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Analysis of Influencing Factors of Chinese Tourism Income Based on Lasso Regression

Cuihong Cao, Yuanying Jiang*

College of Science, Guilin University of Technology, Guilin, China

Abstract

The tourism industry, as a representative of the third industry, has driven its sustainable development, which is conducive to the adjustment of industrial restructuring and economic development in China. Based on Chinese tourism income data from 1994 to 2015, this paper establishes a multiple linear regression model and analyses the factors affecting Chinese tourism income. The empirical study shows that the Lasso regression, compared with the ordinary least square estimation method, can not only eliminate the multicollinearity influence, but also select the main factors affecting Chinese tourism income. Moreover, it has contributed to reducing the fitting error of the model. According to the models results, Chinese tourism income is positively correlated with the number of tourists, the number of private cars and Internet dial-up users. However, it is negatively related to the road mileage variable.

Keywords

Chinese Tourism Income, Multicollinearity, Lasso Regression

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1. Introduction

Since the reform and opening-up, Chinese economy has developed rapidly and people's living standards have been constantly improving. In pursuit of material life, people also pay more and more attention to the spiritual needs. The Nineteenth National Congress clearly pointed out that socialism with Chinese characteristics has entered a new era. The principal social contradictions in China have changed from the contradiction between people's growing material and cultural needs and backward socialist production to the contradiction between people's growing need for a better life and unbalanced and inadequate development. Therefore, the development of tourism industry in China has entered a new century. Tourism, as the representative of the tertiary industry in China, is a new industry in the 21st century. It has been one of the pillar industries to promote national economic development. Meanwhile, it is an important indicator to measure the economic development of a region and can reflect the economic progress of a country. Thus, the paper analyses the factors affecting Chinese tourism income and puts forward some suggestions, which are conductive to promoting the sustainable development of tourism industry. It plays an important role in improving China's economic income and promoting the upgrading of industrial structure.

Many scholars have conducted relevant studies on the factors affecting tourism income, among which the representative research literature are as follows: Orçun [1] found that tourism income of Turkey depends on the number of tourists by using fixed panel model. Grunewald et al. [2] believed that biodiversity, landscape and infrastructure can affect the sustainable development of tourism. Carrascal and Fernandez [3] thought that there is a definite relationship between tourism and income. the study of tourism economy in China are as follows: Wang and Sun [4] used multiple linear regression method to analyze the tourism income status of

* Corresponding author
E-mail address: 102017849@glut.edu.cn (Cuihong Cao), jyy@glut.edu.cn (Yuanying Jiang)

A-level scenic spots in Shanxi Province. Zhou et al. [5], Fu and Huang [6], He [7] used grey correlation analysis method that they find the influencing factors of tourist income including: gross domestic product (GDP), the number of tourists, Internet user number, number of star-rated hotels, traffic condition, etc. Lin and Lin [8] used the panel model and eliminated the multicollinearity of the model by logarithm method to verify the relationship between the number of tourists and tourism income. Zhang et al. [9] used Internet search data synthesis index to predict tourism revenue of Hai nan province. Sun and Feng [10] analyzed the impact of multiple indicators on tourism by using principal component method. Yan and Xiong [11], Qu and Xia [12] take advantage of the vector autoregressive model to find that there is a significant relationship between tourism income and GDP in China. Wang [13] analyzed the correlation between tourism and traffic factors. Zhang et al. [14] established a simple linear model to analyze the impact of network technology on tourism.

To summarize the above literature, the research results mostly focus on the factors that affect the tourism income in China, and the correlation between these factors and Chinese tourism income. However, there are also many shortcomings in these literatures. Firstly, some scholars only studied the relationship between a single factor and tourism income, but they ignored the influence of other factors. In order to understand the factors affecting Chinese tourism income more comprehensively, some scholars try to incorporate the relevant factors into the model as far as possible. Therefore, it is difficult to distinguish the main influencing factors and is easy to result in the overfitting of model, which is not conducive to the interpretation of conclusion. Secondly, in terms of statistical modeling, the research is mainly based on the linear relationship but seldom takes into account that the certain relationship among the economic variables affecting Chinese tourism income. They ignored the multicollinearity problem of the model, which led to a large model fitting error and reduced prediction ability. To solve the above shortcomings, on the basis of referring to previous studies, the paper follows the principle of representativeness and comprehensiveness of influencing factors and selects the typical factors to analyze. Then the Lasso method is adopted to establish linear regression model to select the main factors influencing Chinese tourism income from several typical factors. The paper overcomes the multicollinearity problem, reduces the fitting error, and improves the prediction ability of model. The rest of this article is organized as follows. In Section 2, the basic theory of Lasso model is developed. Section 3 introduces the data sources and variable selection. Section 4 compares the empirical results between ordinary least square estimation and Lasso, and then analyses the Lasso model result. Lastly, Section 5 is a summary and recommendations.

2. Introduction of Lasso Model

Multiple linear regression analysis is one of the important contents of statistical analysis. It is widely used in the field of economy to analyze the linear relationship between a certain economic phenomenon and several influencing factors. Generally, scholars will add more influencing factors to the model for making a comprehensive analysis. At this moment, the models have some problems to be considered such as too much variables and overfitting. It is not conducive to model interpretation. At the same time, the economic variables in real life often have a certain relationship. If the correlation of variables is strong, the ordinary least squares estimation method will exist multicollinearity, which will lead to the increase of fitting error and the decline of prediction accuracy. In recent years, in order to eliminate the multicollinearity problem of multiple regression models, the statisticians propose some improvements based on ordinary least squares estimation. It is proposed to impose a regularization penalty on the estimated coefficient to obtain a more realistic biased estimated coefficient by sacrificing its unbiasedness. The Lasso is one of the typical methods. It is not only helpful to eliminate multiple collinearity, but also better than the ordinary least squares method in the model fitting.

Lasso regression method, first proposed by Tibshirani [15], is a coefficient penalty compression method, which can complete parameter estimation while achieving variable selection. The basic idea is to add a penalty term $\lambda\sum_{j=1}^{p}|\beta_j|$ to the common least squares estimate, which makes the residual sum of squares smaller. Lasso regression coefficient can be obtained by solving the following equation:

$$(\widehat{\alpha}^{Lasso}, \widehat{\beta}^{\text{Lasso}}) = \arg\min_{(\alpha,\beta)} \sum_{i=1}^{n}\left[\left(y_i - \alpha - \sum_{j=1}^{\text{p}} x_{ij}\beta_j\right)^2 + \lambda\sum_{j=1}^{\text{p}}|\beta_j|\right] \quad (1)$$

is equivalent to, under the constraint condition of $\sum_{j=1}^{p}|\beta_j| \le s$, the coefficient satisfies:

$$(\widehat{\alpha}^{Lasso}, \widehat{\beta}^{\text{Lasso}}) = \arg\min_{(\alpha,\beta)} \sum_{i=1}^{n}\left(y_i - \alpha - \sum_{j=1}^{\text{p}} x_{ij}\beta_j\right)^2 \quad (2)$$

Among them, the lambda as the adjustment parameter is the key of the Lasso method. With the change of lambda, the

model containing different variables can be obtained. When lambda equals zero, it means that the penalty term has no effect and the result is consistent with the ordinary least square estimation. When lambda is large enough, some unnecessary coefficients can be forcibly set to zero and the variables whose coefficients are not zero can be retained. The sparse model can better explain the model. Many scholars have found that Lasso regression method is better than ordinary least squares method under certain conditions. For example, Li and Liu [16] believed that the Lasso regression and other methods with compression function are superior to the traditional multivariate model, and it proves that their effects are indeed better through the comparison of actual cases. Man et al. [17] used the Lasso method to identify the credit risk factors affecting small and medium-sized enterprises in China. Liu and Du [18] used Lasso method to select high-quality stocks to construct portfolio. Through the above literature, it can be found that the Lasso method not only helps to solve the multi-collinearity problem among variables, but also can choose the main factors. However, in terms of tourism income, a few scholars used this method to analyze relevant problem. Therefore, based on the previous research experience, this article uses the Lasso to select the main influencing factors, and compares the results with those obtained by ordinary least squares.

3. Data Source and Variable Description

3.1. Sources and Processing of Chinese Tourism Income Data

Considering the timeliness and accessibility, we collect annual data on Chinese tourism income and the relevant economic indexes from 1994 to 2015. The data are obtained from the China Statistical Yearbook (http://www.stats.gov.cn/tjsj/ndsj/). Due to the different measure of each variables, there are great differences among the variables. Thus, we transformed into standardized form to reduce the model error

3.2. Selection of Factors Influencing Chinese Tourism Income

This paper mainly analyzes the factors affecting China's tourism income, so Chinese tourism income (y) is chosen as the explained variable. We select the main factors affecting Chinese tourism income based on previous research, including the number of tourists (x_1), per capital GDP (x_2), Internet dial-up users (x_3), Railway mileage (x_4), Road mileage (x_5), the number of hotels (x_6), and the number of private cars (x_7). The reason why these explanatory variables are selected is that they are considered to be representative. The number of tourists is a basic indicator reflecting the scale of tourism. Per capital GDP analyzes the tourism impact of the Chinese economy from a macroeconomic perspective. Internet dial-up users take into account the impact of modern network technology. The remaining variables analyse the tourism industry in terms of transportation and accommodation. In a word, these factors show the comprehensiveness and rationality, for they include many fields such as population, economy, technology and infrastructure.

4. Empirical Analysis and Result Analysis

4.1. The Trend of Chinese Tourism Income from 1994 to 2015

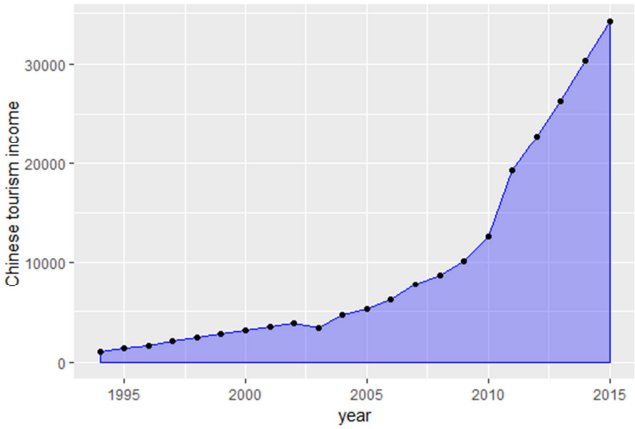

Figure 1. Chinese tourism income from 1994 to 2015.

The figure 1 shows that, from 1994 to 2015, the Chinese tourism income has been increasing year by year. Since the reform and opening up, China's economy has continued to develop, national income has increased, and the implementation of various tourism policies are conducive to the development of tourism, making Chinese tourism income steadily increase year after year. However, the tourism revenue is declining in a few year, which is due to the special factors in those years. As shown in figure 1, Chinese tourism income in 2003 was significantly lower than that in the previous year. This is mainly due to the outbreak of SARS in 2003, which led to the decrease of population travel in China. As a result, the tourism industry with a high mobility of population was hit first. The tourism income in China has suffered a great loss, and is much lower than that of the previous year.

Although Chinese tourism income is rising in general, there is an obvious gap between the absolute and relative speed of growth. From 1994 to 2015, Chinese tourism income can be divided into two stages according to the difference. The first stage is from 1994 to 2010. The income area is small and the fluctuation is gentle, which shows that Chinese tourism

income is small in the total quantity in the early stage and have a very slow growth rate. It is due to the first reform of the working hour system in China since 1995 and implementing of the five-day working day system, which has promoted the development of tourism industry. However, in the late 20th and early 21st centuries, the economic development level of China is low, and people have less disposable income. Only a small part of the funds can be applied to tourism. At the same time, the tourist facilities was very imperfect, which restricted the development of tourism. Although Chinese tourism income increased every year, the overall industry was still not optimistic. Thus, the growth rate was extremely slow at this stage. The second stage is from 2010 to 2015. During these five years, Chinese tourism income has increased dramatically and the fluctuation is extremely steep. This means that tourism income has not only increased substantially in total quantity, but also increased rapidly. This is due to that the national economy has been greatly improving and people's disposable income has been rising with the deepening of the reform and opening up. People's ideas have been evolving, and tourist travel consciousness has been increasing. Transportation has also been improving, which facilitates travel. The coverage area of the Internet has been growing to facilitate the dissemination of tourism information. They all encourage the development of tourism industry and increase tourism income. In general, all aspects of society are changing with the times, and the factors affecting Chinese tourism is also changing. Therefore, in order to promote the development of Chinese tourism and improve its income, we should clearly identify the important factors affecting Chinese tourism income, so as to put forward targeted policies and suggestions..

4.2. Establishment and Testing of Multiple Regression Models

In order to analyse the relationship between the economic factors and tourism income in China, a multivariate linear regression model is established by referring to the previous research experience. Table 1 is the result of parameter estimation using ordinary least squares method based on standard data processed by R software.

Table 1. Test of multiple linear regression results.

	Estimate	Std. Error	t value	Pr (>|t|)
X_1	0.963	0.294	3.387	0.004 **
X_2	0.070	0.278	-0.251	0.805
X_3	0.034	0.038	0.904	0.381
X_4	-0.056	0.139	-0.402	0.693
X_5	-0.134	0.098	-1.369	0.193
X_6	-0.116	0.191	-0.608	0.553
X_7	0.358	0.280	1.276	0.223
R^2	0.997			
P (F>F value)	2.2e-16			

Note: ** indicates significant at 5%.

As can be seen from table 1, the coefficient of determination is 0.997, which means the model has exceptional fitting effect. The P-value of the F test is close to 0, indicating that a significant linear relationship between Chinese tourism income and influencing factors. However, in terms of the significance of its estimated coefficient, only the number of Chinese tourists is significant, and the other influencing factors are not passed the significance test. This may be due to the addition of explanatory variable that has low correlation with Chinese tourism income. Moreover, the positive and negative of some variables do not match to the actual economic significance that they represent. For example, with the increase of railway mileage and the number of hotels, most scholars believed that Chinese tourism income should increase accordingly [19], but the results of the model showed a negative relationship, which may be due to the high correlation among variables. Hence, it is necessary to test the correlation among variables in the macroeconomic model. Through the ellipse diagram of the correlation coefficient matrix of the variables in figure 2, it can be seen that there is a high correlation between Chinese tourism income and various influencing factors, which shows that the established multiple linear regression model is reasonable to some extent. It can also intuitively see the correlation of each factor, which finds that the correlation coefficient among the other variables is basically above 0.86, except that the correlation coefficient between the number of Chinese tourists and each variable is low. The correlation among the variables is high, which may lead to multiple collinearity and affect the fitting effect of the model. Simultaneously, the condition number of the model is used to measure the multi-collinearity of the model from a whole. In general, if the conditional value reaches 30 the problem of multiple collinearity is considered serious. The conditional value of the above multiple regression model is 43.622, further illustrated that the model has severe multicollinearity.

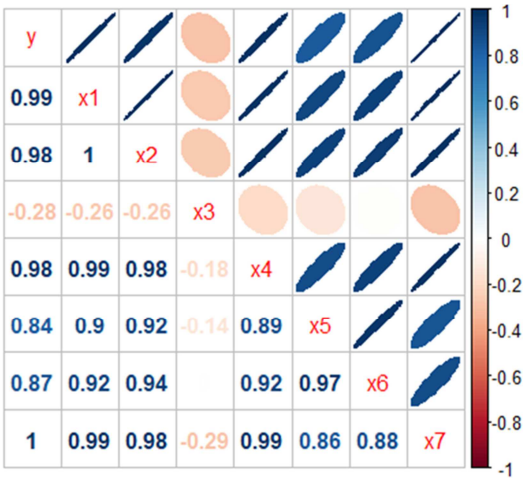

Figure 2. Relevant Matrix Diagram of Variables.

Tourism development covers a wide range of areas. Therefore, there are many factors affecting tourism income, including the number of tourists, traffic conditions, disposable income per capita, accommodation conditions, network communication conditions. However, there are certain links among these factors in the economic field. Through the above analysis, it is found that there are many problems with the multivariate linear regression model estimated by the ordinary least square. The most fundamental problem is the multi-collinearity problem, which makes the result of the model deviate greatly and reduces the accuracy of prediction. At this moment, the established macro-economic model has no practical significance. This means that the ordinary least squares estimation method ceases to be applicable. The Lasso is also a statistical analysis method of multi-factor linear relationship. Its essence is to impose regular penalties on ordinary least squares estimation coefficients, which helps to eliminate the multiple common problems. Thus, the Lasso can improve the accuracy of prediction model.

4.3. Selection of Important Variables Based on Lasso Method

In this paper, the Lasso method is used to analyse the multivariate linear relationship between China's tourism income and various factors. Lars function of lars package of R software is used for Lasso regression modeling of standardized data. The established Lasso model can not only measure the linear relationship between tourism income and relevant factors in China, but also select the main factors and build a sparse model on the basis of overcoming multiple collinearities. It is conducive to analyzing the results of the model and provides pertinent suggestions for promoting the sustainable development of tourism. A key point of Lasso modeling is to select appropriate adjustment parameters. Because of different adjustment parameters, the compression intensity and the variable coefficients selection are different. We can select coefficients by calculating the value of the CV and C_p statistics in different situations. In fact, due to the randomness of cross validation (CV), the consequences will also be random. In order to ensure that the software runs consistently every time, the C_p statistics is chosen as the criterion for evaluating regression. The value of C_p varies from the number of steps, and the choice of model coefficients corresponding to different C_p value is also changed.

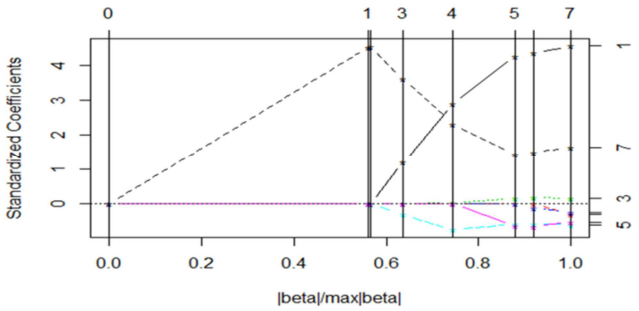

Figure 3. The coefficients of various variables vary with the parameters in the Lasso regression.

Figure 3 shows the variation of the coefficient that affects China's tourism income under different steps. The left number is the standardized coefficient. The right number is the selected variables. For example, 1 represents the number of tourists, 3 represents Internet dial-up users and 7 represents the number of the private cars. The vertical line in the middle is the number of steps. If the number of steps is different, we find that the different variables is corresponding to the different coefficients in these model. In this paper, the Lasso method finally selects the estimated coefficient when the C_p value is the smallest. The minimum C_p value is 4.2581 in step five. Combined with the figure 3 that the Lasso coefficient with the parameter change, we select four factors that coefficient are significantly non-zero. Table 2 shows the four factors affecting Chinese tourism income retained by Lasso regression method and their corresponding coefficient estimates.

Table 2. Variable coefficient selected by Lasso method.

The Number of tourists (x1)	Internet dial-up users (x3)	Road mileage (x5)	The Number of private cars (x7)
0.6349	0.0054	-0.1652	0.5070

Compared with the multivariate regression model of ordinary least squares estimation, the Lasso model not only overcomes the multiple collinearity and makes the positive and negative sign of each coefficient accord with the actual economic significance, but also selects four main factors from many relevant factors. Meanwhile, through the comparison of fitting errors between the ordinary least squares estimation method and the Lasso method in figure 4, it is found that the fluctuation of the prediction error of the Lasso model is significantly smaller, indicating that the Lasso has better prediction ability. It means the lasso can predict Chinese tourism income more accurately. Generally, the Lasso model is superior to the ordinary least squares model. From the results of Lasso regression model, it can be seen that the important factors affecting Chinese tourism income are the number of tourists, Internet dial-up user, road mileage, and the number of private cars. According to the coefficient result after the variable selection of lasso model in table 2, the coefficients of the number of tourists, the number of private cars and Internet dial-up users are all positive, indicating that these variables are positively correlated with tourism income and have a positive effect on Chinese tourism income. It can be seen that the number of tourists and the number of private cars play a decisive role in the change of tourism income from

the coefficient. However, the coefficient of road mileage is negative, which means that it has an inverse relationship with tourism income. It means that the increase in road mileage will lead to a decrease in tourism income. On the surface, this is different from the previous research results and seems to be inconsistent with the reality. However, to some extent, it conforms to a certain economic significance, which will be explained in the following article.

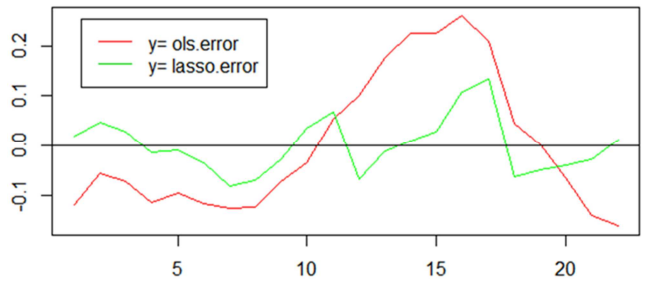

Figure 4. The fitting error of two models.

5. Conclusion and Recommendations

As a major tourist country in the world, China pays attention to the development of the tourism industry, even some provinces have regarded tourism industry as one of their leading industries. Therefore, it is important to promote the increase of the tourism income to boost the economic development of China. In order to promote the sustainable growth of Chinese tourism income, we believe that it is necessary to analyze the factors that affect Chinese tourism income. Studying the relationship between these factors and tourism income can provide a scientific theory for increasing tourism income. The paper takes Chinese tourism income as explained variable, and selects the number of tourists, per capital GDP, Internet dial-up users, Railway mileage, Road mileage, the number of hotels, and the number of private cars as the explanatory variable. According to the tourism-related data from 1994 to 2015, we respectively established a multiple linear regression model by the ordinary least squares and the Lasso to study the relationship between Chinese tourism income and relevant factors. Moreover, compared with the ordinary least squares method, the lasso overcomes the multicollinearity problem, which makes the established model more practical. At the same time, it also selected four major influencing factors from a number of variables, which can provide targeted recommendations for improving Chinese tourism income. We also found that its predictive power is preferable to the ordinary least squares. The empirical results not only effectively complement existing research, it is also important for tourism policy makers in China to pay attention to the findings.

Firstly, it can be seen from the estimated model results that there is a positive correlation between Chinese tourism income and the number of tourists. We find that the absolute value of the coefficient is the largest, indicating that it has the greatest impact on China's tourism income. The number of tourists is a basic factor affecting the development of Chinese tourism. It plays a vital role in increasing China's tourism income, and directly affects tourism income. Thus, scenic spots should try their best to attract the tourist. For example, they regularly implement preferential fare policies, and add some elements of science and technology to the traditional scenic spots. Therefore, Chinese tourism income can be promoted directly by increasing the number of tourists.

Secondly, there is a positive relationship between Internet dial-up users and Chinese tourism income. The Internet is the most influential social platform in the 21st century. With the increase of Internet dial-up users, it is conducive to tourism propaganda. In order to increase the possibility of travel, the country has increased the coverage of the Internet, and scenic spots have used Internet technology to develop tourism software such as the official accounts of Weibo and WeChat. They can raise popularity and announce their recent travel activities in a timely manner by the online platforms. It can help the tourist arrange their own time scientifically. At the same time, they can build a tourism network platform, including exhibitions, consultation, booking and transaction discussions. Scenic spots can promote the development of tourism by building an online and offline tourism system.

Thirdly, there is a negative relationship between road mileage and Chinese tourism income. The coefficient indicates that the marginal impact of road mileage on Chinese tourism income is decreasing, which conforms to the actual law of economic development. In the early period, the road system of China were underdeveloped, which limited the scope of tourism. Road transportation, as the main means of travel, is an important support for the early development of tourism, increasing road coverage has a profound impact on the development of local tourism economy. However, as Chinese highway coverage is basically saturated, too many roads will not increase people's travel intentions. At the same time, the construction of highways requires a lot of manpower and material resources. Therefore, it is difficult to recover costs in the short term. Increasing road mileage will lead to an increase in expecting costs. The paper calls on the local governments in China not to build roads blindly. Excessive road building will increase costs and indirectly reduce tourism revenue.

Finally, we find that the number of private cars is also positively correlated with Chinese tourism income. This demonstrates that the increase of private cars is beneficial to the development of tourism in China. With the development of economy and the increase of national income, private cars are becoming popular. This makes travel easier and promotes self-driving travel, which directly promotes domestic tourism

revenue. From this point of view, scenic spots can develop a self-driving industry chain with the government, local enterprises and residents. They provide a series of services for self-driving tourists, including the introduction and consultation of tourist attractions, the design of tourist routes, parking and accommodation, and travel insurance. Scenic spots will further promote the development of tourism economy by continuously improving service facilities.

Author Contributions

All authors contributed equally to this work.

Conflicts of Interest

The authors declare no conflict of interest.

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References

[1] Orçun, A. (2016). Tourism Income of Turkey: A Panel Data Approach ☆. Procedia Economics & Finance, 38, 245-256.

[2] Grünewald, C. Schleuning, M. and Böhning-Gaese, K. (2016). Biodiversity, Scenery and Infrastructure: Factors Driving Wildlife Tourism in an African Savannah National Park [J]. Biological Conservation, 2016, (201).

[3] Carrascal, I. A. and Fernández, M. (2015). Tourism and Income Distribution: Evidence from a Developed Regional Economy. Tourism Management, 48, 11-20.

[4] Wang, C. P, and Sun, G. N. (2018). The Construction of Scenic Spots Income Estimation Model Based on A-level Scenic Spots in Shanxi. On Economic Problems, 07, 99-103.

[5] Zhou, F. Ma, S. C. and Zhang, M. (2018). A Correlation Analysis of Tourism Revenue Multiplier Model and Major Factors in Tibet. Mathematics in Practice and Theory, 48 (16), 110-115.

[6] Fu, X. Y. and Huang, T. Z. (2015). Grey Correlation Analysis of Influencing Factors of Tourism Economy in Inner Mongolia. Statistics & Decision, 03, 142-145.

[7] He, Y. (2012). A Research of Impacting Xinjiang Tourism Economic Factors Based on Gray Correlative Analysis. Ecological Economy, 01, 160-162+170.

[8] Lin, Y. X. and Lin, B. S. (2017). Tourism Effect of World Heritage Sites and its Impact on Heritage Protection-Evidence from Tourist Arrivals and Tourism Revenues in China. Business Management Journal, 39 (09), 133-148.

[9] Zhang, B. R. Huang, X. K. and Liu, S. L. (2015). Tourism Revenue Forecast Based on Network Search Data-Taking Hainan Province as an Example. Inquiry into Economic Issues, 08, 154-160.

[10] Sun, X. D. and Feng, X. G. (2015). Multi-Criteria Similarity and Spatial Cluster of Provincial Tourism Economic Development in China. Journal of Natural Resources, 30 (01), 50-64.

[11] Yan, H. L, and Xiong, H. (2014) An Analysis on the Co-integration and Causality Relationship Between Tourism Income and Gross Domestic Product (GDP) of China. Journal of Huazhong Normal University (Natural Sciences), 48, (01), 136-141.

[12] Qu, H, and Xia, J. C. (2011). An Empirical Study on Relationship Between Tourism and Economic Growth of China—A Research Based on Data from 1985 to 2009. Finance & Trade Economics, 08, 106-112+137.

[13] Wang, Z. F. (2009). The Research of the Influence of the Tourism Transportation to the Tourism Development in Zhangjiajie. The Theory and Practice of Finance and Economics, 30 (04), 112-116.

[14] Zhang, J. Liu, Z. H. Xie, Z. Du, J. K. and Zhang, J. (2004). On Types of the Spacial Distribution of Chinese Tourist Website. Scientia Geographical Sinica, 04, 493-499.

[15] Tibshirani, R. (1996). Regression Shrinkage and Selection Via the Lasso. Journal of the Royal Statistical Society, 58 (1), 267-288.

[16] Li, X. and Liu, C. (2008). Comparative Study of Several Regression Models Based on Contraction Mechanism. Statistics & Decision, 5, 30-32.

[17] Man, X. Y. Zhang, T. Y. Wang, C. and Ma, R. (2018). Credit Risk Factors Identification and Risk Measurement of Micro, Small and Medium Enterprises in China. Journal of Central University of Finance &Economics, 09, 46-58.

[18] Liu, R. Z. and Du, W. (2012). Portfolio Construction Using Variable Selection: Based on LASSO Method. On Economic Problems, 09, 103-107.

[19] Huang, Z. F. Ding, Z. S. and Li, X. (1999). Preliminary Study on Combined Tourism Development Strategy of Taihu Lake Tourist Belt. Economic Geography, 06, 114-117.