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Empirical Study of Relations Between International Tourism Consumption and Economic Growth in Shanghai

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Abstract

This paper mainly adopts quantitative analysis method. The writer conducted analysis on the relationship between the international tourism consumption and GDP of Shanghai, based on datas of GDP, international tourism consumption, capital investment and labor force in 1992-2016. The results show that the long-term equilibrium relationship exists between those designated variables. As the international tourism consumption increases by 1%, the GDP will be increased by 0.012%. At the same time, it provides some reference to develop the economic tourism.

Keywords

International tourism; economic development; Shanghai; empirical analysis.

1. Introduction

In recent years, the tourism economy of Shanghai has been growing rapidly. In 2016, the added value of the tourism industry in Shanghai reached 168.97 billion yuan, an increase of 6.9% over the previous year. It received 8,543,700 international tourist arrivals, an increase of 6.8% over the previous year. Among the international tourist arrivals, there were 6,904,300 overnight tourists, an increase of 5.6%.The foreign exchange revenue of inbound tourism totaled us $6.53 billion, up 9.6%.At the same time, tourism consumption is gradually becoming an important part of consumption demand, and the development of tourism is of great significance to promote regional economic growth.As shown in table 1, Shanghai's inbound tourism revenue accounts for an increasing proportion of GDP and plays an increasingly important role in economic growth. Therefore, it is necessary to study the relationship between inbound tourism and economic growth in Shanghai.

Table 1. The proportion of international tourism revenue in GDP in Shanghai in 2007-2016

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tourist Income (Billions of Dollars)	4.673	4.972	4.744	6.405	5.835	5.582	5.337	5.705	5.960	6.530
GDP (Billions of Yuan)	1268	1427	1528	1743	1953	2055	2225	2406	2564	2817
Interest Rate	7.81	7.30	6.84	6.83	6.62	6.30	6.29	6.14	6.23	6.64
Proportion (%)	1.4	1.54	1.51	1.46	1.71	1.98	2.12	2.51	2.54	2.88

This paper selects the time series data of Shanghai from 1992 to 2016, conducts VECM test and Granger test through unit root test and co-integration test, and investigates whether there is a long-term equilibrium relationship between international tourism and GDP in Shanghai. In

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addition, the economic growth model is built by using the Cobb-Dauglas production function to quantitatively measure the contribution of fixed asset investment, labor input and international tourism to economic growth. Based on the empirical results, this paper puts forward policies and Suggestions for the development of international tourism in Shanghai.

2. An Empirical Analysis of the Effects of Tourism on Urban Economy

2.1. Econometric Model and Method

The power of urban economic growth mainly comes from the input of various factors.According to neoclassical growth theory, economic growth depends on three factors: labor, capital and technological progress.This paper focuses on the role of Shanghai's tourism industry in economic development. Firstly, it USES the basic model of Cobb-Dauglas production function:

$$Y = A\ K\alpha\ L\beta \tag{1}$$

Based on the general model, tourism variables are added to focus on the impact of tourism on economic growth. The growth accounting equation is expanded into the following form:

$$Y = A\ T\gamma K\alpha L\beta \tag{2}$$

T is the tourism variable, and x is the industrial elasticity coefficient of tourism. Take the logarithm of both sides and get the linear model as follows:

$$\ln Y = \ln A + \gamma \ln T + \alpha \ln K + \beta \ln L \tag{3}$$

Input and output elasticity coefficients of tourism, fixed assets and labor force are respectively. The relevant variables are substituted into the above equation to obtain the urban economic growth model including tourism input, and the contribution of tourism to urban economic growth can be calculated by using this equation.

2.2. Sample Selection, Data Source and Indicator Description

In this paper, Shanghai city was taken as the research unit, samples were selected as the data interval from 1992 to 2016, and the observed values of data were 100.The model equation includes Y, T, K and L variables. The Y indicator is the GDP of Shanghai, the T indicator is represented by international tourism income, the K capital stock indicator is fixed asset investment, and the L human capital indicator is the number of labor force employment.The index data are from Shanghai statistical yearbook and China tourism statistical yearbook.

GDP: GDP is a key indicator reflecting the level of economic development, so this paper selects domestic production in Shanghai to reflect the level of economic development of Shanghai, unit: 1 billion yuan.Capital stock (fixed assets investment) : this paper adopts the fixed assets investment index of the whole society of Shanghai as the measure of capital stock, the unit is: 100 million yuan.Labor force (number of employment) : this paper adopts the number of employment in the whole society of Shanghai to reflect the amount of labor input, the unit is: ten thousand.Tourism revenue (international tourism revenue) : because this paper focuses on the study of the impact of international tourism revenue on the economy, the impact of domestic tourism revenue on economic growth is not considered here, so only the international tourism revenue index is adopted, the unit is: 100 million us dollars.

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Table 2. Data summary table

Year	GDP	INV	EM	TUR
1992	111.43	357.38	776.08	5.7936
1993	151.92	653.91	785.49	7.8769
1994	199.09	1123.29	786.04	8.5000
1995	251.81	1601.79	794.19	9.3942
1996	298.08	1952.05	764.30	11.7060
1997	346.53	1977.59	847.25	13.1698
1998	383.10	1964.83	836.21	12.1791
1999	422.23	1856.72	812.09	13.6433
2000	481.22	1869.67	673.10	16.1267
2001	525.77	1994.73	752.26	18.0771
2002	579.50	2187.06	792.04	22.7545
2003	676.24	2452.11	813.05	20.5266
2004	816.54	3084.66	836.87	30.4124
2005	936.55	3542.55	863.32	35.5588
2006	1071.80	3925.09	885.51	39.0399
2007	1268.81	4458.61	1024.33	46.7297
2008	1427.58	4829.45	1053.24	49.7172
2009	1528.56	5273.33	1064.42	47.4402
2010	1743.32	5317.67	1090.76	64.0500
2011	1953.38	5067.09	1104.33	58.3500
2012	2055.35	5254.38	1115.50	55.8200
2013	2225.77	5647.79	1137.35	53.3700
2014	2406.09	6016.43	1365.63	57.0500
2015	2564.34	6352.70	1361.51	59.6000
2016	2817.86	6755.88	1365.24	65.3000

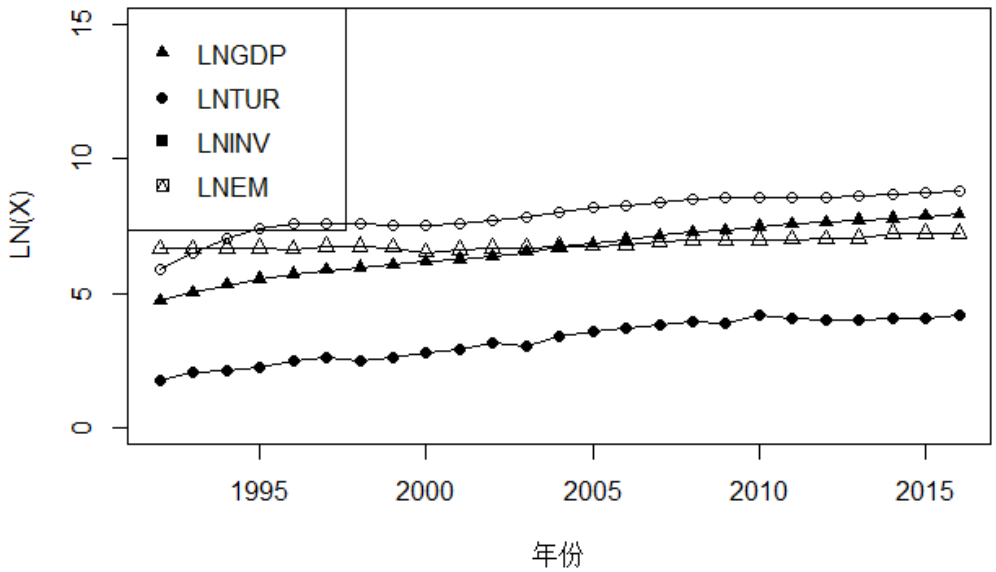

Figure 1. LNGDP, LNINV, LNEM, LNTUR Growth Trend

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Table 3. Descriptive statistics of variables

	LNGDP	LNINV	LNEM	LNTUR
Mean	6.63	7.93	6.83	3.24
Maximum	7.94	8.82	7.22	4.18
Minimum	4.71	5.88	6.64	1.76
Std. Dev.	0.95	0.74	0.21	0.78
Sum Sq. Dev.	21.60	13.18	1.02	14.62
Observations	25	25	25	25

3. Empirical Result Analysis

Table 4. Unit root test results

Variable	Test type	ADF	The critical value at the 1% significance level	The critical value at the 5% significance level	The critical value at the 10% significance level	Conclusion
LNGDP	(C,T,1)	-1.8618(0.64)	-4.428363	-3.459743	-3.024976	Non-stationary
LNINV	(C,T,2)	-2.6098(0.28)	-4.971559	-3.790814	-3.286909	Non-stationary
LNEM	(C,T,0)	-1.9466(0.60)	-4.339330	-3.587527	-3.229230	Non-stationary
LNTUR	(C,T,0)	-1.5837(0.77)	-4.339330	-3.587527	-3.229230	Non-stationary
ΔLNGDP	(C,0,0)	-3.1633* (0.04)	-3.699871	-2.976263	-2.627420	Smooth
ΔLNINV	(C,0,0)	-3.8329**(0.00)	-3.699871	-2.976263	-2.627420	Smooth
ΔLNEM	(C,0,0)	-5.1422**(0.00)	-3.699871	-2.976263	-2.627420	Smooth
ΔLNTUR	(C,0,0)	-6.0587**(0.00)	-3.699871	-2.976263	-2.627420	Smooth

(In this paper, C,T and K respectively represent the intercept term, the trend term and the lag order used.Δ said one order difference;* and ** mean that the null hypothesis of a panel unit root is rejected at the significance level of 5% and 1%, respectively, and the Numbers in brackets are p-values)

3.1. Unit Root Test

As shown in table 4 below, since LNGDP and LNINV did not pass the significance test under the ADF unit root test and contained unit root, the data of these two variables were non-stationary. In order to facilitate the co-integration test of all variables, the first-order difference was required for all variables.The results of the first difference show that all variables have passed the significance test of 5% after the first difference, thus obtaining the stationary data.So, these sequences of variables are all first-order integral sequences.

3.2. Co-Integration Test

The null hypothesis of the co-integration relationship is that there is no co-integration relationship, and if it passes the significance test (5% or 1% level), the null hypothesis is rejected, indicating that there is a co-integration relationship. In this paper, the Johnsen test and e-g test were used to test whether there was a co-integration relationship between LNGDP, LNEM, LNINV and LNTUR, and whether there was a co-integration relationship between LNGDP

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and LNTUR. The difference between the two test methods is that the Johnsen test is applicable to test the co-integration relationship between three or more variables, while the e-g test is applicable to test the co-integration relationship between two variables. As can be seen from the unit root test results in table 5, each variable is a single-order integral sequence, and the co-integration test can be continued in accordance with the requirements of the full football integration test.

3.2.1Test whether there is a co-integration relationship between LNGDP, LNEM, LNINV and LNTUR

The basic idea of the Johansen test method is to construct the product matrix of two residues in the vector auto-regression system composed of multiple variables, then calculate the ordered eigenvalues of the matrix, and then obtain a series of statistics to judge the existence of the co-integration relationship and the number of the co-integration relationship. This test method is very sensitive to the number of lag periods, so AIC criterion and SC criterion are adopted in this paper to determine the optimal lag period, that is, the order when both are the minimum values. In this paper, different lag periods are selected to estimate the VAR model. After the selection in the following table, the lag order is determined to be 4.

Table 5. VAR model lag value selection table

Lag	AIC	HQ	SC	FPE
1	-23.01190	-22.89497	-21.83560	1.151218e-10
2	-24.74122	-24.54634	-22.78072	3.600384e-11
3	-69.00632	-68.73349	-66.26162	1.685246e-29
4	-Inf*	-Inf*	-Inf*	0*

(* represents the value corresponding to the optimal number of lag periods under each index, and -inf represents negative infinity)

Since the optimal lag period of the unconstrained VAR model is 4, the lag period of the co-integration test VAR model is determined to be 3, and the test starts from the hypothesis that there is no co-integration method.In the Johansen test conducted next, the sequence is in the form of co-integration equation with intercept but no definite trend. The test results of characteristic root trace and maximum characteristic root shown by R software are shown in table 6 and table 7.

Table 6. Johansen Results of co-integration test for characteristic root trace test

The null hypothesis	Characteristics of the root	The trace statistic	The 5% threshold
None*	0.8911771	111.17	9.24
At most1*	0.7924037	62.37	19.96
At most2	O.6570626	27.78	34.91
At most3	0.1752699	4.24	53.12

Table 7. Results of Johansen co-integration test for maximum characteristic root test

The null hypothesis	Characteristics of the root	Statistic	The 5% threshold
None*	0.8911771	48.80	28.14
At most1*	0.7924037	34.59	22.00
At most2*	O.6570626	23.54	15.67
At most3	0.1752699	4.24	9.24

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The results of trace test and maximum characteristic root test show that there is a unique co-integration relationship among variables, which indicates that there is a long-term equilibrium relationship between economic aggregate, capital stock , labor force and tourism income in Shanghai during the sample period.The co-integration vectors estimated by the corresponding Johansen co-integration test are shown in table 8.Therefore, a long-term equilibrium relationship between Shanghai's economic aggregate (LNGDP), capital stock (LNINV), labor force (LNEM) and tourism income (LNTUR) is obtained:

LNGDP=12.669007+4.971035 LNINV+1.849839LNEM+2.166564LNTUR

Table 8. Co-integration vectors estimated by the Johansen co-integration test

LNGDP	LNINV	LNEM	LNTUR	Constant
1	4.971035	1.849839	2.166564	12.669007

3.2.2 Test whether there is a co-integration relationship between LNGDP and LNTUR

To test whether there is a co-integration relationship between LNGDP and LNTUR, use the e-g test.In the first step, OLS was used to regression the data and the regression equation was obtained: LNGDP=2.74089+1.19943LNTUR, where R2 =0.9737, Ad R2 =0.9725, F=850.8, P=0.00; 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 9.

Table 9. ADF unit root test results of residuals

Test type (C,T,K)	ADF	The critical value at the 1% significance level	The critical value at the 5% significance level	The critical value at the 10% significance level	Conclusion
(0,0,0)	-2.3523* (0.02)	-2.66	-1.95	-1.6	Smooth

At the significance level of 5%, the statistical value of ADF is -2.3523, less than the critical value -1.95, so the residual differential sequence is classified as a stationary sequence, rejecting the null hypothesis.This indicates that there is a co-integration relationship between LNGDP and LNTUR variables, and a long-term equilibrium relationship between LNGDP and LNTUR variables.

3.3. Error Correction Model

Through the co-integration test, it is found that there is a long-term equilibrium relationship between LNTUR and LNGDP. To make up for the deficiency of the long-term static model, we will construct a short-term dynamic model to reflect the co-integration mechanism that deviates from the long-term equilibrium.First, a model was established based on LNGDP and LNTUR to obtain the residual sequence and test whether the residual sequence was stable. Then, it was used as an error correction term and substituted into the equation to perform regression. Parameters were estimated to consider the impact of short-term fluctuations of LNTUR on short-term fluctuations of LNGDP economic growth. Let the equation be:

$$ECM = \ln GDP - \beta 0 - \beta 1 \, LNTUR \quad (4)$$

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$$\Delta \ln GDP = \lambda 1 \Delta \ln TUR + \lambda 2 ECM + \mu \quad (5)$$

In the error correction model, Δ said first order difference, difference reflects the influence of short-term volatility.Growth changes in the short term can be divided into two parts: one is the short-term fluctuations in the inputs of (Δ LNTUR);The other is the effect of deviation from long-term equilibrium.2 is the error correction coefficient, the magnitude of which reflects the magnitude of the adjustment for deviation from the long-term equilibrium.If we reject the null hypothesis of lambda two equals zero, it means that the error correction mechanism is generated, and the resulting long-term equilibrium relationship between ln TUR and ln GDP is reliable. If we cannot reject the null hypothesis of lambda two equals zero, it means that the long-term equilibrium relationship is unreliable.If we reject the null hypothesis that lambda 1 is zero, then the variable has the effect of short-term fluctuations, and vice versa.As can be seen from table 10 below, the error correction coefficient is -0.20700, and the error correction coefficient is negative, indicating the existence of a reverse error correction mechanism. The error correction term reflects the degree to which tourism and economic growth deviate from their long-term equilibrium in the short-term fluctuations, and the coefficient size reflects the adjustment to the deviation from the long-term equilibrium.The elasticity of tourism to economic growth is 0.29213, indicating that the effect of tourism on economic growth in the short term is positive.

Table 10. Effects of various variables on short-term fluctuation of LNGDP

Dependent Variable	Coefficient	T	P
Δln TUR	0.29213**	3.526	0.0020
ECM	-0.20700**	-2.895	0.0086
DW		0.66678	

3.4. Granger Causality Test

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.This paper mainly studies the relationship between tourism revenue and economic growth, so only the granger causality test analysis is conducted for LNGDP and LNTUR.First, consider that there may be a two-way relationship between inbound tourism revenue and economic growth.On the one hand, the increase of inbound tourism revenue promotes economic growth;On the other hand, the economic growth may improve the quality of tourism service and further attract the increase of inbound tourism.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 11. Results of granger causality test

Causal Direction	F	P	Conclusion
LNTUR does not Granger Cause LNGDP	4.3276	0.0499	Reject
LNGDP does not Granger Cause LNTUR	1.2759	0.2714	Accept

According to the above table, LNTUR is the cause of LNGDP granger, and LNGDP is the result of LNTUR granger.Therefore, it indicates that there is a long-term equilibrium relationship between international tourism and urban economic development in Shanghai.

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4. Conclusions and Recommendations

Based on the time series data of Shanghai from 1992 to 2016, this paper analyzes the long-term and short-term effects of economic growth and international tourism development by examining the co-integration relationship between international tourism and economic growth in Shanghai, and constructing an error correction model.At the same time, the economic growth model is also constructed by using the Cobb-Dauglas production function to quantitatively measure the contribution of capital stock, labor input and domestic tourism to regional economic growth. The following results are obtained, and policies and Suggestions are put forward according to the measurement results.

4.1. Conclusions

(1) The income from inbound tourism in Shanghai can promote the economic development:Through the analysis of regression equation for found that LNGDP = 2.74089 + 1.19943 LNTUR, R2 = 0.9737, Ad R2 = 0.9725, F = 850.8, P = 0.00, R2 tend to 1, shows that the regression equation between time data fitting degree is very good, show the growth of international tourism income indeed has positive impact on gross domestic product, the development of inbound tourism can bring vigor and motivation for economic development, LNTUR every growth unit, LNGDP increased 1.19943 units.

(2) There is a long-term equilibrium and stable relationship between inbound tourism and economic growth: through the co-integration test of time series, it shows that there is a long-term equilibrium and stable relationship between inbound tourism and economic growth.The co-integration equation confirms the positive relationship between the international tourism income and the GDP of Shanghai, which has a positive promoting effect.

(3) Causal relationship between inbound tourism and economic growth: through to the Shanghai international tourism income and granger causality analysis found between gross domestic product (GDP), tourism income of foreign exchange is the granger reason of gross domestic product (GDP), the improvement of tourism income of foreign exchange for the stimulating effect of the growth in gross domestic product (GDP) has obvious;At the same time, the increase of GDP has a certain driving effect on the growth of foreign exchange tourism income, but this growth effect is not obvious.

(4) In terms of the contribution of various factors to economic growth, the regression result of the economic growth model is LNGDP=12.669007LNINV+1.849839LNEM+2.166564LNTUR. It can be found that the elasticity coefficient of fixed asset investment reaches 4.971035, the elasticity coefficient of labor force is 1.849839, and the contribution of domestic tourism to economic growth is 2.166564.Among them, the contribution of fixed assets investment to economic growth is the largest, followed by international tourism income, and the contribution of labor input is the smallest. This is consistent with the current situation, indicating that the model is set correctly.

4.2. Recommendations

There is a long-term equilibrium relationship between the development of international tourism and economic growth, and international tourism has an important contribution to economic growth. This paper puts forward some policy Suggestions to promote the development of tourism and promote China's regional economic growth:

(1) tourism is an important part of modern services. Under the new normal of economy, tourism development and its role in economic growth should be attached importance to at the national level, and strong support should be provided in terms of planning guidance, policy support and fund guarantee.

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(2) to increase the construction of tourism infrastructure, improve the reception capacity of urban tourism, and do a good job in supporting tourism facilities, we should increase the number of star-rated hotels, provide better hardware facilities and service level, improve the public implementation of cities and scenic spots, and provide more convenient conditions for tourists.For example, the religious culture in Tibet, the ethnic customs in ningxia, the exploration of the plateau in qinghai, and the silk road in gansu are all tourism development projects with good potential.However, the regional traffic inconvenience, scenic spots are difficult to reach, there is no direct plane, road transport routes and tourist routes do not coincide, the entertainment facilities are not complete, all these greatly inhibit people to these places to go to the tourist drive.Accelerating the construction of infrastructure and improving the service industry have obvious effects on the development of local tourism and the popularity of local cultural tourism.

(3) to strengthen the supply of products and maintain the stability of relative prices, such as tickets to scenic spots and consumer prices, so as to provide tourists with more affordable consumption, so as to attract more tourists, promote the sound development of tourism, and promote regional economic growth.

(4) tourism is not only a means to increase income and foreign exchange, but also an effective form to enhance cultural influence and highlight the demeanor of our great powers.To become a big tourism country, we also need to develop a variety of tourism resources.At present, targeted tourism market segmentation is essential.In the tourism industry, such as information technology and network development closely linked to the high-tech today, purely natural scenery has less attractive to people, and the other for mice tourism, adventure travel, national scenery tourism has been on the rise, the human factors of the region, the tourism can bring consumers better shopping experience.

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