

## **An Empirical Study on Economic Growth of New Urbanization and Tourism Development**

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**Abstract :** *In recent years, the new concept of "urban tourism" has been widely proposed. This paper studies the time series data of China from 1996 to 2016 and constructs a VAR model to analyze the impact of new urbanization and tourism development on economic growth. The empirical results show that: (1) Tourism development has a significant role in promoting economic development. (2) In the short term, urbanization has not played a role in promoting economic development. However, in the long run, the development of urbanization will promote economic growth. Based on the empirical results, the following suggestions are made: Develop tourism, promote the process of urbanization and economic development, and formulate the plan of "Urbanization of Tourism and Tourism to Towns".*

**Key words :** *New urbanization, tourism development, VAR model, impulse response function*

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### **I. Introduction**

Urbanization is the biggest potential domestic demand and lasting growth driver in the development of contemporary China's economy. It is also a new engine for building an upgraded version of China's economy. Tourism is an important part of the modern service industry and has become a strategic pillar industry supporting the development of China's national economy. International development experience shows that the development of urbanization will bring "golden opportunities" to the development of tourism, and tourism development can provide industrial support and employment for urbanization and promote the development of urbanization.

With regard to the relationship between tourism and economic growth, domestic and foreign scholars have conducted a lot of research. Foreign scholars have basically reached a consistent conclusion through different empirical methods and analysis of specific situations in different countries. That is, tourism promotes economic growth and it is a causal relationship between each other[1-3]. However, some scholars have studied the relevant data in South Korea and found that economic growth is the cause of Granger in tourism development. In the long term, tourism cannot promote economic growth[4]. Besides, domestic scholars have also conducted a lot of research on this issue. Kuizao Dai[5], Wenwen Tu and Junwen Feng[6], Changsheng Liu and Yufeng Jian[7] used time series to study and found that there is a long-term equilibrium and two-way causal relationship between economic growth and tourism development in China. However, the contribution of tourism development to economic growth is less than the contribution of economic growth to tourism development. However, Siwei Liu and Zhongcai Wu's research shows that there is only a one-way causal relationship between regional economic growth and domestic tourism income[8]. Wu Guoxin[9] studied the correlation between tourism development and China's economic growth through quantitative analysis, then empirically tested its effects on economic growth, found that tourism can promote economic growth, and pointed out that it is necessary to vigorously develop tourism so that it becomes China's new economic growth point. With regard to the relationship between tourism and economic growth, there are also some research findings. Qingjie Zhang[10] selected indicators that represent the level of urbanization and economic growth, and evaluated China's urbanization level and economic growth in a comprehensive evaluation method. The result shows that China's urbanization level and economic growth have good coordination from 1995 to 2011. Han Yan[11] established a co-integration model and concluded that there is a significant positive correlation between the level of urbanization in China and regional economic growth, and there is a long-term stable co-integration relationship between them. Youzhi Zhang[12] used the co-integration analysis and the Granger causality test to analyze the dynamic relationship between urbanization and economic growth in China. They all believe that there is a long-term equilibrium relationship between the level of urbanization in China and economic growth.

To sum up, most scholars only think that tourism or urbanization can promote economic development from a single perspective. Few scholars also consider the impact of new urbanization and tourism development on economic growth. Therefore, based on the data from 1996 to 2016, this paper first constructs a theoretical model,

and then constructs a VAR model to consider the impact of new urbanization and tourism development levels on economic growth. This study has certain practical significance for tourism development and economic development.

The software used in this article is R.

1 Theoretical model, variable selection and data processing

### 1.1 Theoretical model

In order to measure the impact of tourism development on economic growth in the context of “tourism urbanization and urban tourism”, we draw on the research ideas of Zhang Min[13] to base the traditional Cobb-Douglas production function. Above, after adding the level of urbanization and tourism development as its input elements, the model is as follows:

$$Y_t = AU_t^\mu K_t^\alpha L_t^\beta T_t^\gamma$$

In the formula,  $A$  denotes the efficiency parameter, which depends on the combined effects of various factors,  $K_t$  denotes capital,  $L_t$  denotes labor, and  $\alpha$  and  $\beta$  denote elastic coefficients of capital and labor share, respectively. What's more,  $U_t$  and  $T_t$  represent the indicators of urbanization and tourism development, respectively and  $\mu$  and  $\gamma$  represent the coefficient of elasticity of output of urbanization and tourism development, respectively.

After obtaining logarithm on both sides of this function, the linear model is obtained:

$$\ln Y_t = \ln A + \alpha \ln K_t + \beta \ln L_t + \mu \ln U_t + \gamma \ln T_t$$

In the formula, let  $c = \ln A$ , and after embodying each variable, we obtain an empirical analysis of the measurement model:

$$\ln GDP_t = c + \alpha \ln K_t + \beta \ln L_t + \mu \ln U_t + \gamma \ln T_t + \varepsilon_t$$

Among them:  $GDP_t$  represents per capita real GDP,  $K_t$  represents material capital investment,  $L_t$  represents labor input,  $U_t$  represents urbanization level, and  $T_t$  represents tourism development level. At the same time, the coefficients  $\alpha$ 、 $\beta$ 、 $\mu$ 、 $\gamma$  represent the elasticity coefficient of capital investment, labor input, new urbanization level, and tourism development level respectively.

### 1.2 Variable selection

Since the reform and opening up, China's urbanization has experienced a low and rapid development process. From the Northam curve, we can see that the three phases of urbanization are 30% and 70%. When the urbanization rate is 30%, the acceleration of urbanization gradually increases and the speed is greatly increased [14]. As can be seen from Figure 1, in the process of urbanization in China, it reached 30.48% in 1996, and this is an inflection point. Since 1996, urbanization has accelerated. Considering the availability of data, this paper is based on the data from 1996-2016 in the "China Statistical Yearbook" and the "Compilation of New China's 60 Year Statistics."

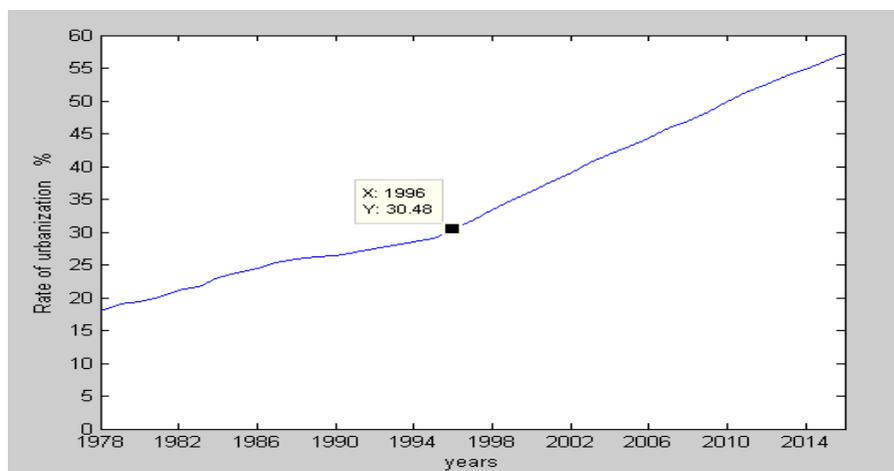


Figure 1 Changes in urbanization development

Generally speaking, economic growth can be expressed in terms of the increase in the total value of national output. Taking into account the population and price factors, the per capita nominal GDP can no longer represent economic growth. Therefore, the average per capita real GDP is used as an index to measure China's economic growth, denoted as  $GDP_t$ . Both endogenous growth theory and classical growth theory emphasize the role of material capital for economic growth. Due to the difficulty of data acquisition, this article uses the total social fixed asset investment to represent the material capital input, denoted as  $K_t$ .

Using the number of employed labor force in the current year to measure labor input, it is recorded as  $L_t$ . At present, most scholars use a single indicator and a composite indicator method to use urbanization indicators. Among them, the composite index approach takes into account the complex persistence in the process of urbanization, but it is relatively arbitrary in the selection of indicators. The single index method, that is, the urbanization rate index, is the most commonly used ratio of urban population to the total population, which is concise and clear [15]. Therefore, the use of urbanization rate as an indicator to measure the level of new urbanization in this paper is more scientific, which is recorded as  $U_t$ . Both urbanization and tourism development interact economically. In previous studies, most scholars used tourism revenues, employees, and tourism companies as interpretive indicators. However, employees and tourism companies have a strong correlation with tourism revenue and will ultimately be reflected by tourism revenue. The total tourism income measures the scale and level of tourism development, including the two parts of international tourism foreign exchange revenue (recorded as  $IR_t$ ) and total domestic tourism expenditure ( $TR_t$ ), denoted as  $T_t$ . In order to eliminate the possible heteroscedasticity of the time series, the author performed a natural logarithmic transformation on the data, and the logarithmic transformation will not change the co-integration relationship of the original time series.  $\ln T$ ,  $\ln U$  and  $\ln GDP$  are the natural logarithm values of actual tourism revenue, urbanization rate, and actual per capita GDP, respectively.

### 1.3 data processing

First, deal with total tourism income. Collecting the RMB-US dollar exchange rate from 1996 to 2016, we use the direct quotation method:  $IR_t' = IR_t * (\text{RMB to USD exchange rate})$  and convert the foreign exchange revenue of tourism into foreign exchange income in RMB (recorded as  $IR_t'$ ). Second, taking into account that the per capita GDP, international tourism foreign exchange revenue, and total domestic tourism spending in the statistical yearbook are nominal values, the effect of changes in the price level has not been removed, and the true situation of the economy cannot be faithfully reflected. Therefore, using the consumer price index (reported as  $CPI_t$ ) and the per capita GDP index ( $GDPI_t$ ) of the period 1996-2016, the respective actual values were obtained (based on 1996 as the base period during the conversion process) [16]. The specific conversion process is as follows:

$$actualTR_t = (nameTR_t / CPI_t) * 100$$

$$GDPI_t' = (GDPI_t / GDPI_{1996}) * 100$$

$$actualIR_t' = (nameIR_t' / CPI_t) * 100$$

$$actualGDP_t = nameGDP_{1996} * GDPI_t' / 100$$

$$T_t = IR_t' + TR_t'$$

2 Empirical test

## II. Time Series Analysis Based On VAR Model

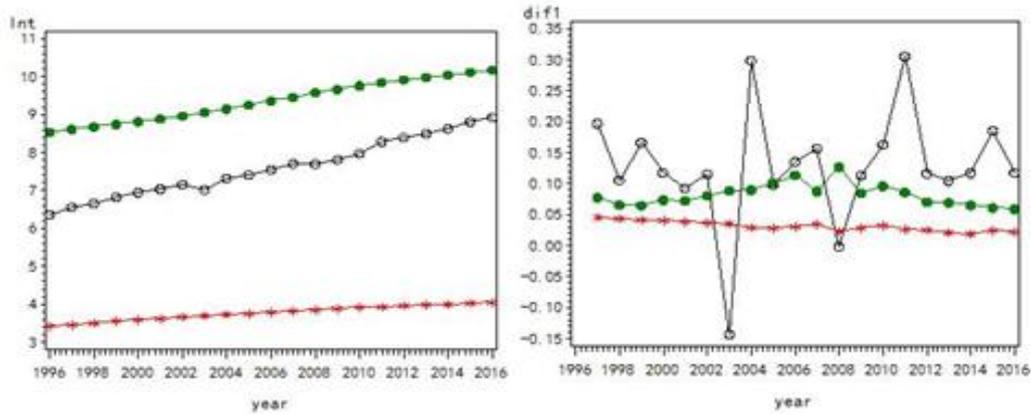


Figure 2 timing diagram Figure 3 Differential sequence diagram

1) Stability test. From Figures 2 and 3, it can be seen that  $\ln T$ ,  $\ln U$ , and  $\ln GDP$  have a common upward trend in the 1996-2016 interval, and the upward trend of  $\ln T$  is more pronounced. However, all three sequences showed a steady growth trend and showed non-stationary. To begin with, in order to eliminate common trends, the variables are processed differentially. As shown in figure 3, the observations of the second-order differential series of the variables fluctuate around the zero-mean value, and the amplitude variation is not sharp. So the second-order difference sequence may be a stationary sequence. If it is stable, further unit root tests are required. Furthermore, it's necessary to use the ADF test in the unit root test to test the smoothness of the data by R. The test results are shown in Table 1. From Table 1, we can see that at the 5% level of significance,  $\ln T$ ,  $\ln U$  and  $\ln GDP$  are non-stationary time series, and  $D^2 \ln T$ ,  $D^2 \ln U$  and  $D^2 \ln GDP$  are stationary time series. Under this condition, we can carry out the next test to verify the long-term co-integration relationship between stationary sequences.

Table 1 Results of ADF unit root test of variables

Variable	Test form	ADF statistics	1% threshold	5% threshold	10% threshold	Conclusion
$\ln T$	(C,T,0)	-1.5817	-4.38	-3.60	-3.24	Non-stationary
$\ln U$	(C,T,2)	-1.8627	-4.38	-3.60	-3.24	Non-stationary
$\ln GDP$	(C,T,1)	-1.644	-4.38	-3.60	-3.24	Non-stationary
$D^2 \ln T$	(C,T,1)	-4.617	-4.38	-3.60	-3.24	smooth
$D^2 \ln U$	(C,T,1)	-5.4715	-4.38	-3.60	-3.24	smooth
$D^2 \ln GDP$	(C,T,1)	-5.1657	-4.38	-3.60	-3.24	smooth

According to the results in Table 1,  $\ln T$ ,  $\ln U$  and  $\ln GDP$  have 1%, 5%, and 10% significance level, the sequence is not stable, but the second-order difference rejects the null hypothesis that there is no unit root. In a word, all variables are second-order single integer sequences that satisfy the conditions of the co-integration test. That is, the sequences are all monotonous to the second order.

2) Co-integration test. Since all variables are second-order monotonic and are non-stationary time series, there may be a co-integration relationship between the variables. A co-integration test is required to determine whether there is a long-term stable co-integration relationship among variables. The E-G test is used here.

First, use OLS to estimate the regression equations for  $\ln GDP$  and  $\ln T$  and  $\ln U$ . The results are as follows:

$$\ln GDP = 3.4915 + 0.1073 \ln U + 0.8325 \ln T$$

(1.575) (-0.094) (2.885)

$$R^2 = 0.9159 \quad R^2_{adjust} = 0.9066$$

$$DW = 1.0265 \quad F = 3.835$$

Then, the ADF test is performed on the residual sequence of this equation. The results are shown in Table 2.

Table 2 Residual sequence unit root test result

Variable	Test form	ADF statistics	1% threshold	5% threshold	10% threshold	Conclusion
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residual	(C,T,0)	-2.6616	-2.66	-1.95	-1.6	smooth
Vresidual	(C,T,1)	-2.0553	-2.66	-1.95	-1.6	smooth

From the table, it can be seen that at the 1% significance level, the ADF value of residual is less than the critical value, and the ADF value of Vresidual is greater than the critical value. Therefore, choosing residual to measure smoothness is more appropriate. In conclusion, at the 1% level of significance, the series of regression residuals of per capita real GDP, total tourism income, and urbanization rate are zero-ordered and it's are written as:  $residual_t \sim I(0)$ .

This shows that there is a co-integration relationship between the three, and growth or reduction has a synergistic effect for them. The coefficient of regression estimation in the above equation shows that the goodness of fit is high and the overall explanatory power is strong. The regression coefficients determine the elasticity between the per capita real GDP, the urbanization rate, and the total tourism income respectively. That is, when the urbanization rate is assumed to be constant, the per capita real GDP will increase by 0.8325 percentage point for each additional 1 percentage point; When the level of development is unchanged, the per capita real GDP will increase by 0.1073 percentage points for every one percentage point increase. Therefore, in the process of urbanization, China must also do a good job in the construction of tourism.

### 3) VAR model

VAR model can be used to test the short-term dynamic interaction mechanism, which is an extension of the autoregressive model. Its focus is more on the relationship between variables and the lagged structure of variables. Before building a VAR model, determine the model's lag order. The lag order of the model refers to the most reasonable model used to evaluate how many lag orders are established. And then, the results of the lag order are shown in Table 3.

Table 3 Lag results

Lag	AIC	HQ	SC	FPE
1	-1.948659e+01	-1.976021e+01	-1.905252e+01	3.823940e-09
2	-1.949717e+01	-1.997600e+01	-1.873755e+01	6.821969e-09*
3	NaN	NaN	NaN	-7.576201e-41*

The above information criterion shows that it is more reasonable to select a VAR model whose lag order is second order. After determining the optimal lag order we can fit the model:

$$\begin{bmatrix} \ln T \\ \ln U \\ \ln GDP \end{bmatrix} = \begin{bmatrix} 0.5931708 & -0.7698682 & 0.8528764 \\ -0.0007700332 & 0.9355797231 & 0.0099106280 \\ 0.7589308 & -0.8378200 & 0.40288859 \end{bmatrix} \begin{bmatrix} \ln T(-1) \\ \ln U(-1) \\ \ln GDP(-1) \end{bmatrix} + \begin{bmatrix} -1.8663365 \\ 0.1871521497 \\ 3.1323776 \end{bmatrix}$$

From the model, urbanization, total tourism revenue and per capita real GDP are not only related to their own lag-phase variables, but also related to the lag phase of the remaining variables.

### 4) Granger causality test

The results of the co-integration test can indicate whether there is a long-run equilibrium between variables, and whether such long-term equilibrium constitutes a causal relationship still needs further verification. This paper takes a lag period of 2 for a Granger causality test to verify the causality between  $\ln T$ 、 $\ln U$  and  $\ln GDP$ . The test results are shown in Table 4.

Table 4 Granger causality test table

Null hypothesis	F value	P value	Conclusion
$\ln T$ is not a Granger cause of $\ln U$	0.8453	0.3707	accept
$\ln U$ is not a Granger cause of $\ln T$	0.2994	0.5914	accept
$\ln U$ is not a Granger cause of $\ln GDP$	1.0059	0.3299	accept
$\ln GDP$ is not a Granger cause of $\ln U$	3.2062	0.06156	accept
$\ln T$ is not a Granger cause of $\ln GDP$	5.2801	0.03453	refuse
$\ln GDP$ is not a Granger cause of $\ln T$	4.2956	0.04715	refuse

Granger causality test results show that there is a two-way causal relationship between  $\ln T$  and  $\ln GDP$  at the 5% significance level. Besides, there is no one-way causal relationship between any two, indicating that in the long-term equilibrium relationship, it is mainly reflected in Tourism and GDP per capita promote each other and develop each other. For the level of urbanization, it shows that it can not play a direct role in the development of tourism and per capita GDP growth, but can only play an indirect role.

5) Impulse response function

The Granger test explores the existence of causal flow between variables in a certain direction from the perspective of statistical significance. The impulse response function can express the economic significance contained in the vector autoregressive (VAR) model more completely and finely.

First, give an impact on  $\ln T$  and  $\ln U$ , observe the response of b. The result of it is shown in figure 5、

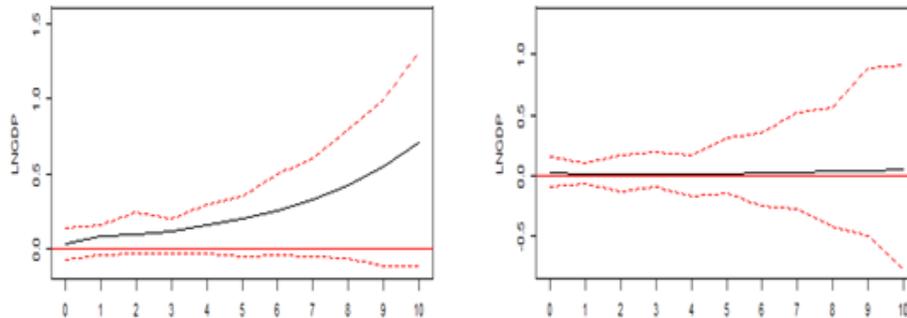


Figure5 the response of Figure6The response of  $\ln GDP$  under  $\ln T$   $\ln U$  under  $\ln GDP$

Figure 5 shows how the level of economic development responds to the level of tourism development after applying a positive impact to  $\ln T$ . Since the first period, it has been a positive response, indicating that tourism development has a significant role in promoting economic development throughout the period.

With the increase in the income level of urban and rural residents and the improvement of the quality of life, tourism consumption is expected to be greatly released, the scale of tourism participants will expand rapidly, and the scale of tourism industry will continue to expand. According to the forecast of the World Tourism Organization, by 2020, China will become the world's largest tourism destination, and total tourism revenue will account for 8% of GDP, and there is a large room for growth in the future. In 2017, at the 22nd General Assembly of the United Nations World Tourism Organization, Jinping Xi emphasized that China attaches great importance to the development of tourism, and tourism has contributed more than 10% to China's economy and employment. This shows that the country's emphasis on tourism.

Figure 6 shows how the economic development level responds to urbanization after applying a positive impact to  $\ln U$ . Starting from the first period, the trend gradually tended to be zero. By the fifth period, it began to respond positively, indicating that in the short term, urbanization did not play a role in promoting economic development, but in the long term, the development of urbanization was related to GDP per capita. There are still promoting effects, but the effect is not obvious. We can think that urbanization and economy are not causal, and they are phased relationships.

According to China's current economic development status, China is still a developing country. The process of urbanization has not enabled a large number of rural people to successfully gather in cities and towns to develop tertiary industries so that the rural population is still very large. What's more, it's not particularly significant that the urban rate has only a positive effect on economic growth, which is only 0.1073 percentage points, but it still has a positive impact on economic development and has a correlation. This connection is mainly driven by the globalization process, marketization reform, and monetization process, which have driven the economic growth in China. Specifically, during the process of urbanization, a large number of rural populations flooded into towns and cities, demanding more urban infrastructure construction; the loosening of the household registration system caused the flow of labor from agriculture to industry and commerce, and increased structural efficiency, scale effect, and division of labor efficiency; China's manufacturing and export trade markets have expanded, and China's industrialization, urbanization, and economic growth have produced synergies. After the first period, the trend tends to be 0, and there are volatility. The main reasons are: First, the household registration system still has some problems. Because the floating population does not have an urban household registration, it cannot enjoy basic urban public services linked to household registration, such as basic social insurance, minimum living guarantees, which forces migrants to increase their savings as a means of personal life protection, thus saving the residents' savings. Second, in the process of urbanization in China, a large number of rural residents have flown

into the cities, and the total factor productivity has weakened. China's total factor productivity reached its fastest annual average growth rate in 2009, and it subsequently experienced a significant decline.

### 3 Conclusion

Using the data from 1996 to 2016, this paper uses the VAR model to empirically study the relationship between new urbanization, tourism development, and economic growth in China, and draws the following conclusions: (1) There is a co-integration relationship between per capita real GDP, total tourism income, and urbanization rate, that is, a long-term equilibrium relationship. (2) Granger causality analysis shows that tourism development is the Granger cause of economic growth, and economic growth is also the Granger cause of tourism development. (3) The analysis of the impulse response function shows that in the short term, urbanization has not played a role in promoting economic development. However, in the long run, the development of urbanization still has an effect on per capita GDP, but the effect is not obvious. And tourism development has a significant role in promoting economic development.

According to the research conclusions, some suggestions can be given: (1) Develop tourism, promote urbanization and economic development. From the impulse response function, we can see that in the long term, tourism development has a positive and significant driving effect on economic development. Therefore, while our country is vigorously developing tourism, we must promote the development of urbanization and tourism development in a coordinated manner. (2) Formulate the plan of "Urbanization of Tourism and Tourism to Towns". On the one hand, the sustained and rapid growth of the tourism industry has led to the upgrading of the market structure, industrial structure, cultural structure, and consumption structure of cities and towns, which can fully exert the agglomeration effect and provide a significant impetus for the development of urbanization. On the other hand, the development of tourism can create a large number of jobs for the development of urbanization and promote the process of urbanization.

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