org//media/files/reports/economic-impact-research/countries-2017/turkey2017.pdf> (accessed on 13-09-2017)
- Wu, C. and Carson, D. (2008). Spatial and temporal tourist dispersal analysis in multiple destination travel. *Journal of Travel Research*, 46(3), 313-317.
- Yang Y. and Wong. K. (2013). Spatial Distribution of Tourist Flows to China's Cities. *Tourism Geographies*, 15(2), 338-363.
- Yang, H., Xiaoya D., Min W. and Yu G. (2013). GIS-Aided Evolvment Analysis of Spatial-Temporal Pattern of Regional Tourism Industry Environment. *Advanced Materials Research*, 762-731, 4690–4693.
- Yüncü, D., Günay, S. and Kantar, Y.M. (2016). Spatial Relationship of Tourist Distribution in Turkey. In Saufi, A., Andilolo, I, R., Othman, N and Lew, A. A. (eds) (2016). *Balancing Development and Sustainability in Tourism Destinations*, Singapore: Springer Nature, 353-366.
- Zhang, J., Li, N., Liang, Y., and Liu, Z. (2005) An analysis on spatial field effect of domestic tourist flows in China. *Geographical Research*, 02.
- Zhang, Y., Xu, J., and Zhuang, P. (2011). The spatial relationship of tourist distribution in Chinese cities, *Tourism Geographies*, 13(1), 75–90.
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