

# The Measurement Analysis of Influencing Factors of China's Tourism Income

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**Abstract**—Based on the analysis of factors and the basic knowledge of econometric, this paper studies various factors that influence our domestic tourism revenue by theoretical analysis and empirical analysis. This paper reveals the current characteristics of tourism revenue in China and puts forward countermeasures and suggestions for the development of tourism in China. The research conclusion is based on the actual data, and provide important reference for the development of tourism economy in China.

**Index Terms**—tourism revenue, influencing factors, econometric model

## I. INTRODUCTION

Tourism has long been known as "Chaoyang" economic, "smokeless industry", and it is a business with great potential for development in current social and economic industry groups. It has become more and more prominent in the national economy, and the national government attaches great importance to the influence of tourism economy and plays an important role in tourism economy. This paper analyzes the growth factors of tourism economy by theory and empirical analysis, and provides reference for the management of tourism economy and tourism investment. For this topic, domestic and foreign scholars have been exploring in recent years.

Maloletko, O.N. and Kaurova, O.V. (2015) put forward that tourism sector attracts ever-increasing volumes of material, financial and human resources. It brings together a large number of industries, the functions of which is to meet the growing demand for different types of tourism and recreation. They described the main indicators of the dynamics of the Russian tourist market dynamics for five consecutive years combined. Jenny Briedenhan and Eugenia Wickens (2013) proposed to pay attention to the participation of community residents and cooperation between regions. Zhixin Chen, Koh Kikuchi (2017) employed a cross-country panel data model to investigate the relative contributions of sociopolitical, natural and cultural characteristics and national tourism policies to international tourism growth.

In China, the research on tourism economic growth focuses on the calculation of the value added to tourism economy and the research on the factors of growth. Ding Xiaoning, Yang Haifen (2015) use the 1999 ~2013 years related figures released by the national bureau of statistics, finding out the relationship between domestic tourism consumption and social and economic indicators,

then provide some Suggestions for tourism consumption expenditure; Zhang Taotao (2016) established an econometric model of the influencing factors of tourism income in Anhui province, carried out related metrological test analysis and made suggestions on the development of tourism in Anhui province; Yan Yinghui and Duan Wenbin (2017) use grey correlation method to select 12 indicators, including regional economy, living standard, tourism transport, environment quality, tourism service and urban civilization.

To sum up, the domestic and foreign scholars has been a lot of research and analysis on this issue, this article will study on four aspects of economic level, industrial structure, travel price, traffic condition by the theoretical analysis and empirical analysis.

## II. THEORETICAL ANALYSIS OF TOURISM ECONOMIC GROWTH

### A. Economic Level

In our country, high-speed growth of the economy promote fast development of tourism industry, and tourism income is rising. To a certain extent, the development of tourism promoted the economic growth, which formed a virtuous circle. As people's increasing consumption level and pursuit of the entertainment industry, which provides an advantageous condition for the growth of the tourism economy, at the same time, it greatly promoted the economic growth and capital circulation, make the market economy of greater vitality.

### B. Industry Structure

To realize the increase of tourism revenue, we need to rationalize the macro-structure, internal microscopic structure, dynamic development structure of tourism industry. It includes three levels, one is the tourism industry macro-structure rationalization, that is, the whole development of the tourism industry must coordinate with the first, second industry, and other industries, so that adapt to economic development. Second, internal microscopic structure of tourism industry rationalization is mainly refers to the tourism industry coordination, such as eating, living, traveling, purchasing, and entertainment are coordinated with each other, making the resources reasonably allocated and effectively used, the phenomenon of supply shortage and oversupply no longer appears. The third is the rationalization of the dynamic structure of tourism industry, that is, the long-term coordinated development of tourism industry will put the

rationalization of the tourism industry structure reach to a higher stage.

C. Tourism Price

Tourism revenue is the product of tourism product price and tourism product sales. This formula shows that the tourism price is closely related to tourism income. Generally speaking, increasing the price of tourism products will increase tourism revenue, while reducing the price of tourism products will reduce tourism revenue. However, this conclusion is not exactly right, which involves the problem of supply and demand of tourism products.

When tourism products are in short supply, increasing the price of tourism will promote the production of tourism products and expand the sales volume, thus greatly increasing the tourism revenue. When supply and demand of tourism products are in equilibrium, improve tourist prices, will stimulate the production of tourism products, but will lead to tourism demand and sales drop, two factors offset each other, tourist income won't have too big change. When tourism products are sufficient, improve the tourism price not only can't stimulate the production of tourism products, but also will depress tourism demand further and make it harder to sale tourism products, tourism revenue will decrease further. If the travel price is reduced properly, the tourist demand will be stimulated, which can not only offset the loss caused by the price reduction, but also the tourism revenue may increase.

D. Traffic Conditions

Traffic is a bridge connection of tourists and tourist area, tourist flow (traffic) will not be formed without good traffic conditions. Traffic is the travel channel and the media of tourism, which is a necessary part of function to form a complete tourism system, and modern mass tourism is formed only after traffic conditions improved significantly. In the development of tourism resources, traffic construction is a major development content. There is no convenient transportation linking the source and destination, tourism resources as a potential resource has no practical significance. Traffic service is also an important service content in tourism products, which is an important source of tourism revenue.

III. EMPIRICAL ANALYSIS OF TOURISM ECONOMIC GROWTH

By econometric method, this part names the gross domestic product (GDP) per capita, travel cost per capita, domestic tourists three influence factors as X1, X2, X3, names domestic tourism income as Y to carry on the empirical analysis, the following table data from statistical yearbook:

TABLE I. DATA OF INFLUENCING FACTORS OF CHINA'S TOURISM REVENUE

year	Domestic tourism revenue (\$100 million)	Gross domestic product per capita (yuan)	Expenditure per capita (RMB)	Domestic tourists (one million)
2006	6229.7	16738	446.9	1394
2007	7770.6	20505	482.6	1610
2008	8749.3	24121	511	1712
2009	10183.7	26222	535.4	1902
2010	12579.8	30876	598.2	2103
2011	19305.4	36403	731	2641
2012	22706.2	40007	767.9	2957
2013	26276.1	43852	805.5	3262
2014	30311.9	47203	839.7	3611
2015	34195.1	50251	857	4000
2016	39407.2	53922	880	4448

A. Establish Scatter Diagram

By establishing a scatter diagram, investigating the correlation between Y and X1, X2 and X3, as shown in Fig.1, Fig.2, Fig.3.

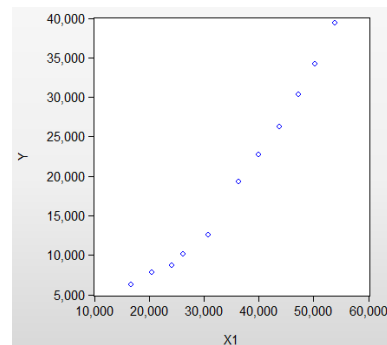


Figure 1. The scatter plot of domestic tourism revenue and gross domestic product per capita

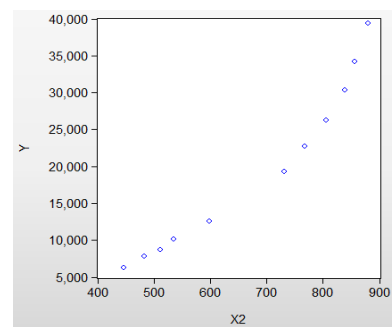


Figure 2. The scattered plots of domestic tourism revenue and expenditure per capita

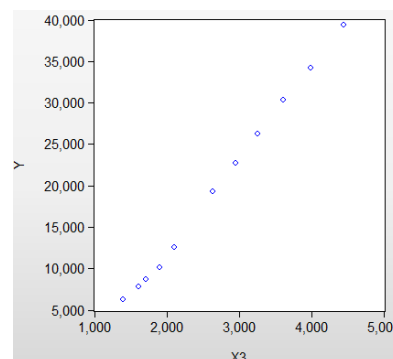


Figure 3. The scatter plot of domestic tourism income and the number of domestic tourists

Through the scatter diagram it can be seen that there is positive correlation relationship between the domestic tourism revenue and gross domestic product per capita, cost of tourism per capita, and the number of domestic tourists, and it is consistent with real economic significance, therefore, the three indicators can be equation fitting.

**B. Fitting Equation**

Set up multiple linear regression model as follows:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + u \tag{1}$$

Among them: the explanatory meanings of independent variables and dependent variables are as follows:

- Y ---- domestic tourism revenue (billion yuan)
- X1 ---- gross domestic product per capita (yuan)
- X2 ---- per capita expenditure (RMB)
- X3 ---- Domestic tourists (one million)

The regression equation of multiple linear regression equations was tried to return with OLS, and the estimated output of Eviews was shown as the Fig.4:

Dependent Variable: Y Method: Least Squares Date: 01/04/18 Time: 10:38 Sample: 2006 2016 Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12644.19	867.5602	-14.57442	0.0000
X1	-0.349751	0.083063	-4.210684	0.0040
X2	13.15715	3.898393	3.375021	0.0118
X3	13.33163	0.624538	21.34639	0.0000
R-squared	0.999575	Mean dependent var	19792.27	
Adjusted R-squared	0.999393	S.D. dependent var	11611.95	
S.E. of regression	286.0665	Akaike info criterion	14.42561	
Sum squared resid	572838.3	Schwarz criterion	14.57030	
Log likelihood	-75.34087	Hannan-Quinn criter.	14.33441	
F-statistic	5489.973	Durbin-Watson stat	2.982345	
Prob(F-statistic)	0.000000			

Figure 4. The Output of a Linear Regression Equation

In the output, goodness-of-fit  $R^2 = 0.9996$ , explaining the degree of fitting sample data and the model is good, but the explanation variable X1 P value is less than 0.05. However, the index value and economic significance are not consistent, so it is necessary to rematch and obtain a more suitable fitting equation, and the initial regression equation is as follows:

$$Y = -0.349751 * X1 + 13.15715 * X2 + 13.33163 * X3 - 12644.19$$

$$T \text{ value } (-4.210684) \quad (3.375021) \quad (21.34639) \quad (-14.57442)$$

$$R^2 = 0.999575 \quad F = 5489.973 \quad DW = 2.982345 \quad T = 11 \tag{2}$$

Check the residual distribution map by Eviews as shown below:

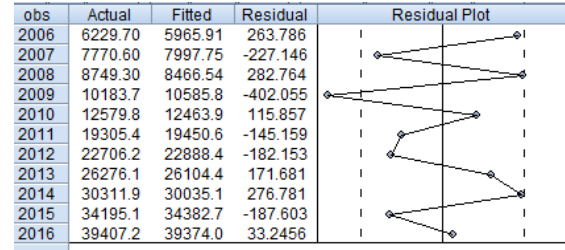


Figure 5. Residual distribution map

**C. Partial Correlation Coefficient Matrix**

To further observe the partial correlation coefficient between Y and X1, X2 and X3, the partial correlation coefficient matrix between variables can be obtained, as shown in the Fig.6:

Correlation				
	Y	X1	X2	X3
Y	1.000000	0.985341	0.969488	0.999249
X1	0.985341	1.000000	0.988765	0.988988
X2	0.969488	0.988765	1.000000	0.970375
X3	0.999249	0.988988	0.970375	1.000000

Figure 6. Relation Diagram of Partial Correlation Coefficient Matrix

**D. Fitting with Polynomials**

To observe the scatter diagram again, the relationship between Y and X1 and X2 is processed in pairs, Y and X3 continue to maintain a linear relationship, the result is shown as follows:

Dependent Variable: LNY Method: Least Squares Date: 01/04/18 Time: 10:33 Sample: 2006 2016 Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.528199	0.262005	-9.649414	0.0000
LN(X1)	0.283109	0.054910	5.155859	0.0013
LN(X2)	1.351561	0.082884	16.30672	0.0000
X3	0.000194	1.05E-05	18.40206	0.0000
R-squared	0.999838	Mean dependent var	9.714190	
Adjusted R-squared	0.999768	S.D. dependent var	0.650116	
S.E. of regression	0.009892	Akaike info criterion	-6.118903	
Sum squared resid	0.000685	Schwarz criterion	-5.974213	
Log likelihood	37.65396	Hannan-Quinn criter.	-6.210109	
F-statistic	14395.49	Durbin-Watson stat	3.498107	
Prob(F-statistic)	0.000000			

Figure 7. Equation Fitting Final Output Diagram

Each variable has a high significance, variable X1, X2, X3 can explain 99.98% of the variation, model fitting degree is high, all the indicators are in line with the economic significance and function, result in China's tourism revenue model is:

$$LN(Y) = 0.28 * LN(X1) + 1.35 * LN(X2) + 0.0002 * X3 - 2.528$$

$$T \text{ value } (5.1559) \quad (16.3067) \quad (18.4020) \quad (-9.6494) \tag{3}$$

$$R^2 = 0.999838 \quad F = 14395.49 \quad DW = 3.498107 \quad T = 11$$

**IV. SUGGESTION**

Through theoretical analysis and empirical analysis, the influencing factors of our country's tourism revenue growth including economic level, industry structure, tourism, prices, traffic condition, gross domestic product per capita, the cost per capita, domestic tourist areas. The

improvement of the economic level, the rationalization of industrial structure, the applicability of tourism price and economic level, and the favorable traffic conditions, all will promote the growth of tourism revenue. The empirical analysis shows that tourism income is positively correlated with GDP per capita, tourism per capita and domestic tourists. This part will combine theory and data to put forward useful suggestions to make China's tourism revenue growth become better and faster.

#### A. Adapt the Tourism Economy to the National Economy

The main contradictions of our country's society have been transformed into the contradiction between the people's increasingly good life needs and the unbalanced development. The rapid development of economy in our country has made people to pursue the entertainment industry. Therefore, quantitative analysis of national economic growth and tourism income is needed. It is concluded that there is a strong nonlinear positive correlation between the gross domestic product (GDP) per capita and tourism income by final fitting equation.

#### B. Strengthen the Production Factor Allocation of Tourism Industry

Related supervision and management departments need to make the input of production factors in the travel industry on a reasonable standard, optimize the investment direction of capital and improve the operation performance of capital. For example, improve the operation mode and labor factor distribution of tourism industry while making the tourism industry more diversified; Optimizing the spatial distribution of production factors are conducive to solving the spatial distribution of capital and labor force; At the same time, for different regions, investment in capital and labor should be tilted, and different preferential policies should be implemented accordingly.

#### C. Improve the Adaptability of Tourism Industry Price and Quantity

Tourism revenue is equal to travel price times tourism quantity, but from an economic point of view, it is not completely positive correlation between them, which involves the supply and demand relationship and interval problem. Based on the theoretical analysis of supply and demand, we can find that the quantity of tourism industry should be maintained at the equilibrium point of supply and demand, so that the income can be maximized. From the empirical analysis of the final equation, we found that the number of passengers and tourism revenue don't exist linear positive correlation, but the index relationship, which means too much amount of tourist quantity, will not cause the growth of the tourism income. From the perspective of ecology, it can destroy the carrying capacity of the ecological environment, which is not conducive to the good development of tourism industry. Her major is financial management and her research direction is risk management.

She participated in the editing of several textbooks and published several papers in domestic and foreign academic journals, three of which were retrieved by EI.

#### D. Improve the Macro Environment of Tourism Industry Development

The country should optimize the supply of tourism economy system from tourism legislation, tourism industry policy, tourism market supervision and so on, to create system guarantee for the growth of tourism economy. At the same time, we should strengthen the construction of other infrastructure such as tourism, communication and information system. Standard the current consumer market is the precondition of developing tourism industry, the state should strengthen the supervision of the tourism market and strive to build a standardized, fair and harmonious tourism market, which will promote fair competition and healthy development of tourism economy.

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