Research Journal of Applied Sciences, Engineering and Technology 5(14): 3704-3709, 2013
DOI:10.19026/rjaset.5.4512
ISSN: 2040-7459; e-ISSN: 2040-7467

Submitted: July 27, 2012 Accepted: September 17, 2012 Published: April 20, 2013

Research Article

An Empirical Research on the Development of Eco-tourism Based on Convergence Theory in China

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Abstract: In this study, we analyze the development experience of eco-tourism in different regions of china to find the common regional convergence which is checked with ADF test and co-integration relations. In our results, we could contribute as theoretical foundation for regional development of eco- tourism in China. Meanwhile, the research result of convergence of regional eco-agricultural tourism in China could also contribute as the theoretical foundation for the policymaker.

Keywords: Convergence theory, eco- tourism, empirical research

INTRODUCTION

The research on the development of eco-tourism has become more popular in recent years. Today, the scientific development views for the eco-tourism are profound in the connotation where there are rich in their contents to deal with development of eco-tourism and the development characteristics. The regional convergence of development of eco-tourism in China has brought about the new development views of being people-oriented, overall coordination and sustainable development, which is a great change of our way of thinking. Nowadays, with the rapid development of China's eco-tourism, many Science and Technology Parks linked with the eco-tourism combining tourism, as well as, the popular science, leisure and vacation are being established in many regions with developed economy, such as the eastern region of China. In order to boost the regional eco-tourism and to promote the economic development for the region(especially, the developing region of China) with rich eco-tourism resources. These Macro-economic theories enlighten us on regional research of eco- tourism in China and lead a new thinking for quantitative research of tourism management. Eco-agricultural tourism, as one of the kinds of "back to nature", becomes more and more popular. There are two means to apply theories said above to research on eco- tourism: one is Income return of eco-tourism based on cross section data (including panel data), the other one is analysis based on time series data. The former is to judge whether the eco-agricultural tourism of different countries (regions) converges (including absolute convergence and relative convergence) based on income return ratio of eco-agricultural tourism with growth rate of eco-agricultural tourism the DV, Income of eco-agricultural tourism and other CV the IV. The latter is based on the relationship shown by time series of eco-agricultural tourism income in different countries (regions), to judge whether the difference of eco-agricultural tourism income between different countries (regions) will disappear in a long time by single root and co-integration test and then confirm the convergence and common trend of tourism development between different countries. Meanwhile, the advantage of the method of income return is that it can determine whether there is convergence and further provide evidence support, from significance of CV, for research on determinant of tourism development and its disadvantage is that it can't tell intermediate states between convergence and non convergence, which is the problem time series method will solve. However, many researches show that there could be transitional component for income series of eco- tourism, which will reduce the test power of time series method. This study applies time series method, which was adapted by Bernard and Durlarf to research on economy growth, to study the convergence of regional eco-tourism in China. Miller and Russek (2000) have a research of the co integration and error correction models: the temporal causality between government taxes and spending. Dickey and Fuller (2001) have a research of the likelihood ratio statistics for autoregressive time series with a unit root. Johansen and Juselius (2002) analyze the maximum likelihood estimation and inference on co integration with application to the demand for money. Hall (2004) give the testing for a unit root in time series with pretest data-based model selection. Johansen (2007) give a statistical analysis of co integration faction, journal of economic dynamics and control. Li and Zi (2009) study the comprehensive analysis of the relationship between ecotourism and regional sustainable development in China.

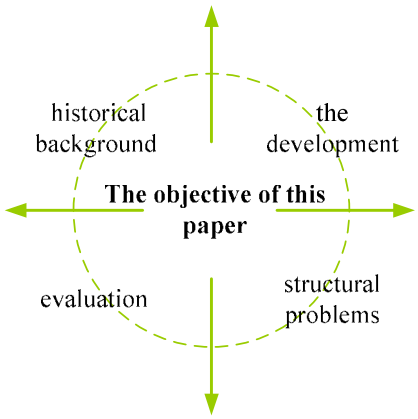

Fig. 1: The objective of this paper

The objective of this study is to approach the case of China's eco-tourism by addressing various aspects as follows: first of all, the study will provide a historical background of eco-tourism development, as well as addressing the process of tourism development after independence (post-1960s). Second, the study will focus on the development of eco-tourism in China in comparison to that of the other country. Third, an evaluation of governmental institutions in respect of the China situation forms the fundamental part of this study due to their major role in development in general and tourism in particular. Finally, the analysis of the structural problems of the eco-tourism sector, in respect of government policy and planning, uses an institutional approach based on the belief that the institutional framework affects growth because it is integral to the amount spent on both the cost of transactions and the cost of transformation (in the production process) (Fig. 1).

On this study, we discussed the eco-tourism and its development characteristics in China in terms of eco-tourism circle, which is established commonly by China. Finally, we thought that developing eco-tourism is the best way of searching the balance between the utilizing resources and protecting environment.

LITRATURE REVIEW

The convergence of the theoretical basis of economic growth is mainly from the neoclassical growth theory; therefore, the academic research on this field is mainly based on the β convergence. The other methods of measure and decomposition also include the Gini coefficient, coefficient of variation, Theil index, Atkinson index and Kernel estimated amount. In terms of convergence of the test results on the regional economy in China, most scholars did not believe that unconditional convergence of the global should exist, but there is conditional convergence. Some scholars believed that the phenomenon of club convergence should exist. Phased view, the relatively fast convergence of regional per capita GDP growth was in 1978-1985, while the regional per capita GDP growth of 1986-1995 did not exist a significant convergence. This definition, which is adopted in his study published several years ago, promoted economic, environmental and socio-cultural enhancement, together with the eco-tourism and thus moves beyond the status quo connotations of Brundtland. In addition, Weaver also identified costs and benefits that are relatively context-dependent, this definition also embraced and continued with idea of sustainability as an adaptive paradigm with "strong" and "weak" manifestations about the eco-tourism. The former, for example, employ the indicators and thresholds which are suitable for ecologically vulnerable settings in different regions, while the latter can be applied to indicators and thresholds for appropriating for urban and other highly modified settings involved in ecotourism.

The construed and explicit support for sustainability of ecotourism, however, is almost universal within the tourism industry. "Sustainable tourism" or its variants with convergence of regional eco-agricultural tourism are now neo-normative phenomena embedded in numerous corporate mission statements, codes of ethics, destination planning strategies and organizational structures.

Thus, all researches above were proposed to analysis the eco-tourism and its development characteristics, which can provide the base for this study.

METHODOLOGY

In order to research the regional convergence of eco-agricultural tourism, combined with the hypothesis that series of output per capita contains linear deterministic trends and stochastic trends by Bernard and Durlarf, definitions of regional convergence and common trend of eco-agricultural tourism are shown below:

Convergence: for time series y_{pt} of eco-agricultural tourism income in p = 1, 2, …, n countries (regions), If

$$\lim_{k \to \infty} E(y_{1,t+k} - y_{p,t+k} \mid I_t) = 0$$

$$\forall P \neq 1 \qquad (1)$$

I_t Means the information base at t

Then, the eco-agricultural tourism development in these p countries (regions) is convergent. Convergence, in economic sense, means when time tends to infinity,

the expectation value of difference between regional eco-agricultural tourism incomes is 0. Convergence requires there are p-1 co integration relations in *p* time series and co integration vector should be [1, -1] technically. Furthermore, if time series of eco-agricultural tourism trends smoothly, every country (region) has the same time trend.

Common trend: for time series y_{pt} of eco-agricultural tourism income in p = 1, 2, …, n countries (regions),

$$If \lim E(y_{1,t+k} - \alpha_p \bar{y}_{t+k} \mid I_t) = 0\, k \to \infty \qquad (2)$$

$\bar{y}_t[y_{2,t}, \ldots, y_{pt}]$, I_t means the information base at t

Then, these p countries (regions) have the common trend in eco-agricultural tourism. Common trend, in economic sense, means the expected value of regional eco-agricultural tourism income changes proportionally at t. Common trend requires there are $r(0<r<p-1)$ co integration relations, effected by p–r common shock and co integration vector should be $[1, -\alpha]$.

The definitions above show that the key for research on convergence of regional eco-agricultural tourism is to determine the co integration relation of the eco-agricultural tourism income series in these countries (regions). When r, the number of co integration relations of eco-agricultural tourism income series, is equal to p–1, there is convergence between the eco-agricultural tourism developments in different countries (regions). When r is less than p–1, there is no convergence and are p–r common trends.

The common method for co integration test is the maximum likelihood method and the model shown as below:

$$\Delta Y_t = \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{q-1} \Delta Y_{t-q+1} + \prod Y_{t-q} + \varphi D_t + U_t \qquad (3)$$

In the equation, Y_t means a vector including *p* number of I(1), the time series variable, Δ means first difference, $\Gamma_1, \Gamma_2, \ldots, \Gamma_{q-1}$ means $p \times p$ Coefficient matrix, *q* means lag order, D_t means determined variable I(0), U_t means vector white noise, $\prod$ means Compressed matrix.

According to the test principle raised by Johan son, the key point to determine the co-integration relation between variables is r in compressed matrix $\prod$ in Eq. (3). Therefore, the below Track Statistics could be made:

$$\eta_r = -T \sum_{i=r+1}^{p} \ln(1-\lambda_i)\ r = 0, 1, \ldots, p-1 \qquad (4)$$

In this equation, p means the number of time series variable in vector Y_t, T means sample size, λ_i means the largest characteristics root at the *i* step, *r* means the number of assumptive co integration relations, range [0, p–1].

If there are r co integration relations in this group of time series and the Alternative hypothesis is there are p co integration relations, which means Y_t is Stationary process. The test method is, give r = 0, 1, …, p–1 according to equation (3) and (4) and then to get the corresponding Statistics η_r, until the first indistinctive η_r comes up, then the *r* is the number of co integration relations in this group of vector. As the test result is sensitive to lag order q, q will be determined with Akaike and Schwarz principle in this study.

RESULT ANALYSIS

Based on the definition and method above, the convergence of regional eco-agricultural tourism in China is investigated by single root and co integration test of regional eco-agricultural tourism income in each province in China. According to Bernard's research in 1991, the transitional component in variable time series has very little negative effect on the result when sample number is large enough. This study adopts sample period from 1988 to 2007 to enlarge sample size and then to increase the test power of time series method. As the common method of reference material, regional eco-agricultural tourism income approximately reflects the level of eco-agricultural tourism development in the region in the sample period. The basic data is from Statistical Yearbook of China and Chongqing, Hainan and Xizang are not included because the data in these regions are incomplete. So the final sample includes 28 provinces. Furthermore, co integration test is made for the series of eco-agricultural tourism income of every province and the eastern region, central region and western region to determine the convergence of eco-agricultural tourism in this province and then sum up the eco-agricultural tourism income in each region and then get arithmetic mean values.

ADF test: ADF test can be used to determine the stability of the series of GDP per capita in each province and region and the result is shown as in Table 1.

In Table 1, the east, the middle and the west means the logarithmic series of eco-agricultural tourism income in each province in each region. And c in test type mean a constant item, t means time item, q means lag order, which is selected under AIC and SC principle. For significant level of 5% and 1% is -3.508

Table 1: Test on the time series of eco-agricultural tourism development

The East		The West		The Middle		Between the Regions	
η Statisti-cs	r Assu-mption Value	η Statisti-cs	r Assu-mption Value	η Statistic-s	r Assu-mption value	η Statistic-s	r Assu-mption value
938.261	None * *	689.20	None * *	582.71	None * *	54.64	None * *
684.91	≤1 * *	457.77	≤1 * *	408.73	≤1 * *	76.89	≤1
539.87	≤2 * *	317.92	≤2 * *	279.53	≤2 * *	4.16	≤2
419.16	≤3 * *	196.07	≤3 * *	166.81	≤3 * *		
303.11	≤4 * *	112.93	≤4 * *	118.83	≤4 * *		
225.76	≤5 * *	52.96	≤5 * *	74.33	≤5 * *		
52.95	≤6 * *	20.51	≤6 *	42.43	≤6		
96.45	≤7 * *	0.92	≤7	22.13	≤7		
52.22	≤8 * *			7.57	≤8		
18.39	≤9 *						
0.93	≤10						

* and **: Mean there is no hypothesis for the result is apparently above 1% and 5% and the lag order is determined by AIC and SC principle. "Statistical Yearbook of China", published by the State Statistical Bureau

Table 2: Test for co integration relationship of eco- tourism in China

	ADF statistics	First difference ADF statistics	Test type (c t q)	Conclusion
Beijing	-1.856	-5.065	(c t 3)	I(1)
Tianjin	-1.585	-5.912	(c t 2)	I(1)
Hebei	-1 .124	-6.767	(c 0 3)	I(1)
Guangdong	-1.041	-4.839	(c t 2)	I(1)
Shangdong	-2.260	-4.906	(c t 3)	I(1)
Fujian	-0.618	-4.811	(c t 4)	I(1)
Zhejiang	-0.737	-5.038	(c t 3)	I(1)
Jiangsu	-1.922	-5.085	(c t 3)	I(1)
Shanghai	-2.241	-6.314	(c t 2)	I(1)
Liaoning	-1.712	-5.295	(c t 3)	I(1)
Guangxi	-1.258	-4.196	(c t 3)	I(1)
Sichuan	-2.145	-4.136	(c t 3)	I(1)
Guizhou	-1.443	-4.801	(c t 4)	I(1)
Yunnan	-0.971	-5.251	(c t 4)	I(1)
Shaanxi	-1.404	-4.815	(c t 4)	I(1)
Gansu	-3.057	-6.945	(c t 2)	I(1)
Qinghai	-1.712	-4.251	(c t 4)	I(1)
Ningxia	-1.661	-5.716	(c t 3)	I(1)
Xinjiang	-0.533	-4.872	(c t 3)	I(1)
Shanxi	-0.726	-6.288	(c t 3)	I(1)
Mongolia	-0.859	-5.083	(c t 4)	I(1)
Jilin	-0.522	-5.779	(c t 3)	I(1)
Helongjiang	-1.056	-6.076	(c t 3)	I(1)
Anhui	-0.227	-5.508	(c t 4)	I(1)
Jiangxi	-0.421	-4.364	(c t 3)	I(1)
Henan	-1.745	-5.287	(c t 3)	I(1)
Hubei	-0.826	-6.276	(c t 4)	I(1)
Huinan	-0.384	-7.062	(c 0 3)	I(1)
The East	-1.051	-5.016	(c t 3)	I(1)
The Middle	-0.658	-5.483	(c t 3)	I(1)
The West	-0.486	-6.207	(c t 3)	I(1)

"Statistical Yearbook of China", published by the State Statistical Bureau

and -4.1670. Figure 1 shows that the ADF statistics of eco-agricultural tourism income in each province are all more than 1%, the significant level critical value and the First difference ADF statistics are all less than 1% (the ADF statistics of Sichuan is more than 1% but less than 5%), which means the series of eco-agricultural tourism income in each province is first order I(1) series.

Test of co integration relation: If time series are stable in the same order, the co integration likelihood ratio of coefficient matrix (LR) by can be applied to determine whether these two time series have co integration relationship in a long time. The fundamental principle is to adopt the VAR (Vector Auto regression) model of likelihood including first difference lag order of related variables and standard value, shown as Eq. (3).

The convergence and common trend of economy growth in and between different regions can be determined by equation 4 by Johansson and the definition by Bernard and Durlarf, through calculating the characteristics root of a matrix in different cyclamate number. Comparing the statistics value and critical value

of max and trace of the Eigen value to determine whether there is long term co integration relation. Hypothesizing that the two variables don't have co integration relationship, if the statistics value is more than the critical value, then the hypothesis is false and the two have co integration relationship. Test result is shown as Table 2.

Table 2 shows that, for the East, when r = 10, the first indistinctive track statistics comes out, which means the number of the co integration of the series of eco-agricultural tourism income in the 11 provinces in the east, r = p–1. According to the research of Bernard and Durlarf, eco-agricultural tourism in the east has the long-term trend of convergence. The West has the similar situation, with r<p–1 = 8, which shows that eco-agricultural tourism in the west has the long-term trend of convergence too. The test for the co integration of the series of eco-agricultural tourism income in the east, west and middle shows that there is only one co integration relationship, which means there is no convergence between the eco-tourism developments in these three regions. Each region will be affected with common shock in the long term.

RECOMMENDATIONS

The proposition that eco-tourism is converging towards SMT (at least where conditions of sufficient demand and socio-economic stability in regional economy are satisfied) through evolutionary means is likely to attract controversy if only because of the long held association in some academic circles between eco-tourism and unsustainability. As in most related discourses on the between the eco-development in these three regions of China, however, the focal issue will revolve around what is meant by “convergence”. There are compelling reasons, as presented, to believe that convergence of eco-tourism in China and their destinations will continue to move in the direction, thus, though for the foreseeable future in an evolutionary context of pragmatic operational environmentalism that reflects growth-friendly paradigm nudge rather than growth-hostile paradigm shift.

Meanwhile, even if this is sufficient to resolve “sustainability and convergence” issues of eco-tourism developments in China, such as congestion or waste management, the global “volume perspective” issue of climate change remains a complex, existential and impending threat that many will argue can only be addressed through a transformational approach entailing radical institutional and societal innovation for eco-tourism developments, including possibly the rejection of long-haul travel habits. The debate over what can legitimately be designated as “sustainable and unconvergence” then perhaps is reduced to respective support for evolution or revolution depending on how critical this issue, in particular, is deemed to be. In favor of the evolutionary approach, increased demand for air travel, as discussed above, must be assessed against reductions in per capita emissions and the increased adoption of carbon footprint mitigation strategies, which is harmful for the long-term trend of convergence in terms of eco-tourism in China. Meaningful assessments of tourism-related consumption, in addition, should take into account the resources that would otherwise be consumed if these travelers remained at home.

In this study, the subsequent identification of three convergent developmental trajectories has diverse management implications depending on whether the post-CAT evolutionary impulse is initially dominated by considerations of growth (organic), regulation (incremental), or both together (induced) for the convergence between the eco-tourism developments in these three regions of China. The dynamics of community, however, are illustrative. In the induced path, community is initially and intentionally displaced, requiring subsequently that it be reinvented with a new and larger population. Therefore, the integrity of community is inadvertently eroded in the organic path, which is requiring reinvigoration in the rejuvenation stage. Community in the incremental path for the development of eco-tourism in China is empowered and then reinforced through continual adaptation for additional growth. Reinvention, reinvigoration and reinforcement each requires distinct management strategies proceeding from the respective initial positioning of community as destroyed, weakened, or preserved. Induced displacement, for example, may be “softened” through policies that give these residents priority access to employment and training in the new growth pole in studying the convergence between the eco-tourism developments in these three regions of China, whilst incremental reinforcement might involve access to new technologies and intermediaries to cope with increased visitation levels in terms of convergence between the eco-tourism developments in these three regions of China.

Therefore, the magnitude of destination usually envisioned by the induced path to convergence between the eco-tourism developments in these three regions of China and the dramatic actions required to acquire and prepare the designated area, are such that is a relatively rare option. East and West of China, host are the likely regional venues for future development convergence between the eco-tourism developments which is given by so much growth in their domestic, inbound and

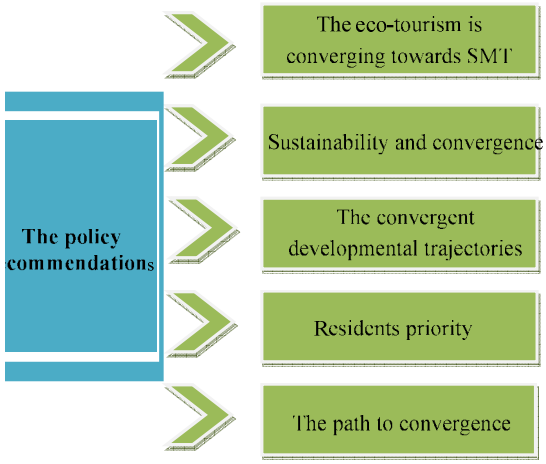

Fig. 2: The policy recommendations for the eco-development in these three regions of China

outbound tourist flows and relatively authoritarian governments willing and able to enforce domestic population transfers in different regions of eco-tourism. The likelihood of multiple mega-developments in China is high given its recent tourism performance in terms of convergence between the eco-tourism developments in these three regions of China. Existing induced resort destinations may accordingly face greater competition than originally anticipated, possibly distracting from exemplary convergence and sustainability between the eco-tourism developments in China (Fig. 2).

CONCLUSION

There are a lot of research materials for the regional eco-tourism in China, but none is by the method of time series. The author investigates the convergence of eco-agricultural tourism in and between each province from another point of view, with the method of Bernard and Durlarf, by the test for the co integration relationship of time series of eco-agricultural tourism income in and between the east, the west and the middle. The result shows that there is convergence for eco-agricultural tourism development between the provinces in the East and the West, but there is no convergence for eco-agricultural tourism development in the Middle and between the three major regions. A new discovery of this study is that eco-agricultural tourism development of the 9 provinces in the Middle will be effected by three common shocks in the long term and the three major regions will be affected by two common shocks in the long term. Therefore, this is where the advantage of method of time series on convergence. Meanwhile, the research result of convergence of regional eco-agricultural tourism in China could also contribute as the theoretical foundation for the policymaker.

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