

The impact mechanism of all-for-one tourism on carbon emissions in China

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Abstract: As the country with the second highest tourism carbon footprint, the impact of tourism on carbon emissions may become one of the determinants for achieving China's reduction commitments in 2030 (60%-65%). And the development of all-for-one tourism, which refers to the integration of resources and industries, provides more opportunities and challenges. Hence, this paper constructs the index system of all-for-one tourism and studies impact mechanism of all-for-one tourism on carbon emissions in China. The key findings show that: The development of all-for-one tourism includes industrial domain, spatial domain and integrated domain. Each domain has heterogeneity effect on carbon emissions. And the impacts of all-for-one tourism on carbon emissions are mainly through the population agglomeration and industrial structure.

Keywords: All-for-one tourism; Carbon emissions; Impact mechanism.

1. Introduction

Recently, more and more attentions have been paid on the reduction of greenhouse gases (GHGs) emissions and the development of low-carbon economy in response to global warming and energy shortage. As a supporter of low-carbon economy, China was committed to reduce the carbon emission intensity of 2030 by 60% - 65% than 2005. As a clean industry, tourism is cultivated as a strategic pillar industry of national economy in China since 2009.

However, the tourism activities, such as transportation, catering, accommodation, inevitably bring more carbon pollutions (Wang et al., 2019). It is shown that the carbon emissions caused by tourism account for 8% of the global and are expected to increase 1.5 times in the coming 30 years (Lenzen et al., 2018; Scott et al., 2008). As the fourth largest tourism destination in the world, the impact of tourism on carbon emissions in China is far from negligible. According to the statistics, China ranked second (after the United States) for its carbon footprint of tourism between 2009 and 2013 (Lenzen et al., 2018). And the carbon emissions caused by tourism further increases with the tourists growing at 10% a year (Administration, 2017). However, it is noteworthy that the all-for-one tourism has been proposed in China since 2008. As a new development viewpoint, all-for-one tourism refers to the comprehensive improvement of regional tourism, which helps to transform the development modes of tourism from scenic spot pattern to comprehensive pattern and realize the integration of resources and industries. Therefore, there may be several implications of all-for-one tourism for carbon emissions in China.

On the one hand, the development of all-for-one tourism expands the scale of tourism industry. The carbon emissions of China increase for the population aggregation, infrastructure construction, etc. On the other hand, tourism inhibits the development of local manufacturing and decreases the carbon emissions (Faber and Gaubert, 2019). Accompanied by the integration of resource and spatial expansion of infrastructure, the development efficiency of all-for-one tourism improves, which is helpful for the reduction of the carbon emissions. Moreover, the industry convergence caused by the all-for-one tourism also has indirect impacts on

carbon emissions.

The impacts of different factors on carbon emissions have been extensively studied. However, few researches focus on the perspective of all-for-one tourism, which is worthy of more attention. Furthermore, according to the strong spatial correlation of carbon emissions generated by economic development (Liu and Liu, 2019; Wang and Li, 2019) and endogenous problems caused by the bi-directional causality between all-for-one tourism and carbon emissions (Albaladejo et al., 2014), both of the spatial spillover effect of carbon emissions and endogenous development of all-for-one tourism should be identified to obtain accurate results and provide sufficient empirical evidence for the low-carbon development.

Overall, this paper constructs the all-for-one tourism index system involving industrial domain, spatial domain and integrated domain, which reduces the deviation caused by the single indicator. Second, the impact mechanism of all-for-one tourism are further discussed. Both of them may help to provide direction for the low-carbon development of all-for-one tourism.

2. Related literature review

2.1. All-for-one tourism

As a comprehensive development concept proposed by China, all-for-one tourism is closely related to a series of development experiences and research directions.

The theory of Tourism Area Life Cycle (TALC) (Butler, 1980) is the basis for the development of all-for-one tourism, which indicates that both of the demand and the development state of tourism destination are key factors for all-for-one tourism. Moreover, the spatial expansion of tourism economy is important as well as the diversification of new tourism policies (Baidal, 2003).

As one of the main contents of all-for-one tourism, the impact of infrastructure has been well recognized by the scholars. Carteni et al. (2017) conducted a quantitative study on the development of high-speed rail and destination choice, and found that perception of tourists can be affected by the price of high-speed rail, service quality and urban comprehensive attraction. Moreover, the spatial expansion of

tourism infrastructure is also closely related to the sustainable development of community and the quality of community life in tourism destination (Mathew and Sreejesh, 2017). This perspective of multi-stakeholder is consistent with the development notion of co-construction and sharing emphasized by all-for-one tourism.

Moreover, industry convergence is an effective means to optimize industrial structure and promote employment and economic growth (Shen et al., 2019). And the strong correlation among industries is the basis of further integration and development (Wang and Xu, 2013). It is showed that there are 110 industries related with tourism industry (Cheng and Zhu, 2012), and different integration phenomena between tourism and other industries generate in different stages of development. Along with the increasingly environmental pollution, the integrated development between tourism and low pollution industries in the tertiary industry, such as creative industries (Woyo, 2018), information technology (He, 2011) and health (Rydbäck and Hyder, 2018), has received widespread attentions.

In China, the conception of all-for-one tourism was first mentioned in the regional tourism development plan, such as Chengdu, Dalian. It aims at developing the destination with all stakeholders and promoting the cooperation tourism and all other industries (Jiang et al., 2018). Yang (2016) put emphasis on the development of all-for-one tourism in regions with rich tourism resources, and pointed that the advanced mode of all-for-one tourism is the development of tourism functional area. In terms of measurement method, Liu (2017) constructed an index system of rural all-for-one tourism from the development ability, management ability and environmental quality three aspects, and discussed the development level of rural all-for-one tourism with the data of Chongqing in China. Zhao et al. (2018) believed that all-for-one tourism is a new concept of regional development, which promotes the coordinated development of economy and society on the basis of tourism industry. And four dimensions, including industrial advantages, market scale, employments and tourism resources, were used to measure the development of all-for-one tourism. On the basis above, Feng and Xia (2018) summarized the concept of all-for-one tourism and constructed the index system from industrial domain, spatial domain and management domain.

The above researches show that the development of tourism industry, spatial expansion of infrastructure and integrated development among tourism and other industries are the necessary dimensions of all-for-one tourism. However, most of the index systems focus on the expansion of tourism industry and infrastructure development, and ignore the integrated development. The distortion of measurement may be resulted, which decreases the accuracy of further discussion on the pollution of all-for-one tourism. Therefore, this paper incorporates the development of industrial integration into the index system, and tries to measure the all-for-one tourism of China from industrial domain, spatial domain and integrated domain.

2.2. Tourism and carbon emissions

Low-carbon tourism is one of the important fields of both low-carbon economy and sustainable development of tourism.

Most scholars have attempted to study the relationship between tourism development and carbon emissions. Lee and Brahmašrene (2013) found there is a long-term co-integration relationship between them, and the impact of tourism on

carbon emissions is positive (Zaman et al., 2016). Furthermore, the Environmental Kuznets curve (EKC), which is the most authoritative interpretation for the non-linear relationship between economic development and environmental quality, has been applied to the studies of tourism and carbon emissions (Lee and Brahmašrene, 2013; Wang et al., 2018; Zaman et al., 2016). The results shown that there are short-term and long-term impacts of tourism on carbon emissions (Lee and Brahmašrene, 2016). In the short term, the expansion of tourism scale increases the transportations, catering, accommodations and water supply and leads to more energy consumptions and carbon emissions. The ecological degradation and environmental pollution are also exacerbated with the construction of tourism infrastructure (Lee and Brahmašrene, 2013). While the development of tourism contributes to the reduction of carbon emissions in the long term. One of the reasons is that the consumption preference of consumers for low-carbon productions increases with the upgrading of consumption structure. Therefore, more environment-friendly productions and services are provided to cater to the demands of the market, which helps to promote the low-carbon development of tourism. Another reason is that more environmental policies of tourism industry may be staged with the growing awareness of environmental protection (Scott et al., 2010). In addition, the improvement of efficiency brought by public facilities and internet technology also provides reliable guarantee for the low-carbon development of tourism industry (Wang et al., 2018).

There are two deficiencies based on current research. One is the lack of research with comprehensive perspective. As most of the studies only focus on single industry, the impacts of interactive development of tourism and the other industries are ignored, leading to an inaccurate estimation, particularly for China. Another one is about the index system of tourism, which mainly studies the development of tourism with tourism income. While the improvement of tourism productivity and efficiency may also affect the carbon emissions of tourism. Then the impacts of tourism on carbon emissions may be overestimated or underestimated without considering their effects. Based on these, an index system of all-for-one tourism involving industrial domain, spatial domain and integrated domain is constructed in this paper. Moreover, this paper studies the impact mechanism of all-for-one tourism on carbon emissions.

3. Mechanism analysis

In this study, the industrial domain, spatial domain and integrated domain are included in the development of all-for-one tourism. And the impact mechanisms of all-for-one tourism on carbon emissions are summed up mainly as population aggregation effect and industrial structure effect.

Specifically, the development of all-for-one tourism is accompanied by the centralization of population and production factors, and their impacts on carbon emissions are uncertainty. On the one hand, the agglomeration of production factors, such as capital, labor, etc., in tourism industry may form scale economies (Wang et al., 2019). The sharing of the infrastructures and facilities of environmental treatment can help to slash the costs of environmental protection and improve the efficiency of tourism development and environmental governance, which contributes to the carbon emissions reduction (Kyriakopolou and Xepapadeas, 2013). On the other hand, the excessive population and their tourism

activities also aggravate environmental pollution for the congestion effect. Moreover, the expansion of tourism and the other related industry increases the demand of energy consumption and adds the carbon emissions through scale effect (Andersson and Loof, 2011).

As one important part of all-for-one tourism, the industry convergence is advantageous in the restructuring of industry. Zhong et al. (2008) studied the development of tourism destination with the theory of Tourism Area Life Cycle (TALC), and found that mutual effects exist between tourism destination and the regional industrial structure. First, the development of all-for-one tourism may be unfavorable to the development of manufacturing and helpful for the carbon reduction (Faber and Gaubert, 2019). Second, it can enlarge the markets of the complementary industries and expand their scales. Both of them changes the industrial structure of the tourism destination. However, the impact of industry convergence on carbon emissions is depend on the type of complementary industries. If the complementary industries of all-for-one tourism is mainly low pollution, such as the tertiary sector, the industrial structure effect may help to reduce the carbon emissions; conversely, it may increase the carbon emissions. In addition, the industry convergence is conducive to the distribution of production factors and promotion of technological innovation, which also improves the efficiency of economic development and affects the carbon emissions.

Based on the analysis above, the empirical analyses of this study are given as follow. A benchmark model is proposed to analyze the impact of all-for-one tourism on carbon emissions first. Then, this study discusses the effectiveness of the results with the following robustness test. The third part is heterogeneity testing, where the different impacts of tertiary industry development and the development modes of all-for-one tourism on carbon emissions are identified. Finally, the impact mechanism of all-for-one tourism on carbon emissions is analyzed from the perspectives of population agglomeration and industrial structure.

4. Conclusion

This study discusses the all-for-one tourism in China with industrial domain, spatial domain and integrated domain. Then, the impact mechanism of all-for-one tourism are further analyzed. The results indicate that each domain have heterogeneity effect on carbon emissions. And the impacts of all-for-one tourism on carbon emissions are mainly through the population agglomeration and industrial structure.

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