Asian Business Research; Vol. 7, No. 2, 2022
ISSN 2424-8479 E-ISSN 2424-8983
Published by July Press

Research on the Restoration and Development of Tourism According to the Characteristics of Rural and Urban Groups --- Based on Cointegration and Error Correction Model

Yaning Sun[1]

[1] Tianjin University of Commerce, Tianjin, China

Correspondence: Yaning Sun, Tianjin University of Commerce, Guangrong Road, Beichen District, Tianjin, China. E-mail: 2839419655@qq.com

Received: February 25, 2022 Accepted: March 22, 2022 Online Published: March 29, 2022

doi:10.20849/abr.v7i2.1058 URL: https://doi.org/10.20849/abr.v7i2.1058

Abstract

With the further establishment of the scientific development concept of "green water and green mountains are golden mountains and silver mountains", tourism has become an important part of the tertiary industry and an important way for urban development, poverty alleviation and prosperity. It is known as the "sunrise industry". During the epidemic period, even if the tourism industry and its related catering and accommodation fields are greatly impacted, the tertiary industry is still the driving force for maintaining local macroeconomic stability in all regions of China and the key to the victory of the "battle against poverty". Based on the modeling of non-stationary time series, this paper establishes cointegration and error correction models for the relationship between urban and rural residents' domestic tourism consumption, residents' income and social security, in order to put forward reasonable suggestions and measures on how to restore tourism in different regions after the epidemic. The innovation of this paper is to compare rural areas with urban areas, and explore and analyze the different effects and paths of influencing factors. The conclusion of this paper is that for urban residents, the policy of increasing residents' income or reducing personal tax to increase disposable income can better stimulate urban residents' tourism consumption, while residents in rural areas pay more attention to social welfare and security, Therefore, the economic recovery of tourism in the later stage of the epidemic should be developed according to local conditions and different consumer groups.

Keywords: tourism, resident, income, social security, cointegration model, error correction model

1. Introduction

According to the data released by the Ministry of culture and tourism of China, the number of domestic tourists in 2019 was 6.006 billion, an increase of 8.4% over the same period in 2018; The comprehensive contribution of tourism to GDP exceeded 10 trillion yuan, with a contribution rate of 11.05%. Among them, urban residents spent 4.75 trillion yuan, an increase of 10.5% over the same period in 2018; Rural residents spent 0.97 trillion yuan. Although their consumption was less than that of urban residents, it increased by 12.1% over the same period. It can be seen that tourism revenue contributed greatly to the macro-economy and continued to grow in the early stage of the epidemic, but the consumption and growth contribution rate of tourism in cities and towns and rural areas were different. In recent years, with the economic development, the proportion of cultural tourism consumption in residents' consumption expenditure has increased year by year, and the correlation between the income of cultural tourism industry and the level of economic development has become increasingly prominent. After 2020, due to the impact of epidemic prevention measures such as "local Chinese New Year" and "travel restriction order" during the epidemic period, the national tourism consumption in 2020 was less than 2.5 trillion yuan, of which the tourism consumption of urban residents fell to 1.8 trillion yuan, down 62.1% from that before the epidemic; The total tourism consumption of rural residents was 0.43 trillion yuan, down 53.6% from the previous year, which shows that the epidemic has a great impact on the national tourism industry. In the late 2021, with the improvement of the epidemic situation and the deepening commercialization of line cultural tourism related products, the tourism industry recovered to a certain extent, but it has not yet returned to the consumption level before the epidemic. Therefore, based on the time series model, this paper studies the relationship between urban and rural residents' domestic tourism consumption, residents' income and social security, which has practical reference significance for the further recovery and development of National

Tourism in the later stage of epidemic control.

In the research of foreign scholars, the relationship between the two is mainly based on the tourism oriented growth hypothesis (Chatziantoniou, I., Filis, G., Eeckels, B., et al., 2013) and the economic driven tourism growth hypothesis (Narayan, P. K., 2004), as well as the causal relationship between them (Durbarry, R., 2004; Tang, C. H., & Jang, S. C., 2009). Domestic researchers, such as he Manxi (2010), Zuo Bing (2002), Tao Jinlong (2004) Li Ying, Bao Jigang (2007), etc., have used regional panel data or time series data to establish different models to study the relationship between tourism and economic growth. After 2020, the research on the relationship between tourism and residents' income is not correct. For example, Lu Dongning and Zheng Jiangwei (2020) studied the impact of residents' income and tourism in Yan'an area by using the error correction model, believing that they interact and have a long-term equilibrium relationship, while Long Wei (2021) only studied the unilateral positive impact of tourism development on rural residents' income. The above scholars have studied the relationship between tourism and macro-economy through different models and angles, which provides a reference theoretical basis for this paper. The deficiency of the above research results is that there is no classified discussion for rural and urban residents. Therefore, based on the data of economic development and tourism from 994 to 2018, taking the consumption and income of rural and urban residents as the starting point, this paper establishes cointegration and error correction models respectively, which is of theoretical significance to enrich the relevant theoretical content of this topic. This paper avoids the problems of inconsistent caliber of macroeconomic data such as GDP and GNP, inaccurate description of problems and large correlation between variables. Using subregional data can explore the differences of influence paths of various factors. At the same time, combined with the economic reality of this year, explore the importance of economic policies to the recovery of domestic tourism consumption, add social security factors, and reflect the impact of social welfare and security on the recovery of tourism industry.

2. Establishment of Urban and Rural Tourism Consumption Model

2.1 Modeling Principle of Cointegration and Error Correction

In 1987, Engle and Granger published a paper "cointegration and error correction model", the concept of "cointegration" is put forward for the first time (Engle, R. F. & Granger, C. W. J., 1987). This paper provides a scientific principle of how to model the case of long-term equilibrium relationship in non-stationary time series data. Engle Granger defines cointegration as: if the time series under consideration(Represented by vector $x_t = (x_{1t}, x_{2t}, \cdots, x_{nt})'$). Having the same single integer order: d-order single integer. There is some kind of linear combination β(Cointegration vector). The single integral order of the linear combination of sequences is reduced to $d-b(b>0)$, is recorded as $x_t \sim CI(d,b)$, represents the vector $x_t = (x_{1t}, x_{2t}, \cdots, x_{nt})'$is a cointegration of order d,b. For economic variables, it is often a first-order single integer, so the case of $CI(1,1)$ is often used to study economic problems. Then, in 1990, Lee and Granger extended the definition of original cointegration: "the single integration order of a single variable is the same" to the allowable vector x_t to be single integer of order l in $x_{1t}, x_{2t}, \cdots, x_{kt}$, the vector $x_{kt}, x_{k+1t}, \cdots, x_{nt}$ is a k-order single integer. If there is β_1 make $\beta_1 * (x_{1t}, x_{2t}, \cdots, x_{kt})$ a single integer of order d, then there may still be a linear combination βx_t is cointegrated.

After discovering the long-term equilibrium relationship between variables, an error correction model is derived based on the principle of dhsy model proposed by Davidson, Hendry, SRBA and Yeo in 1978 (Abbreviated as ECM): by incorporating the correction items obtained from the long-term equilibrium relationship into the model, a short-term model is established together with other explanatory variables reflecting short-term fluctuations, so as to analyze how the variables respond to short-term fluctuations and adjust to achieve long-term equilibrium. Generally, the ECM model is expressed in the form of vectors commonly used in the model involving n variables. The general form of ECM model is:

$$\Delta x_t = \pi_0 + \pi x_{t-1} + \pi_1 \Delta x_{t-1} + \pi_2 \Delta x_{t-2} + \cdots + \pi_p \Delta x_{t-p} + \varepsilon_t \quad (2\text{-}1)$$

π_0 is $n \times 1$ intercept term column vector; x_{t-1} indicates an amendment; π $n \times n$-order coefficient matrix and non-zero matrix; Otherwise, the correction item does not exist; π_i is the $n \times n$-order coefficient matrix corresponding to each lag term Δx_{t-i}; Random interference term of model ε_t is the column vector,and its stationarity is determined by d,b in the cointegration relationship $CI(d,b)$.

The test of the model is mainly divided into two methods: Engle Granger two-step method and Johansen

cointegration test, Because this paper explores the relationship between tourism, residents' income and social security, and does not preset the Granger Engle relationship between variables, Johansen cointegration test method suitable for estimating system model is selected. According to formula 2-1, the test of cointegration relationship is related to the rank of coefficient matrix π and the characteristic root. Based on this, the principle of Johansen cointegration test is combined with the idea of DF unit root test. In the DF test, pay attention to whether the $a_1 - 1$ contained in $\Delta y_t = (a_1 - 1)y_{t-1} + \theta_t$ is significantly 0, expand it into the form of vector, that is, rewrite formula 2-1 as:

$$\Delta x_t = \pi_0 + (A - I)x_{t-1} + \pi_1 \Delta x_{t-1} + \pi_2 \Delta x_{t-2} + \cdots + \pi_p \Delta x_{t-p} + \varepsilon_t \quad (2\text{-}2)$$

A is $n \times n$-order parameter matrix, here $\pi = A - I$; If $rank(A - I) = 0$, that is, if all characteristic roots are 0, equation 2-2 (2-1) is no longer an error correction model, but transformed into a VAR model, that is, there is no linear combination to make the process $\{x_{it}\}$ stable. Let there be a cointegration vector to make the non-stationary process have a stable long-term equilibrium relationship, then if $rank(A - I) = 1$, then the rank of matrix π is 1, it shows that there is only one cointegration vector in the matrix; If $1 < rank(A - I) < n$, then there are multiple cointegration vectors in the matrix π; If $1 < rank(A - I) = n$ then the vector process is stable. Therefore, by testing non-zero eigenvalues λ_i, the number of I can test the number of cointegration vectors. On this basis, important statistics in cointegration test are constructed:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} ln\left(1 - \hat{\lambda}_i\right)$$

$$\lambda_{max}(r, r+1) = -Tln\left(1 - \hat{\lambda}_{r+1}\right)$$

$\lambda_{trace}(r)$ is used to test whether the number of cointegration vectors is less than or equal to r, if the original hypothesis is rejected, it is necessary to make $ln\left(1 - \hat{\lambda}_i\right)$ less than 0, the greater the absolute value of $\sum_{i=r+1}^{n} ln\left(1 - \hat{\lambda}_i\right)$, the greater the calculated value of $\lambda_{trace}(r)$. λ_{max} is used to test whether the number of cointegration vectors is equal to r. if you want to reject the original hypothesis and choose the alternative hypothesis, if you think the number of cointegration vectors is $r + 1$, you need to make λ_{max} value is greater than its critical value.

For the problem of whether there is a linear time trend in the original sequence generation process, Johansen cointegration test can deal with the existence of intercept term or drift term in the cointegration vector through constraints. In formula 2-3:

$$\Delta x_t = A_0 + (A_1 - I)x_{t-1} + \pi_1 \Delta x_{t-1} + \pi_2 \Delta x_{t-2} + \cdots + \pi_p \Delta x_{t-p} + \varepsilon_t \quad (2\text{-}3)$$

After adding an unconstrained intercept term, use $n \times 1$ −order constant vector A_0 means; Use $\hat{\lambda}_i$ represents the characteristic root under unconstrained conditions. $\hat{\lambda}_i^{\ *}$ represents the characteristic root under constraints, that is all elements a_{i0} in A_0 can be incorporated into matrix π to form matrix π^*, then Construction Statistics: $-T \sum_{i=r+1}^{n} \left[\ln\left(1 - \hat{\lambda}_i^{\ *}\right) - ln\left(1 - \hat{\lambda}_i\right)\right] \sim \chi^2(n - r)$. It can be concluded that if the constraint condition is true, the value of the statistic is less than its critical value. Therefore, according to the different conditions of Johansen cointegration test selected in Eviews 10, the specific form of matrix π in the error correction model can be determined.

2.2 Establishment of Tourism Consumption Model for Urban and Rural Residents

2.2.1 Establishment of Tourism Consumption Model

By reading relevant research literature, the per capita disposable income of urban and rural residents is selected from economic variables and recorded as: $urbany, villagey$; The average social security level enjoyed by residents in the two regions is expressed by social security expenditure, which is recorded assi; The per capita

domestic tourism consumption expenditure of urban and rural residents is recorded as urban and rural, and the tourism consumption model is as follows:

$$lnuc(lnvc) = f(lnuy(lnvy), lnsi)$$

$lnuc(lnvc) = \log(urbanc(villagec)), lnuy(lnvy) = \log(urbany(villagey)),\ lnsi = \log(si).$

2.2.2 Data Selection and Processing

This paper selects the data time period as the relevant national statistical yearbook data from 1994 to 2018 in the early stage of the epidemic. Since the tourism revenue before 1994 was not divided by region, the data before that year were not selected; Social security expenditure is not listed according to urban and rural sub regions in the statistical yearbook, so the national average level represents the level of social security benefits enjoyed by residents in the two regions. Logarithmically process the data to reduce the order of magnitude, and the forms of $D(ln\gamma)$ appears below are the first-order difference in the logarithmic form of the corresponding variables.

3. Establishment of Cointegration and Error Correction Model

3.1 Unit Root Test of Variables

China's economic variables and their related variables show a non-stationary trend due to the rapid economic development. The traditional OLS estimation is no longer suitable for the estimation and test of long-term non-stationary models. Dickey Fuller (ADF) is used to test the stationarity of each variable under different conditions after the first-order difference processing:

Table 1. Unit root test results

	Level		1 st	
	None	Constant	None	Constant
lnuc	6.598	0.182	-1.500	-4.721*
lnvc	3.955	-2.247	-2.454**	-3.423**
lvuy	3.498	0.314	-1.906	-4.072*
lnvy	3.164	0.227	-0.203**	-3.078**
Lnsi	18.439	-0.954	-0.693	-4.148*

Note: * and * * represent significance levels of 1% and 5% respectively; "ln" represents logarithm; Data range: 1994-2018. The critical value formula is given through the ADF test table: $C(\alpha) = \varphi_\infty + \varphi_1 T^{-1} + \varphi_2 T^{-2}$, Where T is the sample size (t = 23 in this paper), which is calculated at the significance level α= At 1%, $C_1(0.01)$=-2.671 for no intercept item and no trend item, $C_1(0.05)$=-1.956; $C_2(0.01)$=-3.7486, $C_2(0.05)$=-2.997 with constant term without trend term. ADF test is the left test, so the conclusion in Table 1 is obtained.

3.2 Johansen Cointegration Test

Under the nonstationary time series model, Granger Engle causality estimation may lose its significance. Meanwhile, in the estimation of system cointegration by multivariable equation, Johansen cointegration test is better than Engle Granger two-step method, so causality test is no longer done.

Firstly, $VAR_u(p), VAR_v(p)$models are established for$lnuc(lnvc), lnuy(lnvy)$and $lnsi$ in urban and rural areas respectively. According to the critical values of AIC, SC, HQ and other test values at the significance level of 5%, $VAR_u(p)$ model selections lag order 3, For the selection of lag order of $VAR_v(p)$, although the optimal lag order is 4, considering the trade-off between the length of lag time and insufficient sample size, lag order 3 is still selected.

The results obtained by Johansen cointegration test are shown in Table 2. Under the significance level of 5%, there are three cointegration relationships between urban areas. Due to the insufficient sample size, two cointegration relationships are selected to be considered when establishing ECM model.

Table 1. Johansen cointegration test results (City)

Eigenvalue	Trace-Statitic	0.05 Critical Value	Prob(0.05)	Hypothesized No.of CE(s)
0.600	39.819	29.797	0.003	None
0.511	19.665	15.495	0.011	At most 1
0.163	3.918	3.841	0.048	At most 2

Table 2. Johansen cointegration test results (village)

Eigenvalue	Trace-Statitic	0.05 Critical Value	Prob(0.05)	Hypothesized No.of CE(s)
0.951	83.511	29.797	0.000	None
0.542	17.219	15.495	0.027	At most 1
0.001	0.023	3.841	0.879	At most 2

As shown in the results in Table 3: under the significance level of 5%, there are two cointegration relationships among rural areas. The standardized coefficient of cointegration relationship between the two regions is extracted as follows:

$$lnuc = 0.78lnuy + 0.435lnsi - 5.121C$$
$$(t = -41.929), (t = 87.626)$$
$$lnvc = 0.609lnvy + 0.356lnsi - 4.394C$$
$$(t = -43.885), (t = 47.620)$$

Thus, for every 1% increase in the per capita disposable income of urban residents, the tourism consumption of urban residents will increase by 0.78%, while for every 1% increase in the per capita disposable income of rural residents, the tourism consumption of residents will increase by 0.609%. According to the data of the National Bureau of statistics, in 2018, the per capita disposable income of residents nationwide was 28228 yuan, an actual increase of 6.5% over the previous year. Among them, the per capita disposable income of urban residents increased by 5.6% and that of rural residents by 6.6%. However, the contribution rate of urban domestic tourism consumption growth is greater than that of rural areas. Combined with the actual situation, the value of the coefficient is objective.

In the research on the impact of social security expenditure on tourism consumption level, there are few relevant literature, and social statistics can not directly explain the problem. However, scholars He Wei (2017) and Shen Yan (2012) have discussed the relationship between social security and economic growth and verified that there is a positive impact between them. Scholars Liu Lingling and Xu Lei (2012) used the panel cointegration relationship to explore the relationship between social security expenditure and consumption in the central and western regions, and concluded that social security expenditure can stimulate consumption, but its contribution rate is less than the impact of economic growth on Residents' consumption. At the same time, due to different levels of development, the contribution rate of social security expenditure to consumption is also different in different regions. The above research conclusions of scholars can provide ideas for this analysis:

For every 1% increase in social security expenditure in urban areas, residents' tourism consumption expenditure increases by 0.435%, while for every 1% increase in social security expenditure in rural areas, residents' tourism consumption expenditure increases by 0.356%. The elasticity coefficients of the two regions are different, indicating that the stimulating effect of social security on tourism consumption is different in different environments. Combined with the actual situation of rural development, the current minimum living security system in rural areas is not perfect, and the coverage is not wide. Among them, the number and proportion of old-age insurance and unemployment insurance are lower than those in cities. Even if the increase of social security expenditure is the same as that of cities, it still can not meet the needs of old-age care, which will affect the cross period distribution of disposable income of rural residents. Rural residents tend to consume less than urban residents and are more inclined to save.

3.3 Error Correction Model

In order to study the changes and adjustments of tourism consumption in urban and rural areas to short-term fluctuations, an error correction model is established to maintain the consistency with the cointegration equation. Two cointegration relationships are selected, and the error correction model in the form of intercept term:

Equation1: VECM model output results (city)

$$d(lnuc) = 0.676ecm11_{t-1} - 3.419ecm12_{t-1} + 4.544d(lnuy_{t-1}) - 2.006d(lnuy_{t-2}) - 11.003$$

4.238	-2.907	2.596	-1.748
(0.159)	(1.176)	(1.750)	(1.147)

Ajusted $R-squared = 0.991238$, S. E. of regression $= 0.105609$, $F-statist = 415.8193$,

$AIC = -1.412$, $SC = -1.067$, $HQ = -1.325$.

Equation 2: VECM model output results (village)

$$d(lnvc) = 0.581ecm21_{t-1} + 0.346ecm22_{t-1} + 2.331d(lnsi_{t-1}) - 1.528d(lnsi_{t-2}) + 0.077$$

3.180	0.290	2.320	-1.779
(0.182)	(1.160)	(1.005)	(0.859)

Ajusted $R-squared = 0.983537$, S. E. of regression $= 0.130468$, $F-statistic = 220.0555$,

$AIC = -0.989585$, $SC = -0.644000$, $HQ = -0.902672$. The value without () in the above formula is the value of T, and () is the corresponding standard error.

It can be analyzed from the output results that under the confidence level of 1%, the deviation of urban residents' domestic tourism consumption expenditure from the long-term equilibrium of $lnuc$ and $lnuy$ has a positive adjustment. There is a negative adjustment to the long-term equilibrium relationship between $lnuy$ and $lnsi$, and the adjustment range is greater than the previous cointegration relationship. When the growth of urban residents' per capita disposable income is out of proportion to the level of social security, it will inhibit the consumption of urban residents in domestic tourism. Therefore, the growth of residents' per capita disposable income and social security need to develop in coordination. At the same time, in the VECM model, the lag term of social security level is not included in the model, indicating that the current impact of social security level is stronger.

For rural areas, under the confidence level of 1%, the deviation of domestic tourism consumption expenditure of rural residents from the long-term equilibrium of lnvc and lnvy also has a positive adjustment, but the adjustment intensity is weaker than that of urban residents, indicating that rural residents are less sensitive to the deviation of disposable income. In the rural VECM model, the lag period of disposable income is not included, which shows that the impact of social security factors is large in the adjustment process of rural residents' tourism consumption, which reflects the differences between the two regions.

The fitting of the two region error correction model is given in Figure 1 and Figure 2. It shows that the estimation coefficient in the error correction model can scientifically explain the actual situation of tourism consumption of urban and rural residents. The above analysis can draw reasonable suggestions for restoring the development of tourism after the epidemic.

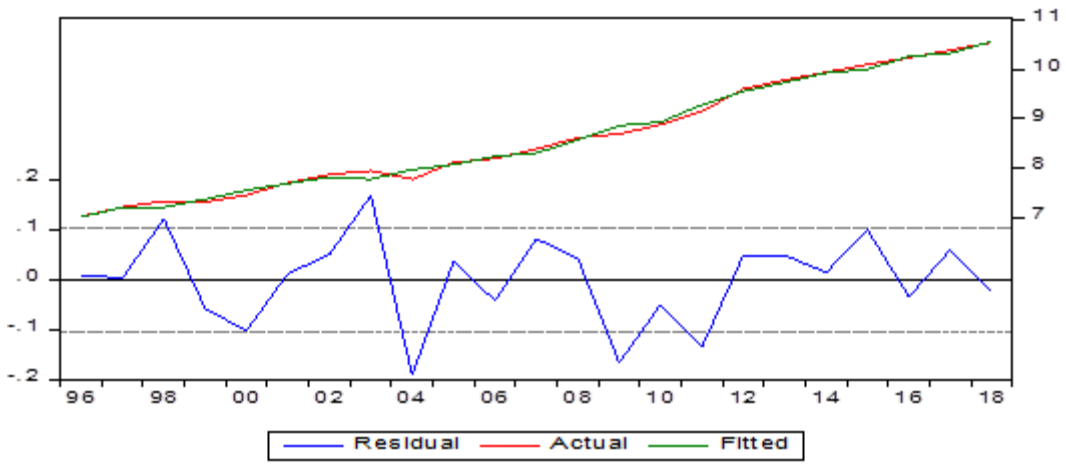

Figure 1. VECM model fitting diagram (city)

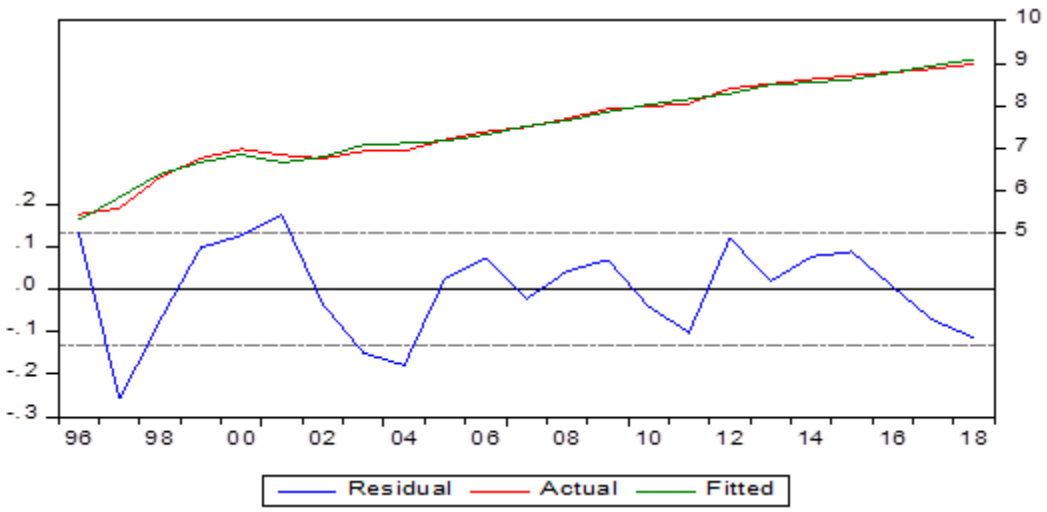

Figure 2. VECM model fitting diagram (village)

3.4 Impulse Response Between Variables

For VECM model, lutkepohl and Reimers pointed out in 1992 that VECM model can also use impulse response function and variance decomposition to analyze the dynamic characteristics and influence path between variables (Helmut, L., Hans-Eggert, R., & Helmut, L., 1992).

As shown in Figure 3 and Figure 4, the disposable income of urban residents has a long-term impact on their tourism consumption, which began to decline after the eighth period, but the response of tourism consumption to the disposable income of urban residents in the first two periods is unstable, indicating that the pulling effect of economic development on Tourism can not be significantly reflected in the short term, but has the characteristics of time lag. The domestic tourism consumption expenditure of urban residents has a positive response to their social security level only from phase 2 to phase 3, and the duration is short, indicating that for urban residents, the change of social security level can not significantly adjust their tourism consumption expenditure, which is consistent with the conclusion of VECM model.

For rural residents, the result of impulse response is just the opposite. The impact of per capita disposable income of rural residents has only a short impact in the second period, and begins to decline after the third period. The tourism expenditure is more sensitive to the change of social security level, and continues to decline gradually after the fourth period, indicating that the tourism consumption expenditure of rural residents is more impacted by the change of social security level, which is consistent with the conclusion of VECM model.

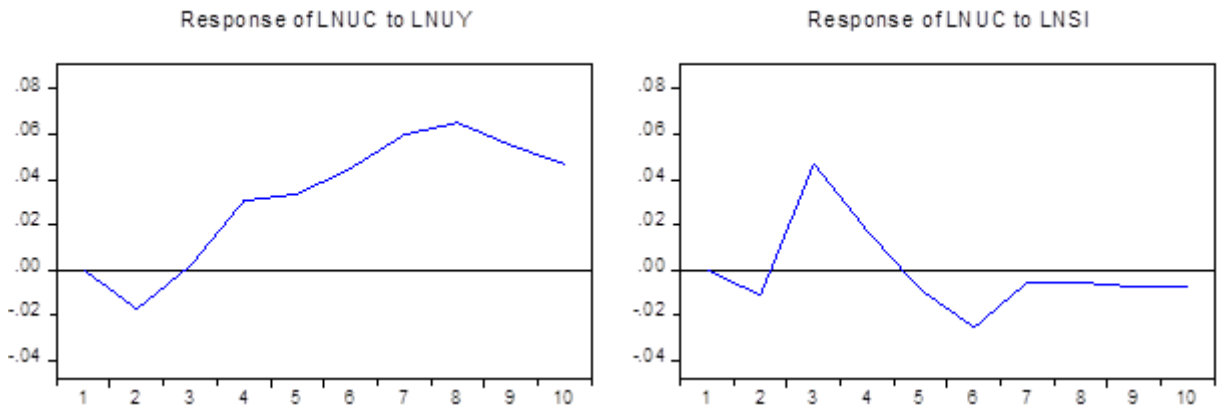

Figure 3. Response of LNUC to LNUY and LNSI

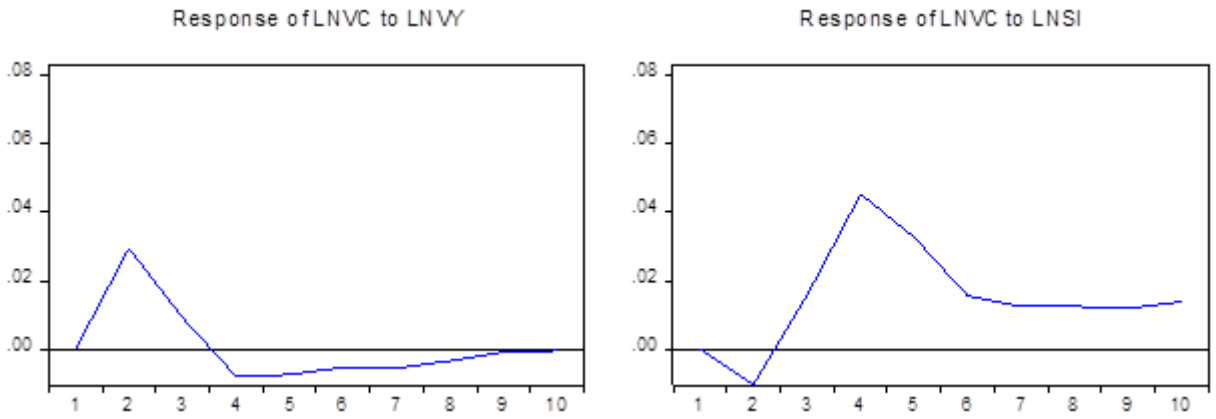

Figure 4. Response of LNVC to LNVY and LNSI

4. Conclusion

Through the establishment of Cointegration and error correction model, this paper explores the relationship between domestic tourism consumption expenditure of urban and rural residents and residents' income and social security level. Through the process of model establishment, estimation and test, this paper explores the differences of changes and impacts of tourism consumption expenditure in two different regions, and draws the following conclusions:

After the epidemic situation has recovered after 2020, the state has issued plans to stimulate economic recovery and industrial recovery in different cities. This article has mentioned that the tourism industry was greatly impacted during the epidemic, but the recovery policy did not take into account the different ideas of urban and rural residents on consumption distribution in the same city. For urban residents, we should reduce individual year-old taxes through resumption of work, resumption of production and independent entrepreneurship, which can gradually restore the disposable income of urban residents to the pre epidemic level. At the same time, we can promote their consumption of tourism activities by launching cultural tourism activities to stimulate demand.

For rural residents, only stimulating demand and increasing their income through online and offline agricultural assistance activities can not play a significant positive role in stimulating tourism consumption expenditure. Due to the imperfect rural social security system and the large number of low-income people, rural areas have great demand for social security and social welfare. Rural residents pay more attention to social security, social welfare and social relief after the epidemic, such as unemployment, pension and subsistence allowances after the epidemic. Therefore, for rural residents, in addition to continuing to carry out activities to help agriculture, poverty alleviation and increase their disposable income, we should pay more attention to the future life and employment security of rural residents, and introduce policies related to social security and public services after the epidemic, so as to make the policy with the fundamental purpose of increasing residents' disposable income play its efficiency and role.

References

Chatziantoniou, I., Filis, G., Eeckels, B., *et al.*. (2013). Oil prices, tourism income and economic growth:a structural VAR approach for European Mediterranean countries. *Tourism Management, 36*(3), 331.

Durbarry, R. (2004). Tourism and economic growth: the case of Mauritius. *Tourism Economics*, *10*(4), 389.

Engle, R. F. & Granger, C. W. J. (1987). Co-integration and error-correction: Representation, estimation and testing. *Econometrica*, *55*(4), 251-276.

He, M. X. (2010). Study on the correlation between tourism economy and GDP. Ecological economy, (8), 34-37.

He, W. (2017). Research on the impact of social security on economic growth. *Labor Security World*, (35), 8-12.

Helmut, L., Hans-Eggert, R., & Helmut, L. (1992). Impulse response analysis of cointegrated systems. *Journal of Economic Dynamics & Control*, *16*(1), 53-78.

Liu, L.-L., & Xu, L. (2012). Study on regional differences of social security expenditure, economic growth and

residents' consumption. *Population and Economy*, (3), 70-76.

Long, W. (2021). *Research on the impact of tourism development on rural residents' income.* Inner Mongolia Autonomous Region: Inner Mongolia Agricultural University.

Lu, D.-N., & Zheng, J.-W. (2020). Study on the impact of tourism development on Residents' income based on VECM -- a case study of Yan'an City. *Xinjiang Agricultural Reclamation Economy*, (11), 78-85.

Narayan, P. K. (2004). Fiji's tourism demand: the ARDL approach to cointegration. *Tourism Economics, 10*(2), 193.

Shen, Y. (2012). The impact of social security on human capital and its economic growth -- Based on China's data from 1989 to 2008. *Social Security Research,* (4), 69-76.

Tang, C. H., & Jang, S. C. (2009). The tourism-economy causality in the United States: a sub-industry level examination. *Tourism Management, 30*(4), 553.

Tao, J.-L., Yuan, Y.-Z., & He, H.-T. (2004). Empirical Analysis on the economic pull effect of tourism in Suzhou. *Social scientist*, (9), 99-105.

Zuo, B. (2002). Preliminary calculation of China's tourism output multiplier and employment multiplier. *Journal of Yunnan University of Finance and Trade, 18*(6), 30-34.

Zuo, B., Li, Y., & Bao, J.-G. (2007). Study on Tourism National Income and its initial distribution pattern -- a case study of Hunan Province. *Journal of Tourism, 22*(1), 10-14.