Is the Influence of Chinese Local Government Act on Tourism Efficiency Positive?

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In China, local governments play a very important role in the development of the tourism industry. Local governments appear to have a positive effect on the development of tourism because of the fact that the tourism industry output has improved for more than a decade. Many researchers have studied the relationship between government and tourism development. However, the existing studies were limited to qualitative discussion and there is still no relatively scientific quantitative analysis which can prove whether the impact is positive or not. Therefore, the purpose of this paper is to verify whether the impacts of Chinese local government act on the tourism industry are positive or negative from the perspective of efficiency. To achieve this aim, this paper binned a quantitative model of local government act, data envelopment analysis and spatial statistics together in a creative way, measured tourism industry efficiency with and without the influence of local government act and compared the changes in results and their spatial patterns and spatial interactions. On the basis of these analyses, the author found that positive impacts as a result of the local government act on efficiency in the tourism industry do exist.

Keywords: tourism efficiency, local government act, impacts, China

1. Introduction and Literature Review

Government is one of the most important stakeholders with a major role in tourism development (Bachmann, 1988). The tourism industry involves many sectors and stakeholders, and governments must take responsibility for building the social policies and legal systems needed to support tourism (Jenkins and Henry, 1982; Gunn, 1988; Hughes, 1994; Akama, 2002). In addition, tourism market mechanisms possess features that can be dealt with by governments, such as public goods, external effect, information asymmetry and monopolistic competition (Wang, 2005; Wei and Zhu, 2005). In developing countries, these factors as well as the low regional economic development and economic effects of the tourism industry (Balaguer and Cantavella-Jordá, 2002) are common reasons for governments to act within the tourism industry.

In China, the government is closely related to tourism industry development because

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of the country's unique national conditions. During the mid-1990s, a strategy mode called government-led tourism development was established in China. Government intervention in development of the tourism industry became explicit and rational, and the government's fields of participation have continuously expanded. The methods of government intervention have continued to diversify and the level of intervention has gradually increased. Government activities have permeated the tourism industry and have had a natural and inevitable influence on the scale and quality of tourism industry development in China.

Nowdays, tourism is a strategic industry and will develop into a strategic pillar industry of the national economy and a modern service industry that the people are more statisfied with. Tourism has become a powerful industry that is leading development of the national economy, with the increasingly important and positive roles of maintaining growth, expanding domestic demand, adjusting industrial structure and promoting employment. However, there is a common reality that cannot be ignored; the tourism industry in China is large but not strong. In other words, Chinese tourism possesses quantity on a large scale but lacks quality and efficiency. The tourism industry urgently needs transformation and upgrading, as well as improvement of its quality and efficiency. Much remains to be achieved before China can reach its goal to be a nation with a robust tourism industry. Hence, the question arises of what exactly is the effect of the Chinese government act on tourism industry development and is it positive or negative.

All existing studies agree that the government's act has a dual effect on development of the tourism industry. On one hand, the fact that the acts of government described above have positive impacts on the tourism industry is beyond doubt. For example, the government can coordinate different interest groups and tourism resources (Chien and Law, 2003; Henderson, 2003); establish an operating environment that is conducive to the tourism industry (Akama, 2002); and guarantee that sustainable measures be applied by tourism operators, with the environment, social costs and benefits in mind (Hunter and Green, 1995; Bramwell and Alletorp, 2001; Oracion, 2007). The government can also promote the capacity to supply tourism and the overall national tourism image (Hao, 2001); solve problems of externalities, information asymmetry and public goods in the tourism industry and ensure social fairness and stability in the referent fields (Wang, 2005); and speed up the accumulation of tourism human capital (Miu and Wang, 2002; Liu *et al.*, 2009). On the other hand, most scholars believe that the limitations of governments and some improper acts have had negative effects on the development of tourism (Burns, 1999). In China, these negative effects have mainly been expressed as unclear property rights, unfair competition, imbalance of tourism supply and demand, resource waste and environmental destruction, poor management of tourism enterprises and low economic benefits, among others. (Zhang, 2002). Some causes of these negative effects include the government's pursuit of

maximum economic benefit; preoccupation with too many things within the tourism industry; and its short-term leadership, administrative procedures and decentralized organization (Guo, 2006). Other causes are governments' functional absence and dislocation (Cao, 2006) as well as excessive competition between local governments (Li and Yang, 2012).

Hence, does the government in China have a positive effect on the tourism efficiency or not? Those studies cited above were limited to qualitative discussion and failed to uncover the relationship between governmental actions and tourism development by quantitative analysis. Further, there has been no quantitative research studying the overall impacts of Chinese local government act (LGA) on tourism efficiency in China, the question to which this work is dedicated. Thereforth, finding the answer to this question is the research goal of this paper. To realize this aim, this paper focuses on the following aspects. First, the author defined two important variables, Chinese local government act (LGA) and tourism efficiency. Second, a quantitative model of LGA proposed by Sun and Xia (2017) and data envelopment analysis (DEA) were used to detect the changes in tourism efficiency owing to LGA. Specifically, the quantified LGA was taken as one input factor, and the results of tourism industry efficiency with and without LGA were compared. To further clarify the real impacts of LGA on tourism industry efficiency, further comparative analysis was made of spatial patterns and spatial interactions of the efficiency results under the two conditions, using spatial statics.

This paper attempts to clarify the influence of government act on tourism and further develop quantitative research on the activities of governments in this regard, which will help guide the study of government act in the academic field of tourism, to convert quantitative analysis from qualitative analysis. These findings will provide a basis for local governments to control the strength of their influence so as to improve tourism industry efficiency in China.

2. Methods

2.1. Quantification of Governmental Act

The acts of local governments (LGA) in the tourism industry are diverse and complex. In 1974, Eden investigated governmental act in the tourism industry. Since then, several reference studies have emerged, and the consensus is that government interventions in the tourism industry are diverse, complex, and interact with each other. The influence of the government is different in different countries. Hughes (1984) pointed out that supportive act of the British government for the tourism industry included cash subsidies, tax breaks, restriction of imports and export promotion. In Thailand, Elliott (1987) found that government action focused on reducing taxes

for hotel rooms, increasing charter flight service, simplifying tourism procedures, controlling tourism functions and the status of Bangkok International Airport, and endowing the national economic and social development committee with new functions to coordinate and monitor tourism development, among others. Akama (2002) summed up the acts of the Kenyan government into three aspects: being solely responsible for operation and management of the tourism industry, establishing a Kenya tourism development group to promote the government's direct investment in and management of tourism industry development, and setting up a socioeconomic environment to attract social capital and foreign capital for tourism through tax incentives, financing and others. Other activities such as promoting human resources, online marketing and investment in tourism have been reported by Baum (2007), Horng and Tsai (2010), and Chavan and Bhola (2013), respectively. In China, most studies agree that governmental act in tourism is embodied by establishing laws, regulations and policies; planning; financing; and marketing, among others. Deng (2005) and Meng (2009) condensed the influence of the Chinese government into the following acts: creating favorable conditions for tourism development; establishing tourism laws, regulations and industry policies, and tourism development planning; engaging in destination marketing; raising funds to improve tourism infrastructure and guiding their investment. In addition, Ge (2003) considered government actions such as protecting tourism resources, and the collection and publication of tourism market information. Sun and Xia (2017) distinguished eight main acts of local governments with respect to tourism that are based on some basic principles, and established an index system for quantification (Table 1). The method followed in that study was applied in this work.

According to Sun and Xia (2017), the principles of an index system should include four aspects. First, the index system must be comprehensive and scientifically treat the macro-and micro-level activities of local governments. Second, each index selected should be related to development of the tourism industry and should be consistent with the mechanisms of governmental act on tourism industry efficiency. Third, the data of each index should be accurate, reliable, complete, and continuous and should reflect any change, so as to be able to draw clear and factual conclusions. Following these principles and basing this work on national and international data as well as the opinions of several relevant experts in the tourism industry, the author established an index system for quantization of macro-and micro-level LGA. Macro-level LGA refers to macro-environment development acts, including political, economic and cultural as well as those related to industry, ecology and facilities. Micro-level LGA includes tourism policies, regulations, standards, planning, marketing, cooperation, image, industry, management, education and training by local governments. Fourth, the index system comprises 8 aspect indexes, 24 primary indexes, 13 sub-indexes and

6 basic indexes. Details about the specific meaning and nature[1] of each index and its relationship with LGA and the quantization method have been described by Sun and Xia (2017). For brevity, these details have been omitted from this paper.

Table 1. Index System of Local Government Acts in the Tourism Industry

Index name	Index category
1 Macro environment construction	Major index
1a political environment	primary index
1a1: regional corruption control	sub-index
1a2: regional social security control	sub-index
1b economic environment	primary index
1b1: regional economic development	sub-index
1b2: degree of regional marketization	sub-index
1c industry environment	primary index
1c1: third industry development level	sub-index
1c2: third industry investment level	sub-index
1d ecological environment	primary index
1d1: forest cover rate	sub-index
1d2: coverage rate of Nature Reserves	sub-index
1d3: control efforts of environmental pollution	sub-index
1e infrastructure environment	primary index
1e1: transportation infrastructure	sub-index
road construction	basic index
railway construction	basic index
1e2: the level of city facilities	sub-index
the construction of public toilet	basic index
the construction of public transportation	basic index
the construction of city road	basic index
the green construction of city park	basic index
1f social and cultural environment	primary index
1f1: expenses on cultural undertakings	sub-index

[1] The nature of an index is positive, i.e., the higher the index value, the stronger the effect of the corresponding action of local government, and vice versa. Among the indexes, regional corruption control is taken as a neutral index and regional social security control as a negative index; the rest are considered positive indicators.

Index name	Index category
1f2: financial support for cultural undertakings	sub-index
2 Construction of the policies, regulations and standards	Aspect index
2a the construction of regional tourism policy	primary index
2b the construction of regional tourism regulations	primary index
2c the construction of regional standards	primary index
3 Tourism planning and construction	Aspect index
3a attainment rate of tourism income	primary index
3b attainment rate of the number of tourists	primary index
4 The evaluation and construction of tourism image	Aspect index
4a the creation of national excellent tourism city	primary index
4b the creation of national scenic area	primary index
5 Tourism marketing	Aspect index
5a tourism promotion	primary index
5b festival marketing	primary index
6 Regional tourism cooperation	Aspect index
6a international cooperation	primary index
6b cooperation between the central and local	primary index
6c inter provincial cooperation	primary index
7 The management of the tourism industry	Aspect index
7a the travel agency management	primary index
7b the star hotel management	primary index
7c the tour guide management	primary index
8 Tourism education and training	Aspect index
8a the construction of tourism colleges	primary index
8b cultivation of students majoring in Tourism	primary index
8c tourism industry training	primary index

2.2. Calculation of Tourism Industry Efficiency

Based on a comprehensive comparison of the existing research literature, this paper followed Sun and Xia (2014; 2016) and used fixed capital of the tourism industry; number of employees in tourism; travel agencies and top-rated hotels; and the number of 4A and 5A scenic tourist attractions as input indicators. Total tourism revenue, total number of tourists and inbound tourists, and tourist complaints were used as output indicators.

To establish a clear link between the findings of this study and those of existing research so as to make comparisons, the static efficiency of China's provincial tourism industry in the years 2000, 2006 and 2012 was measured using a DEA-BCC (Banker, Charnes and Cooper) model. This is a basic DEA model that has been applied to many studies on tourism efficiency. The premise of the model is that the returns to scale vary; it is therefore known as a variable returns to scale (VRS) model. Results obtained using the BCC model include overall efficiency (OE), pure technical efficiency (PTE) and scale efficiency (SE). OE is the product of PTE and SE and can be used to evaluate the resource allocation capacity and resource use efficiency. PTE is related to the influence of technical factors and SE to that of industry scale. When OE is equal to 1, the input and output of the provincial unit are effective, that is, both the PTE and SE are effective. The closer the values of PTE and SE are to 1, the more effective their efficiency. When both values are equal to 1, maximum efficiency is achieved.

The dynamic efficiency—that is, the change of TFP (total factor productivity) of the tourism industry—was measured from 2000 to 2012 using the DEA-MI (Malmquist productivity index). The value of the MI reflects the growth in TFP from period t to t+1. When the value of MI is greater than 1, the TFP is increasing. The MI can be further decomposed into technical efficiency change (TEC) and technical progress (TP) indexes. The TEC measures variation of the boundary distance from period t to t+1 of a provincial unit. A value of TEC greater than 1 indicates that the relative efficiency of the provincial unit is high. The TEC can be further divided into pure technical efficiency and scale efficiency; the meaning of these is the same as above. TP measures the degree of technological progress during the period t to t+1 of every provincial unit.

Table 2. Classification and Description of the Measurement Indexes, without LGA

Index	Name	Unit	Representations
Input	Fixed capital of tourism industry	Million	The scale of capital investment in tourism industry
	Number of tourism employees	Person	Number of labor force in tourism industry
	Travel agency conditions	Score	Tourism reception conditions
	Stars Hotel conditions	Score	Tourism reception conditions
	4A and 5A scenic spot conditions	Number	Tourism resource endowment
Output	Total tourism income	Billion	Economic output of tourism
	Number of tourists	Billion person time	Scale output of tourism
	Evaluation of inbound tourists	Score	Service quality output of tourism
	Tourist complaints	Score	Service quality output of tourism

2.3. Analysis of the Spatial Pattern and Interaction of Tourism Efficiency

The influence of LGA on tourist industry efficiency cannot be determined if only considering impacts of LGA on the measurement results of tourist industry efficiency. Because industry efficiency data possess geographic attributes, they can also present spatial patterns and have spatial autocorrelation, that is, there is interaction between neighboring provinces. The existence and types of influence from LGA on the spatial interaction patterns of tourism industry efficiency are therefore worth further exploration, to clearly understand the impacts on tourism efficiency by LGA.

To achieve this purpose, the author selected an appropriate level of the OE and MI values to present the spatial patterns and used a Moran scatter plot of spatial statistics to compare the change in spatial interaction of tourism industry efficiency, with and without LGA included in the measurement. The Moran scatter plot is divided into four quadrants. The first quadrant represents the spatial relationship between regions with high observed values and surrounding regions with high observations, namely HH (High-High). The second quadrant represents the spatial relationship between regions with low observed values and surrounding regions with high observations, or LH (Low-High). The third quadrant represents the spatial relationship between regions with low observed values and surrounding regions with low observations, or LL (Low-Low). Finally, the fourth quadrant represents the relationship between regions with high observed values and the surrounding regions with low observations, namely HL (High-Low). A significance level map can be obtained by combining a Moran scatter plot with the significance level of the Moran's *I* index of local autocorrelation. In practical analysis, because the function is the same and the present form is more vivid, the clustering chart commonly replaces the significance level chart (Sun and Dai, 2014). Therefore, a clustering chart was chosen in the following analysis to reflect the change in tourism industry efficiency.

3. Results

3.1. Measured Results of Static Efficiency

LGA was taken as an input indicator of tourism industry efficiency. The measurement results of 31 provinces throughout China in the years 2001, 2006 and 2012 are listed in Table 3, without and with the inclusion of LGA. The result of the former is OE (overall efficiency), and that of the latter is AOE (overall efficiency with governments' act).

The data in Table 3 show that with LGA, the average tourism industry efficiency increased (0.095, 0.121 and 0.12 in 2001, 2006 and 2012, respectively) compared with the results without LGA. Refined to the provincial level, tourism industry efficiency

improved in 17, 21 and 21 provinces in these 3 respective years, when taking LGA into account in measurement. The provinces with significantly improved tourism efficiency in 2001 are Jiangsu (0.383), Anhui (0.294), Zhejiang (0.261), Shandong (0.250), Shaanxi (0.233) and Sichuan (0.215). In 2006, these were Gansu (0.484), Jilin (0.273), Xinjiang (0.271), Liaoning (0.269), Shandong (0.252), Hebei (0.243), Zhejiang (0.235), Jiangsu (0.225), Heilongjiang (0.221), Hubei (0.205) and Yunnan (0.201) and in 2012, Xinjiang (0.409), Jiangsu (0.338), Shandong (0.321), Beijing (0.294), Zhejiang (0.263), Shanxi (0.250), Guangxi (0.248), Gansu (0.242) and Jilin (0.223). Therefore, it can be seen that the act of local governments has a significant positive impact on efficiency in the tourism industry. However, the strength of this impact remains to be expounded. The number of provinces whose tourism industry efficiency changed from ineffective status to effective was only 7, 6 and 5 in 2001, 2006 and 2012, respectively.

Table 3. Static Efficiency of the Tourism Industry, without LGA and with LGA, in 31 Provinces of China: 2001, 2006, and 2012

	2001		2006		2012	
	OE	AOE	OE	AOE	OE	AOE
Mean	0.844	0.939	0.808	0.929	0.780	0.900
Beijing	1.000	1.000	1.000	1.000	0.493	0.787
Tianjin	1.000	1.000	1.000	1.000	1.000	1.000
Hebei	0.785	0.958	0.626	0.869	0.494	0.619
Shaanxi	1.000	1.000	0.980	1.000	0.681	0.931
Inner Mongolia	0.962	1.000	1.000	1.000	0.736	0.833
Liaoning	0.542	0.639	0.587	0.856	0.933	1.000
Jilin	0.844	1.000	0.727	1.000	0.777	1.000
Heilongjiang	1.000	1.000	0.779	1.000	1.000	1.000
Shanghai	1.000	1.000	1.000	1.000	0.877	1.000
Jiangsu	0.617	1.000	0.775	1.000	0.662	1.000
Zhejiang	0.636	0.897	0.583	0.818	0.516	0.779
Anhui	0.625	0.919	0.651	0.784	1.000	1.000
Fujian	0.627	0.788	0.779	0.837	0.528	0.693
Jiangxi	1.000	1.000	0.783	0.790	0.704	0.754
Shandong	0.750	1.000	0.748	1.000	0.662	0.983
Henan	1.000	1.000	1.000	1.000	1.000	1.000
Hubei	1.000	1.000	0.602	0.807	0.874	0.898
Hunan	0.914	1.000	0.657	0.799	0.734	0.797
Guangdong	1.000	1.000	0.866	0.997	0.814	1.000

	2001		2006		2012	
	OE	AOE	OE	AOE	OE	AOE
Guangxi	0.795	0.887	0.736	0.875	0.709	0.957
Hainan	0.536	0.688	0.609	0.683	0.714	0.714
Chongqing	1.000	1.000	1.000	1.000	1.000	1.000
Sichuan	0.785	1.000	1.000	1.000	1.000	1.000
Guizhou	1.000	1.000	1.000	1.000	1.000	1.000
Yunnan	0.654	0.707	0.624	0.825	0.605	0.775
Tibet	1.000	1.000	1.000	1.000	1.000	1.000
Shaanxi	0.767	1.000	0.835	1.000	0.842	0.913
Gansu	0.633	0.808	0.422	0.906	0.535	0.777
Qinghai	1.000	1.000	1.000	1.000	1.000	1.000
Ningxia	1.000	1.000	1.000	1.000	1.000	1.000
Xinjiang	0.681	0.831	0.672	0.943	0.289	0.698

3.2. Measured Results of Dynamic Efficiency

The data in Table 4 show that LGA also has a significant positive impact on dynamic efficiency in the tourism industry. From the perspective of mean, the average annual growth rate of dynamic efficiency in the tourism industry increased from –1% to 2% after the inclusion of LGA. At the same time, the annual growth rates of technical efficiency and technical progress in the tourism industry also increased, from 0.3% and –0.1% to 2.5% and 2.0%, respectively. Clearly, LGA not only promotes technical efficiency but also the technological progress of tourism. In particular, the influence on the latter is more remarkable, further promoting dynamic efficiency within tourism.

According to the measurement results in different periods, the impact of LGA on dynamic efficiency of the tourism industry is basically positive because its annual growth rate improved after taking LGA into account. However, the influence of LGA from 2008 to 2011 decreased. As is well known, a global financial crisis broke out in 2008. The Chinese tourism industry faced an adjustment before a gradual recovery took place. The reason may lie in the lack of experience of local governments to revitalize the tourism industry when faced with the economic crisis. To further examine the changes in technical efficiency and technical progress before and after the addition of LGA, it can be seen that the influence of LGA on technical efficiency reflects a mix of positive and negative effects; however, the effects are nearly all positive with respect to technical progress. This verifies the conclusion above that LGA promotes

the dynamic efficiency of the tourism industry mainly through improving the status of technological progress.

Table 4. Dynamic Efficiency of the Tourism Industry from 2001 to 2012, without and with LGA

Year	without LGA			with LGA		
	Technical efficiency change	Technical progress change	TFP Change	Technical efficiency change	Technical progress change	TFP change
2001-2002	0.998	0.895	0.893	0.985	0.946	0.931
2002-2003	0.927	0.909	0.843	0.976	0.909	0.887
2003-2004	1.075	0.946	1.017	1.028	1.023	1.052
2004-2005	0.977	0.988	0.965	1.011	0.996	1.006
2005-2006	0.982	1.005	0.987	0.992	1.030	1.022
2006-2007	0.982	0.982	0.965	1.014	0.984	0.998
2007-2008	0.944	1.102	1.040	0.948	1.104	1.047
2008-2009	1.025	1.044	1.070	1.013	1.055	1.069
2009-2010	1.050	1.059	1.112	1.028	1.051	1.081
2010-2011	0.972	1.040	1.010	0.965	1.089	1.052
2011-2012	0.982	1.104	1.084	0.999	1.104	1.102
Mean	0.987	1.003	0.990	0.996	1.025	1.020

To further analyze the impacts of LGA on dynamic efficiency in the tourism industry, the author adopted a provincial perspective. The data in Table 5 show that the number of provinces with an average annual growth rate that improved, remained constant, or decreased was 26, 1 (Sichuan) and 4 (Guangxi, Anhui, Hainan and Yunnan), respectively. It can be seen that the overall impact of LGA on the dynamic efficiency of tourism is positive. Among those provinces with improved annual growth rates in dynamic efficiency, Xinjiang, Shandong, Shanxi, Hebei, Guangdong and Henan showed superior performance. By comparing the change in the average annual growth rates of technical efficiency and technical progress, it can be seen that the average annual growth rate of technical efficiency declined in only six provinces (Liaoning, Jiangsu, Anhui, Hainan, Sichuan and Shaanxi); however, this rate for technical progress increased in these six provinces. Only Beijing, Guangxi and Yunnan had a decline in the average annual growth rate of technical progress and an increase in that of technical efficiency.

Therefore, these provincial data provide further evidence of the previous conclusion that there is a positive effect owing to LGA on both technical efficiency and technical progress in the tourism industry via the promotion of dynamic efficiency by LGA, which is especially true for technical progress.

Table 5. Dynamic Efficiency of the Tourism Industry, with and without LGA, in 31 Provinces of China from 2001 to 2012

Province	without LGA			with LGA		
	Technical efficiency change	Technical progress change	TFP change	Technical efficiency change	Technical progress change	TFP change
Beijing	0.938	1.093	1.025	0.978	1.086	1.063
Tianjin	1.000	1.010	1.010	1.000	1.016	1.016
Hebei	0.959	1.023	0.981	0.961	1.070	1.029
Shanxi	0.966	0.966	0.933	0.993	0.994	0.987
Inner Mongolia	0.976	0.962	0.939	0.984	0.969	0.953
Liaoning	1.051	1.070	1.125	1.041	1.099	1.144
Jilin	0.993	0.977	0.970	1.000	1.002	1.002
Heilongjiang	1.000	1.034	1.034	1.000	1.056	1.056
Shanghai	0.988	1.037	1.025	1.000	1.039	1.039
Jiangsu	1.006	1.092	1.099	1.000	1.130	1.130
Zhejiang	0.981	1.087	1.066	0.987	1.098	1.084
Anhui	1.044	0.998	1.041	1.008	1.019	1.027
Fujian	0.985	1.040	1.024	0.988	1.070	1.058
Jiangxi	0.969	0.971	0.940	0.975	0.971	0.946
Shandong	0.989	1.001	0.989	0.998	1.076	1.074
Henan	1.000	1.023	1.023	1.000	1.063	1.063
Hubei	0.988	1.050	1.037	0.990	1.076	1.066
Hunan	0.980	1.001	0.981	0.980	1.039	1.018
Guangdong	0.981	1.050	1.031	1.000	1.079	1.079
Guangxi	0.990	1.098	1.086	1.007	1.064	1.071
Hainan	1.026	0.937	0.962	1.003	0.952	0.955
Chongqing	1.000	1.039	1.039	1.000	1.041	1.041
Sichuan	1.022	1.091	1.115	1.000	1.115	1.115
Guizhou	1.000	0.996	0.996	1.000	1.006	1.006
Yunnan	0.993	1.071	1.064	1.008	1.052	1.061
Tibet	1.000	0.931	0.931	1.000	0.933	0.933
Shaanxi	1.009	0.987	0.996	0.992	1.035	1.026
Gansu	0.985	0.940	0.926	0.997	0.957	0.953
Qinghai	1.000	0.875	0.875	1.000	0.890	0.890
Ningxia	1.000	0.862	0.862	1.000	0.868	0.868
Xinjiang	0.925	0.890	0.823	0.984	0.962	0.946

3.3. Results of Spatial Patterns of Static Efficiency

By observing the range of the measurement results, it can be seen that 0.7 is an appropriate value with which to divide static efficiency into three levels, that is OE=1, 0.7≤OE＜1 and OE＜0.7. In the light of this division, the spatial pattern of tourism static efficiency changed obviously after the addition of LGA. Specifically, the number of provinces with tourism industry static efficiency equal to 1 increased, those with tourism industry static efficiency less than 0.7 declined, and those with tourism industry static efficiency between 0.7 and 1 remained stable. In other words, efficiency of the tourism industry presented a spatial pattern that was predominantly upper-and mid-level OE values, after including LGA in the measurement.

By performing an in-depth analysis of change in the provinces during different periods, it can be seen that the number of provinces with OE values at the three levels above, listed in descending order, changed from 14, 8, and 9 to 21, 8, and 2 in 2001; the spatial pattern showed predominantly upper-level OE values and became more significant. In 2006, this change was from 14, 8, and 9 to 17, 13, and 1. The spatial pattern was still predominantly OE values at the upper level, but the mid-level values began to show an increasing trend. In 2012, the change was from 10, 11, and 10 to 15, 13, and 3, and the spatial pattern changed from uniform distribution of the three levels to predominantly upper-and mid-level values. Therefore, LGA consistently influenced the change in static efficiency of China's tourism industry such that the spatial pattern gradually became predominantly static efficiency with OE values greater than 0.7; most provinces demonstrated effective efficiency.

3.4. Results of Spatial Patterns of Dynamic Efficiency

The value of dynamic efficiency from 2001 to 2012 was measured by the MI divided into three levels: MI > 1, 0.9 < MI ≤ 1 and 0.8 < MI ≤ 0.9. The results show that the spatial patterns of tourism industry dynamic efficiency underwent considerable changes after including LGA in the measurement. The number of provinces with MI values greater than 1 increased; MI values decreased in the remaining provinces.

To more clearly depict changes in the spatial patterns of tourism industry dynamic efficiency over the 12 years, the study period was divided into two stages, with 2006 as the midpoint. MI values were divided into three levels following the principle above, and a pattern of spatial distribution emerged.

When LGA was included for 2001—2006, the number of provinces with dynamic efficiency at the upper, mid and lower MI levels changed from 9, 13, and 9 to 12, 15, and 4. Consequently, although the pattern of spatial distribution changed overall, mid-level values were always predominant. From 2006 to 2012, with LGA included in measurement, the number of provinces with dynamic efficiency at these three levels

changed from 24, 5, and 2 to 24, 6, and 1. Changes in the pattern of spatial distribution were small, and upper-level MI values always predominated.

It can therefore be concluded that the spatial pattern of dynamic efficiency in China's tourism industry was influenced by both changes in the tourism industry efficiency itself and the effect of LGA during 2001—2012.

3.5. Results of Spatial Interaction of Static Efficiency

It can be seen that after LGA is included in measurement, the spatial interaction pattern of static efficiency in the tourism industry for 2001, 2006 and 2012 changed considerably. The basic pattern of change is that the number of provinces in the HH quadrant increased, those in the LH and LL quadrants decreased, and the number in the HL quadrant remained relatively stable. Specific changes are as follows.

Firstly, after inclusion of LGA in 2001, the number of provinces in the HH, LH, HL and LL quadrants changed from 7, 10, 4, and 10 to 13, 7, 2, and 9, respectively. In other words, the number of provinces in the HH and LL quadrants increased whereas those in HL and LH decreased. There were 20 provinces with no change from the original quadrant: Beijing, Tianjin, Heilongjiang, Shanxi, Hubei, Chongqing and Hunan in the HH quadrant; Liaoning, Gansu, Yunnan, Fujian and Hainan in the LH quadrant; and Guangdong, Tibet, Qinghai, Guizhou, Ningxia, Jiangxi, Jilin and Inner Mongolia in the HL quadrant. In the remaining 11 provinces, Hebei and Shaanxi changed from the original LH quadrant to the HH quadrant; Jiangsu and Shandong moved from the LL to the HH quadrant; Shanghai and Henan went from HL to HH; Xinjiang and Guangxi moved from LH to LL; Anhui and Zhejiang changed from LL to LH; and Sichuan moved from the LH quadrant to the HL quadrant. In 2001, LGA had an overall influence on the spatial interaction of static efficiency in the tourism industry; however, the interaction pattern remained predominantly in the HL and LH quadrants.

Secondly, with inclusion of LGA in 2006, the number of provinces in the HH, LH, HL and LL quadrants changed respectively from 7, 7, 10, and 7 to 12, 5, 7, and 7; that is, interaction patterns in the HH quadrant increased whereas those in LH and LL decreased and those in HL remained the same. There were 19 provinces with no change from the original quadrant: Beijing, Tianjin, Shaanxi, Shanxi, Tibet and Sichuan in the HH quadrant; Gansu, Hebei, Yunnan, and Hainan in the LH quadrant; Anhui and Jiangxi, Zhejiang, Fujian and Guangxi in the LL quadrant; and Shanghai, Guangdong, Guizhou and Henan in the HL quadrant. Among the remaining 12 provinces, Chongqing moved from the HH quadrant to HL; Heilongjiang from LH to HH; Inner Mongolia, Ningxia and Qinghai changed from HL to HH; Xinjiang and Jilin from LL to HH; Hubei and Hunan went from HL to LL; Liaoning from LL to HL; and Jiangsu and Shandong moved from the LL quadrant to the HL quadrant. Compared with 2001, LGA had a large influence overall on the spatial interaction of static efficiency of tourism in

2006. The interactive correlation patterns were strongly dominated by the HH and LL quadrants, and performance was more notable after taking LGA into account.

Thirdly, with inclusion of LGA in the measurement in 2012, the number of provinces in the HH, LH, HL and LL quadrants changed respectively from 5, 10, 6, and 10 to 9, 8, 4, and 10. Interaction patterns in the HH quadrant increased whereas those in LH and LL decreased and those in HL remained the same. A total of 23 provinces showed no changes in quadrant: Shaanxi, Sichuan, Chongqing and Guizhou in the HH quadrant; Inner Mongolia, Xinjiang, Hunan, Yunnan, Hainan, Gansu and Hebei in LH; Zhejiang, Jiangxi, Fujian and Beijing in LL; and Ningxia, Liaoning, Tianjin, Shanghai, Guangdong, Henan, Qinghai and Tibet in the HL quadrant. In the remaining eight provinces (or city), Hubei moved from the HH quadrant to the LH quadrant; Shandong and Jilin from the LH to the HH quadrant; Guangxi from LH to HL; Jiangsu from LL to the HH quadrant; Shanxi from LL to HL; and Heilongjiang and Anhui from the HL to the HH quadrant. In 2012, LGA had an overall influence on the spatial interaction of tourism static efficiency; however, the interaction pattern remained predominantly reflected by the HL and LH quadrants.

3.6. Results of Spatial Interaction of Static Efficiency

In accordance with the results, with LGA, the number of provinces in the HH, LH, LL and HL quadrants changed respectively from 13, 7, 8, and 3 to 10, 5, 8, and 6. A total of 25 provinces remained unchanged from the original quadrant: Beijing, Henan, Jiangsu, Anhui, Chongqing, Shanghai, Zhejiang, Yunnan, Fujian and Guangxi in the HH quadrant; Jilin, Jiangxi, Guizhou and Hainan in LH; Inner Mongolia, Xinjiang, Gansu, Shanxi, Shaanxi, Ningxia, Qinghai and Tibet in LL; and Sichuan, Liaoning and Heilongjiang in the HL quadrant. In these provinces, the influence of LGA on spatial interaction patterns of the dynamic efficiency of tourism was small. In the remaining six provinces, Tianjin moved from the HH quadrant to both the LH and HL quadrants; Guangdong and Hubei moved from the HH quadrant into the HL quadrant; Hebei and Shandong changed from LH to HH; and Hunan from LH to the HL quadrant. LGA in these provinces had a large influence on the spatial interaction patterns of tourism dynamic efficiency. Therefore, during 2001—2012, LGA had a small overall influence on the spatial interaction patterns of tourism industry dynamic efficiency, with interaction patterns predominantly in the HH and LL quadrants.

To further clarify the influence on spatial interaction patterns of tourism industry dynamic efficiency by LGA during 2001–2006 and 2006–2012, the spatial interaction patterns of tourism dynamic efficiency, with and without LGA included in measurement.

According to the data, from 2001 to 2006 and with inclusion of LGA, the number of provinces in the HH, LH, HL and LL quadrants changed respectively from 11, 6,

11, and 3 to 6, 9, 8, and 8. In total, 18 provinces remained unchanged from the original quadrant: Shandong, Jiangsu, Shanghai, Zhejiang and Yunnan in the HH quadrant; Jilin, Anhui, Jiangxi and Hainan in LH; Xinjiang, Gansu, Shanxi, Hubei, Ningxia, Qinghai and Tibet in LL; and Sichuan and Liaoning in the HL quadrant. The remaining 13 provinces showed varying distributions.

With LGA from 2006 to 2012, the number of provinces in the HH, LH, HL and LL quadrants changed respectively from 9, 11, 7, and 4 to 13, 6, 8, and 4. A total 26 provinces remained unchanged from the original quadrant: Tianjin, Henan, Jiangsu, Anhui, Hubei, Chongqing, Zhejiang, Hunan, Yunnan and Guangxi in the HH quadrant; Jilin, Jiangxi, Guizhou, Fujian and Hainan in LH; Inner Mongolia, Xinjiang, Gansu, Shaanxi, Ningxia, Qinghai and Tibet in LL; and Sichuan, Guangdong, Liaoning and Heilongjiang in the HL quadrant.

It can be seen that LGA had a large influence on the spatial interaction patterns of tourism industry efficiency from 2001 to 2006, but a comparatively small influence from 2006 to 2012. In the first period, the predominance of the HH and LL quadrants declined, and that of HL and LH increased; this was completely reversed in the second period.

4. Conclusion

By analysis and comparison of the spatial patterns and spatial interactions of tourism efficiency, the conclusion can be reached that LGA indeed exerts an influence on the efficiency in the tourism industry. Judging from these results, LGA has a positive correlation with tourism efficiency via promotion of technological efficiency and technological advancement. In terms of spatial pattern variation, LGA has led to a tremendous increase in the number of provinces with static efficiency above 0.7, depicted as a predominant spatial pattern in these provinces. Moreover, LGA also improves the dynamic efficiency of tourism; thus, the number of provinces with positive annual average growth has increased substantially. Spatial patterns vary remarkably, with central and eastern regions of China enjoying positive annual average growth whereas western areas experience negative annual average growth. From variation in the general static and dynamic efficiency of tourism, it can be concluded that LGA also affects the spatial interaction patterns of tourism efficiency, but the influence is not profound.

The above analysis has served to clarify the general correlation between LGA and efficiency in the tourism industry and thereby verify the rationality of this research. In addition, the quantification of government acts and the method used to determine the impacts of LGA on the tourism industry have provided a solid basis for quantitative study in this field. In other words, the intensity index of LGA is a useful tool for such thorough investigation; temporal and spatial variations alone can be tracked and analyzed, and the economic impact of LGA on the tourism industry can be assessed.

The findings of this paper are factual and can serve as a reference for local

governments and tourism development. However, this study was unable to determine which activities of local governments have a larger influence on tourism efficiency and which acts have little or no impact. Further study and follow-up analysis are required.

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