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Analysis on the influencing factors of China&apos's domestic tourism economic development

Nie Ruichao[1], Lu Haotian[2], Liu Lin[3]

[1]School of Management of Science and Engineering, Anhui University of Finance and Economic, Bengbu 233030, China
[2]School of Computer Science and Technology, Anhui University of Finance and Economic, Bengbu 233030, China
[3]School of Electronic Information Engineering, Anhui University of Finance and Economic, Bengbu 233030, China
**Corresponding author*

Abstract: *Tourism, as China&apos's tertiary industry, plays an important role in China&apos's economic development. This paper selects the relevant statistical data of China&apos's tourism industry from 1994 to 2019, and establishes a multiple linear regression model to analyze the impact of seven factors, including the number of domestic tourists, per capita GNP, railway mileage, highway mileage, airline mileage, the number of travel agencies, and the number of star hotels, on China&apos's tourism economic development. The results show that the number of railway miles, the number of domestic tourists and the number of star hotels have a significant impact on the development of China&apos's tourism economy, among which the increase of the number of domestic tourists has the greatest impact on the development of China&apos's tourism economy.On the basis of the above empirical evidence, this paper puts forward some suggestions to promote the development of China&apos's tourism industry, such as solidly promoting the integration of domestic tourism resources, giving full play to spillover effect of resource integration, strengthening tourism infrastructure and improving residents&apos'income level.*

Keywords: *tourism,economic development,multiple linear regression model*

In recent years, China&apos's tourism market is expanding and tourism industry has developed rapidly. Domestic and foreign scholars on China&apos's tourism research literature is increasingly rich, the development of China&apos's tourism has played a certain role in promoting. Song Danying (2019) collected samples and made a conclusion through factor analysis that the behavioral motivation of young tourists in traveling includes the following four aspects: spiritual and cultural motivation, exploratory motivation, leisure motivation and social behavior motivation. Cheng Yu (2020) reviewed the development course of China&apos's tourism industry in the past 70 years and summarized the basic experience of tourism development. Zhang Liping (2020) put forward the idea of transforming the supply side of tourism shopping in the whole tourism demonstration area of Hunan province, providing a direction for the national tourism reform. Liu Dingrong (2020) puts forward that a modern transportation network will greatly promote the development of tourism. Yang Siyi (2020) proposes that the development of contemporary regional logistics will indirectly promote the rapid progress of tourism. These research results have a wide range of perspectives and in-depth analysis.This paper expounds the development of tourism market from the aspects of modern transportation, China&apos's economic development and the reform of tourism supply side. This paper starts from the most basic factors affecting the development of tourism, analyzes the important factors affecting the development of Tourism in China through establishing a multiple linear regression model, and puts forward feasible countermeasures and suggestions.

1. Development status of China&apos's tourism industry

1.1 Rising industrial status

As an important industry after the first and second industries, the tertiary industry plays an important role in promoting national economic growth. Now all countries in the world are focusing on the development of their own tertiary industry economy, for the national economic growth to open up a

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new direction. Tourism is also an important part of the tertiary industry, which is mainly characterized by: green environmental protection, high growth rate, large benefits and so on. And due to the increasing investment in tourism in the world, its industrial status is also improving. In recent years, China has put forward the slogan of "promoting the development of edge color industry", the importance of green economy is self-evident. As an important member of the tertiary industry, tourism plays an important role in promoting the high-quality growth of China&apos's economy and stabilizing the growth rate of China&apos's economy in the new era.

1.2 Broad prospects for development

Since China&apos's reform and opening up, tourism has made great progress. In 1978, the number of international tourists in China was only 716,000, and the foreign exchange income from tourism was 263 million US dollars. By 2019, The number of inbound Chinese tourists had reached 145.31 million, and the international tourism revenue was 131.3 billion dollars, dozens of times the previous figure. In 2019, China&apos's total tourism revenue was about 6.63 billion yuan, accounting for 12.41% of the added value of the tertiary industry. Now China&apos's tourism industry has occupied a place in the international market. In addition, the number of tourists in China and the number of tourists at home and abroad are also constantly improving. The number of domestic tourists has increased from 101.83 million in 2009 to 50 million. By the end of the first half of 2021, the number of Chinese tourists has exceeded at least 55 million. In addition, the total domestic tourism consumption has exceeded 0.6 trillion yuan. Both the number of tourists and the total amount of tourism consumption in China are growing at an amazing speed and have very broad prospects for development.

1.3 Lack of stable driving factors

The development of tourism in addition to its excellent properties, also need to jointly promote the of all kinds of environmental factors, because of the tourism industry started relatively late in China, so the blood of the environmental factors for tourism are smaller, as a modern important industry, to promote the development of China&apos's economy must be reasonable planning of various factors to promote the development of tourism, Efforts will be made to build tourism into a pillar industry of the Chinese economy.

2. Variable selection and data sources

2.1 Variable selection

This paper mainly through the analysis of China&apos's tourism development factors to complete the empirical analysis. Therefore, the following explanatory variables are selected: the number of domestic tourists, the number of railway miles, the number of highway miles, the number of flight routes, the per capita GNP, the number of travel associations, and the number of star-rated hotels, and these seven variables are taken as explanatory variables. At the same time, China&apos's tourism income will be studied as the explained variable.

2.2 Description of data

This paper mainly collects and collates the data of China&apos's statistical data Application support system in 2021, and selects the statistical data of the number of domestic tourists, railway mileage, highway mileage, flight route mileage, per capita GNP, number of travel agencies, and number of star-rated hotels from 1994 to 2019 after the reform and opening up. Sorted out the relevant research data for analysis.

2.3 Model selection

By establishing linear model, logarithm model, logarithm model, exponential model and quadratic polynomial model, it is concluded that the logarithm model is the best model among the five models in terms of rationality of signs and coefficients and goodness of fit of the model. Therefore, the multiple linear regression model is established in this paper as follows:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \cdots + \beta_k \ln X_k + \mu \quad (1)$$

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2.4 Data sources

Of this article is adopted by the ordinary least squares method, the multiple linear regression model was established based on E - Views software, after the model by stepwise regression method, test correction of multicollinearity, since the correlation and heteroscedasticity, among them, the explanation variable X1, domestic tourism number per capita gross national product (GNP)X2, X3 railway mileage, X4 highway mileage, X5 Flight mileage, number of X6 travel agencies, number of X7 star hotels, u stands for random error term.

3. Establishment of parameter estimation model

The following regression model is obtained through e-views command operation:

$$\ln Y = -9.27608 + 0.61855 \ln X_1 + 1.0043 \ln X_2 - 0.37745 \ln X_3 + 0.16526 \ln X_4 + 0.52514 \ln X_5 - 0.0032 \ln X_6 + 0.35726 \ln X_7 \quad (2)$$

$$t = \quad -2.926199 \quad 1.127550 \quad 1.362014 \quad -1.668834 \quad 0.581221 \quad 1.300384 \quad -0.018913 \quad 2.092647$$

$$R^2 = 0.995863 \quad \overline{R^2} = 0.994254 \quad F = 618.9271 \quad DW = 1.114631$$

4. Model inspection and modification

4.1 Test of economic significance

The regression results show that the number of domestic tourists, the number of railway miles, the number of flight routes, the per capita gross national product and the parameter coefficients of star hotels are in line with the test of economic significance and can be used normally under the condition that other factors remain unchanged. However, the parameter values of road mileage and the number of travel agencies are negative, which do not accord with the actual economic significance, so they should be deleted.

The redesigned regression model is as follows:

$$\ln Y = -7.243340 + 0.188732 \ln X_1 + 1.519129 \ln X_2 + 0.238591 \ln X_4 + 0.523160 \ln X_5 + 0.227462 \ln X_7 \quad (3)$$

$$t = \quad -2.449923 \quad 0.381442 \quad 2.169244 \quad 0.950697 \quad 1.272988 \quad 1.616253$$

$$R^2 = 0.995111 \quad \overline{R^2} = 0.993889 \quad F = 814.8027 \quad DW = 0.932945$$

4.2 Statistical significance test

4.2.1 Test of goodness of fit

The determination coefficients of R^2=0.995111 and $\overline{R^2}$=0.993889 indicated that the model had a good goodness of fit for samples. That is, explanatory variables "number of domestic tourists (LNX1), railway miles (LNX2), flight route miles (LNX4), Gross National Product per capita (LNX5), number of star hotels (LNX7)" explain most of the differences in explained variable" Domestic tourism income (LNY)".

4.2.2 F test

In view of the H_0: Given the significance level α=0.05, the critical value $F_\alpha(4,21)$ with k-1=4 degree of freedom and n-k =21 was found in the F distribution table. By the grace F=814.8027>$F_\alpha(4,21)$the original hypothesis Ho should be rejected, indicating that the regression equation is significant, that is, the explanatory variables included in the model "domestic tourists (LnX1) railway miles (LnX2), flight route miles (LnX4), gross national product per capita (LnX5), number of star hotels (LnX7)" combined really have a significant effect on the explained variables "domestic tourism income (InY) "There is a significant effect.

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4.2.3 T test

For H_0: βj=0 (j=0,1,2) respectively, given significance level α=0.05, the degree of freedom in the t-distribution table is the critical value of n-k=21 $t_{\frac{\alpha}{2}}$ (n-2). According to the data in the figure, the corresponding T statistics are -2.449923. 0.381442,2.169244, 0.950697,1.272988 and 1.616253, whose absolute values are all greater than $t_{\frac{\alpha}{2}}$ (n-k), indicating that Ho can be rejected at the significant level α=0.05: βj=0, that is to say, each explanatory variable "number of domestic tourists (LNX1), railway miles (LNX2) flight route miles (LNX4), per capita gross National Product (LNX5) and number of star hotels (LNX7)" have a significant impact on the explained variable" Domestic tourism income (LNY)" respectively

4.3 Econometric significance test

4.3.1 Multicollinearity test

① Correlation coefficient test

The correlation coefficient of moxibustion explanatory variables was calculated and the data of LNX1, INX2, LNX4, LNX5 and LNX7 were selected to obtain the correlation coefficient matrix as shownin the figure below:

Table 1 Correlation coefficient matrix of explanatory variables

	LNX1	LNX2	LNX4	LNX5	LNX7
LNX1	1.000000	0.983790	0.980554	0.991236	0.640148
LNX2	0.983790	1.000000	0.992242	0.962397	0.559306
LNX4	0.980554	0.992242	1.000000	0.958941	0.562888
LNX5	0.991236	0.962397	0.958941	1.000000	0.727106
LNX7	0.640148	0.559306	0.562888	0.727106	1.000000

According to the matrix relationship, the correlation coefficients of LNX1,LNX2,LNX4 and LNX5 are all greater than 0.8, which may lead to serious multicollinearity.

② Variance inflation factor test

From the model of the auxiliary equation, it can be seen that $VIF_1 = 412.6921, VIF_2 = 89.30187, VIF_3 = 70.94923, VIF_4 = 374.1617, VIF_5 = 10.41244$ are all greater than 10, indicating that there are many among the explanatory variables Recollinearity.

③ Model revision

Stepwise regression method was adopted to revise the model, and the redesigned regression model is shown as follows:

$$\ln Y = -8.121596 + 0.801166 \ln X_1 + 1.882983 \ln X_2 + 0.383110 \ln X_7 \quad (4)$$

$$t = \quad -10.37421 \qquad 4.687540 \qquad 3.907045 \qquad 5.786605$$

$$R^2 = 0.994600 \quad \overline{R^2} = 0.993863 \quad F = 1350.587 \quad DW = 1.004029$$

4.3.2 Heteroscedasticity test

The sample number was 26, and the model was a ternary linear regression model. White&apos's test was used to test the heteroscedasticity, and t results were estimated by grace. The results are shown in the following figure:

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Heteroskedasticity Test: White

F-statistic	1.100743	Prob. F(9,16)	0.4146
Obs*R-squared	9.942371	Prob. Chi-Square(9)	0.3552
Scaled explained SS	3.192397	Prob. Chi-Square(9)	0.9562

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/22/21 Time: 07:58
Sample: 1994 2019
Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.218559	4.465605	-0.048943	0.9616
LNX1^2	0.210650	0.151634	1.389198	0.1838
LNX1*LNX2	-1.225899	0.903383	-1.357008	0.1936
LNX1*LNX7	-0.095836	0.088360	-1.084608	0.2942
LNX1	-1.522690	1.310391	-1.162012	0.2623
LNX2^2	1.654235	1.300614	1.271888	0.2216
LNX2*LNX7	0.337933	0.259893	1.300277	0.2119
LNX2	4.466896	4.322448	1.033418	0.3168
LNX7^2	-0.033642	0.026953	-1.248167	0.2299
LNX7	1.010273	0.619487	1.630823	0.1225

R-squared	0.382399	Mean dependent var	0.007843
Adjusted R-squared	0.034998	S.D. dependent var	0.007575
S.E. of regression	0.007441	Akaike info criterion	-6.679898
Sum squared resid	0.000886	Schwarz criterion	-6.196015

Figure.1 White test results

Therefore, it can be seen that the critical value of nR^2=9.94237 of White's test is presented in the X2 distribution at α=0.05, so the null hypothesis is accepted, indicating that the residual is homoscedasticity and there is no heteroscedasticity.

4.3.3 Autocorrelation test

①DW test

DW=1.004029 after model testing.

For the model with 26 samples and three explanatory variables, the DW statistical table is checked at the significance level of 5%, and it can be seen that d_L=1.143 d_u=1.652,DW<d_L , in the model, indicating that there may be a positive correlation in the model.

②BG test

BG test nR^2=7.713029 can be obtained. At α=0.05, the critical value is shown in the X2 distribution table, so the original hypothesis is accepted, indicating that the model has a first-order assumption.

Based on the above three test methods, it can be concluded that the triple linear regression model composed of explanatory variable Domestic tourism income (LNY) and explanatory variable domestic tourism number (LNX1), railway operating miles (LNX2) and number of star hotels (LNX7) has autocorrelation and needs to be revised.

③Adjust the logarithmic model

In e-views, the generalized difference method is adopted to modify the original model, and the final modification result is shown in the figure below:

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Dependent Variable: LNY
Method: ARMA Generalized Least Squares (BFGS)
Date: 06/22/21 Time: 08:07
Sample: 1994 2019
Included observations: 26
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.05396	1.376640	-7.303255	0.0000
LNX1	1.371731	0.195968	6.999780	0.0000
LNX2	0.400872	0.553740	0.723936	0.4771
LNX7	0.188948	0.097868	1.930653	0.0671
AR(1)	0.854550	0.132296	6.459362	0.0000

R-squared	0.996918	Mean dependent var	8.999831
Adjusted R-squared	0.996331	S.D. dependent var	1.228964
S.E. of regression	0.074438	Akaike info criterion	-2.136252
Sum squared resid	0.116363	Schwarz criterion	-1.894310
Log likelihood	32.77127	Hannan-Quinn criter.	-2.066581
F-statistic	1698.334	Durbin-Watson stat	1.310680
Prob(F-statistic)	0.000000		

Figure.2 Estimation results of the logarithmic model with AR term added

The figure above shows that the estimation converges after 7 iterations, and the adjusted DW=1.6571, n=26,k=1. When the significance level is a=0.05,d_L=1.143 d_u=1.652can be obtained by looking up the table, while d_u<1.6571<4-d_u indicates that there is no first-order autocorrelation of the model. Then bias relation number test and BG test were carried out.

F-statistic	2.728235	Prob. F(2,19)	0.0909
Obs*R-squared	5.546779	Prob. Chi-Square(2)	0.0624

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/22/21 Time: 16:55
Sample: 1994 2019
Included observations: 26
Coefficient covariance computed using outer product of gradients
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.044199	0.091089	0.485228	0.6331
LNX1	-0.005469	0.012900	-0.423974	0.6763
LNX2	0.010808	0.036145	0.299027	0.7682
LNX7	-0.000407	0.006103	-0.066675	0.9475
AR(1)	0.019766	0.011537	1.713305	0.1029
RESID(-1)	0.506254	0.239971	2.109648	0.0484
RESID(-2)	0.262906	0.277117	0.948720	0.3547

R-squared	0.213338	Mean dependent var	0.007456
Adjusted R-squared	-0.035082	S.D. dependent var	0.067799
S.E. of regression	0.068978	Akaike info criterion	-2.285257
Sum squared resid	0.090401	Schwarz criterion	-1.946539
Log likelihood	36.70834	Hannan-Quinn criter.	-2.187718

Figure.3 BG test results after adjustment of the logarithmic model

The adjusted logarithm model passes BG test and also indicates that there is no high-order autocorrelation. Therefore, the final form of the revised logarithm model is:

$$\ln Y = -10.053966 + 1.371731 \ln X_1 + 0.400872 \ln X_2 + +0.188948 \ln X_7 \quad (5)$$

$$t = \quad -7.303255 \quad 6.999780 \quad 0.723936 \quad 1.930653$$

$$R^2 = 0.996918 \quad \overline{R^2} = 0.996331 \quad F = 1698.334 \quad DW = 1.310680$$

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5. Conclusions and suggestions

5.1 Conclusions

Through the establishment of multiple linear regression model, this paper studies and analyzes the impact indicators from 1994 to 2019 and finally concludes that the three impact indicators, namely the number of railway miles, the number of domestic tourists and the number of star-rated hotels, have a significant impact on the development of China&apos's domestic tourism in the past 25 years. At the same time, through the trend analysis and forecast, the impact of these three factors on China&apos's tourism is still deepening.

5.2 Suggestions and countermeasures

5.2.1 Improve the construction of tourism infrastructure and improve the level of tourism services

The improvement of infrastructure is a necessary prerequisite for the development of tourism, especially the convenience and accessibility of traffic is an important factor for tourists to consider. The Chinese government should actively mobilize the domestic high-speed transportation network to reduce the round-trip time between regions and facilitate people&apos's travel. In terms of service and reception, both travel agencies, scenic spots and related tourism enterprises should grasp the quality of service. First, they should improve the management system of each unit of tourism industry, implement rewards and punishments simultaneously, and improve the tourism industry in mechanism. Secondly, we should increase investment in various tourism industries. In addition to improving the quantity of tourism, we should also constantly improve the quality of tourism industry. Third, China&apos's tourism areas should realize the contribution of tourism resources to improve the overall level of China&apos's domestic tourism.

5.2.2 Regional policies to promote and improve educational concepts

With the continuous improvement of China&apos's domestic economic development, the quality of people&apos's living standards has been a qualitative leap. Nowadays, people are not only satisfied with the present material life, but also have great pursuit of spiritual life. Tourism, as the best way to improve residents&apos'spiritual life, has also been increasingly valued by people. However, cumbersome travel actions, long time consuming and high consumption level hinder people&apos's choice of tourism. In addition to people&apos's self-choice, local governments in China should also introduce relevant policies to encourage people to travel.

5.2.3 Issuing relevant national policies and providing policy support

Economic factors can directly affect the development of a country&apos's tourism industry, while policy factors can directly affect the progress of the tourism industry. In China, national policies greatly affect the development of domestic tourism to a certain extent. China&apos's tourism industry not only needs its own efforts to achieve progress, but also needs the support of national policies. Compared with developed countries, China&apos's tourism industry started late, and the infrastructure construction in most areas and the protection of scenic spots are insufficient. In addition, the government can also provide a large amount of funds for the industry to provide financial guarantee for the development of China&apos's tourism industry. Sound policy making can also provide a stable policy environment for the development of China&apos's tourism industry. Under the joint action of the two, China&apos's tourism industry is bound to make great progress and development.

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