

Study on the Spatial Differences and Influencing Factors of Regional Tourism Development Taking 21 Cities in Guangdong Province as Examples

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ABSTRACT

Moran's I in the spatial autocorrelation analysis method is used, and Geoda software is applied to sequentially analyze the spatial distribution of per capita international tourism foreign exchange income (USD) in 21 cities in Guangdong Province in 2018. The global autocorrelation test and the local autocorrelation test are used to explore its spatial correlation and spatial heterogeneity. It is concluded that there is a significant spatial autocorrelation of foreign exchange income per capita of international tourism in various cities in Guangdong Province in 2018. Subsequently, a spatial regression model is used to calculate the influencing factors of the spatial differences in tourism development of 21 cities in Guangdong Province in 2018, and it is concluded that the three factors of GDP, total imports of foreign-invested enterprises, and total exports of foreign-invested enterprises to foreign exchange income per capita in international tourism have a positive impact.

Keywords: *tourism development, spatial differences, influencing factors*

I. INTRODUCTION

The Guangdong-Hong Kong-Macao Greater Bay Area is a key area for regional tourism economic development. As tourism has gradually become an important pillar industry for the development of its national economy, the tourism industry in the Greater Bay Area has become one of the important sources of economic growth in the region, and nine cities in Guangdong Province are located in the Greater Bay Area, so the study of Guangdong Province Tourism development is meaningful. There is a two-way relationship between tourism and economic development [1]. With the development of the economy, more and more people choose to travel [2], but they must also pay attention to the development of sustainable tourism [3]. Wu Zhicai, Zhang Lingyuan (2020) and others analyzed the spatial structure and network characteristics of tourism economic links in 11 cities in Guangdong, Hong Kong and Macau, discussed the collaborative model and countermeasures for the development of tourism cooperation in Guangdong, Hong Kong and Macau Bay Area; Su Haiyang, Chen Chaolong (2020) Take the Pearl River Delta region as an example to study its multi-center tourism symbiosis relationship; Wang Xueji and Sun Jiuxia (2019) studied the construction of the integrated development mechanism of tourism in the Guangdong-Hong Kong-Macao Greater Bay Area from the perspective of cultural circles. At present, there are not many studies on tourism development in Guangdong

Province. Qualitative research methods are applied mostly, quantitative research methods are used rarely. More importantly, there is no relevant literature that uses spatial econometric analysis methods to study differences in tourism development in Guangdong Province. 21 cities in Guangdong Province are taken as the research object, econometric model is constructed to analyze the spatial differences in regional tourism development, and spatial econometric models is applied to further study various influencing factors of the spatial differences in tourism development.

II. RESEARCH AREA, DATA SOURCES, AND RESEARCH METHODS

A. Research area and data source

Guangdong Province covers 21 cities: Guangzhou, Shenzhen, Zhuhai, Shantou, Foshan, Shaoguan, Heyuan, Meizhou, Huizhou, Shanwei, Dongguan, Zhongshan, Jiangmen, Yangjiang, Zhanjiang, Maoming, Zhaoqing, Qingyuan, Chaozhou, Jieyang, Yunfu, data retrieved from "Guangdong County and City Statistical Database-Annual Data (City Level)" (2018).

B. Research methods

1) *Spatial autocorrelation analysis method:* The statistics of spatial autocorrelation are diverse, and Moran's I is the most widely used.

$$I = \frac{n \sum_i \sum_j w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_i \sum_j w_{ij} \sum_i (x_i - \bar{x})^2} \quad (1)$$

Where n is the number of samples, w_{ij} is the (i, j) element of the spatial matrix W , x_i and x_j are the observations of the spatial unit i, j , \bar{x} are the average of the observations. A positive value of I reflects a positive correlation, and a negative value of I reflects a negative correlation.

The above is the global Moran's I , and the corresponding is the local Moran's I .

$$I_i = \frac{n(x_i - \bar{x}) \sum_{j \neq i} w_{ij} (x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2} \quad (2)$$

Local Moran's I reflects the spatial autocorrelation of a certain spatial unit, that is, the direct correlation between a certain spatial unit and its neighboring spatial units.

2) *Spatial regression model*: The mathematical expression is as follows

$$\ln GDP = \alpha + \beta_1 \ln export + \beta_2 \ln import \quad (3)$$

III. EMPIRICAL ANALYSIS RESULTS

The following is the analysis process and results of spatial autocorrelation and spatial regression models.

A. Spatial autocorrelation analysis

Here per capita international tourism foreign exchange income (USD) (ten thousand US dollars) in 21 cities in Guangdong Province in 2018 is applied to measure the spatial difference of tourism development in Guangdong Province, that is, the foreign exchange income of international tourism (ten thousand US dollars) in Guangdong Province in 2018 divided by the number of overnight tourists received in Guangdong Province in 2018 (ten thousand people) Amount. In order to analyze

the spatial connection and difference of the tourism development level of 21 cities in Guangdong Province in 2018, Geoda software is used to sequentially analyze the spatial distribution and Global Moran's I as well as Local Moran's I of per capita international tourism foreign exchange income (USD) in 21 cities in Guangdong Province in 2018. Three aspects of autocorrelation test explore its spatial correlation and spatial heterogeneity.

1) *The spatial difference of tourism development in Guangdong Province*: As can be seen from "Fig. 1", the per capita international tourism foreign exchange income of 21 prefecture-level cities in Guangdong Province is divided into four levels. The higher the prefecture-level city per capita international tourism foreign exchange income, the better the development of the tourism economy is shown on the map. The darker the color, it can be divided into backward areas, relatively backward areas, more developed areas, and developed areas in order from light to deep. Figure 1 is a map of the regional distribution of per capita international tourism foreign exchange income (USD) (ten thousand US dollars) in various cities in Guangdong Province in 2018. From the figure, we can see that there are 2 developed regions, namely Guangzhou (US\$103.35) and Foshan (US\$107.55); four more developed regions are Jiangmen City (US\$59.90), Zhuhai City (US\$64.16), Shenzhen City (US\$85.18), and Dongguan City (US\$75.42); there are four relatively backward areas, namely Zhaoqing City (US\$27.23) and Huizhou City (US\$42.09), Zhongshan City (US\$20.42), Chaozhou City (US\$22.64); 11 backward areas are Zhanjiang City (US\$5.25), Maoming City (US\$2.57), Yangjiang City (US\$3.26), Yunfu (US\$3.46), Qingyuan (US\$8.53), Shaoguan (US\$1.45), Heyuan (US\$1.45), Shanwei (US\$4.01), Meizhou (US\$8.73), Jieyang (US\$1.32), Shantou 10.57 USD).

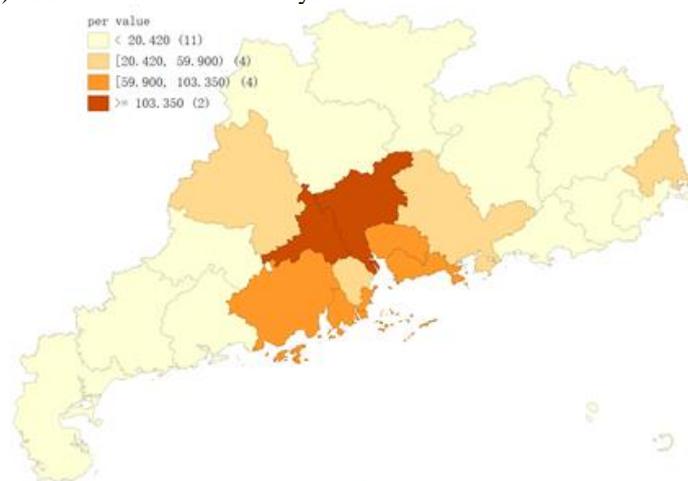


Fig. 1. Distribution of per capita international tourism foreign exchange income in 21 cities in Guangdong Province in 2018.

2) *The global Moran's I of tourism development in Guangdong Province:* It can be drawn from "Fig. 2" that in the per capita international tourism foreign exchange income of 21 cities in Guangdong Province in 2018 has a positive spatial autocorrelation. Perhaps because of the increasing trend of the number of overnight tourists in Guangdong in recent years, the international tourism foreign exchange income has increased year by year.

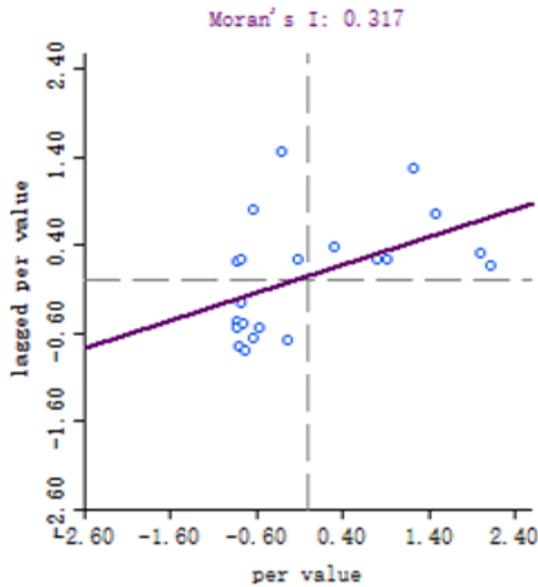


Fig. 2. Scatterplot of global autocorrelation test of per capita international tourism foreign exchange income in 21 cities in Guangdong Province in 2018.

Global autocorrelation reflects the spatial agglomeration level in all regions. In order to study the average correlation and its significance between the per

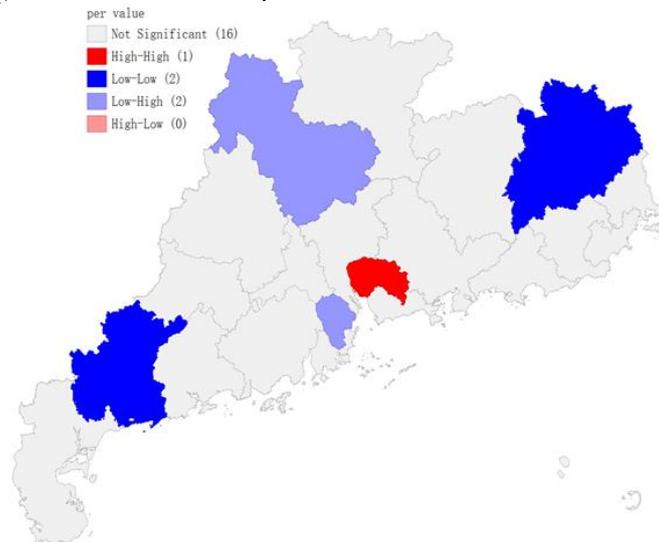


Fig. 3. LISA cluster chart of per capita international tourism foreign exchange income of 21 cities in Guangdong Province in 2018.

capita international tourism foreign exchange earnings of 21 prefecture-level cities in Guangdong Province, the Moran's I index method was used to test the global autocorrelation of the city's per capita international tourism foreign exchange income data. The results are shown in "Table I".

TABLE I. GLOBAL AUTOCORRELATION TEST VALUES OF PER CAPITA INTERNATIONAL TOURISM FOREIGN EXCHANGE INCOME IN 21 CITIES IN GUANGDONG PROVINCE IN 2018

Test	Numerial Number
Moran's I	0.317
P-value	0.019

It can be drawn from "Table I" that the Moran's I index of various cities in Guangdong Province in 2018 is 0.317, indicating that there is a significant spatial positive correlation in per capita international tourism foreign exchange income, and the P value is 0.019, which is less than the significance level of 0.05, which means there is a significant spatial autocorrelation in per capita international tourism foreign exchange income in various cities in Guangdong Province.

3) *The local Moran's I of tourism development in Guangdong Province:* It can be drawn from "Fig. 3" that the gray area is an insignificant area, the large red area is a High-High agglomeration type area, this area has Dongguan City; the light purple area is a Low-High agglomeration type area, this area has Qingyuan City and Zhongshan City; dark blue area is Low-Low agglomeration type area, this area has Maoming City and Meizhou City.

It can be drawn from "Fig. 4" that gray areas are insignificant areas, dark green areas indicate areas that are significant at the 0.01 level, and there are Zhongshan and

Dongguan cities; light green areas indicate areas that are significant at the level of 0.05. Regions include Maoming City, Qingyuan City and Meizhou City.

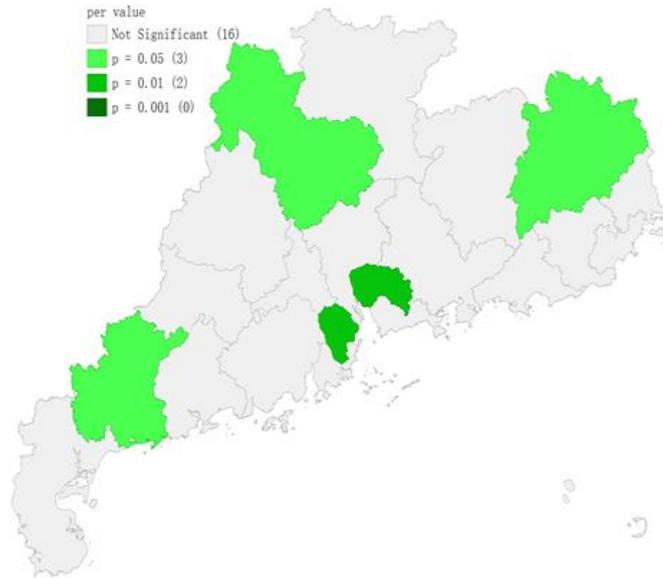


Fig. 4. LISA significance map of per capita international tourism foreign exchange income in 21 cities in Guangdong Province in 2018.

B. Spatial regression model analysis

Here, the per capita international tourism foreign exchange income is used as the dependent variable, the local GDP, the total import of foreign-invested enterprises, and the total export of foreign-invested enterprises are

used as independent variables. Geoda software is used and the spatial regression model is applied to calculate the spatial difference and the influencing factors in tourism development in Guangdong Province, the results are as follows.

TABLE II. RESULTS OF THE FIRST PART OF THE SPATIAL REGRESSION MODEL

Test	Numerial Number
R-squared	0.717876
Adjusted R-squared	0.668089
F-statistic	14.4191
Prob(F-statistic)	6.32567e-005

It can be drawn from "Table II" that the value of Adjusted R-squared is 0.668089, and the F statistic is

qualified, indicating that the model as a whole is established.

TABLE III. RESULTS OF THE SECOND PART OF THE SPATIAL REGRESSION MODEL

Variable	Coefficient	Std.Error	t-Statistic	Probability
CONSTANT	-1.2241	2.26345	-0.540813	0.59565
LN_GDP	0.296719	0.321419	0.923155	0.36884
LN_EXPORT	0.0500062	0.293841	0.170181	0.86688
LN_IMPORT	0.465029	0.285219	1.63043	0.12140

According to "Table III", the elasticity coefficient of GDP to per capita international tourism foreign exchange income is 0.296719, the elasticity coefficient of total export of foreign-invested enterprises to per capita international tourism foreign exchange income is

0.0500062, and the elasticity coefficient of total import of foreign-invested enterprises to per capita international tourism foreign exchange income is 0.465029.

IV. CONCLUSION

In summary, the tourism development of 21 cities in Guangdong Province has significant spatial differences and has a positive spatial correlation; and the three factors of gross domestic product, total imports of foreign-invested enterprises, and total exports of foreign-invested enterprises contribute to per capita international tourism foreign exchange income, and the relevant elasticity coefficients are all positive, proving that these three factors have a positive impact on per capita international tourism foreign exchange earnings. Therefore, to improve the efficiency and quality of tourism development in Guangdong Province, it is necessary to accelerate the development of the local economy and increase the total import and export volume of foreign-invested enterprises. Guangdong province ought to continue to improve the level of opening to the outside world, increasing tourism infrastructure and creating a good investment environment, in order to attract foreign investment. Relying on the good geographical location of Hong Kong and Macao, take measures to simplify customs clearance procedures and encourage cross-border tourism. As a tertiary industry, the tourism industry not only plays a significant role in promoting regional economic development, but also has strong industrial relevance. It has increasingly become a leading pillar industry in coastal areas and a new engine for economic growth in coastal areas. Tourism is an important way for people to enrich their spiritual civilization, and at the same time, it is conducive to the improvement of related infrastructure. Finally, tourism can drive the development of related industries, promote local image and spread local culture. Tourism is the fastest growing and most active field in the service industry [4], measures to promote the development of tourism include the development of e-tourism [5], focus on cultural tourism planning [6], pay attention to the sustainable use of natural resources [7].

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