Urban-rural income disparity and inbound tourism: Spatial evidence from China

Wenming Shi

Maritime and Logistics Management, Australian Maritime College,

University of Tasmania, Launceston TAS 7250, Australia

Wenming.Shi@utas.edu.au

Meifeng Luo

Department of Logistics and Maritime Studies,

The Hong Kong Polytechnic University, Hong Kong, China

meifeng.luo@polyu.edu.hk

Mengjie Jin

Jiangsu Key Laboratory of Modern Logistics, School of Marketing and Logistics Management, Nanjing University of Finance and Economics

No.3 Wenyuan Road, Xianlin College Town, Nanjing, China

mengjiejin@nufe.edu.cn

Seu Keow Cheng

Tasmanian School of Business and Economics,

University of Tasmania, Hobart 7006, Australia

Seu.Cheng@utas.edu.au

Kevin X. Li*

Ocean College, Zhejiang University

No.1 Zheda Road, Dinghai District, Zhoushan, China

kxli@zju.edu.cn

*Corresponding author: kxli@zju.edu.cn

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Abstract

The challenging concern regarding how the benefits of inbound tourism can be evenly distributed, especially among urban and rural individuals, has received considerable attention in China. To address this concern, a spatial econometrics approach is used to estimate the spillover effects of inbound tourism on urban-rural income disparity (URID). An empirical analysis using the spatial Durbin model was conducted for 31 Chinese provinces covering the period from 2003 to 2017. Our findings suggest that at the national level, local inbound tourism significantly reduces the local URID, while neighboring inbound tourism significantly increases the local URID. At the regional level, the role of inbound tourism in reducing the local URID is only detected in the western region. The spillover effects of inbound tourism are positive and significant in the eastern/northeastern region but negative in the western region. In general, these findings provide insights into the importance of inter-regional tourism policies and strategies for inbound tourism development in China.

Keywords: Inbound tourism; Urban-rural income disparity; Spatial Durbin model; Moran's *I*

Introduction

Efficiency and equity are two primary criteria that are widely used when evaluating the allocation of resources, and they have been widely considered in areas such as education (Fethke, 2017), health (Mentzakis et al., 2019), the environment (Dietz and Atkinson, 2010), and transportation (Wang, 2013). As stated by Mankiw (2015, p.5), efficiency means that the economy is getting the most from its scarce resources, and equity means the fair distribution of the benefits of those scarce resources among society's members. A more efficient economy can transform its inputs into outputs in a more efficient manner than inefficient economies, thereby generating higher economic growth (Scully, 1988). Meanwhile, a fairer economy can equalize the benefits of economic growth among people and create a more satisfactory society. In China, however, the rapid economic growth has been accompanied by a relatively high urban-rural income disparity (URID), which greatly challenges overall economic equity (Zhou and Song, 2016). As a result, a primary concern for policy makers is how to balance economic growth and URID, which can be achieved, to some extent, by promoting tourism.

The positive role of tourism in achieving economic growth has been broadly recognized throughout the world (Kim et al., 2006; Aslan, 2014; Li et al., 2018), although very few studies suggest the presence of negative or unclear impacts (Blake et al., 2003; Katircioglu, 2009; Pratt, 2014). Particularly, as a form of exporting, inbound tourism has been widely believed to boost economic growth by creating foreign exchange earnings, providing employment opportunities, promoting infrastructure development, and enhancing world cultural exchanges. This, in turn, generates considerable attention from policy makers and witness remarkable growth over the last few decades (Blake et al., 2008; Brida et al., 2016; Li et al., 2016). As addressed in the United Nations World Tourism Organization (UNWTO) Tourism Highlights (2017), international tourist arrivals have increased by 344.24% since 1980, from 278 million globally in 1980 to 674 million in 2000 and 1,235 million in 2016. Likewise, the international tourism receipts that are earned by destinations worldwide have increased by 1,073.08% since 1980, from US $104 billion in 1980 to US $495 billion in 2000 and US $1,220 billion in 2016.

Furthermore, there are at least two different ways in which tourism (i.e., inbound and domestic tourism) can contribute to economic equity. One is the job creation in the tourism sector, which mainly targets low-income individuals. In this way, the involvement and engagement of low-income individuals can be increased, which is likely to reduce income disparities (Li et al., 2016). A notable example is the

pro-poor tourism strategy aiming to raise the incomes of low-income households at the destination (Truong et al., 2014). The other way is to develop fairer tourism policies and regulations that ensure that individuals can evenly share the economic benefits of tourism (Vanegas et al., 2015). Nevertheless, tourism's role in achieving economic equity has not received enough attention in previous studies. One possible reason is the trade-off between economic growth and economic equity in the tourism sector. For example, some redistribution policies aiming to achieve a more equitable distribution of the economic benefits of tourism tend to reduce the rewards for working hard and subsequently slow economic growth (Mankiw, 2015, p.5). Another possible reason is that the aforementioned contributions of tourism to economic equity have not been widely supported in the existing studies, thereby reducing the attraction of tourism as a tool for boosting economic equity (Manyara & Jones, 2007; Blake, 2008; Alam & Paramati, 2016).

Similarly, earlier studies could not reach a consensus with respect to the role of tourism in promoting economic equity in China, and some have confirmed the existence of both positive (Zhao, 2009) and negative impacts (Liu et al., 2015). This in turn raises a challenging concern regarding how the benefits of tourism can be evenly distributed, especially among urban and rural individuals due to a rising urban-rural income gap in China. As shown in Table 1, China's urban-rural income gap displayed an apparent rising trend in each region from 2003 to 2017, thereby indicating that the economic benefits were not evenly distributed among urban and rural individuals. Accordingly, policy makers' primary concern is how to reduce URID when promoting tourism.

Insert Table 1 about here

Using the spatial Durbin model (SDM), this paper examines the presence of spatial spillovers of inbound tourism on URID in China from 2003 to 2017 and provides at least two advancements over the existing literature. First, the SDM allows policy makers to investigate the role of inbound tourism in improving URID from a spatial perspective, thereby deepening their understanding regarding how URID can be influenced by local and neighboring inbound tourism. Second, the results of the spatial spillovers provide insights into different strategies and practical approaches for regional inbound tourism development.

The remainder of this paper is organized as follows: In the literature review section, we review tourism's contributions to economic equity. The methodology section focuses on the application of the SDM. The data and empirical results are reported in the empirical analysis section, which is followed by

the discussions and policy implications section. Finally, the conclusion section concludes the paper.

Literature review

Although most previous studies focused on tourism's contribution to economic growth, more efforts have been made to explore the role of tourism in improving economic equity due to a growing concern regarding whether people can evenly share the economic benefits of tourism. Surprisingly, tourism's positive effects on economic equity have not been widely supported in the existing studies. For example, as demonstrated in Table 2, Gartner & Cukier (2012) undertake a case study in Malawi and find little significant evidence to support tourism's role in improving economic equity. Similar results were discovered by Manyara & Jones (2007) for the community-based tourism in Kenya; Lee (2009) for resorts, lakes, and parks tourism in the United States of America (USA); Scheyvens & Russell (2012a; 2012b) for the pro-poor tourism in Fiji; and Liu et al. (2015) for the Longevity Village in China.

Insert Table 2 about here

A close inspection of the existing studies reveals that the impact of tourism on economic equity has been assessed from multiple angles. Among them, poverty alleviation has gained the highest popularity and been frequently researched (Blake, 2008; Scheyvens and Russell, 2012a), and it is followed by income inequality (Lee, 2009; Alam and Paramati, 2016; Li et al., 2016), regional inequality (Andraz et al., 2015; Goh et al., 2015), relevant influential channels (Walpole & Goodwin, 2000; Thomas & Long, 2001), and gender inequality (Khatiwada & Silva, 2015). To quantitatively measure the effect of tourism on economic equity, the existing literature places great emphasis upon ordinary regression techniques (Lee & O' Leary, 2008; Alam & Paramati, 2016), input-output analysis (Blake, 2008), computable general equilibrium (CGE) models (Mahadevan et al., 2017), etc. However, the abovementioned models cannot reflect the observed regional disparities in inbound tourism in China due to their failure to capture the spatial spillovers of inbound tourism, thereby resulting in potential misspecifications of inbound tourism's impact on the local URID. To overcome this limitation, this paper uses the SDM to examine how inbound tourism affects URID, thereby allowing policy makers to revisit the role of inbound tourism in reducing URID by taking account of its spatial spillovers. Although the spatial econometric models have been previously used in tourism, they focus mainly on the spatial distribution of tourist flows (Zhang et al., 2011; Yang and Wong, 2012; Marrocu and Paci, 2013) and give little attention to economic equity. An exceptional study by Li et

al. (2016) proposes a spatiotemporal autoregressive model to examine the role of tourism development in reducing regional income inequality in China. Unlike Li et al. (2016), the current paper focuses on urban-rural income inequality, which is measured by the difference between urban and rural disposable income per capita, rather than regional income inequality, which is measured by real GDP per capita. This differentiation enables us to examine whether the benefits of inbound tourism can be evenly distributed among urban and rural individuals. Interestingly, the income level (i.e., the World Bank's classification of high-income, middle-income, and low-income) of a country or a region has been identified as an important factor affecting the popularity of tourism and has been used as a tool for promoting economic equity. As shown in the existing literature, more studies have been conducted in middle-income countries or regions (Spenceley and Goodwin, 2007; Erskine & Meyer, 2012; Khatiwada & Silva, 2015).

After better realizing the potential impacts of tourism on economic equity, policy makers have taken specific actions to enhance economic equity. For example, the pro-poor tourism strategy has been widely considered around the world, and it aims to raise the incomes of low-income households at a destination. However, most studies focus too much on the impacts of pro-poor tourism on economic growth rather than economic equity, which are deviations from the primary goal of the pro-poor tourism strategy (Theerapappisit, 2009; Harris, 2009; Akyeampong, 2011; King & Dinkoksung, 2014). Meanwhile, negative impacts of the pro-poor tourism strategy on poverty alleviation have also been detected, which reduce its attractiveness for enhancing economic equity (Scheyvens & Momsen, 2008; Scheyvens & Russell, 2012a, 2012b; Truong et al., 2014).

Turning our attention to China, the strict dual household registration system prevents, to some extent, labor movements from rural to urban areas, thereby resulting in relatively high URID and greatly challenging the overall economic equity (Sicular et al., 2007). Although a range of factors affecting URID have been previously identified, such as urbanization and the allocations of capital, government spending, educational resources, and financial resources (Li et al., 2014; Zhou and Song, 2016), very few studies have emphasized examining inbound tourism's impact on URID in China (Li et al., 2016). This in turn draws policy makers' attention regarding how to view the role of inbound tourism in reducing URID when promoting tourism. This gap can be filled by examining how inbound tourism affects China's URID using the SDM. Moreover, a cross-region comparison provides insights into different strategies and practical approaches that can be used to reduce the URID in China when promoting inbound tourism.

Methodology

To explain the degree to which one province's URID can be influenced by its neighboring URIDs, we applied Moran's *I* model (1950), as shown in Equation (1), to capture the spatial autocorrelation of the URIDs of different Chinese provinces.

$$I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(x_i - \overline{x})(x_{\overline{j}} - \overline{x})}{\sum_{i=1}^{n}(x_i - \overline{x})^2} \quad (1)$$

where n is the number of provinces, which is 31 in this paper; province i's and j's URIDs are indicated by x_i and x_j, respectively; the average URID is $\overline{x}$; and w_{ij} is the ij th element of the row-standardized spatial weight matrix W, which clearly shows all the spatial influences on province i that are attributable to province j. It is worth mentioning that W is constructed based on the binary contiguity weights and assumes that only contiguous provinces can influence each other (Anselin and Griffith, 1988). As a result, for two provinces that share boundaries, they are neighbors, and w_{ij} takes the value of one; it is zero otherwise (Yu et al., 2013).

As shown in Figure 1, at the national level, a higher gross domestic product (GDP) per capita is usually associated with a higher urban disposable income per capita (UDI) and a higher rural disposable income per capita (RDI). Then, it could reasonably be argued that a province's gross regional product (GRP) per capita can determine, to some extent, its UDI and RDI.

Insert Figure 1 about here

Next, we use the stepwise regression technique and include an additional variable of interest, international tourism receipts (ITR), in order to separately reflect inbound tourism's impacts on disposable incomes (Wilkinson, 1979). As a result, the log-linearized specifications of the UDI and RDI can be written as Equations (2) and (3), respectively.

$$\ln UDI_t = a_1 + a_2 \ln GRP_t + a_3 \ln ITR_t + e_{Ut} \quad (2)$$

$$\ln RDI_t = b_1 + b_2 \ln GRP_t + b_3 \ln ITR_t + e_{Rt} \quad (3)$$

where t represents the year, and e_{Ut} and e_{Rt} are error terms that follow normal distributions with zero means and constant variances. Then, the URID can be written as

$$URID_t = \ln UDI_t - \ln RDI_t = (a_1 - b_1) + (a_2 - b_2)\ln GRP_t + (a_3 - b_3)\ln ITR_t + (e_{Ut} - e_{Rt}) \quad (4)$$

Conversely, in a simple manner, the URID can be rewritten as

$$URID_t = \ln UDI_t - \ln RDI_t = \gamma_1 + \gamma_2 \ln GRP_t + \gamma_3 \ln ITR_t + \mu_t \quad (5)$$

where $\gamma_1 = a_1 - b_1$, $\gamma_2 = a_2 - b_2$, $\gamma_3 = a_3 - b_3$, and $\mu_t = e_{Ut} - e_{Rt}$. However, as mentioned above, the ordinary regression technique that is specified in Equation (5) fails to capture the spatial spillovers of inbound tourism, thereby resulting in potential misspecifications of inbound tourism's impact on the URID. To overcome this limitation, the following SDM is considered to address how the URID responds to changes in the local GRP and ITR, as well as changes in the neighboring GRP, ITR, and URID (Arbués et al., 2015).

$$URID_{i,t} = \ln(UDI / RDI)_{i,t} = \rho \sum_{j=1}^{n} w_{ij} \ln(UDI / RDI)_{j,t} + \alpha_1 \ln GRP_{i,t} + \alpha_2 \ln ITR_{i,t}$$

$$+ \beta_1 \sum_{j=1}^{n} w_{ij} \ln GRP_{j,t} + \beta_2 \sum_{j=1}^{n} w_{ij} \ln ITR_{j,t} + u_i + \varepsilon_{i,t} \quad (6)$$

where i and j represent the local and neighboring provinces ($i \neq j$), respectively; u_i is the individual effect; ρ is the spatial autoregressive coefficient; and w_{ij} and other variables are defined as above. The SDM will be estimated using the maximum likelihood estimation (MLE) method in Stata 15.

In addition, as pointed out by LeSage and Pace (2009), the decomposition of the total effect of a change in the ITR into the direct and indirect effects can help policy makers better understand the spatial spillovers of inbound tourism. More specifically, the direct effect of a change in a province's ITR on its own URID includes not only the estimated coefficient of the local ITR but also the spillover feedback effects that pass through other provinces and back to that province. The indirect effect measures the impact of a change in all other provinces' ITRs on the local province's URID, which is commonly understood as spillover effects (Arbués et al., 2015; Golgher and Voss, 2016; You and Lv, 2018). Then, the total effect, including both the direct and indirect effects, measures the impact of changes in all provinces' ITRs on the local province's URID.

Empirical analysis

Data and measurement of variables

The above SDM is estimated using a balanced panel dataset of 31 Chinese provinces from 2003 to

2017, which yields 450 observations. The data are mainly collected from the China Statistical Yearbook (2004-2018), and are supplemented by Wind Information data[1]. UDI and RDI are per capita disposable incomes (expressed in renminbi (RMB)) of urban and rural individuals, respectively. GRP is per capita gross regional product (expressed in RMB), which is calculated by dividing the gross regional product by the population size. The international inbound tourism receipts (ITR) can be obtained by multiplying US dollar-denominated international tourism receipts by the annual USD-RMB exchange rate. Furthermore, the consumer price index (CPI), with the year 2003 as the base year, is used to convert variables with nominal values to real values to eliminate the impact of inflation. As a result, the real UDI, RDI, GRP, and ITR are obtained and summarized in Table 3. As shown in Table 3, the average urban-rural income ratio was nearly 2.7 (UDI/RDI=15279.95/5674.63) from 2003 to 2017, which is relatively high (Li et al., 2014).

Insert Table 3 about here

Sicular et al. (2007) showed that China's urban-rural income gap contributes to the overall inequality using new household survey data for 1995 and 2002. To gain a deeper understanding of how China's urban-rural income gap can be influenced by inbound tourism, the URID is calculated as the difference between the logarithmic UDI and RDI, which facilitates the following spatial econometric analysis. Figure 2 shows the evolution of the URID from 2003 to 2017 and Table 4 presents the descriptive statistics of the URID. As depicted in Table 4, the western region had the highest URID with the mean of 1.221, and was followed by the central region with a mean of 1.025, and the eastern/northeastern region with a mean of 0.908. This reveals the presence of regional disparity of urban-rural income in China. In the meantime, Table 5 reports the results of Moran's *I* and provides some preliminary insights into the detection of spatial dependence in the URID. As suggested by the significant Moran's *I*, the URID displayed an overall declining trend from 2003 to 2017, thereby implying that the impact of neighboring URIDs on the local URID decreased. To better understand the observed declining spatial dependence, we restrict our attention to inbound tourism and use the SDM to estimate its spatial spillovers to reflect its role in influencing the local URID.

Insert Figure 2 about here

[1]Wind Information Co., Ltd (http://www.wind.com.cn/en/) is a leading integrated service provider of financial data, information, and software. It has built up a substantial, highly-accurate, first-class financial database. Its data are frequently quoted by media, in research reports, and in academic theses.

Insert Table 4 about here

Insert Table 5 about here

Estimation results of the SDM

Before estimating the SDM, a necessary step is to determine whether to use a fixed effect model or a random effect model, which can be achieved by conducting the Hausman test. For example, consider the following. At the national level, the Hausman statistic is 4.68, with a p-value of 0.1967, thereby suggesting that a random effect model better corresponds to the data. Similarly, a random effect model is also found to perform better at the regional level. Table 6 reports the estimation results of the SDM. As given in Table 6, the spatial autoregressive coefficient ρ is positive and significant in all regions except for the eastern/northeastern region, and it ranges from 0.555 to 0.728. That is, significant spatial dependence in the URID can be detected and confirmed at the 1% level, thereby implying that a province's URID can influence and be influenced by the URIDs of neighboring provinces at the national level, and in the central and western regions.

Insert Table 6 about here

In terms of the local explanatory variables, it is observed that $\ln GRP$ is negative and significant only in the eastern/northeastern and central regions, while $\ln ITR$ is negative and significant only at the national level and in the western region. This reveals that at the national level, inbound tourism plays a significant role in reducing the URID while GRP's contribution is insignificant. At the regional level, the URID can be significantly reduced by increasing the GRPs in the eastern/northeastern and central regions and promoting inbound tourism in the western region.

With respect to the neighboring explanatory variables, the coefficient of $w \times \ln GRP$ is significantly negative at the national level and in the eastern/northeastern region, significantly positive in the central region, and insignificant in the western region. Conversely, $w \times \ln ITR$ is positive and significant at the national level and in the eastern/northeastern region, negative and significant in the western region, and insignificant in the central region. This indicates that at the national level, increases in neighboring provinces' GRPs can help to reduce the local province's URID. However, inbound tourism's expansion in neighboring provinces tends to increase the local province's URID, thereby reflecting a competitive relation when using inbound tourism as a tool for reducing URID. At the regional level, the local province's URID can be reduced by increasing the neighboring provinces' GRPs in the

eastern/northeastern region and expanding the neighboring provinces' inbound tourism in the western region. Nevertheless, the neighboring provinces' inbound tourism expansion in the eastern/northeastern region can increase the local province's URID. A similar effect can be found for the neighboring provinces' GRPs in the central region.

Spatial spillovers at the national and regional levels

Following LeSage and Pace (2009), the estimated coefficients of $\ln GRP$ and $\ln ITR$ cannot directly reflect their marginal effects on the URID. To overcome this problem, Table 7 reports the direct, indirect, and total effects of $\ln GRP$ and $\ln ITR$ on the URID. In particular, the indirects effect of $\ln GRP$ and $\ln ITR$ are commonly regarded as spillover effects (Yu et al., 2013; You and Lv, 2018). That is, the spatial spillovers of $\ln GRP$ and $\ln ITR$ represent the impacts that result from changes in other provinces' GRPs and ITRs on the local province's URID, respectively. From Table 7, it is observed that the indirect effect of $\ln GRP$ is significant and negative in all regions except for the central region. For example, at the national level, the spatial spillovers of $\ln GRP$ amount to -0.132, thereby suggesting that a change in all other provinces' $\ln GRP$ can decrease the local province's URID. Similar explanations can be made for other regions. Regarding inbound tourism, the indirect effect of $\ln ITR$ is significantly positive in the eastern/northeastern region, significantly negative in the western region, and insignificant at the national level and in the central region. The results suggest that a change in all other provinces' $\ln ITR$ can increase the local URID in the eastern/northeastern region, which is conversely displayed in the western region. Thus, the spatial spillovers of $\ln ITR$ behave quite differently across regions.

Insert Table 7 about here

Discussions and policy implications

The empirical findings provide new insights into the role of inbound tourism in improving URID and how economic benefits from inbound tourism are shared among urban and rural individuals under the influence of different strategies. At the national level, the significant spatial autocorrelation of the URID suggests that the local province should take into account not only its own URID but also its neighbors' URIDs when using inbound tourism as a strategy to improve their URID. This implies that for a

representative province, its URID can be reduced by promoting local inbound tourism but increased by expanding the inbound tourism in neighboring provinces. Surprisingly, the overall spatial spillovers of inbound tourism are insignificant. At the regional level, the role of inbound tourism in reducing the URID behaves quite differently across regions, thereby suggesting that there are different strategies for developing inbound tourism. Specifically, for an eastern/northeastern province, the local URID can be increased by inbound tourism expansion in neighboring provinces and encouraging the use of a mitigation strategy in dealing with potential negative consequences. In the western region, a collaborative strategy is suggested since both local and neighboring inbound tourism expansion can reduce the local URID. However, for a central province, a low-priority strategy for inbound tourism development can be adopted due to its insignificant impact on the URID.

These disparate findings suggest that some practical approaches can be provided to distribute the economic benefits of inbound tourism more evenly among urban and rural individuals, such as the creation of more inbound tourism-related job opportunities for low-income individuals; the provision of necessary business skills, training, and consultation, which are targeted at inbound tourists; offering subsidies and preferential tax treatment to encourage private tourism enterprises to source suppliers from local communities when providing inbound tourism-related services; and upgrading the transport infrastructure and tourism facilities to attract more inbound tourists.

Conclusion

This study explores how inbound tourism affects the URID from a spatial econometric perspective. Using the SDM, we estimate the spatial spillovers of inbound tourism in China from 2003 to 2017. The findings from this study demonstrate that when evaluating resource allocations, the trade-offs between economic growth and economic equity require policy makers to pay attention to economic equity in order to better balance the two primary criteria. The empirical results also provide insights into different strategies and practical approaches for developing regional inbound tourism in China.

In general, significant spatial autocorrelation of the URID is detected and confirmed in all regions except for the eastern/northeastern region. Significant and negative impacts of local inbound tourism on the URID are found at the national level and in the western region. At the national level, inbound tourism expansion in neighboring provinces tends to increase the local province's URID, which is also found in the

eastern/northeastern region but contrary to the findings in the western region. In addition, it is found that the spatial spillovers of inbound tourism behave quite differently across regions, which suggests a mitigation strategy, a collaboration strategy, and a low-priority strategy for inbound tourism development in the eastern/northeastern, western, and central regions, respectively. Accordingly, some practical approaches for inbound tourism development are highlighted that can distribute inbound tourism's benefits efficiently and fairly among urban and rural individuals. These approaches include job creation, preferential taxation treatment and financial incentives, local sourcing projects, unemployment insurance or welfare support, the provision of transport infrastructure and tourism facilities, and ongoing pre-employment training and consultation.

This study has significant policy implications, and therefore, it is important to extend it to investigate the importance of inbound tourism on economic growth and economic equity simultaneously, which can be modelled using simultaneous equation techniques. This approach will further enhance our understanding of the complexity that is inherent in the role of inbound tourism in balancing the interactive effect of the two economic criteria for policy development.

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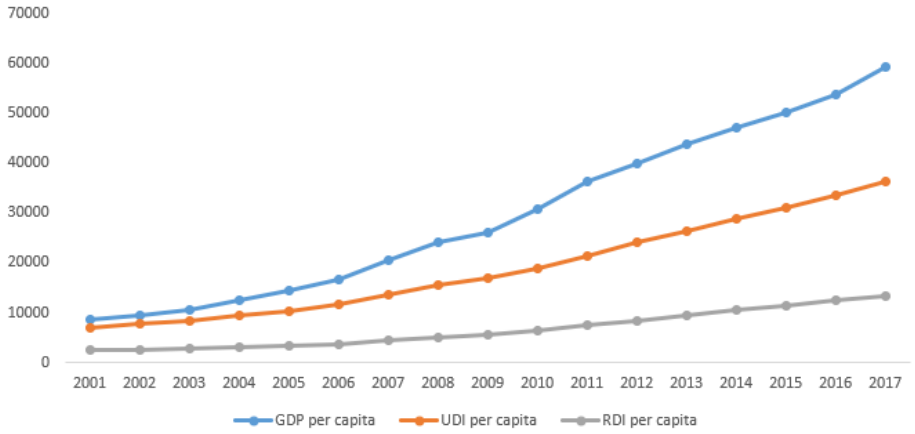

Figure 1 National level of GDP per capita disposable income per capita 2001-2017

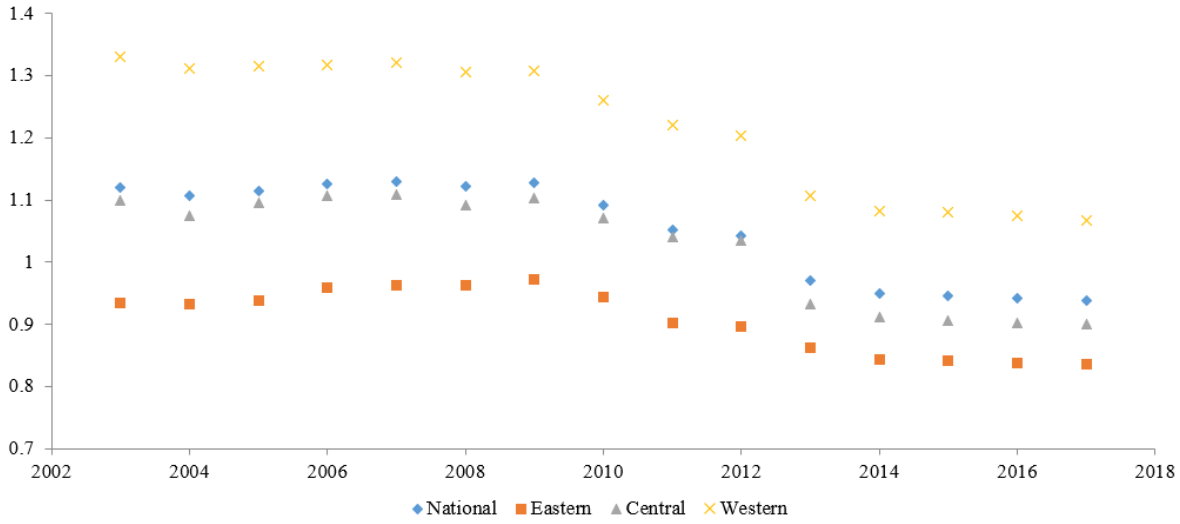

Figure 2 Urban-rural income disparity during 2003-2017

Table 1 Urban-rural income gap in China during 2003-2017 (Unit: RMB Yuan)

Year	National	Eastern/northeastern	Central	Western
2003	5450.28	5908.33	4731.21	5313.59
2004	5718.02	6341.04	4878.93	5462.62
2005	6275.32	6965.35	5402.78	5964.04
2006	6939.62	7806.99	6013.96	6462.80
2007	7668.12	8551.81	6721.60	7184.06
2008	8213.73	9251.76	7101.80	7645.16
2009	9036.72	10212.76	7793.42	8384.32
2010	9564.46	10792.43	8261.55	8885.63
2011	10128.52	11384.53	8851.57	9406.31
2012	11069.30	12377.02	9722.30	10326.12
2013	11339.96	12768.81	9780.94	10571.55
2014	11969.27	13445.37	10327.46	11191.06
2015	12781.62	14263.00	11008.33	12063.42
2016	13527.94	15044.59	11622.67	12837.52
2017	14396.95	15975.20	12385.85	13692.72

Notes: Income gap is the difference of per capita disposable income (RMB Yuan) between urban and rural households. All data are converted to constant prices of 2003 using the consumer price index (CPI) to reduce the impact of inflation on urban-rural income gap. In addition, the Eastern/northeastern region includes 13 provinces (Beijing, Tianjin, Hebei, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan); the Central region includes 6 provinces (Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan); and the Western region includes 12 provinces (Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang).
Source: China Statistical Yearbook (2004-2018) and the Wind Information (http://www.wind.com.cn/en/).

Table 2 Summary of papers addressing negative impacts of tourism on economic equity

Publications	Tourism forms	Tourism indices	Poverty or inequality indices	Countries	Data collection and analysis	Main findings
Walpole and Goodwin (2000)	Ecotourism	Tourist arrivals, overnight stays	Distribution of tourism-related revenue and employment	Indonesia	Small-scale survey and questionnaire; Descriptive analysis	Distributional inequalities favor external operators and urban gateway residents rather than rural villagers
Manyara and Jones (2007)	Community-based tourism	Tourism employment, income	Incidence of poverty	Kenya	Case study; interview	insignificant impact of CBE on poverty
Spenceley and Goodwin (2007)	Nature-based tourism	Tourism employment, earnings, procurement	Proportion of local people living above the international poverty line	South Africa	Case study	Little tangible impact on the majority of people living in highly populated rural communities but substantial impacts on the few people who directly benefit
Lee and O' Leary (2008)	Nonmetropolitan tourism	Tourism and recreation employment and earnings	Gini coefficient	USA	Panel data regression	Income inequality in selected US non-metropolitan communities increased
Blake (2008)	Hotels, restaurants and transport industries	Tourism expenditure	Food poverty lines, food and basic needs poverty lines	East Africa	Input-Output analysis	Tourism provide substantially less income for poorer households; tourism expansion may be detrimental for poverty alleviation
Scheyvens and Momsen (2008)	Pro-Poor tourism	Tourism revenues and employment	Material poverty, poverty of opportunity	SIDS	Descriptive analysis	In some cases the growth of tourism entrenches existing inequalities
Lee (2009)	Resorts, lakes, parks, etc.	Employment, income, seasonal housing	Gini coefficient	USA	Quintile analysis	Tourism services-dependent counties have greater income inequalities (*continued*)

(*continued*) Publications	Tourism forms	Tourism indices	Poverty or inequality indices	Countries	Data collection and analysis	Main findings
Gartner and Cukier (2012)	Lakeshore community	Tourism income, employment	Employment, monetary, health, education, and living conditions	Malawi	Case study; interview, questionnaire	Little evidence to support an improvement in poverty conditions
Scheyvens and Russell (2012a)	Pro-poor tourism	Tourism export earnings	Poverty line; three determinants (opportunity, empowerment and security)	Fiji	Case study; semi-structured interview, literature review; descriptive analysis	Poverty has increased in Fiji, despite rising tourism arrivals, but it is complex and is linked to agricultural decline
Scheyvens and Russell (2012b)	Pro-poor tourism	Tourist arrivals, tourism foreign exchange earnings	Poverty line	Fiji	Case study; semi-structured interview, literature review; descriptive analysis	Tourism greatly contributes to growing inequality and uneven spatial development
Truong et al. (2014)	Pro-poor tourism	Tourist arrivals, tourism income	Official poverty lines; other poverty factors (e.g. vulnerability to shocks, access to social services)	Vietnam	Semi-structured interviews; descriptive analysis	The local tourism sector has primarily benefited the non-poor and tour operators
Liu et al. (2015)	Longevity village	Tourism visits and income	Income levels of local residents	China	Questionnaire and surveys; descriptive statistical method	Local residents are seldom involved in the distribution of fair benefits; the actual income did not increase
Mahadevan et al. (2017)	Tourism sector	Tourist arrivals, tourism expenditure, tourism consumption	Income inequality, poverty incidence	Indonesia	Dynamic computable general equilibrium model	An increase in tourism causes a reduction in poverty and an increase in income inequality
Alam and Paramati (2016)	Tourism sector	Tourism revenue	Gini coefficient	Developing economies	Panel regression model	Tourism increases income inequality significantly

Source: Compiled by the authors. SIDS indicates small island developing state.

Table 3 Summary statistics of variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Per capita disposable income of urban individuals (UDI)	15279.95	6806.76	6530.90	46060.12
Per capita disposable income of rural individuals (RDI)	5674.63	3275.19	1564.70	19436.11
Per capita gross regional product (GRP)	26840.66	17391.45	3685.63	95241.43
International tourism receipts (ITR)	86.446	136.074	0.069	946.47

Notes: All nominal variables are adjusted for inflation factor using CPI to reflect the real variables. UDI, RDI, GRP are measured in RMB while ITR is measured in 100 million RMB.

Table 4 Summary statistics of URID during 2003-2017

	Mean	Standard Deviation	Minimum	Maximum
National	1.052	0.080	0.938	1.130
Eastern region	0.908	0.052	0.835	0.972
Central region	1.025	0.087	0.901	1.109
Western region	1.221	0.108	1.067	1.331

Notes: Urban-rural income disparity is $URID = \ln(UDI / RDI)$.

Table 5 Test for spatial autocorrelation Moran's *I*

Year	Moran's *I*	Year	Moran's *I*
2003	0.622***	2011	0.548***
2004	0.625***	2012	0.546***
2005	0.584***	2013	0.439***
2006	0.581***	2014	0.431***
2007	0.606***	2015	0.454***
2008	0.603***	2016	0.446***
2009	0.578***	2017	0.433***
2010	0.559***		

Note: ***statistical significance at the 1% level.

Table 6 Estimation results of the SDM

Variable	National	Eastern/Northeastern	Central	Western
Constant	1.217***	1.797***	0.791***	0.940***
	(0.000)	(0.000)	(0.000)	(0.002)
$\ln GRP$	-0.028	-0.077**	-0.345***	0.057
	(0.229)	(0.036)	(0.000)	(0.326)
$\ln ITR$	-0.024**	-0.010	0.040	-0.017***
	(0.026)	(0.674)	(0.170)	(0.007)
$w \times \ln GRP$	-0.049***	-0.058***	0.288***	-0.101
	(0.000)	(0.004)	(0.000)	(0.124)
$w \times \ln ITR$	0.031*	0.081**	-0.022	-0.024*
	(0.072)	(0.010)	(0.515)	(0.095)
ρ	0.555***	0.224	0.728***	0.640***
	(0.000)	(0.101)	(0.000)	(0.000)
R^2	0.5391	0.3891	0.6869	0.6905
Log-pseudolikelihood	869.86	869.86	167.82	869.86

Note: p-values are in parentheses. ***Statistical significance at the 1% level. **Statistical significance at the 5% level. *Statistical significance at the 10% level.

Table 7 The direct and indirect effects of variables

Variable		National	Eastern/Northeastern	Central	Western
$\ln GRP$	Direct effect	-0.039	-0.086**	-0.321***	0.042
		(0.102)	(0.015)	(0.001)	(0.436)
	Indirect effect	-0.132***	-0.086**	0.113	-0.165**
		(0.000)	(0.031)	(0.317)	(0.031)
	Total	-0.170***	-0.172***	-0.208	-0.123**
		(0.000)	(0.000)	(0.232)	(0.013)
$\ln ITR$	Direct effect	-0.022**	-0.003	0.043	-0.027***
		(0.043)	(0.907)	(0.168)	(0.001)
	Indirect effect	0.036	0.090***	0.024	-0.088**
		(0.223)	(0.008)	(0.733)	(0.017)
	Total	0.014	0.087**	0.067	-0.115***
		(0.665)	(0.012)	(0.435)	(0.007)

Note: p-values are in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level.