A Study on the Impact of Tourism Activities on Gross Regional Product - Taking Hubei Province as an Example

Shiqi Han[1a], Kai Xiong[2]*

[1]Business School of Jianghan University 2021 Postgraduate of Management Science and Engineering Wuhan City, Hubei Province, P.R. China
[2]Business School of Jianghan University Manufacturing Industry Development Research Center on Wuhan City Circle Wuhan City, Hubei Province, P.R. China
[a]e-mail 455724776@qq.com
*e-mail xkyx@sina.com
* Corresponding author

Abstract
Domestic tourism occupies an increasingly important position in people's daily life, this paper takes the economic indicators related to urban tourism in Hubei region from 2005-2019, studies the influence of each economic indicator on the gross regional product of Hubei province through regression analysis, and puts forward relevant suggestions.

Keywords- *Tourism economy; Gross regional product; Impact*

1. INTRODUCTION

Judging from the current situation of domestic tourism, with the continuous rapid economic development and the continuous improvement of people's material living standards, the number of tourists reported in each year and the tourism revenue of each place have shown an obvious upward trend, which indicates that the influence of tourism is increasing. In recent years, China has also continued to implement relevant policies to encourage the continuous development of the tourism industry and to drive the economic development of various regions through tourism. In the recently concluded 2020 Comprehensive Well-off society, many poor regions have been able to lift their "poverty" hats by developing tourism, which shows that tourism plays a very important role in China's economy. While scholars are usually accustomed to analyzing regional economic development through economic indicators and industrial structures, the impact on the tourism industry on regional gross domestic product (GDP) is of some positive significance now that the tourism industry is becoming increasingly important. GDP is the final result of production activities of all resident units in a country or region in a certain period of time.

This paper will use the method of data analysis to analyze the influence of each relevant factor of the regional GDP of Hubei Province by selecting several factors related to tourism in Hubei from 2005 to 2019 and establishing regression equations with STATA software, and provide relevant references to the development and adjustment of Hubei tourism industry through the analysis results.

2. LITERATURE REVIEW

Since the 13th Five-Year Plan, the country has emphasized economic transformation and upgrading, and strengthened supply-side structural reform, which means that tourism development will become a strong pillar of the regional economy. Wen Yuan (2022) believes that the tourism industry is an important form of service industry that promotes economic growth, which is highly integrated with and highly dependent on the development of the region itself. Based on the relevant literature and data analysis, it supports the relevant views that the tourism industry drives the regional economy, and puts forward relevant opinions on the development and reform of regional tourism[1]. Guo Jianquan et al. (2021) selected data of 20 years and constructed a second-order differential vector autoregressive model for analysis, and the study found that economic growth is affected to

varying degrees by tourism-related industries. It is not difficult to see from the analysis of domestic scholars' studies that there is an impact of tourism activities on regional GDP[2] .

Guo et al. (2009) and others selected eight indicators for correlation analysis in measuring tourism revenue in cities, including the number of tourists, GDP, passenger traffic, price level index, per capital disposable income of urban residents, number of hotels, number of travel agencies, and social fixed asset investment, and found that the price level index, number of hotels and number of travel agencies are the most important factors affecting tourism revenue, and tourism development has a stage[3] . Ji ChenYu et al. (2021) concluded that there is a correlation between domestic tourism, civil aviation industry and regional economy through autoregressive analysis of panel data, and tourism development has a long-term or indirect promotion effect on civil aviation industry[4] . Foreign scholars Shaheen K et al. analyzed the relevant data from ten countries over a period of 20 years and concluded that tourism revenue positively leads the economic revenue of the country, and concluded that each country should pay attention to ecotourism policy, which is important for the sustainable development of each country[5] .Balaguer and Cantavella Jorda, recognizing tourism as a catalyst for economic growth, proposed the tourism-led growth (TLG) hypothesis, which assumes a one-way causal relationship between international tourism expansion and economic growth[6] . Currently many scholars will choose some perspective to analyze the economic development, but fewer domestic scholars study the impact of tourism activities on the regional economy from the perspective of tourism, but more analysis of what factors will have an impact on the tourism economy, but the relevant literature scholars for the selection of indicators is very informative.

3. ANALYSIS OF THE IMPACT OF TOURISM ACTIVITIES ON HUBEI'S GROSS REGIONAL PRODUCT

3.1. Indicator Selection

There are many factors affecting a regional GDP, and the regional GDP can be affected by various aspects such as economy, policy and industrial structure. In this paper, multiple regression analysis of the changes of the gross regional product in Hubei Province from the perspective of tourism, the following indicators were selected as variables for correlation analysis according to the actual situation of tourism in Hubei Province and under the premise of ensuring the accuracy of the indicators obtained, as shown in Table1.

TABLE 1. SELECTION OF INDICATORS AND DESCRIPTION

Variable Type	Variable Symbols	Variables	Description
Dependent variable	y	Gross regional product (billion yuan)	The final result of production activities of all resident units in a region at market prices over a certain period of time, measuring the development of the region
Independent variable	X_1	Total tourism revenue (billion yuan)	Domestic tourists in the process of domestic travel, sightseeing, accommodation, food and beverage, shopping, entertainment and other expenses for all
	X_2	Resident consumption level (yuan)	Refers to the extent to which the population has reached in the process of consumption of material goods and services to meet the needs of the people in terms of production, development and enjoyment
	X_3	Number of resident population in Hubei region (million)	Refers to the number of people who are always at home or have been living at home for more than six months throughout the year; resident population = current resident population + temporarily away population
	X_4	Railroad operating mileage (km)	Refers to the total length of the railroad main line that handles passenger and cargo

		transportation in a certain period of time
X_5	Railroad passenger volume (million people)	Railroad passenger volume is the number of passengers carried in a certain period
X_6	Total operating income of star-rated hotels (million yuan)	Refers to the total business category revenue of star-rated hotels in a certain area
X_7	Number of star-rated scenic spots of 3A and above (one)	The total number of AAA scenic spots, AAAA scenic spots and AAAA scenic spots in a certain area

3.2. Data source

The indicators selected in this paper were obtained from the Hubei Provincial Statistical Yearbook for each year from 2009 to 2021 published on the official website of Hubei Provincial Bureau of Statistics and the EPSDATA database website.

3.3. Model Construction

The fluctuation of gross regional product can be considered from many aspects, this paper considers the impact of the development of tourism economy in Hubei Province on the change of gross regional product from the analysis of gross tourism income indicators to macro measure the development of tourism in Hubei region[7] .The paper considers the impact of the development of tourism economy in Hubei Province on the change of regional GDP, and the macro measurement of tourism development in Hubei Province from the index of total tourism revenue, the index of railroad mileage and railroad passenger volume[8] .The total revenue of star-rated hotels and the number of star-rated scenic spots of 3A and above are used to measure the convenience of tourism travel in Hubei Province.[9] The model also includes the level of consumption of residents and the number of resident population in Hubei to measure the development of residents' life and consumption in Hubei.

The data from 2005-2019 were selected, and the total regional output value of Hubei Province, y, was used as

the dependent variable for the tourism-related economic indicators selected in the paper x_1 , x_2 ...... x_7 as the independent variables to construct a regression model of the change in the regional gross output value of Hubei province based on the influence of tourism-related economic factors. Considering the practical significance of the economic indicators, which are not suitable for ordinary linear regression, a double logit model is used.

$$lnY = \beta_0 + \beta_1 lnX_1 + \beta_2 lnX_2 + \beta_3 lnX_3 + \beta_4 lnX_4 + \beta_5 lnX_5 + \beta_6 lnX_6 + \beta_7 lnX_7 \quad (1)$$

The indicators were logged and regression analysis was performed using STATA software, and the results are shown in Table 2.

TABLE 2. PRELIMINARY REGRESSION RESULTS

Variables	Coefficient	Standard Error	t-statistic	Probability
C	149.1072	83.08172	1.79	0.116
lnX_1	0.6503975	0.1456129	4.47	0.003
lnX_2	1.136823	0.2202154	5.16	0.001
lnX_3	-16.76198	9.757086	-1.72	0.130
lnX_4	-0.4501538	0.3246125	-1.39	0.208
lnX_5	-0.4697404	0.2333797	-2.01	0.084
lnX_6	-0.1967776	0.2586098	-0.76	0.472
lnX_7	0.0159786	0.3094854	0.05	0.960

From the regression results, it can be seen that R^2 =0.9981 and the adjusted $\bar{R}^2$ =0.9953, indicating that the respective variables jointly explain the model with good and significant strength. Among them, the number of resident population (x_3), railroad mileage in operation (x_4), railroad passenger traffic (x_5), business income of star-rated hotels (x_6) and the number of scenic spots of 3A and above (x_7) all have negative coefficients, and the coefficients of the verdict are opposite to the impact of these indicators on regional GDP under the judgment of theory and economic common sense. Meanwhile among the seven variables, the x_1 p-value of is 0.003, the x_2 the p-value of is 0.001, and only x_1 and x_2 passed the significance test at 5% significance level, while the rest of the variables did not pass the significance test, so it is presumed that the model may have multicollinearity.

3.4. Model Correction

3.4.1. Correlation coefficient test

The STATA software was used to analyze the correlation coefficients between the variables, and the results are shown in Table 3. according to the graphs we can see that there is a significant correlation between the variables, with coefficients above 0.79 and very significant, indicating that there is a serious multicollinearity in this regression model.

TABLE 3. CORRELATION COEFFICIENT MATRIX

	lnX_1	lnX_2	lnX_3	lnX_4	lnX_5	lnX_6	lnX_7
lnX_1	1.00 00						
lnX_2	0.98 71***	1.00 00					
lnX_3	0.94 78***	0.97 17***	1.00 00				
lnX_4	0.98 48***	0.97 38***	0.92 32***	1.00 00			
lnX_5	0.99 10***	0.99 16***	0.97 05***	0.96 79***	1.00 00		
lnX_6	0.85 94***	0.83 17***	0.69 80***	0.88 73***	0.81 28***	1.00 00	
lnX_7	0.97 62***	0.98 82***	0.98 59***	0.95 87***	0.98 36***	0.79 07***	1.00 00

(Note: t-statistic values of coefficients in the table*** < 0.01)

3.4.2. Model Correction

The regression is said to have multicollinearity when more than two variables are significantly correlated with each other. To address the situation that many independent variables in the model are insignificant and some of the coefficients of the independent variables have opposite signs to the actual economic significance. This paper considers reducing the multicollinearity of the model by eliminating the variables. The elimination of variables takes into account that the purpose of this paper is to study the impact of tourism economy of Hubei Province on the regional GDP of Hubei Province, so in eliminating the multicollinearity is considered to keep the variable total tourism revenue (x_1), which is an important explanatory variable in this paper; the number of resident population in Hubei province in the preliminary regression (x_3),Although the absolute value of the coefficient is the highest, the significance is not good, while the coefficient of total tourism income (x_2) coefficient is larger and significant, so we consider keeping the total tourism income (x_2) as the main explanatory variable, and on this basis, stepwise regression method is adopted for analysis to eliminate multicollinearity. The results are presented in Table 4.

TABLE 4. STEPWISE REGRESSION RESULTS

Regression model	lnx1	lnx2	lnx3	lnx4	lnx5	lnx6	lnx7	R^2	Aadjust R^2
Y=f(X1,X2)	0.4752	0.3161						0.9906	00.989
	-4.09	-1.62							
Y=f(X1,X2,X3)	0.3737	0.8553	-14.68					0.9965	0.9956
	(4.83)	(4.88)	(22.122)						
Y=f(X1,X2,X4)	0.4493	0.3131		0.1163				0.9964	0.9933
	(2.82)	(1.54)		(0.25)					
Y=f(X1,X2,X5)	0.6549	0.6473			-0.632			0.9941	0.9925
	(5.53)	(3.14)			(-2.58)				
Y=f(X1,X2,X6)	0.366	0.3953				0.3735		0.9936	0.9919
	(3.3)	(2.3)				(2.27)			
Y=f(X1,X2,X7)	0.482	0.719					-0.574	0.9939	0.9923
	(4.93)	(3.09)					(-2.45)		
Y=f(X1,X2,X3,X6)	0.3986	0.9752	-19.02			-0.119		0.9968	0.9955
	(4.78)	(4.34)	(-3.13)			(-0.87)			
Y=f(X1,X2,X5,X7)	0.6303	0.9211			-0.526		-0.469	0.9963	0.9948
	(6.31)	(4.44)			(-2.5)		(-2.37)		

According to the stepwise regression results, the $Y = f(lnX_1, lnX_2, lnX_5, lnX_7)$ the fit is better and the significance of each coefficient is more significant, butβ_5 andβ_7 The coefficients of are negative, contrary to expectations, and after the heteroskedasticity test, it is found that the variance inflation factor VIF of each variable is over 40, and there is still serious multicollinearity in the model, although the coefficients are very significant, but the multicollinearity causes errors in the sign of the regression coefficients of the variables, which leads to errors in the analysis of the final results. Although the rest of the models also all satisfy the significance test and the degree of fit is good, the models are selected based on the study of the relevant literature of existing scholars and taking into account the degree of correlation between the independent and dependent variables, on the basis of ensuring accuracy by allowing as many variables to enter the model as possible. $Y = f(lnX_1, lnX_2, lnX_6)$ The R^2 large, and each coefficient t-test is very significant, BP test in STATA software, given α= 0.05, the chi-square statistic of BP test chi² (1) = 3.45, p = 0.0633 > 0.05, can not reject the original hypothesis that the equation does not exist heteroskedasticity, can not be considered that there is significant heteroskedasticity in the model, in

summary, considering this model is selected as the final model.

3.5. Model and economic significance

From the regression results, we can obtain the coefficients of the variables β_1 =0. 36605, and β_2 =0.39526, β_6 =0.37359 The finalized model, as follows.

$$\ln Y = 0.29175 + 0.36605 \ln X_1 + 0.39526 \ln X_2 + 0.37359 \ln X_6 \quad (2)$$

t=   (3.30)   (2.30)   (2.27)

Among them β_1, β_2 and β_6 are all positive values, indicating that total tourism revenue, residents' consumption level and star-rated hotel business income have a positive effect on the regional GDP of Hubei Province. β_1 =0.36605 indicates that when the rest of the variables are held constant, every 1% increase in total tourism revenue causes a 0.36605 percentage point increase in regional GDP, the t-statistic of this coefficient is 3.30, p=0.007< 0.01, rejecting the original hypothesis that the coefficient is 0, and the coefficient is significantly non-zero. β_2 =0.39526 indicates that when the rest of the variables are held constant, for every 1% increase in the level of consumption of the population, the gross regional product rises by 0.39526 percentage points, the t-statistic of this coefficient is 2.30, P=0.042< 0.05, rejecting the original hypothesis that the coefficient is 0 and the coefficient is significantly non-zero. β_6 =0.37359 indicates that when the rest of the variables are held constant, for every 1% increase in the business income of star-rated hotels, the gross regional product will rise by 037359 percentage points, the t-statistic of this coefficient is 2.27, P=0.044< 0.05, rejecting the original hypothesis that the coefficient is 0, the coefficient is significantly not 0, and the regression effect is significant. β_1, β_2 and β_6 are positive in line with the economic significance and consistent with the expectation that the total tourism income, the level of residential consumption and the business income of star hotels positively affect the regional GDP.

4. CONCLUSIONS AND RECOMMENDATIONS

This paper analyzes the regional GDP of Hubei Province through seven variables: total tourism income, residents' consumption level, the number of resident population in Hubei, railroad mileage, railroad passenger volume index, total business income of star-rated hotels and the number of star-rated scenic spots of 3A and above, establishes a double logit model, eliminates multiple covariance by stepwise regression method, enhances the significance of coefficients, and finally obtains the functional relationship between the regional GDP of Hubei Province and total tourism income, residents' consumption level and total business income of star-rated hotels. The relationship between the GDP of

Hubei Province and the total tourism revenue, the consumption level of residents, and the total business income of star-rated hotels is finally obtained.

Through the above analysis, it is easy to see that it is reasonable and feasible to analyze the gross value of a region from the perspective of the tourism economy, but it is necessary to consider the high correlation between economic indicators. According to the indicators selected in this paper, it can be assessed that the three indicators of total tourism revenue, residents' consumption level and total business income of star-rated hotels have a significant positive impact on the regional GDP of Hubei Province.

Based on the above findings, the following recommendations are achieved.

4.1. Enhance the overall quality of the tourism industry through the tourism industry to enhance total tourism revenue

With the improvement of people's living standards, people will pay more attention to spiritual entertainment, and tourism as one of the main items of spiritual entertainment also continues to promote the development of tourism. Within the tourism industry, we should strengthen the regulatory system, improve the relevant laws and regulations, reduce the conflicts between tourists and tourism industry practitioners, and provide a better tourism environment for tourists. At the same time to improve the level of industrial quality. The stable and healthy development of the tourism industry is inseparable from high-quality tourism workers, and the government, tourism enterprises and relevant universities should continue to strengthen cooperation to cultivate more high-quality tourism workers who can adapt to the process of the networked information era, strengthen innovative tourism content, find suitable tourism promotion points, effectively grasp the consumer psychology of tourists, and achieve the goal of driving the regional economy through the improvement of tourism revenue The goal of the development of the regional economy through the improvement of tourism revenue.

4.2. Strengthen government investment and raise the consumption level of residents

The government can strengthen the convenience of tourism in Hubei province through various investments. There are numerous cities in Hubei province suitable for tourism development, but the number of tourists is low due to inconvenient transportation and no high-speed rail. Secondly, it can make unique tourism development for some areas to create more core tourism areas and concentrate the attractions, which can not only drive the local economic development but also improve the image of the city. At the same time the government needs to

help improve and sound the market order, both to maintain a sound and stable development of the tourism market, but also to actively expand and promote different get tourism projects to maintain the competitiveness of the city's tourism. Through tourism development for the poorer areas can drive the local economic development, reduce the income gap between urban and rural residents, and improve the consumption level of residents. China's tourism industry attributes gradually transition from economic to political and social functions[10] In addition to the development of infrastructure, the promotion of scenic brands should be taken into account, and the tourism market can be broadened through more special "thematic" tourism, which can lead to an increase in regional GDP.

4.3. Standardize the management of star-rated hotels to create a comfortable travel experience

According to scholarly research, accommodation accounts for the majority of tourist spending[9], which also corroborates the conclusion of this paper. Total tourism revenue in Hubei Province has been rising in recent years shows that tourism is in a stage of continuous development, and the continuous development of economic level and the improvement of living conditions will promote the demand of residents for tourism. We strive for the comfort of living, the freshness of the environment and the government should build a good image of tourist city through excellent infrastructure.

5. SHORTCOMINGS AND OUTLOOK

The scope of this paper is limited to the Hubei province region, and the impact of tourism activities on regional GDP will vary from region to region due to the development differences of each urban area. Also, this paper does not consider other factors that may affect economic growth, such as inbound and outbound tourism, carbon emissions, urban greening, tourism innovation and other related factors, and subsequent studies can go further in these areas.

Although this paper does not break down the regions, the analysis results can provide policy suggestions for tourism-related industries. For example, from the perspective of infrastructure investment, the government can provide a more convenient and comfortable tourism environment for tourists by investing in various infrastructure constructions; from the perspective of improving the quality of the industry, more tourism innovations can be found in the information era through the introduction and training of tourism-related talents and the improvement of industry regulations and policies; from the perspective of development, a variety of personalized approaches such as special tourism and theme tourism can effectively improve the competitiveness of local tourism, and then achieve the goal of driving regional economic development through tourism.

REFERENCES

[1] Wen Yuan. An analysis of the pulling effect of tourism industry on regional economy in the new era[J]. Business and Exhibition Economy, 2022(03): 35-37.

[2] Guo Jianquan, Huang Liujun. Research on the relationship between tourism and economic growth from the perspective of industry differentiation-- based on the optimization vector autoregression model[J]. Journal of Chongqing University of Commerce and Industry (Social Science Edition), 2020, 37(01): 24-34.

[3] Guo Xiaojia, Chen Xingpeng, Zhang Zilong, et al. Quantitative identification of drivers of tourism revenue growth [J]. Statistics and Decision Making, 2009(22): 88-89.

[4] Ji Chen-Yu, Zhang Hanyu. The dynamic relationship between tourism, civil aviation and economic growth: a panel data analysis based on major tourism cities in China[J]. Journal of Tourism, 2021, 36(12): 40-53.

[5] Shaheen K, Zaman K, Batool R, et al. Dynamic linkages between tourism, energy, environment, and economic growth: evidence from top 10 tourism- induced countries[J]. Environmental science and pollution research international, 2019, 26(30): 31273-31283.

[6] Balaguer J, Cantavella-Jordá M. Tourism as a long-run economic growth factor: the Spanish case [J]. Applied Economics, 2002, 34(7): 877-884.

[7] Yang Jinbo. Quantitative analysis of the contribution of tourism development to regional economic growth in Guizhou Province[J]. Land and Natural Resources Research, 2021(06): 53-57.

[8] Deng Qingnan. Analysis of domestic tourism consumption structure in Sichuan Province[J]. Journal of Chengdu Higher Institute of Electronic Machinery, 2005(02): 57-62.

[9] Cao Xinxiang. Analysis of the changes in tourism consumption of domestic tourists in Henan Province[J]. Tourism Forum, 2009, 2(04): 583-588.

http://www.cqvip.com/qk/82140a/200904/31698383.html

[10] Shu Boyang, Xu Qitao. The evolution of China's tourism industry and the transformation of development in the post-epidemic era[J]. Journal of Central South University for Nationalities (Humanities and Social Sciences Edition), 2022, 42(02): 73-80+184.