

# Econometric Analysis of the Influence Factors of Tourism Consumption in Sichuan Province

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**Abstract**—According to the relevant data of the tourism consumption from 1998 to 2017 in Sichuan province, this paper chose four factors affecting consumption which were the per capita GDP, the Engel coefficient of urban residents, urban residents' disposable income, Sichuan highway total mileage. It applied the software Stata12.0 to build the multivariate linear regression model and test the model to draw conclusions, and give relevant recommendations based on the conclusions.

**Keywords**—Sichuan province; tourism consumption; econometric analysis

## I. INTRODUCTION

With the rapid development of China's economy and the continuous improvement of people's living standards, the scale of China's tourism industry is increasing, and the total tourism revenue and the number of tourists are increasing year by year. The tourism industry presents a booming development trend. Sichuan is endowed with unique tourism resources. It is the only province in China that has world natural heritage, cultural heritage, natural and cultural heritage. Abundant tourism resources and unique tourism culture are the advantageous resources of Sichuan, and the tourism industry is where the great potential of Sichuan's economic development lies. This article selects the per capita GDP, urban residents' Engel coefficient, urban residents' disposable income, Sichuan highway mileage four possible influence factors, using the econometric methods to analyze the influencing factors of Sichuan tourism consumption, set up multiple linear regression model, and find out the significant factors influencing the Sichuan tourism consumption, which has practical significance for expanding the number of Sichuan tourism consumption.

## II. INFLUENCING FACTORS ANALYSIS AND MODEL SETTING

### A. Per Capita GDP (X1)

GDP is an important indicator to measure the degree of economic development in a region. It is closely related to the development of tourism in a region. The degree of economic development and national income affect tourism consumption. The higher the level of GDP, the greater the national expenditure on tourism consumption will be. So we choose per capita GDP (X1) as an explanatory variable.

### B. Urban Residents' Engel Coefficient(X2)

The Engel coefficient is one of the main measures of a family's or a country's wealth. Generally speaking, other things being equal, the Engel coefficient is higher, which indicates a lower income for a family and a poorer country. Less income is used for tourism consumption, and the consumption ability of urban residents is higher than that of rural residents. Therefore, Engel's coefficient (X2) of urban residents was selected as the explanatory variable.

### C. Urban Residents' Disposable Income(X3)

There is a positive correlation between the disposable income of urban residents and the demand for tourism products. The higher the disposable income is, the more the demand for tourism product is. Therefore, we choose the disposable income of urban residents (X3) as the explanatory variable.

### D. Sichuan Total Highway Mileage(X4)

The transportation industry is closely related to tourism. The degree of traffic development in a region has a significant impact on tourism consumption. The more convenient the traffic, the more convenient the trip, the more attractive it is to visitors. If it is convenient and economical

to reach a tourist destination, tourism consumers will definitely choose such a location as a tourist destination, and with the development of the economy People's living standards continue to improve, and many families are more inclined to travel by car, so choose highway mileage(X4) as an explanatory variable.

Based on the above analysis, the tourism income (Y) of Sichuan Province is taken as the explained variable, per capita GDP (X1), Engel coefficient (X2), disposable income of urban residents (X3) and total highway mileage (X4) are taken as the explanatory variables, and the econometric

model is obtained by using stata12.0 software and ordinary least square method:

$$Y=C+C1*X1+C2*X2+C3*X3+C4*X4$$

### III. THE DATA COLLECTION

This paper collects data on the income of Sichuan Province from 1998 to 2017. Including tourism revenue from Sichuan Province, per capita GDP, urban residents' Engel coefficient, urban residents' disposable income, Sichuan total highway mileage.

TABLE I. DATA ON TOURISM CONSUMPTION IN SICHUAN PROVINCE FROM 1998 TO 2017

Year	Tourism Revenue of Sichuan Province (100 Million Yuan)	Per Capita Gdp	Urban Residents' Engel Coefficient	Urban Residents' Disposable Income	Sichuan Highway Mileage (10 Thousand Kilometers)
1998	126	4294	44.5	5425	8.17
1999	222	4540	41.9	5854	8.93
2000	258.1	4955.7	41.48	5894	9.09
2001	314	5376.2	38.2	6360	10.87
2002	380.2	5890.5	37.7	6611	11.19
2003	420.8	6623.4	38.9	7042	11.25
2004	566.23	7895.2	40.2	7710	11.3
2005	721.26	9060	39.3	8386	11.47
2006	979.57	10546	37.7	9530	16.47
2007	1217.31	12963	41	11098	18.94
2008	1091.52	15495	43.96	12633	22.45
2009	1472.5	17339	40.45	13839	24.92
2010	1886.09	21182	39.5	15461	26.61
2011	2449.15	26133	40.68	17899	28.33
2012	3280.25	29608	40.4	20307	29.35
2013	3877.4	32617	39.6	22228	30.18
2014	4891.04	35128	34.94	24234	30.97
2015	6210.52	36775	35.19	26205	31.56
2016	7705.5	40003	34.46	28335	32.41
2017	8923.06	44651	33.3	30727	33

<sup>a1</sup> Data from Sichuan statistical yearbook, China statistics bureau

### IV. MODEL ESTIMATION AND ADJUSTMENT

Using the ordinary least squares method, using Stata12.0 software for multiple linear regression, the estimated results are as follows:

$$Y = -1448.334 - 0.2927X1 - 24.6986X2 + 0.9555X3 - 169.6736X4 \quad (1)$$

(1485.296) (0.0898) (31.4805) (0.1424)  
(24.113)  
t = (-0.98) (-3.26) (-0.78) (6.71)  
(-7.04)  
R<sup>2</sup> = 0.9928  $\bar{R}^2$  = 0.9908 F = 515.37 n = 20

#### A. Statistical Tests

- Goodness of Fit: R<sup>2</sup>=0.9928, adjusted R-squared is  $\bar{R}^2$ =0.9908, which means
- the model explained the tourism revenue of Sichuan Province as high as 99.3%, indicating that the model fits well with the sample.
- F-test: At a given significance level  $\alpha=0.05$ , F=515.37, the critical value  $F_{\alpha}(4,15)=3.06$  with degrees of freedom k-1=4 and n-k=15 is found in the F distribution table. Since F=515.37 >  $F_{\alpha}(4,15)=3.06$ , the null hypothesis H<sub>0</sub> should be rejected: C<sub>1</sub>=C<sub>2</sub>=C<sub>3</sub>=C<sub>4</sub>=0, indicating that the regression equation is significant, that is, "per capita GDP",

“urban residents Engel coefficient”, “disposable income of urban residents” and total “highway mileage “ have a significant impact on the tourism revenue of Sichuan Province.

- T-test: The P values of the regression coefficients of X1, X3 and X4 are all less than 0.05, indicating that X1, X3 and X4 have a significant impact on Sichuan tourism income (Y). The impact of X2 on Sichuan tourism income (Y) fails the t test, and the explanatory variable X2 is excluded. However, since the symbols of variables X1 and X4 are negative, that is to say, economic growth and traffic development will reduce the tourism income in China, which is obviously inconsistent with the theoretical analysis and practice test, indicating that there may be multicollinearity. Econometric test is conducted on it.

**B. Multicollinearity Test**

Multicollinearity test: because there are too many explanatory variables selected, the relationship between each explanatory variable and the explained variable should be analyzed before the model estimation, as well as the correlation degree between explanatory variables. COR command is used for correlation coefficient test, and the correlation coefficient matrix is obtained as follows:

TABLE II. THE CORRELATION COEFFICIENT

	Y	X1	X3	X4
Y	1.0000			
X1	0.9525	1.0000		
X3	0.9642	0.9984	1.0000	
X4	0.8418	0.9568	0.9501	1.0000

It can be seen from the above table that the simple correlation coefficients between X1 and X3, X1 and X4, and X3 and X4 are all above 90%, which indicates that there is serious multicollinearity between explanatory variables.

**C. Eliminating Multicollinearity with Stepwise Regression**

Stepwise regression is used to eliminate multiple collinearity. First, select the most significant variables from the three explanatory variables to build the model, and then introduce the remaining two explanatory variables into the model one by one. Each time a variable is introduced, a significant test is performed on all the variables in the model. Explain the insignificant explanatory variables from the model and repeat them until all explanatory variables outside the model are not significant. Using the stepwise regression method, the order of significance of these three explanatory variables is X3, X4, and X1, and the estimated results are as follows:

$$Y = -2552.281 + 0.9997X3 - 176.6848X4 - 2552.281X1$$

(2)

(469.9015) (0.1292) (22.1252) (0.0854)

t = (-5.43) (7.74) (-7.99) (-3.65)

R<sup>2</sup> = 0.9925  $\bar{R}^2$  = 0.9911 F = 703.86 n = 20

- Goodness of Fit: R<sup>2</sup>=0.9925, which means the model explained the tourism revenue of Sichuan Province as high as 99.25%, indicating that the model fits well with the sample.
- F-test: At a given significance level  $\alpha=0.05$ , F=703.86. Since F=703.86 > F $\alpha(3,15)$ =2.90, indicating that the regression equation is significant, that is, “urban residents Engel coefficient”, total “highway mileage “and “per capita GDP” have a significant impact on the tourism revenue of Sichuan Province.
- T-test: The P-value of the regression coefficient of each explanatory variable is less than 0.05, indicating that each explanatory variable has a significant impact on tourism income (Y) in Sichuan Province, indicating “urban residents' disposable income (X3)” “Total mileage of Sichuan highway (X4) ” “Per capita GDP (X1)” has the most significant impact on “Sichuan Tourism Income (Y)”.

**V. CONCLUSIONS AND SUGGESTIONS**

By using the relevant theories of econometrics, this paper establishes a multiple linear regression model that affects the tourism income of Sichuan Province, and concludes that the disposable income of urban residents has the greatest impact on tourism revenue in Sichuan Province. Based on the conclusions, the corresponding policy recommendations are proposed.

**A. Disposable Income of Urban Residents**

The disposable income of urban residents is positively correlated with the tourism income of Sichuan Province, indicating that it can drive tourism revenue. Government departments should increase the disposable income of residents, so that they have more room for growth in tourism consumption, and be optimistic about future income expectations, and willing to actively increase consumption expenditures.

**B. Highway Mileage**

The total number of highway mileage is negatively correlated with tourism revenue in Sichuan Province, indicating that visitors may like to travel short distances. For the office workers who are resting on weekends, weekend trips try to choose a closer tourism destination, travel to a farther place, time is not allowed, the traffic distance in big cities is best within 2 hours, medium city is within 1 hour. The small city is within half an hour. Therefore, it is necessary to focus on rural tourism, the journey is short, and you can travel on weekends. Therefore, it is necessary to focus on rural tourism, the road is short, and you can travel on weekends.

**C. Per Capita GDP**

There is a negative correlation between per capita GDP and tourism income in Sichuan Province. Tourism generally needs to go through three development stages of "sightseeing,

leisure and vacation". According to the research of world tourism organization, when the per capita GDP reaches 2000 us dollars, leisure tourism will achieve rapid development. When the per capita GDP reaches 3000 Us dollars, the demand for tourism explosively, and the form of tourism is dominated by vacation. When the per capita GDP reaches 5000 us dollars, it will step into a mature economy of vacation and tourism, and its leisure demand and consumption capacity will be increasingly strengthened and diversified. Therefore, we should focus on improving the quality of tourism consumption.

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