Empirical Study of Relations between International Tourism Income and Economic Growth in Qingdao

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Abstract

This paper examines the dynamic relationship between international tourism income and economic growth in Qingdao.Through empirical analysis of data on the GDP and the international tourism income during 1998-2016 of Qingdao, I figure out whether there is a long-term equilibrium relationship between these two variables. The empirical results show that there is a long-term equilibrium relationship between them, and the tourism industry has a significant driving effect on economic growth. Finally, according to the empirical results, we put forward the policies and suggestions for the development of international tourism industry.

Keywords

International Tourism Income, Economic Growth, Qingdao, Empirical Study.

1. Introduction

Qingdao has excellent tourism resources.In terms of land, Qingdao has numerous cultural relics and other excellent cultural resources, diversified architectural styles, colorful and cultural festivals, and beautiful mountains and rivers near the sea.In addition, Qingdao leisure tourism resources in the coastal natural landscape can be more reflected.Qingdao's coastline, at the same time has created Qingdao offshore beach tourism resources, and Qingdao has a famous mountain Qingdao laoshan scenic area, famous for Taoist mountains.Besides, Qingdao is also rich in cultural, leisure and tourism resources. It is worth mentioning that Qingdao has a multi-country style architectural block.In recent years, with the completion of Qingdao grand theatre, Qingdao library, Qingdao's numerous film and theater lines, concert halls and smaller cultural entertainment venues, these cultural resources have become an important part of residents' daily activities.The development of Qingdao's cultural leisure tourism industry has been identified as one of the four featured cultural industries that Qingdao will focus on in the future.

These advantaged and accumulated tourism resources are the important factors to attract international tourists, making international tourism income become an important part of the tourism industry.

In recent years, Qingdao has taken tourism as the strategic pillar industry of the national economy, and the role of tourism in the adjustment of the city's industrial structure and social and economic development has become increasingly prominent.Therefore, the income of international tourism is selected to measure the development of tourism and examine its contribution to economic growth.

2. Sample Data Processing

Table 1: Data summary table

Year	GDP (One hundred million yuan)	Tourism income (One hundred million yuan)
1998	901.19	60.59
1999	1018.97	71.6
2000	1191.25	88.7
2001	1368.55	102.8
2002	1583.51	130.62
2003	1869.44	121.9
2004	2270.16	183.78
2005	2687.46	222.59
2006	3183.18	281.79
2007	3750.16	350
2008	4401.56	420.28
2009	4853.87	489.1
2010	5666.19	580.04
2011	6615.6	681.39
2012	7302.11	807.58
2013	8006.56	937.19
2014	8692.1	1061.1
2015	9300.07	1270.01

This paper selects relevant data from Qingdao from 1998 to 2016 for analysis.GDP is used to measure the regional economic aggregate of Qingdao, and ITR is used to measure international tourism income.In order to eliminate the influence of price factors, we use the price index to convert the data of two nominal variables to the data of actual variables in 1998 as the base period. The heteroscedasticity in the data is eliminated by taking the logarithmic transformation, which is denoised as LGDP and LITR respectively, because the logarithmic transformation will not change the cointegration relationship between variables, but can make it explicit, so as to facilitate the construction of the model and better reflect the elastic value of the relationship between them.The corresponding first-order difference sequences are denoted as DLGDP and DLITR.In the process of analysis, this paper obtained the statistical value of relevant measurement by using R x64 3.4.3 software.The original data are from the statistical yearbook (2001 - 2016) provided by Qingdao statistical information network and the main indicators of Qingdao tourism (1998 - 2016) provided by the official website of Qingdao tourism.

3. The Empirical Research

3.1. Descriptive Statistical Analysis

After obtaining the sample data of time series, the most important problem is to judge its stability.In order to better observe the relationship between Qingdao's GDP and international tourism income, we first conducted a descriptive statistical analysis of the sequence, and drew a sequence diagram, a first-order difference sequence diagram and a second-order difference sequence diagram by using rx64 3.4.3 software.The results show that the first-order difference of the variable ITR and GDP is not stable, and the second-order difference of the two is stable and may be a stationary sequence, as shown in figure 1, but further unit root test is required.

We chose the ADF unit root test, and the horizontal sequence showed a time trend and constant term, so the horizontal sequence was tested with a time trend and constant term. The selection of the first-order difference sequence contained constant term, while the selection of the second-order difference sequence did not contain constant term and linear time trend.
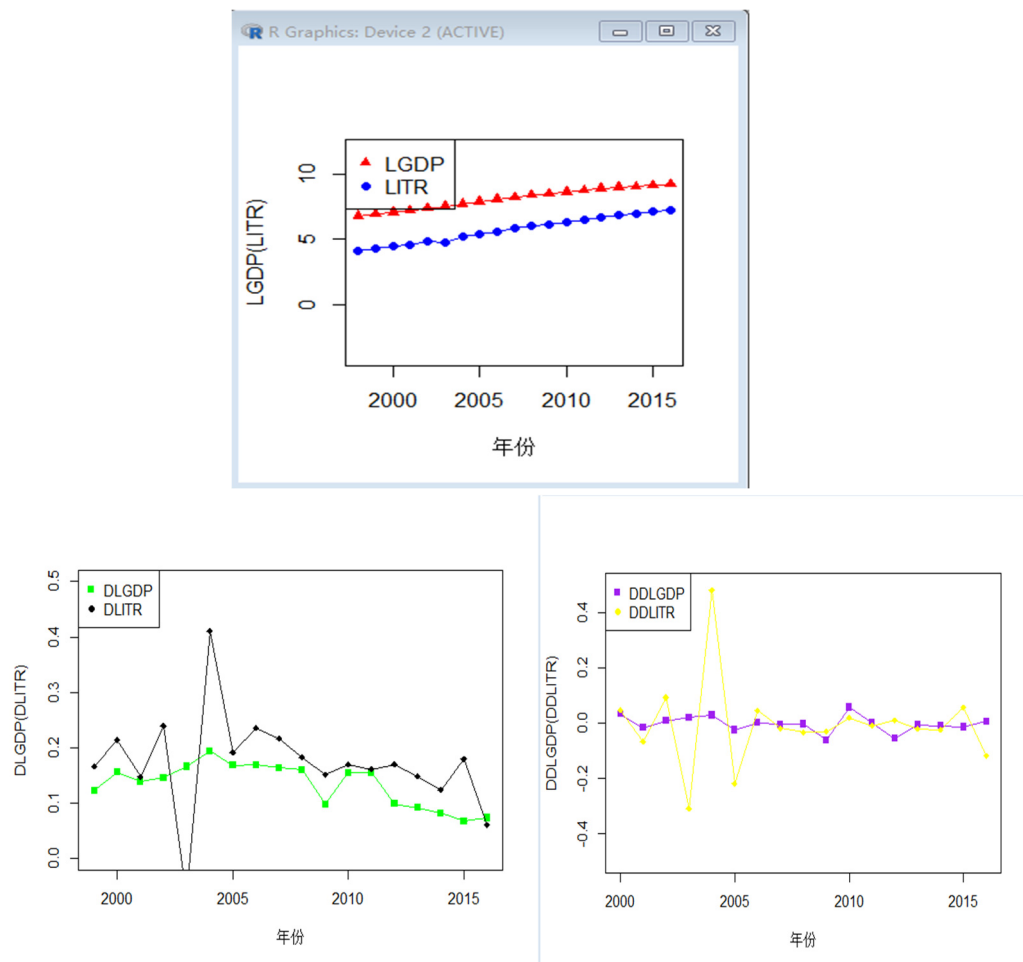

Figure 1: Variable sequence diagram

3.2. Unit Root Test

Using R x64 3.4.3 software, according to the test results (see table 2), the ADF statistical test values of LGDP and LITR are both greater than the critical value of 5% of the significant level, indicating that both LGDP and LTR have unit roots and are non-stationary sequences.However, DLITR is still unstable after the first difference, so the horizontal sequence of the first order is non-stationary.DDLGDP and DDLTR are stationary at the significance level of 5%, so the horizontal sequence is stationary, the second-order difference sequence is stationary, and LGDP and LITR are second-order single integral I(2) sequences.However, in order to judge whether there is a co-integration relationship between the two time series of international tourism revenue and GDP growth, it needs to be further tested.

Table 2: The results of ADF test

Variable	Test type	ADF	The critical value at the 5% significance level	P	Conclusion
LITR	(C,T,1)	-0.6331	-3.699	0.963	Smooth
LGDP	(C,T,0)	1.8303	-3.674	1	Smooth
ΔLITR	(C,0,1)	-1.9466	-3.052	0.6000	Smooth
ΔLGDP	(C,0,0)	-1.1946	-3.040	0.6512	Non-stationary
ΔΔLITR	(0,0,0)	-10.49	-1.963	0.0000	Smooth
ΔΔLGDP	(0,0,0)	-5.2315	-1.963	0.0000	Smooth

3.3. Cointegration Analysis and Error Correction

3.3.1. Cointegration Analysis

LGDP and LTR are second-order single integral I (2) sequences, and the co-integration relationship between tourism economic growth and international tourism industry development in Qingdao can be tested by Engle -- Granger two-step method. In the first step, OLS is used to regression the data and the regression equation is obtained.

According to the test results (see table 3), the co-integration regression equation (standard deviation in parentheses) can be established to obtain a long-term equilibrium relationship between Qingdao's economic aggregate (LGDP) and international tourism income (LITR):

$$LGDP=3.61760+0.78469 \ LITR+U$$
$$(47.42)(60.02)$$
$$R^2=0.9953 \quad F=3603 \quad DW=1.4342$$

Table 3: OSL regression results

Variable	Coefficient	Std. Error	t-Statistic	Proh
C	3.61760	0.07629	47.42	0.0000
R-squared	0.9953	F-statistic	3603	
Adjusted R-squared	0.995	Prob(F-statistic)	0.0000	

3.3.2. ADF Unit Root Test for Residuals

The second step is to test the unit root of residual. If the residual term does not have a unit root, the resulting regression equation is a co-integration equation between variables, otherwise it is not. ADF test with no intercept term and no trend term was selected for the residual test, and the results are shown in table 4.

Table 4: ADF unit root test results of residuals

Test type(C,T,K)	ADF	The critical value at the 5% significance level	P	Conclusion
(C,0,0)	-3.0924*	-3.040	0.004	Smooth

It can be seen from table 4 that the ADF value of the residual of the regression equation is -3.0924, which is significantly less than the critical value at the significance level of 5%, so the residual does not have a unit root, indicating that the two time series have a co-integration relationship between international tourism income and GDP growth.

The co-integration test can only show that there is some long-term equilibrium relationship between the two variables, while many economic variables have mutual influence. So, we do the granger causality test for LGDP and LITR. First of all, there may be a two-way relationship between international tourism revenue and economic growth. On the one hand, the increase of international tourism income promotes the economic growth; On the other hand, the economic growth may promote the improvement of tourism infrastructure construction and the improvement of tourism service quality, thus further attracting the increase of international tourism revenue. Therefore, Grange causality test is used to analyze the above causal relationship. The Grange test determines the correctness of the null hypothesis by comparing the statistics obtained by the constrained F test with the critical value.

Table 5: Results of granger causality test

Causal Direction	Lag	F	P	Conclusion
LITR does not Granger Cause LGDP	1	23.592	0.0002*	Reject
LGDP does not Granger Cause LITR	1	6.4761	0.0224*	Reject
LITR does not Granger Cause LGDP	2	7.5164	0.0077*	Reject
LGDP does not Granger Cause LITR	2	0.9639	0.4091	Accept
LITR does not Granger Cause LGDP	3	4.1382	0.0423*	Reject
LGDP does not Granger Cause LITR	3	0.5179	0.6803	Accept
LITR does not Granger Cause LGDP	4	4.5556	0.0495*	Reject
LGDP does not Granger Cause LITR	4	0.2862	0.8769	Accept

When the lag period is 1, LITR and LGDP mutually cause and effect each other; when the lag period is 2-4, LITR is the cause of LGDP granger, and LGDP is the result of LITR's granger. Therefore, it indicates that there is a long-term equilibrium relationship between international tourism income and economic development of Qingdao.

4. Conclusions and Recommendations

4.1. Conclusion

Based on the time series data of Qingdao from 1998 to 2016, this paper examines the relationship between international tourism revenue and economic growth in Qingdao. The conclusion is as follows:

The time series diagram of the two variables of international tourism income and GDP is stable, and the second-order difference is also stable, indicating that there is some stable equilibrium relationship between the two variables. The co-integration analysis shows that there is a long-term and balanced co-integration relationship between the international tourism income and the regional GDP of Qingdao. Every 1% increase in the international tourism income can boost the GDP growth by about 0.785 percentage points. This shows that the development of tourism in Qingdao, especially the development of international tourism industry, has a very obvious

pulling effect on economic growth.3. Granger causality test showed that the lag order for one year, LGDP granger reason of apparent to LITR, but when the lag order number from 2 to 4, the gradual decline in the probability of that is to say, in the long run LGDP LITR were reduced gradually, and the effect of the growth of GDP is not clearly lead to international tourism income increase. The LITR's granger reason for LGDP is obvious. At the lag order of 1 to 4, the probability increases gradually. It indicates that the increase of tourism income will promote the increase of GDP, and this probability is gradually increasing. To sum up, international tourism revenue has an obvious relationship to promote the economy.

4.2. Recommendations

To realize the coordinated development of international tourism revenue and GDP growth, we need to solve the following problems.

First, we need to find ways to expand the number of inbound tourists. Qingdao has a long history, colorful culture, exotic natural resources, a relatively safe political environment and an environment that attracts tourists. However, in recent years, some tourism resources have been destroyed to varying degrees due to various reasons, resulting in a decline in their tourism value. Therefore, on the one hand, we should pay attention to exploring traditional culture and developing tourism products; on the other hand, we should formulate relevant laws and regulations to use science, technology and means to protect tourism resources. The attraction of tourism cultural resources to inbound tourists should be enhanced, and special tourism activities should be designed to stimulate consumption and extend stay time.

Second, to establish an effective tourism supply chain model. The related industries and departments should be organically linked to ensure that tourists can achieve the maximization of utility, while at the same time making relevant industries and departments gain profits.

Third, we should intensify publicity and carry out market operation. Qingdao in order to attract more foreign tourists, tourism should further improve the quality of tourism services, increase the brand awareness of tourism enterprises, make come to Qingdao tourism of foreign tourists come to China again, make the Chinese inbound tourism potential foreign tourists to accelerate the process of travel schedule to Qingdao, and not change the direction of travel abroad.

Fourth, we should actively create an institutional environment conducive to the development of tourism economy. We will formulate policies to support the development of the international tourism industry. We will provide support in the areas of fiscal taxation, investment, land policies, and approval procedures. We should make bold innovations in the operation mode of the tourism industry and actively encourage nongovernmental forces to set up international tourism through joint ventures, cooperation, divestment, equity participation, transfer and leasing. In terms of industry management, we should continue to strengthen the implementation of service quality standards for the tourism industry and adopt uniform industry standards for management. This will help to form a fair competition market environment and promote the healthy development of tourism economy.

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