Empirical Analysis of the Main Influencing Factors of Tourism Revenue in Chizhou City

-- Based on Multiple Linear Regression Model

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Abstract

In recent years, the tourism industry in Chizhou City has developed rapidly, and the proportion of tourism revenue in the city's income has been rising, and the development of tourism in Chizhou City has played an important role in promoting local economic growth. This paper selects the data of Chizhou City from 20 03 to 2021 as the sample, based on the econometric model, takes the total tourism revenue of Chizhou City as the dependent variable, selects the per capita GDP, permanent population, railway operating mileage, the total number of travel agencies in Chizhou City and other variables as independent variables, and uses Eviews software to establish a multiple regression model. The results show that the per capita GDP, the number of permanent residents, the railway operating mileage, and the total number of travel agencies in Chizhou have a significant impact on the tourism revenue of Chizhou City, and all four are positively correlated with the tourism revenue of Chizhou City. Based on the research results, provide recommendations for the development of local tourism.

Keywords

Tourism Revenue; Multiple Linear Regression; Least Squares; Influencing Factors.

1. Introduction

With the improvement of people's living standards and the upgrading of consumption structure, more and more people choose tourism to cultivate their emotions, broaden their horizons and relax their lives, and tourism has gradually emerged, radiating strong vitality and vitality. Therefore, it is of great practical significance to improve the efficiency of tourism development in Chizhou. Tourism development is affected by many factors, and it is of great significance to study the relevant factors affecting the tourism industry in Chizhou City.

2. Literature Review

In Yang Yejun's (2018) research and proof, Chizhou City's breakthrough in the future tourism economy change node provides strategic suggestions such as basing itself on distinctive brands and inheriting intangible cultural heritage. Wang Ning et al. (2020) selected the tourism data of 31 provinces in China from 2010 to 2017, and analyzed the influencing factors of China's tourism revenue by constructing a path analysis model and a panel model, and concluded that the convenience of transportation, the richness of tourism resources, the size of the permanent population and the per capita tourism expenditure all have a certain impact on domestic tourism revenue. Shi Peihua et al. [3] selected the panel data of 60 tourism cities in 2020, analyzed the impact of global tourism mode on tourism economic development by using the double difference method, and found that building a global tourism demonstration zone and creating a regional global tourism model can increase tourism investment in the region, improve the industrial structure and promote the development of tourism. Although Chizhou

is famous for its Buddhist holy land, it has not fully exploited its advantages for various reasons, putting it in a competitive position in the tourism industry. Therefore, this paper takes Chizhou City as the research object, selects relevant data from 20 03-2021 to construct a time series model, conducts multiple linear regression analysis, empirically explores the tourism development factors of Chizhou City, and puts forward relevant suggestions that are conducive to improving the tourism development capacity of Chizhou City, the recovery of Chizhou City's tourism after the epidemic, and the framework of local characteristic tourism model.

3. The Analysis of Influencing Factors

3.1. Per Capita GDP of Chizhou City

To a certain extent, the economic development of the region determines the development of tourism, and the development of tourism depends on the consumption level of people in the region. Per capita GDP is an important indicator to measure the economic development of a region, reflecting the consumption power of people in the region. The increase in per capita GDP can increase the tourism demand of the place to a certain extent, thereby improving its tourism development capacity.

3.2. The Number of Permanent Residents

In recent years, the impact of increased population mobility on tourism has been affected. In modern society, a large number of rural people flock to the cities, and at the same time people move between cities. The increase in population mobility has raised people's awareness of tourism.

3.3. Railway Operating Mileage

Accessibility is an important factor affecting the attractiveness of a region's tourism. At present, the tourism transportation in Chizhou City is mainly by road and railway. The better the condition of the railway, the more attractive it will be to travelers, thereby increasing local tourism demand, increasing total tourism revenue and promoting the further development of local tourism.

3.4. The Total Number of Travel Agencies

To a certain extent, the development of travel agencies can increase tourism consumption demand, and even derive other demand to stimulate tourism consumption. The degree of development of tourism agencies shows the degree of development of tourism from the side, and the degree of development of travel agencies can be measured by the total number of local travel agencies.

4. Variables and Data

4.1. Explanatory Variables and Explanatory Variables

X_1 - GDP per capita/yuan

X_2 – resident population/10,000 people

X_3 – Railway operating mileage/km

X_4 – Total number of travel agencies/united

Y - Domestic tourism revenue/100 million yuan

4.2. Data Related to Tourism Revenue of Chizhou City from 2003 to 2021

Table 1. Selected variable data from 2003 to 2021

Year	Domestic tourism revenue y/100 million yuan	GDP per capita x1 /Yuan	Number of permanent residents x 2/10,000	Railway operating mileage x 3/km	The total number of travel agencies in Chizhou City x4/pcs
2003	12.99	4876	150	2172	14
2004	15.31	6121	152	2305	18
2005	17.32	7378	144	2353	24
2006	25.16	9066	143	2387	32
2007	55.24	10949	143	2387	48
2008	70.40	14147	143	2871	54
2009	89.97	17295	142	2850	70
2010	119.21	21476	140.3	2850	81
2011	188.12	26446	141.39	3121	83
2012	261.9	29471	141.9	3260	84
2013	295.2	32541	142.23	3513	83
2014	336.9	36267	143	3549	79
2015	408.5	38014	143.63	4169	76
2016	489.3	40919	144.30	4243	73
2017	602.8	43178	144.93	4275	71
2018	692.7	46865	147.45	4275	71
2019	801.2	56217	148.5	4716	69
2020	401.3	64843	134.33	5159	62
2021	524.0	75191	133.10	5263	63

Note: Data from Anhui Statistical Yearbook

5. Model Establishment and Testing

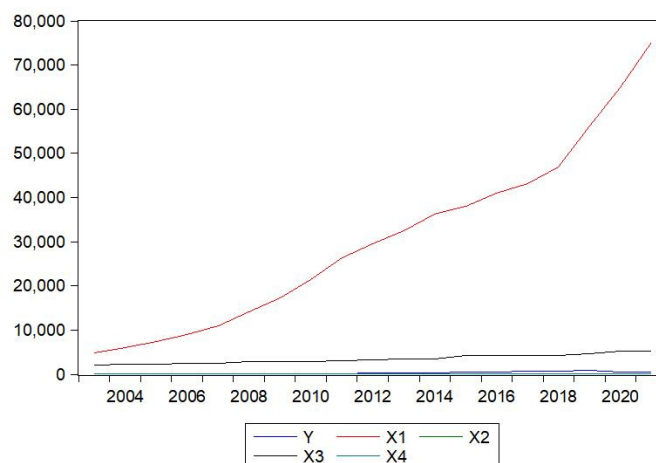## 5.1. Analysis of Relevant Charts and Trend Charts

Fig 1. The trend chart

From the trend chart, we can see that each explanatory variable changes in the same direction as the explanatory variable, and the difference between them becomes more and more significant with the change of year.
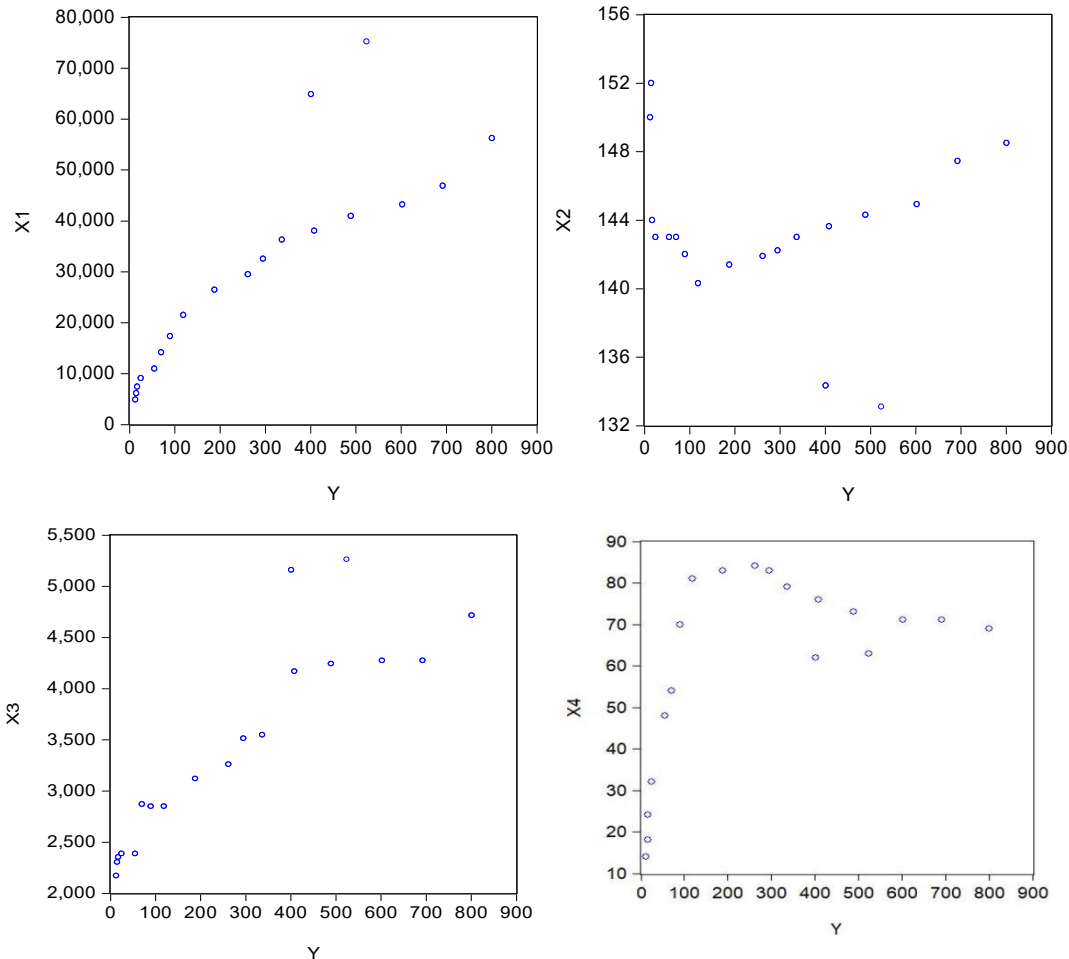

Fig 2. The correlation diagram between each explanatory variable and the explanatory variable

The above is the correlation diagram between each explanatory variable and the explanatory variable, the results show that there is a high linear correlation between each explanatory variable and the explanatory variable, the model is set as a linear regression model, and the least squares method is used to estimate the unknown parameters of the model. Set the regression model as follows:

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \mu$$

5.2. Model Regression Results

Table 2. Multiple linear regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4375.706	560.4585	-7.807369	0.0000
X1	0.007972	0.004523	1.762690	0.0998
X2	27.74478	4.069927	6.817021	0.0000
X3	0.089918	0.090107	0.997901	0.3353
X4	2.147043	0.771207	2.784002	0.0146

The regression equation of the factors influencing tourism revenue in Chizhou City is as follows:

$\hat{Y}_i$ = -4375.706+0.0080x1+27.7448x2+0.0899x3+2.1470x4

R^2=0.9538 $\bar{R}^2$ =0.9406

F=72.30235 DW=1.458672

Based on the model estimation, the squared coefficient R^2 = 0 9538, modified R-squared coefficient $\bar{R}^2$ =0.9406 is close to 1, indicating that the model has a high goodness-of-fit; When significance level α= 0.05, the F-statistic of the model is 72.30235大于$F_{0.05}(4,14)$ =3 11. The regression equation is generally significant, indicating that the impact of per capita GDP, permanent population, railway mileage and total number of travel agencies on Chizhou City's tourism revenue is significant. When significance level α= 0.05, a critical value t 0. with degrees of freedom of 1 4 is found in the t-distribution table 0.05/2(14)=2.1448, obtained from the result, β 2, β4 corresponding to t The absolute values of the statistics are all greater than t0. 10/2(14)=1.7613, and the t-statistic of β 1 and β3 is less than the critical value of 2.1448 , the t-test failed.

In summary, the regression model may have problems such as multicollinearity and need to be corrected.

5.3.   Model Testing and Correction

5.3.1. Multicollinearity Test and Correction

(1) Correlation coefficient test

The correlation coefficient test is performed in the Eviews9 software, and the correlation coefficient matrix is obtained as follows:

Table 3. Correlation coefficient matrix

	Y	X1	X2	X3	X4
Y	1.000000	0.861440	-0.075614	0.888122	0.544163
X1	0.861440	1.000000	-0.51 1784	0.984874	0.553145
X2	-0.075614	-0.511784	1.000000	-0.447671	-0.421299
X3	0.888122	0.984874	-0.447671	1.000000	0.547339
X4	0.544163	0.553145	-0.421299	0.547339	1.000000

It can be seen from the correlation coefficient matrix that the correlation coefficient between the explanatory variables is high, and the correlation coefficients of x1 and x3 are 0 9849 > 0.8, so there is a multicollinearity problem.

（2）Stepwise regression

It can be seen from the above correlation coefficient matrix that the explanatory variable railway operating mileage (x3) has the largest correlation coefficient and the strongest correlation between the explanatory variable Chizhou City tourism revenue. Therefore, the regression equation corresponding to x3 is used as the basic model, the remaining variables are introduced into the model one by one, and the regression analysis is carried out by Eview s9 software, and the results are as follows:

αWhen significance level = 0.05, after introducing the x1 variable on the basis of the x3 equation, the equation cannot pass the t-test, and x4 is introduced The equation after the variable fails the t-test. Therefore, excluding x1,x4, the final equation after stepwise regression analysis is:

$\hat{Y}_i$ = -3814.700+22.1555x2+0.2675x3

t=(-5.748717)（5.042308)（13.37846）

R^2=0.9184 $\bar{R}^2$ =0.9082

F=90.0522 DW=1.5183

Table 4. Stepwise regression results

model	X1	X2	X3	X4	R2	$\bar{R}2$
Y=f(x3)			0.2224 (7.9673)		0.7887	0.7763
Y=f(x3, x1)	-0.0054 (-0.6748)		0.3312 (2.0228)		0.7946	0.7689
Y=f(x3, x2)		22.1555 (5.0423)	0.2675 (13.3785)		0.9184	0.9082
Y=f(x3, x4)			0.2110 (6.2095）	0.9053 (0.6107)	0.7936	0.7678

5.3.2. Test for Heteroscedasticity

The W hite test was performed on the final model, and the results showed that when the significance level α=0.05, p=0.0833>0.05, nR2=9.728057< χ20.05(5)=11.0705, that is, accepting the null hypothesis, the model does not have heteroscedasticity.

5.3.3. Self-correlation Testing

B-G test was performed on the model, when the significance level = 0.05 and αthe lag length was 2, Prob F=0.2126 and Prob Obs*R-squared=0.1518 were greater than 0.05. That is, the model does not have an autocorrelation problem, and the autocorrelation test passes.

The partial autocorrelation test of the model (as shown in the figure below) shows that the corresponding PAC value is within the left and right dashed lines, and the p value is greater than 0.05, indicating that there is no significant difference between the partial correlation coefficient and the zero value at the significance level of 5%, that is, there is no autocorrelation of the corresponding order.

Table 5. Partial autocorrelation coefficient test

Lag	AC	PAC	Q-Stat	Prob
1	0.207	0.207	0.9511	0.329
2	-0.266	-0.323	2.6155	0.270
3	-0.339	-0.233	5.4859	0.139
4	0.049	0.118	5.5498	0.235
5	0.243	0.077	7.2282	0.204
6	-0.034	-0.184	7.2636	0.297
7	0.056	0.279	7.3692	0.391
8	-0.160	-0.260	8.2940	0.405
9	-0.185	-0.189	9.6596	0.379
10	-0.210	-0.138	11.612	0.312
11	0.140	0.139	12.583	0.321
12	0.275	-0.042	16.909	0.153

5.4. Expression of Economic Significance

In summary, the functions affecting domestic tourism revenue in Chizhou City are:

$\hat{Y}_i$ = -3814.700+22.1555x2+0.2675x3

t=(-5.748717)（5.042308）（13.37846）

R^2=0.9184 $\bar{R}^2$ =0.9082

F=90.0522 DW=1.5183

The economic significance of the estimation results of the model is that when other explanatory variables remain unchanged, the permanent population of Chizhou City increases by 1% and the tourism revenue increases by 22.1555%. Railway operating miles increased by 1% and tourism revenue increased by 0.2675%. The permanent population of Chizhou City and the railway operating mileage of Anhui Province have a significant positive impact on Chizhou City's tourism revenue.

6. Conclusion and Recommendations

6.1. Increase the Number of Local Permanent Residents

According to the results of the study, the number of resident residents has the greatest impact on total tourism revenue. Therefore, by increasing the number of permanent residents, various public services will be gradually improved, and the efficiency of services will be significantly improved, thereby increasing social welfare and attracting more people to live in Chizhou City. At the same time, the increase in the number of permanent residents will also increase the labor force, thereby improving the employment rate and per capita resource utilization rate, and with the increase of the employed population with strong ability to pay, the growth rate of tourism consumption will accelerate, and promote the development and growth of the local tourism industry.

6.2. Improve Local Infrastructure and Improve the Tourist Experience

At present, there is only one high-speed railway station and airport in Chizhou City, and there is no transportation hub between various attractions, and the imperfect transportation facilities lead to inconvenient travel and reduced favorability of travel experience; Most of the local roads are provincial and rural roads, and the roads are narrow and prone to long-term traffic jams, so improving the transportation network is of key significance to the development of local tourism. Improve the transportation network, increase the number of bus lines connecting the urban areas and counties of Chizhou, and build transportation hubs between Guichi District and important scenic spots in various counties to facilitate transfers between scenic spots; Set up scenic bus lines at Chizhou High-speed Railway Station and Jiuhuashan International Airport to improve the convenience of tourists; Accelerate the construction of the Chihuang high-speed railway and build a golden tourism channel between Jiuhuashan and Huangshan; Improve the construction of accommodation, catering and entertainment service facilities to enhance tourists' favorability of local tourism; At the same time, improve the safety supervision system of tourist attractions, set up iconic signs to prohibit tourists from entering scenic spots with dangerous terrain, and regularly check relevant facilities to prevent safety incidents.

6.3. Make Use of Local Tourism Resources to Develop Local Characteristic Tourism

Chizhou is famous for its Buddhist holy sites, so the development of local tourism resources needs to fully reflect its characteristics. Vertical and horizontal development of Chizhou's tourism resources, vertical development is the in-depth development of Buddhist cultural soft products led by Jiuhua Mountain, absorbing the tourism development mode and experience of the other three famous Buddhist mountains in China, creating tourism elements of "people have me, people have me excellent", and strive to promote Jiuhua Mountain to the world tourism market and build a world-class Buddhist famous mountain; The horizontal development is based on Jiuhua Mountain as the trunk, with Guniuxiang, Xinghua Village, Qishan-Pingtian Lake as the branches, and carries out dislocation development of tourism types such as Buddhist worship, sightseeing tourism, intangible cultural heritage, and rural tourism, so as to achieve parallel and coordinated development. Take tourism as the pillar industry of Chizhou City,

rationally plan the development of Chizhou urban area and Jiuhuashan, plan the development of characteristic industries in urban areas, and create a one-stop urban tourism route.

6.4. Strengthen Regional Linkage and Expand Opening Up

Chizhou City is located in the Yangtze River Delta city cluster, should make full use of this advantage, accelerate its integration into the development of the Yangtze River Delta city cluster, make full use of the radiation driving advantages of Shanghai, Nanjing, Hangzhou, Hefei and other cities in the Yangtze River Delta city cluster, strengthen exchanges and cooperation, promote industrial agglomeration and opening up, jointly build a Yangtze River Delta tourism zone, and give play to the agglomeration effect of tourism; Strengthen the regional linkage between Jiuhua Mountain and Huangshan, Jiuhuashan is mainly based on Buddhist cultural development, Huangshan is mainly based on Huipai culture and ancient town tourism, so as to realize dislocation development and regional linkage.

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