

# Research on the Economic Benefits of Pro-Poor Tourism in Chongqing Based on the DEA Model

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## Abstract

Pro-poor tourism creates and distributes value, and can extensively and effectively drive regional economic growth by means of inter-industry integration, intra-industry driving and inter-regional cooperation. In recent years, pro-poor tourism has gradually become known to the public as an important part of the economic activities of all provinces. However, during the actual work, it is not possible to measure how much the input and output of pro-poor tourism will drive and affect the local economic benefits. Therefore, this paper gives an empirical research of the economic benefits brought by pro-poor tourism in Chongqing from the perspective of practice and spatial evolution by taking Chongqing's 18 counties as the research object and applying the DEA model together with Malmquist Index. It shows that Chongqing's pro-poor tourism overall has a better-than-average level economic efficiency, with great differences between different counties: the Eastern counties, though economically backward, have good results in pro-poor tourism while its effects in the central and in the west are modest. In the future, Chongqing should implement precision pro-poor tourism in relatively poor counties and make the most of the leading role of economically developed counties in the really pro-poor and pro-really poor.

**Keywords:** DEA Model, Chongqing, Pro-Poor Tourism, Economic Benefits, Empirical Study.

## 1. BACKGROUND

### 1.1 Literature review

In recent years, as more attention is gained to the development of tourism, pro-poor tourism has gradually become known to the public and growing rapidly. Many scholars have researched pro-poor tourism models, economic benefits and efficiency, etc. in some regions, and obtained some literature data. Su Juan evaluated the economic, social and ecological benefits of pro-poor tourism in Wulingyuan based on surveys and interviews, and proposed optimization countermeasures for pro-poor tourism (Su, 2009). Li Rui et al. discussed pro-poor tourism model, mechanism and development path in mountain tourist attractions based on surveys and analysis of fields in chongdugou, Funiu Mountain (Li et al., 2012). Long Zukun et al. calculated the pro-poor tourism efficiency in Wuling Mountain from 2009 to 2013 with the use of data envelopment analysis, evaluated its efficiency distribution together with the MI index, and divided it into four types: sunrise, potential, gold, and sunset (Long et al., 2015). Zeng Yong et al. compared the special ideas, initiatives for the development of pro-poor tourism and the economic benefits obtained in Xiangxi, Huaihua and Zhangjiajie, analysed the current problems in the development of pro-poor tourism in the three city-level regions, and proposed development suggestions accordingly (Zeng and Yang, 2015). Li Yanan evaluated the pro-poor tourism efficiency in different regions of Guangxi from the perspective of tourism input-output based on data envelopment analysis and the panel data on 14 prefecture-level cities in Guangxi from 2008 to 2015 (Li, 2016). Li and Yang calculated the comprehensive efficiency, technical efficiency and scale efficiency of pro-poor tourism in 12 counties of the Dabie Mountain poverty-stricken section, Anhui from 2011 to 2015 based on DEA data envelopment analysis, calculated the change over time of pro-poor tourism in the section with the use of the Malmquist index, and researched the difference in the spatial distribution of the pro-poor tourism efficiency in the section based on GIS spatial analysis (Li and Yang, 2017).

### 1.2 Purpose

As a comprehensive industry, tourism plays a significant role in promoting the social economy, so it has received wide attention and recognition from the public (Yang and Xiao, 2011). In recent years, Chongqing has developed rapidly in its overall economy, and achieved good results in politics, economy, culture and social life and other

aspects, except for some of its counties and rural areas where the economic development has been slow. According to statistics, in 2015, Chongqing's rural tourism received 115 million visits, up from 100 million visits in 2014 and by about 15%, representing a tourism revenue growth of more than RMB 1 billion, and driving a transferred labour population of more than 400,000 and an out-of-poverty population of more than 200,000. In order to scientifically guide the poverty-stricken regions to get rid of poverty, seek ways out and golden ideas for poor villages, and achieve the coordinated and steady development of Chongqing's overall economy, the municipal government has proposed the public welfare action plan for pro-poor tourism. In order to calculate the specific economic benefits brought from pro-poor tourism, this paper researches the economic benefits of pro-poor tourism in 18 counties of Chongqing from 2011 to 2015 by analysing the data on the input and production of pro-poor tourism in Chongqing over the years, from the perspective of time and spatial evolution, with the use of the DEA model and the Malmquist index, and based on previous studies. It shows that, over the years, Chongqing's pro-poor tourism has achieved good results, its regional economic efficiency being at a better-than-average level, with great differences between different counties in economic development and the economic benefits of pro-poor tourism: the Easter counties, though economically backward, have good economic benefits of pro-poor tourism; the central and western regions are economically developed but have modest economic effect in pro-poor tourism. It's hoped that this research will add literature to the calculations of economic benefits of pro-poor tourism, and provide theoretical reference and thinking to the later development of pro-poor tourism in Chongqing.

## 2. ANALYSIS OF THE STATUS QUO OF PRO-POOR TOURISM IN CHONGQING

In late November 2015, at the pro-poor tourism working meeting held in Chengkou, Chongqing, the Municipal Tourism Bureau explained the local preparation of the 13th Five-Year Planning for Tourism and Overall Planning for Tourism, and defined the important aspects of tourism development, including preparation by stages and in groups of the planning for 128 national-level pro-poor tourism villages in Chongqing and pro-poor tourism planning public actions to scientifically guide the poverty-stricken regions to get rid of poverty. Since the start of pro-poor tourism in Chongqing, the related departments have strengthened innovation of work ideas and methods, positively guide the districts and counties to create special pro-poor tourism industrial clusters that integrate construction, planning and management. They have arranged specific implementation methods for pro-poor tourism from the perspective of increased capital investment, fully promoted construction of projects, strengthened pilot demonstration and market supervision, optimized products and line construction, increased publicity and marketing personnel training, partner assistance, etc. This, to some extent, has promoted the urban and rural integration in Chongqing, boosted the development of the rural economy, and accelerated the innovation and development of pro-poor tourism.

After one year's innovation and efforts, currently Chongqing's pro-poor tourism work has achieved good development results. According to the Chongqing Municipal Tourism Bureau statistics, as of December 2016, Chongqing had built 201 pro-poor tourism villages, 53 rural pro-poor tourism areas, of which Wulong Three Natural Bridges, Wushan Goddess, and Fuling Wuling Mountain Rift Valley are named national pro-poor tourism demonstration projects. At of the late September 2016, members of the Poverty Relief Group of Chongqing Municipal Tourism Bureau had provided a total of RMB 7.759 million relief funds for pro-poor tourism projects, and from January to September, Chongqing rural tourism had received 95.02 million visits. In the future, Chongqing will start and develop to accelerate the development of standards for rural tourism villages or towns, create a number of characteristic landscape tourism villages or towns, and help poor people out of poverty by taking rural tourism as an important starting point for poverty alleviation.

## 3. EMPIRICAL ANALYSIS OF THE ECONOMIC BENEFITS OF PRO-POOR TOURISM IN CHONGQING

### 3.1 Model building

In the face of multi-input and multi-output decision-making units, data envelopment analysis (DEA) is often used for evaluation. According to the input and output indicators, the DEA model will propose more efficient suggestions. The evaluation of the economic benefits of pro-poor tourism in Chongqing is that the more the investment, the more the output (Li and Jiang, 2010). Therefore, this paper analyses it with the DEA model to represent the leading role of pro-poor tourism in Chongqing's local economy as well as the scale effect due to agglomeration, namely, the total promoting effect on the regional economy. It can be seen from the essence of the DEA model that the actual decision-making unit (DMU) of Chongqing's pro-poor tourism efficiency is the county (city) level; when output is constant, different input combinations will have differences in the effect on the regional economic development, then the calculation formula of regional tourism investment is as follows:

$$\begin{cases} \min \theta \\ s.t. \sum_{b=1}^n \lambda x_{ab} + S_a^- = Qx_{ao} \\ \sum_{b=1}^n \lambda y_{rb} - S_r^+ = y_{ao} \\ \lambda_b \geq 0, b = 1, 2, \dots, n, S_a^- \geq 0, S_r^+ \geq 0 \end{cases} \quad (1)$$

Where  $\lambda_a$  represents the decision variable;  $x_{ab}$  represents class  $a$  input value of  $b$  decision units, and so on,  $y_{rb}$  represents class  $r$  output value;  $S_a^+$  and  $S_a^-$  represent the input and output slack variables respectively;  $\theta$  represents the target value. When  $\theta < 1$ , then the DEA allocation benefit and technical efficiency of the DMU are not optimal; when  $\theta = 1$ , the state of decision making unit is relatively excellent, but there is still room for improvement; when  $\theta > 1$ , and  $S_a^+$  and  $S_a^-$  are 0, DEA of the DMU is the most effective and the allocation of resources is the most reasonable.

As the economic benefits of pro-poor tourism change over time, the Malmquist (MI) index in the DEA model is used in this paper to analyse the intertemporal dynamic production efficiency of DEU as shown in the following expression:

$$MI_t = \left[ \frac{d^{t+1}(x^{t+1}, y^{t+1})}{d^{t+1}(x^t, y^t)} \times \frac{d^t(x^{t+1}, y^{t+1})}{d^t(x^t, y^t)} \right]^{\frac{1}{2}} \quad (2)$$

Where  $d^t(x^{t+1}, y^{t+1})$  represents the DEU production frontier distance of phase  $t + 1$  and phase  $t$ , which can be used to measure the DEU efficiency of phase  $t + 1$ . If  $MI < 1$ , then the efficiency phase  $t$  to phase  $t + 1$  is stagnant; if  $MI = 1$ , then economic benefits during such period gradually decline; if  $MI > 1$ , then the economic efficiency during such period needs to be improved.

### 3.2 Index selection and data sources

In order to scientifically analyse the economic benefits of pro-poor tourism in Chongqing, this paper builds an input-output index system for pro-poor tourism in Chongqing based on the previous studies, pro-poor tourism evaluation index selection and data acquisition feasibility. The selection of pro-poor tourism input index allows for the status of tourism development in Chongqing as well as the consistency with the output index; the selection of pro-poor tourism output index allows for the overall development of Chongqing's economy as well as the living conditions of the local people (Huang and Yu, 2014). Therefore, the input index in this paper is per capita comprehensive tourism income and per capita visits; the output index herein is per capita regional GDP, per capita disposable income of urban residents, and per capita net income of rural residents. The comprehensive tourism income is used to represent the development benefits of Chongqing's tourism industry, and the number of tourists is used to measure the driving effect of tourism on the surrounding industries. The required data is from the work reports, department planning and statistical yearbooks of the Chongqing Municipal Government.

### 3.3 Empirical analysis

DEAP is used to calculate the comprehensive economic benefits of pro-poor tourism in Chongqing's 18 counties from 2011 to 2016 and obtain the average comprehensive economic benefits of 0.894, indicating an above-average level, as shown below in Table 1 (Guo, 2015).

**Table 1** Comprehensive Economic Benefits of Pro-poor Tourism in Chongqing's Major Counties

| County    | 2011  | 2012  | 2013  | 2014  | 2015  | Average |
|-----------|-------|-------|-------|-------|-------|---------|
| Tongliang | 1.068 | 0.948 | 0.993 | 1.115 | 1.081 | 1.041   |
| Bishan    | 1.024 | 0.945 | 1.052 | 1.045 | 0.958 | 1.005   |
| Qijiang   | 0.909 | 1.067 | 1.012 | 0.945 | 1.018 | 0.99    |
| Chengkou  | 0.61  | 0.608 | 0.789 | 0.865 | 0.902 | 0.755   |
| Kaixian   | 0.927 | 0.909 | 1.074 | 1.081 | 0.874 | 0.973   |
| Wuxi      | 0.525 | 0.706 | 0.898 | 1.003 | 0.985 | 0.823   |
| Wushan    | 0.506 | 0.724 | 0.872 | 0.915 | 0.979 | 0.799   |
| Yunyang   | 0.927 | 1.063 | 0.923 | 0.824 | 1.025 | 0.952   |
| Fengjie   | 0.587 | 0.651 | 0.879 | 0.997 | 1.051 | 0.833   |
| Zhongxian | 0.775 | 0.616 | 1.068 | 0.971 | 0.809 | 0.848   |

|                                           |       |       |       |       |       |       |
|-------------------------------------------|-------|-------|-------|-------|-------|-------|
| Liangping                                 | 0.601 | 0.517 | 0.825 | 0.941 | 1.093 | 0.795 |
| Dianjiang                                 | 0.886 | 1.039 | 1.059 | 0.926 | 1.071 | 0.996 |
| Fengdu                                    | 0.998 | 1.109 | 0.913 | 0.879 | 0.924 | 0.965 |
| Wulong                                    | 1.056 | 0.901 | 0.981 | 1.014 | 0.869 | 0.964 |
| Shizhu Tujia Autonomous County            | 0.591 | 0.787 | 0.832 | 1.071 | 0.974 | 0.851 |
| Pengshui Miao and Tujia Autonomous County | 0.605 | 0.745 | 0.699 | 0.981 | 1.012 | 0.808 |
| Youyang Tujia and Miao Autonomous County  | 0.531 | 0.612 | 0.848 | 0.959 | 1.098 | 0.809 |
| Xiushan Tujia and Miao Autonomous County  | 0.672 | 0.884 | 1.021 | 0.912 | 0.907 | 0.879 |

Given that the DEA model for the economic benefits of pro-poor tourism in Chongqing includes input and output index systems, the DEA model calculation results are often different from the pure output of Chongqing's tourism industry. It can be seen from Table 1 that the pro-poor tourism efficiency MI index in each of Chongqing's counties had been increased year by year, indicating that the overall economic benefits of pro-poor tourism in the region had been expanding. But such expanding trends were different, and the economic efficiency of pro-poor tourism in the 18 counties was distributed differently. Specifically, it can be seen from the comprehensive benefits from 2011 to 2015 that the average MI index of Tongliang and Bishan near the downtown area was greater than 1, indicating that the economic benefits of pro-poor tourism in the two counties had been at a high level in a growth trend that was not obvious; the pro-poor tourism efficiency MI index in Yunyang, Qijiang, Dianjiang, Fengdu, Wulong, etc. in the central of Chongqing was 0.952, 0.99, 0.996, 0.965 and 0.964 respectively, all from 0.9 to 1, indicating that the economic benefits of such counties were also high though not as high as those in Tongliang and Bishan; the average MI index of the counties on the eastern edge of Chongqing, including Chengkou, Wuxi, Wushan, Fengjie, Zhongxian, Liangping, Shizhu Tujia Autonomous County, Pengshui Miao and Tujia Autonomous County, Youyang Tujia and Miao Autonomous County, and Xiushan Tujia and Miao Autonomous County was all less than 0.9, indicating that their economic benefits were modest. It can also be seen from the growth trends in the economic benefits of pro-poor tourism in all counties from 2011 to 2015 that the counties on the eastern edges of Chongqing had maintained a sustained growth, indicating that pro-poor tourism of such counties had a significant impact on the local economic benefits.

#### 4. CONCLUSION

To sum up, this paper calculates the specific economic benefits brought to county-level poverty by pro-poor tourism from the perspective of time and spatial evolution by taking Chongqing's 18 counties as examples and applying the DEA model together with Malmquist Index. It shows that, over the years, Chongqing's pro-poor tourism has achieved good results, its regional economic efficiency being at a better-than-average level, with great differences between different counties in economic development and the economic benefits of pro-poor tourism. Specially, the Easter counties, though economically backward compared with the central and west, have good economic benefits of pro-poor tourism due to natural, distinctive, more attractive tourism projects in Shizhu Tujia, Pengshui Miao and Tujia, Xiushan Tujia and Miao Autonomous County, and other minority autonomous counties; the central and western counties, including Tongliang, Bishan, Dianjiang, and Fengdu, are near the downtown and economically developed but have modest economic effect in pro-poor tourism. Therefore, the related departments should pay attention to the investment in the eastern poor counties, apply Internet technologies to establish the poor population database, focus on the economic development in the poor areas, and implement precision pro-poor tourism during pro-poor tourism planning and development in the future. They should also make the most of the driving and exemplary role of good county-level pro-poor tourism effects to promote the economic development of other regions (Xiao and Xiao, 2014). This search only touches on the economic benefits of pro-poor tourism in Chongqing from the perspective of time and space, so it has sidedness and limitations. The related studies in the future may analyse the degree of impact of the specific input and output factors of pro-poor tourism on the economic benefits based on data on specific cases to further add to the research base in such field.

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