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RELATIONSHIP BETWEEN INBOUND TOURISM DEVELOPMENT AND ECONOMIC GROWTH: AN EMPIRICAL PANEL DATA STUDY ON MAINLAND CHINA

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ABSTRACT

This paper analyses the relationship between inbound tourism development and economic growth using a general dynamic panel data model, and testing for panel cointegration and Granger causality. It is based on the yearly series of tourism foreign exchange income and GDP per capital for 31 provinces in mainland China of the period from 1997 to 2019. Results indicate that a positive long-run relationship between inbound tourism and economic growth only exists in the east region, while the other regions and the full sample have a negative long-run relationship. When applying the panel Granger causality technique, evidence in favour of tourism-led growth hypothesis is found in the full sample, as well as east and west regions. Furthermore, there's also evidence showing that economic growth promotes tourism development in the full sample, middle and west regions. No Granger causality is found in the traditionally heavily industrial northeast region. Results differ considerably from the research using data of 20 years ago, implying the importance of rich information carrying capacity and effectiveness of the latest data.

1. INTRODUCTION

With the continuous improvement of comprehensive strength and national living standard in mainland China, its tourism industry has realized a huge development. According to the Travel & Tourism Competitiveness Report released by the World Economic Forum, the China mainland's tourism sector has risen to the 13th place in the world in 2019 (World Economic Forum, 2019). The combined contribution of tourism to GDP was 10.94 trillion Chinese Yuan, accounting for 11.05 percent of total GDP in China. Among them, the development of inbound tourism is advancing by leaps and bounds, driven by the continuous and in-depth advancement of the reform and opening-up policy. In 2019, the number of inbound tourists for the China mainland reached 145 million, an increase of 2.9 percent over the same period last year, and the international tourism revenue reached US $131.3 billion, an increase of 3.3 percent over the same period last year (Ministry of Culture and Tourism of the People's Republic of China, 2020). Even though inbound tourism only accounts for about 1.2 percent of total tourism revenue, its importance in absolute terms cannot be underestimated. However, the pandemic caused by the Coronavirus (COVID-19) and the blockade policy between countries or regions seriously damaged the rapid development trend of inbound tourism, and caused a sharp decline. It is expected to recover to the level before the epidemic over a long and unstable period of time. The tourism industry creates employment opportunities, increases people's income, expands the consumer market, promotes export trade and generates foreign exchange income (Salman Saleh et al., 2013). The development of international tourism is also conducive to promoting cultural exchanges between regions or countries and increasing intercultural understanding. Therefore, it is necessary to conduct a rigorous and in-depth analysis of the impact of tourism on the economic development of mainland China to correctly quantify the severity of the crisis. This will help policy makers and stakeholders related to the tourism industry make appropriate decisions to cope with the sharp drop in profits from the pandemic and to welcome the gradual recovery of tourism in the post-epidemic era. Conspicuously, as the tourism industry is highly dependent on the free movement of people, it would be quite important to understand the impact of changes in the flow of people and income levels caused by events such as COVID-19, economic crises or the Olympic Games on the rise and fall of the tourism industry in order to more accurately understand the connection between inbound tourism development and economic growth.

This research aims at contributing to the empirically study of the nexus between inbound tourism development and economic growth and to study the validity of the tourism leg-growth hypothesis (TLGH) through a panel data set of 31 provincial administrative regions (22 provinces, 5 autonomies and 4 municipalities) in China mainland from 1997-2019 using standard panel cointegration and Granger causality.

Panel data allows the existence of individual differences between different provinces. Furthermore, dynamic panel models by including lagged variables enable to model the dynamic relationship in the panel. For large dynamic panels, different research methods have been proposed. In particular, Pesaran et al. (1999) proposed pooled group mean group estimation, Pedroni (1999,2001,2004) proposed fully modified ordinary least squares (OLS) estimation, panel dynamic OLS estimation by Pedroni (2001) and Mark and Sul (2003) which permit the intersections between cross sections data. Moreover, common

correlated effects (CCEs) were brought up by Pesaran (2006), and Chudik and Pesaran (2015) extended common correlated effects estimation (DCCE) to the context of heterogeneous dynamic panel data allowing for errors of cross section dependence.

Basically, the unit root test is used to determine whether the series are stationary or non-stationary and the cointegration test is used to determine the cointegration relationship between the series. Then, the application of the Granger causality (Granger,1969) can help us further determine the direction in which the series affect each other. It is helpful to discover whether inbound tourism promotes economic growth or economic growth promotes inbound tourism development, or whether the two are related to advance and retreat together.

The hypothesis whether tourism promotes economic development and similar related topics have been widely investigated, but there are not many studies on mainland China, especially those focusing on inbound tourism and economic development. Mainland China is composed of 31 provinces, and each province differs greatly in terms of geographic relations, economic development, economic structure, population size, and population quality. Eugenio-Martin et al. (2004), have found for Latin American countries that the relationship between tourism development and economic growth only exists in low- and middle-income countries and not in high-income countries. Also, for mainland China, the relationship between tourism and economic development could depend on the income of the different provinces, with their income disparities. However, previous studies often regarded mainland China or China as a whole, and did not explore the differences in results between different groups due to differences in economic development (Ya Liqiu.,2013; Hua Qu, Jiechang Xia.,2011; Chunji Liu, Xuegang Feng.,2014; Lipang, Zhengwang, Qingchun Liu., 2006). In addition to using the latest data to study the relationship between economic growth and tourism development in Mainland China from 1997 to 2019, this paper will also study the relationship between inbound tourism and the economy for regions with different levels of economic development in Mainland China. Whether the relationship of growth is significant and whether the causal direction differs between regions and mainland China as a whole.

2. LITERATURE REVIEW

The TLGH

Although there is a large theoretical research literature on the relationship between tourism development and economic growth, the research conclusions are inconsistent due to the differences in research objects, theory construction, model setting, and research methods (Zhao Lei., 2012). Yet, most of the time the tourism-led growth hypothesis (TLGH) is confirmed. In the normative analysis of research methods, the empirical analysis is particularly important when the theoretical research has not reached a universal agreement. It's worth pointing out that the though TLGH theoretical explanatory reasoning is intuitively credible, if empirical evidence is not available for empirical investigation, the argument for the existence of TLGH is slightly far-fetched. In view of this, with the widespread application of economic empirical methods in tourism research, the research content of TLGH has been greatly enriched. It is a simple and effective method to classify the TLGH empirical research literature according to the methods setting. Throughout the literature, empirical research methods are mainly presented in the following four forms: time series data analysis, static panel data estimation, dynamic panel data estimation and other cross-section data analysis.

Time series data analysis

The use of non-stationary time series data for econometric regression analysis based on stationary series will affect the effectiveness of the analysis. This is the fundamental reason why the stationarity of the time series needs to be tested before the study. The purpose of the stationarity test of time series data is not to eliminate data, but to make full use of data information. Cointegration was first proposed by(Engle & Granger, 1987), and the theory is mainly studied in the search for an equilibrium relationship in at least two non-stationary time series, mainly applied to the economic system in which short-term dynamic relationships are susceptible to random disturbances and long-term relationships are constrained by economic equilibria.

Cointegration theory states that if there is a long-term equilibrium cointegration relationship between certain variables; this implies that if a variable deviate from its long-term equilibrium point after being disturbed by ups and downs at a certain time, the equilibrium mechanism adjusts it in the next period to bring it back to equilibrium. Since the cointegration test can only show that there is a certain long-term equilibrium relationship between variables, it does not mean that there is a causal relationship, so it needs to be Granger causality test to explore the direction of the relationship between the variables. (Balaguer & Cantavella-Jordá, 2002) first used the above method in the theoretical analysis of TLGH in Spain from 1975 to 1997, and concluded that there is a long-term stable and balanced co-integration relationship between tourism development and economic growth, and tourism development is the Granger reason. of economic growth. Subsequently, researchers conducted extensive time series data analyses between tourism development and economic growth with different empirical conclusions.

Dritsakis (2004) applied the multivariate VAR model for quarterly data from 1960 to 2000 for Greece, and conducted a Granger causality test on the basis of ECM, and found that there is a two-way Granger causality relationship between tourism development and economic growth. Brida et al. (2008) used co-integration test, VAR model, Granger causality test and impulse response function to analyse the quarterly data of Mexico from 1965 to 2007, which showed that there is a cointegration vector between tourism development and economic growth. It is the one-way Granger cause of economic growth. Belloumi (2010) also found that Tunisia's tourism development and economic growth were consistent with its research conclusions from 1970 to 2007. These papers all support the veracity of the TLGH hypothesis to a certain extent. Oh (2005) analysed the time series data of South Korea from 1975 to 2001 and concluded that the TLGH obtained by Balaguer and Cantavella-Jord (2002) is not applicable to South Korea, mainly because Spain is a typical tourism-dependent country. Its tourism income in 2000 accounted for 5.9% of the national GDP, while that of South Korea is only 3.5%. Besides, it also proposed that TLGH does not happen to South Korea, but an economic-driven tourism hypothesis (EDTH) exists.

The same situation also appears in Tang and Jang (2009) and Jin (2011) in the research literature on Hong Kong and the United States, respectively. The former paper believes that there is no long-term stable co-integration relationship between tourism development and economic growth, and tourism development in a pure sense is the one-way Granger cause of economic growth is not obvious, but there is an influence mechanism that economic growth promotes tourism development, that is, there should be a circular causal relationship between tourism development and economic growth; the latter paper agrees with the general consensus that tourism development can promote economic growth in the short term, while this relationship is not stable in the long term, mainly due to the capital-driven reason of Hong Kong’s economic growth (Zhao L ei, 2012).

Dynamic panel data analysis

One advantage of dynamic panel data is that it can model the dynamic behaviour of individuals, by incorporating lagged variables. The memory of the dynamic panel model in time comes from two aspects: one is the autocorrelation caused by the lagging dependent variable as the model explanatory variable; the other one is the autocorrelation caused by the individual effect of the difference between individuals. Simultaneity, missing variables, and measurement errors of the static panel model can cause endogeneity problems, leading to biased and inconsistent estimation results. In particular, for panel data structures where the number of units is greater than the number of time periods, the use of dynamic panel data processing technology is a very good choice (Roodman, 2006).

In terms of the analysis content of TLGH economic theory, dynamic panel estimation technology has been gradually accepted by research scholars and widely used in this research field because it effectively overcomes the estimation error problem caused by endogeneity in order to accurately reflect the development of tourism Economies of scale. In order to capture the dynamic continuity of the relationship between tourism development and economic growth, Eugenio-Martín et al. (2004) pioneered the application of dynamic panel generalized moment estimation technology to tourism

research for the first time. They used DIF-GMM to empirically investigate the relationship between tourism development and economic growth in 21 Latin American countries from 1985 to 1998. An interesting finding is that although TLGH exists in low-, middle- and high-income countries, tourism development has a relatively large effect on economic growth in low- and middle-income countries. The estimated coefficients are respectively 0.00064 and 0.00063, and the estimated value for high-income countries is only 0.00037. Based on the research method of Eugenio-Martín et al. (2004), Fayissa et al. (2008) used tourism density as a proxy variable for tourism development, and empirically examined the dynamic panel data of 42 African countries from 1995 to 2004. They pointed out that 1% increase of tourism density positively promotes economic growth to 0.0249%. In the study of Sequeira and Nunes (2008), they take the panel data of most countries in the world from 1980 to 2002 as the overall sample. At the same time, it is divided into two subgroups, namely, small countries (with a resident population of less than 5 million) and poor countries (with per capita GDP less than average). By using SYS-GMM and the modified least square dummy variable (LSDV) model (Bruno, 2005) to estimate the overall sample and then use the LSDV model to estimate the small and poor countries respectively, they find that: in the overall sample and the subgroup of poor countries, tourism development significantly promotes economic growth, while in small countries this contribution is not that obvious.

Panel cointegration analysis

With the development of panel unit root test theory, the theory of panel cointegration test has been enriched and expanded for more than two decades, from the initial homogeneous panel (Kao, 1999) to the heterogeneous panel (heterogeneous panel) test (Pedroni, 2001) and dynamic panel (Pedroni, 2004) test. Lee and Chang (2008) used dynamic heterogeneous panel cointegration technique to empirically test the relationship between tourism development and economic growth in OECD and non-OECD countries from 1990 to 2004 and found that compared with non-OECD countries, tourism development in OCED has a greater positive impact on economic growth. Santana-Gallego et al. (2011) used OECD panel data from 1980 to 2005 as the research object and found through empirical research that there is a long-term and stable co-integration relationship between inbound tourism and foreign trade. Inbound tourism Granger causes foreign trade in the short term. Tourism can significantly improve foreign trade. Therefore, these studies have inspired this research to not only pay attention to the relationship between mainland-China's tourism development and economic growth as a whole, but also to explore whether and how this relationship is embodied in various provinces at different levels of development.

TLGH researches of mainland China

Compared with the research literature focused on foreign regions or countries, studies on the existence of TLGH of mainland China still has a certain gap, and the research content is still mainly on the analysis of TLGH using time series data (Pang Li, et al., 2006; Yang Yong, 2006; Liu Siwei, Wu Zhongcai, 2007; Wu Chunyou, et al., 2009; Qu Hua, Xia Jiechang, 2011), and research on the dynamic panel estimation of the relationship between tourism development and economic growth and the co-integration relationship between the two heterogeneous panels is still in its infancy. At this stage, few documents

discuss this (Wang Liangjian, et al., 2010; Zhao Lei, 2011). The empirical literature research on China's TLGH panel data found that in the specific empirical research design, only the impact of tourism development on economic growth was examined by region, but the “heterogeneity” factors mentioned above were ignored in the grouping sub-samples. For this reason alone, it obviously cannot fully explain the timeliness of TLGH in a complex economy like China with a high degree of uneven economic growth. In addition, most of these studies use data up to 2010, not covering a decade of sizeable economic and tourism growth in China. First, most of these data come from the pre-global economic crisis era. Although mainland China did not experience negative growth like some Western countries due to the crisis, the impact of changes in the external environment on inbound tourism should obviously be taken into account; second, mainland China’s explosive economic growth and the rapid development of inbound tourism has been vividly demonstrated in the past ten years. Considering that China may continue to maintain a relatively high development speed in the future and have a huge driving effect on the regional economy, the use of the latest data will help us to proceed from a long-term perspective to understand how the relationship between economic growth and tourism development is reflected in mainland China. This could provide policy makers and stakeholders with useful insights to make wise decisions.

3. METHODOLOGY

This section describes the methodology used to analyse the available data and attain the project's objective. Three types of tests being used in this study are briefly summarised here, which respectively are panel unit root test, panel cointegration test and granger causality test, followed by a short introduction of the chosen panel.

Panel unit root

Conspicuously, in a data set of time series, the results of standard t-test and F-test are useless in the situation where a non-stationary variable is regressed on another non-stationary variable. Similar to the time series data, this issue also happens on panel data. Here Im et al. (2003) unit root tests is performed with the characteristics of heterogenous of various provinces. The null hypothesis for this test is that all panels have unit root, inversely, the alternative hypothesis is that stationarity exists in some panels. By using the Akaike information criteria (AIC) criterion (AR order up to 3), the autoregressive (AR) order is chosen and a time trend is allowed.

Panel cointegration

As (Pérez-Rodríguez et al., 2020) do in the paper studying whether tourism promotes economic growth, some standard panel cointegration models perform well and here we use the same models to test the cointegration in the present paper. Regarding a spurious regression potentially happens where a random walk will have a significant relationship for sure(Gao et al., 2009), panel cointegration test is proposed by Pedroni (1999,2004), using the regression residuals of cointegration and allowing for heterogeneous intercepts coefficients among cross-section data(Pérez-Rodríguez et al., 2020).

$$y_{it} = \alpha_i + \partial_i t + \beta'_{i0} x_{it} + e_{it}, \;\; i = 1,\dots,N, t = 1,\dots,T \quad (1)$$

In equation 1, the dependent variable of order I (1) is represented by $y_{it,}$ X_{it} is a vector of m x 1 of I (1) explanatory variables. Specific individual fixed effects and specific individual trend effect are respectively replaced by αi and ∂i. The null hypothesis is there's no cointegration where e_{it} is of order I(1), and it's I(0) under the alternative hypothesis with cointegration. Testing if the residuals of equation 1 are I(1) is considered with equation 2, which is a auxiliary equation for each cross section:

$$e_{it} = \rho_i e_{it-1} + \sum_{j=1}^{p} \varphi_{ij} \Delta x_{it-j} + v_{it}\,, \;\; i = 1,\dots,N \quad (2)$$

The null hypothesis is ρ_i=1 and the alternative hypothesis for homogeneity is $\rho_i = \rho < 1$, making the heterogeneous alternative hypothesis is $\rho_i < 1$ for all i. A few statistics formed from the residuals in equation 1 are all distributed as standard normal distribution proposed by Pedroni (2001).

In the following steps, we use Pedroni (2001) panel dynamic ordinary least squares (DOLS) to estimate the slope coefficient in the cointegrations. Pedroni proposed this equation regressing in each individual panel in order to estimate the dynamic model in equation (1):

$$y_{it} = \alpha_i + \partial_i t + \beta_i x_{it} + \sum_{j=-p}^{p} \gamma_{ij} \Delta x_{it-j} + \mu_{it}\,*, \;\; i = 1,\dots,N, t = 1,\dots,T \quad (3)$$

Where p stands for the leads and lags in the dynamic ordinary least squares regression.

Granger causality

After determining that there is a significant relationship between inbound tourism and the regional economy, we need to verify whether there is a corresponding causal relationship between inbound tourism and economic growth. The Granger causality test is a statistical method to describe the causality of two variables. This method of testing causality can show the degree of explanation of one variable series to the other variable series, such as the probability of influence indicating to what extent it can be explained. Granger causality was proposed by Granger (1969) for the first time, and the model is:

$$y_t = \alpha + \sum_{i=1}^{m} \beta_i y_{t-1} + \sum_{j=0}^{n} \gamma_j x_{t-j} + \mu_t \quad (4)$$

Where xt, yt are the time series of variables and respectively (in this paper, respectively represent the time series of inbound tourism income and GDP); t is time; $X_{t-j}x_t$ is the lag value; n is the longest lag period of x_t; y_{t-1} is the lag value of y_t; m is the longest lag period of y and t; α is a constant; β_i, γ_j are regression coefficients; μ_t is a random error. The null hypothesis is H_0 : γ_j (j=0, 1... , n). The basic idea is that, in the case of controlling the lag term (past value) of y, if the lag term of x is still helpful to explain the changes in the current value of y, then it is considered that x Granger causes y.

Dumitrescu-Hurlin (2012) provides an expanding method to test the causality of panel data based on that. The potential regression model is:

$$y_{it} = \alpha_i + \sum_{k=1}^{k} \gamma_{ik} y_{i,t-1} + \sum_{k=1}^{k} \beta_{ik} x_{i,t-k} + \varepsilon_{i,t} \quad (5)$$

Among them, i=1,……,N; t=1,……,T. $x_{i,t}$ and $y_{i,t}$ are the observation values of two stationary series on individual i and time t. DH's panel causality test allows the regression coefficient of each section unit to be variable (that is, at the same time, the coefficient is different between individuals). Assume that all individuals have the same lag order k, and the panel is stable. Similar to Granger causality test, DH test also judges causality by the influence of the past value of x on the present value of y. The null hypothesis is that all individuals in the panel do not have causal relationships, and the alternative hypothesis is that some (not all) individuals have causal relationships:

In terms of actual operation, DH proposes to run N-amount of independent regressions included in the formula (4), perform F test of k linear hypothesis to obtain Wald statistics W_i, and finally calculate the average value of Wald statistics

$$\overline{W} = \frac{1}{N} \sum_{i=1}^{N} W_i \quad (6)$$

The purpose of the DW test is to explore the causal relationship of panel data. Rejecting the null hypothesis does not exclude the non-causal relationship of some individuals. Under the assumption that the Wald statistic W_i is independent and identically distributed, when $T \to \infty$ and $N \to \infty$, standardized statistics $\tilde{Z}$ obey the following normal distribution:

$$\bar{Z} = \sqrt{\frac{N}{2K}} \times \left(\overline{\overline{W}} - K\right) \frac{d}{T,N \to \infty} \to N(0.1) \quad (7)$$

Moreover, for a fixed T>5+3K dimension of T, the largest standard statistic Z obeys the following normal distribution:

$$\tilde{Z} = \sqrt{\frac{\mathrm{N}}{2K} \times \frac{T-3K-5}{T-2K-3}} \times \left(\frac{T-3K-3}{T-3K-1} \times \bar{W} - K\right) \frac{d}{T,N\to\infty} \to N(0.1) \qquad (8)$$

4. RESULTS

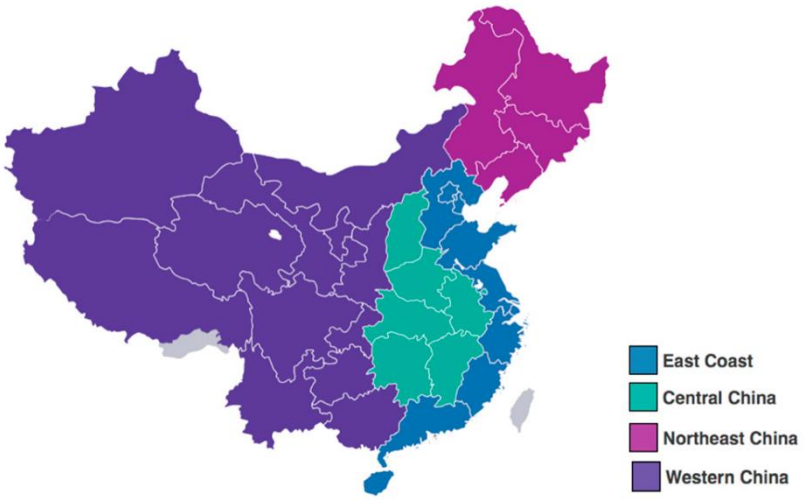
Data selection

The data used in the study is a panel data with T being 23 and N being 31. We collect data from 31 provinces from 1997 to 2019, which brings the total number of observations to 713. In this paper, indicators include China's tourism foreign exchange income serving as a proxy for inbound tourism development and the GDP per capital for economic growth. All the data used in study is obtained from the China Economic Network. Established in 1996. China Economic Network Data Co., Ltd. is a subsidiary of State Information Center, mainly responsible for the development, construction, maintenance and operation of China Economic Information Network www.cei.gov.cn. The "China Economic Information Network Statistics Database" is developed by the National Information Center “China Economic Information Network” based on the good cooperative relationship with the National Development and Reform Commission, the National Bureau of Statistics, the General Administration of Customs, various industry authorities and other government departments. After long-term data accumulation and relying on its own technology, resource advantage, a comprehensive and orderly huge economic statistics database group organized through specialized processing (State Information Center, 2013). As one of the official databases in mainland China, its database is one of the main sources of academic information for many universities in mainland China. The reason why we choose tourism foreign exchange income as the variable to represent the level of inbound tourism development is due to the limitation of database information. But in fact, one can see tourism foreign exchange income as tourism expenditure and it considers idiosyncratic features such as the duration of the stay or the type of tourism (see for example Pérez-Rodríguez et al., 2020, for a similar approach). Two provinces in the mainland China, namely 山西 and 陕西 in Chinese characters, share the same latin transcription with different tones in Chinese mandarin. In order to distinguish them, we respectively name them shanxi[1] and shanxi[2] for 山西 and 陕西.

In order to be able to conduct group analysis, and compare the results of the groups with the one for the entire sample, according to the ecogeographical divisions commonly used by authorities in China, 31 provinces are divided into east, middle, northeast and west regions intuitively showing in graph 1. The GDP per capital, which stands for the level of economic development and income level, for the four regions is ranked in order from high and low: east, northeast, middle and west. In the traditional sense, the east is the region with the most developed economy and the highest standard of living among the four geographic regions of mainland China. In the early days of the founding of the People’s Republic of China in the last century, the northeast region relied on the development of its heavy industry to provide important contributions to the national economy but now there is a negative growth in some cities in this region. The overall economic level of the central and western regions is not as good as that of the east region, but they have developed rapidly in recent years. Especially in the tourism industry, with the support of numerous tourism resources and policies, the central and western regions have gradually become popular tourist destinations. The internal heterogeneity of the west region is relatively large. Although most area in the middle and west regions are still relatively not very high in development,

they also have nurtured international metropolises such as Chongqing and Chengdu, which are home to many countries' consulates in the west region and emerging industries, with the standard of living being close to the more developed cities in the east.

Graph 1: Four regions in the mainland China



Notes: Graph is taken from Huang, H., & Wang, T. (2017). In this paper, the names of the four regions have been changed a little with east coast being the east, central China being the middle, northeast China being the northeast China and western China being the west. Gray areas are declared to be sovereign but not under actual jurisdiction of the People's Republic of China.

In economics, non-stationary variables are very common. Analysing them through standard regressions, results could be spurious. In order to solve this issue, unit root and cointegration of the panel data are used. The panel cointegration estimation technique allows the cointegration coefficient of each individual to be different (Gao et al., 2009). In order to promote the balanced development of tourism foreign exchange income and economic growth, this paper adopts the panel cointegration method to study the relationship between inbound tourism activities and economic growth at both national and regional levels using the latest homogenous data. Tourism foreign exchange income and per capita GDP are significantly different in absolute value. In order to facilitate comparison and explanation, they are logarithmic, so as to show the relationship between tourism development and economic growth in the form of an elasticity. Afterwards, we take the first-difference to it, in an attempt to make non-stationary series stationary.

Standard panel cointegration analysis

Table 1. Panel unit root and standard panel cointegration tests

Variable	31 provinces		East		Middle		Northeast		West	
	Statistic	*P* Value	Statistic	*P* Value	Statistic	*P* Value	Statistic	*P* Value	Statistic	*P* Value
Panel A: Im-Pesaran-Shin unit root test										
GDP per capital	1.9085	0.9718	1.0401	0.8509	0.6645	0.7468	-1.3131	0.0946 *	2.3328	0.9902
Tourism foreign exchange income	5.0296	1.0000	0.7969	0.7872	2.8428	0.9978	0.9241	0.8223	4.9013	1.0000
△Log(GDP per capital)	-1.8867	0.0296 **	-1.3276	0.0922 *	0.0723	0.5288	-0.7162	0.2369	-1.5168	0.0647 *
△Log(tourism foreign exchange income)	-16.8502	0.0000 ***	-8.8609	0.0000 ***	-8.7758	0.0000 ***	-4.6681	0.0000 ***	-10.4545	0.0000 ***
Panel B:Pedroni cointegration test										
Modified Philips-Perron t	-4.6653	0.0000 ***	2.8004	0.0026 ***	-3.8878	0.0001 ***	-1.6831	0.0462 **	-3.2093	0.0007 ***
Philips-Perron t	-9.1627	0.0000 ***	2.9494	0.0016 ***	-6.4552	0.0000 ***	-3.2397	0.0006 ***	-6.1564	0.0000 ***
Augmented Dicky-Fuller t	-9.3743	0.0000 ***	3.2237	0.0006 ***	-6.2297	0.0000 ***	-3.2239	0.0006 ***	-5.8521	0.0000 ***
Panel C: Kao cointegration test										
Modified Dicky-Fuller t	-14.5854	0.0000 ***	1.9433	0.0260 **	-8.4525	0.0000 ***	-5.9239	0.0000 ***	-9.5271	0.0000 ***
Dicky-Fuller t	-11.6651	0.0000 ***	1.8691	0.0308 **	-6.3630	0.0000 ***	-4.2190	0.0000 ***	-7.9389	0.0000 ***
Augmented Dicky-Fuller t	-7.3055	0.0000 ***	0.2317	0.4084	-3.9569	0.0000 ***	-2.6573	0.0039 ***	-4.6824	0.0000 ***
Unadjusted modified Dicky-Fuller t	-17.5308	0.0000 ***	2.1230	0.0169 **	-9.6706	0.0000 ***	-6.1950	0.0000 ***	-12.1933	0.0000 ***
Unadjusted Dicky-Fuller t	-12.1800	0.0000 ***	2.1497	0.0158 **	-6.5190	0.0000 ***	-4.2516	0.0000 ***	-8.3971	0.0000 ***
Panel D: Westerlund cointegration test										
Variance ratio	-2.9205	0.0000 ***	-1.8064	0.0354 **	-2.2396	0.0126 **	-1.6777	0.0467 **	-1.3480	0.0888 *

Note: The AR order according to the Akaike information criteria (AIC) criterion and a time trend are allowed in the Im et al. (2003). In the Pedroni (1999, 2004) and Kao (1999) panel cointegration tests, it follows the AIC criterion (between 0 and 3) to choose the order (See Pérez-Rodríguez et al., 2020 for a similar choices in their empirical analysis). The series are time-demeaned. In the Westerlund (2005) cointegration test, the alternative hypothesis is some panels are cointegrated, and the series is time-demeaned. The test of unit root and cointegration are run respectively in STATA with the commands *xtunitroot* and *xtcointtest*.

*, ** and *** respectively represent the significance level at 10%,5% and 1%. I thank Heiko Rachinger for providing me with the STATA codes of Pérez-Rodríguez et al. (2020).

Since we are interested in knowing the relationship between inbound tourism development and economic growth, first standard panel cointegration techniques are performed to analyse the relationship. Then, Granger causality tests analyse whether there's causality relation between them. Each analysis we focus not only on the whole mainland China but also on the subgroups in order to see the consistency of the relationships between tourism development and economic growth among all the studying groups. All the analyses use data of 31 provinces from 1997 to 2019. Table 1 displays the unit root tests and three standard panel cointegration tests. The null hypothesis of Im et al. (2003) unit root test is that all panels contain unit roots and the alternative hypothesis is that some panels are stationary,

which there could be different coefficients in different panels. According to the Akaike information criteria (AIC) criterion, which means AR order up to 3, autoregressive (AR) order is chosen and we also allow the existence of a time trend, it's the same for the 5 groups. For the sample population, namely 31 provinces, original series of GDP per capital and tourism foreign exchange income are not rejected but both the first-difference of log (GDP per capital) and the first-difference of log (Tourism foreign exchange income) are rejected. Therefore, there is evidence showing that the two original series have a unit root and the first-difference series do not have a unit root. For the subgroups of different regions, things get a little different. In the original series, null hypothesis of GDP per capital of the northeast subgroup is rejected at 10% level and all the others are not rejected with p values larger than 0.1. In the first-difference series, coefficients of GDP per capital and tourism foreign exchange income are still significant, respectively being at 10% level and 1% level for the west region as well as the east. Middle region and northeast region share the same characteristics of significance level, they both have coefficients of first-difference of tourism foreign exchange income significant at 1% level and not significant for the first-difference of GDP per capita. In conclusion, there's evidence of a unit root for both variables in the original series but no evidence in the series of first-differences for the full sample. We also find evidence of a unit root in the original series for the subgroups. Surprisingly, we find some evidence of the existence of unit root for the first-order difference of GDP per capital in the subgroups of middle region and northeast region, which it may concern the lack of enough data in each subgroup. Especially in the subgroup of northeast, there are only three provinces, which it may be the reason causing this issue.

Table 1, panels B, C and D, display the test results of three standard panel cointegration. For all three cointegration tests, the null hypothesis is there's no cointegration and the alternative hypothesis is that all panels are cointegrated. Starting from Pedroni (1999,2004) test for panel cointegration, again, the AIC criterion is used to choose the order. By adding the demean option, the influence of cross-section correlation on the power of unit root test is alleviated. All the three are statistically significant at the 1%. Then, same results show up for the five Kao (1999) cointegration tests statistically based on the Augmented Dicky-Fuller regression and the Westerlund (2005) cointegration test, which is only slightly different from the other two tests, they are all significantly cointegrated at 1% level. Instead of requiring that all panels are cointegrated, the alternative hypothesis of Westerlund cointegration test is that some panels are cointegrated. Thus, there is evidence that some panels or even all panels are cointegrated for entire mainland China. Test results are little different for the four subgroups, especially for the east which happens to be the relatively most developed and open region in mainland China. In the east region subgroup, with all the other tests' coefficients being significant at 1%, Augmented Dickey-Fuller test does not find significant cointegration but significant cointegration is found in all the other three region subgroups all over the kinds of tests. Another difference between the whole and the subgroups is that for the Pedroni and Kao cointegration tests, the entire mainland China and subgroups of middle, northeast and west have negative cointegration while there's positive cointegration of these two tests in the east region. This shows that there is a positive correlation between tourism development and economic growth in the eastern region, and a negative correlation between tourism development and economic growth in the entire sample and the middle, northeast, and west regions. Although it is not yet

possible to judge the causal relationship between tourism development and economic growth, the negative correlation is not what we expect to see. The appearance of negative correlation cannot provide support for explaining the hypothesis that tourism promotes economic growth for the corresponding regions. For east region, it does imply that that tourism development can help the growth of economy in the east region. Considering the east region is relatively the most developed region among the four regions and it also has a higher economic development level than the average of the entire mainland China, one can argue that the positive cointegration may relate to the economy's position where it is in the developing process.

To sum up, there is no unit root in the first difference of the series in the full sample and east and west subgroups, but there's some evidence of unit root in middle and northeast subgroups as the null hypothesis is not even rejected at 10% level; p value is respectively 0.5288 and 0.2369 for first-order difference of GDP per capital. For all panels, there is evidence for cointegration between the first-difference of log (GDP per capital) and the first-difference of log (tourism foreign exchange income). This really helps us confidently continue doing the following panel Granger causality test.

Table 2. Individual DOLS estimation

Provinces	31 provinces		
	Beta	*Standard Error*	T Statistics
Beijing	0.11**	0.06	1.97
Tianjin	0.09	0.09	0.97
Hebei	0.17***	0.06	2.97
Shanxi[1]	0.25***	0.03	7.66
Neimenggu	0.32***	0.06	5.77
Liaoning	0.28***	0.02	12.30
Jilin	0.53***	0.09	5.64
Heilongjiang	0.13*	0.07	1.86
Shanghai	0.30**	0.15	2.01
Jiangsu	0.17***	0.06	2.91
Zhejiang	0.07*	0.04	1.64
Anhui	0.37	0.07	0.04
Fujian	0.50***	0.11	4.52
Jiangxi	0.29***	0.04	7.29
Shandong	0.40***	0.05	7.76
Henan	0.25***	0.03	8.59
Hubei	0.25***	0.08	3.03
Hunan	0.06	0.04	1.38
Guangdong	0.13**	0.06	1.98
Guangxi	0.18**	0.09	2.10
Hainan	0.07	0.05	1.55
Chongqing	0.24***	0.07	3.18
Sichuan	-0.08	0.06	-1.30
Guizhou	0.11	0.10	1.11
Yunnan	0.52***	0.07	7.32
Xizang	0.03	0.02	1.50
Shanxi[2]	0.51***	0.08	6.68
Gansu	-0.02	0.04	-0.59
Qinghai	-0.05	0.07	-0.79
Ningxia	-0.09	0.07	-1.18
Xinjiang	0.24***	0.03	7.60

Note: Dynamic ordinary least squares (DOLS) estimates using standard errors and t statistics. A time trend cointegration relationship and lags and leads of the differenced explanatory variables chosen by AIC criterion, are contained in the regressions. The DOLS estimation is carried out in STATA with the command *xtcointreg*.

*, ** and *** respectively represent the significance level at 10%,5% and 1%.

Next, we use the panel data dynamic ordinary least squares (DOLS) estimator (Pedroni, 2001) to estimate the relationship between tourism activity and economic development for the different provinces. The dynamic ordinary least squares (DOLS) estimation can eliminate the endogeneity caused by the long-term correlation between the equilibrium error and the first-order difference of the regressor. And under the sequence limit theory, the DOLS estimator is asymptotically normal. Together with a linear in the cointegration, lag and lead of the differenced explanatory variable and standard errors, coefficients for each individual province's slope are provided in table 2. Above all, there is no consistency in coefficients being all positive or all negative. Most of the provinces' coefficients are positive, but coefficients for Sichuan, Gansu, Qinghai and Ningxia which are four provinces from west regions are negative and not significant. This is a little surprising as some of the four provinces are quite famous for its tourism, especially the Sichuan province. Sichuan is the authentic origin of Szechuan cuisine, some natural reserves and sites like, for instance, Jiuzhaigou, which is always at capacity and domestically well-known, not to mention that Sichuan has some important and national level places for helping reproduce and take care of pandas where tourists can visit and interact with breeders and pandas there. Besides, the slope coefficients are significantly positive for 21 provinces out of all the 31 provinces in the mainland China, namely Beijing, Hebei, Shanxi[1], Neimenggu, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Fujian, Jiangxi, Shandong, Henan, Hubei, Guangdong, Guangxi, Chongqing, Yunnan, Shanxi[2] and Xinjiang, which they are displaced all over the four regions. All three provinces' slope coefficients in the northeast regions are significantly positive and most east provinces' coefficients are also significantly positive. Generally speaking, east region is relatively more developed region in mainland China, including Beijing, Shanghai, Guangzhou and Shenzhen this kind of high-income international metropolitans, where embassies or consulates of most countries in the world are located. The corresponding group-mean panel DOLS coefficient is 0.20 and with a t statistics of 20.98 clearly significant. To conclude, enough evidence of cointegration between tourism foreign exchange income and GDP per capital, which respectively represents inbound tourism development and economic growth, is found for the 31 provinces all over than mainland China. Particularly, in nearly two thirds of the 31 provinces exist a long-term relationship between inbound tourism development and economic growth. Related to the latest and ongoing pandemics caused by COVID-19, this is a great chance for the provinces that have a significant positive slope coefficient to recover its economy through the recovery of tourism industry by ensuring safety and sanitary measures.

DH's Granger causality analysis

After the co-integration analysis, although we can show that there is a co-integration relationship between the two series, whether there is a causal relationship between them, whether tourism development is the cause of economic growth, or vice versa, whether economic growth is an important driving force for tourism development is still unknown. Here, DH panel causality Test (Dumitrescu-Hurlin, 2012) is used to see the influence direction of the sample population, that is, all 31 provinces and four regions in mainland China.

Table 3. Granger Causality Test Results in east, middle, northeast, west regions and the whole mainland China

Granger reason	31 provinces		East		Middle		Northeast		West	
	P value-Z	P value-$\bar{Z}$	P value-Z	P value-$\bar{Z}$	P value-Z	P value-$\bar{Z}$	P value-Z	P value-$\bar{Z}$	P value-Z	P Value-$\bar{Z}$
△Tourism foreign exchange income on △ GDP per capital	0.0000***	0.4569	0.0000***	0.1052	0.9987	0.5431	0.8500	0.9768	0.0000***	0.5706
△GDP per capital on △ tourism foreign exchange income	0.0000***	0.4201	0.3450	0.5918	0.0000***	0.0189**	0.9326	0.9559	0.0036***	0.9562

Note: In the Dumitrescu-Hurlin (2012) Granger causality tests, the optimal number of lags according to the AIC criterion (lags tested from 1 to 5). All the series are stationary and the panel is strongly balanced. For the test of the first-difference of tourism foreign exchange income on the first-difference on tourism foreign exchange income, the null hypothesis is that the first-difference of tourism foreign exchange income does not Granger-cause the first-difference of GDP per capita, and the alternative hypothesis is that the first-difference of tourism foreign exchange income does Granger-cause the first-difference of GDP per capita. For the other test in this section, the null hypothesis is that the first-difference of GDP per capita does not Granger-cause the first-difference tourism foreign exchange income, and the first-difference of GDP per capita does Granger-cause the first-difference tourism foreign exchange income is the alternative hypothesis. The tests are performed in STATA using the command xtbalance first to make it strongly balanced first and then using xtgcause to test the Granger causality.

*, ** and *** respectively represent the significance level at 10%,5% and 1%

In order to see the affecting direction, we run two tests for the full sample and subgroups. The null hypothesis for each test is respectively, growth of GDP per capital does not Granger-cause growth of tourism foreign exchange income and growth of tourism foreign exchange income does not Granger-cause growth of GDP per capita. In contrast, the alternative hypothesis is respectively, growth of GDP per capital does Granger-cause growth of tourism foreign exchange income for at least one province and growth of tourism foreign exchange income does Granger-cause growth of GDP per capita for at least one province. The results of the test are shown in table 4. First of all, the results show that the p values of Z bar of the full sample, east and west regions are significant when we test the effect of growth of tourism foreign exchange income on growth of GDP per capita. Whereupon it means that we find some evidence of tourism-led growth hypothesis for the entire mainland China, eat region and west region and no evidence at all for the other two regions. This is a surprising found because there is a quite big gap between the development level of the east and west, which it implies that tourism-led growth hypothesis may be not related to the development level and not necessary to be a universal circumstance. When testing the Granger causality between the growth of GDP per capital on and the growth of tourism foreign exchange income, both of the p values of Z bar and Z bar tilde are significant leading to a strong evidence of Granger causality of the impact of the growth of GDP per capital on tourism foreign exchange income in the middle region. It also finds some evidence implying that growth of GDP per capital does Granger-cause growth of tourism foreign exchange income for the full

sample and for the west. Whereupon there's some evidence showing that Granger-causality exists between tourism foreign exchange income for the 31 provinces all over than mainland China, east, middle and west regions. To be more specific, for mainland China and west region, there is a two-way Granger causality between per capita GDP and tourism foreign exchange income. For the other regions, data from east region proves TLGH to some extent and there is strong evidence of economics-led tourism growth hypothesis in the middle region. For the northeast region, no Granger-causality has been found between tourism activities and economy. These findings are not the same as what found in their research. Using data from 1991-2002, they found that in the whole mainland China, middle and west regions, there is no causal relationship between the growth rate of inbound tourism and the GDP growth rate, that is, inbound tourism will not have a significant impact on the economic growth of the corresponding regions, reflecting that at least at that time, inbound tourism has not been sufficiently developed in the central and western regions. Besides, there is a one-way Granger causal relationship between the growth of inbound tourism and regional economic growth in eastern China. This indicates that the research conclusions will change with the timeliness of the data. The latest data takes into account the impact of major events at home and abroad in recent years on economic growth and tourism development. Inbound tourism in mainland China had picked up initially in 2002 but was far from reaching its current scale.

5. CONCLUSION

This paper studies the relationship between the long-term economic growth of mainland China and the development of inbound tourism under the framework of the tourism-led growth hypothesis (TLGH) in a panel data framework. In order to study the different performance of specific provinces and regions, we used panel cointegration and the DH's Granger causality analysis. More specifically, we use data of tourism foreign exchange income and GDP per capital from all the 31 provinces in the mainland China from 1997 to 2019 considering that tourists coming from Macao and Hong Kong are recorded as inbound tourists in China's tourist statistic data because of the permitted different economic and financial systems implemented in the situation where they are under actual jurisdiction of People's Republic of China (PRC).

We use the standard panel cointegratio to model the relationship between tourism foreign exchange income and GDP per capita and test Granger causality for their first-differences, respectively Pedroni (1999, 2001, 2004) and Dumitrescu-Hurlin (2012). The use of tourism foreign exchange income as the proxy for representing the tourism activities is due to the availability of homogenous variables for the results of tourism activities in the data base we use, which it is a subsidiary of State Information Center called China Economic Network. Cointegration results differ for the whole 31 provinces and for the four subgroups which are the four ecogeographical regions in the mainland China, namely east, middle, northeast and west regions. There's strong long-run positive cointegration between inbound tourism activities and GDP per capital found in the east region with all the other regions and the full sample having a negative cointegration relationship. This explains the existence of TLGH in the relatively more developed east region which has a higher development level than the other three regions and the average level of the whole mainland China. Moreover, the results of Granger causality test further prove that inbound tourism development can positively promote economic growth in the east region or in other words, regions with relatively more developed economies. On the contrary, in the middle region, we found strong evidence that economic growth promotes tourism development. The middle region in China is a region with relatively weak intra-regional heterogeneity, a development foundation and a development speed faster than that of the east region. As for the entire mainland of China and the west region, economic growth and tourism development mutually Granger-cause each other. The west region includes the relatively developed cities like Chengdu, Xi'an, and Qinghai and Xizang, which have weak economic foundations and low GDP per capital in absolute numbers. The regional heterogeneity is relatively large in the west, while the mainland China as a whole also has a large heterogeneity. Therefore, we may infer that in a region with relatively weak homogeneity and strong heterogeneity, tourism development and economic growth are more likely to be Granger-causal to each other. There is no Granger causality between economic growth and tourism development in the northeast. On the one hand, it may be due to the small number of internal provinces and the small scale of data. On the other hand, it may be because it is still in the early stage of economic restructuring, the long-term existence and key development of heavy industry, as well as the more serious and rigid bureaucratic system compared to that of other regions. They have affected the development of its inbound tourism to a certain extent. In fact, many cities in these three provinces in the northeast are experiencing

negative economic growth and population outflows to other regions in the country in recent years, especially to the east region. To fundamentally curb the occurrence of this phenomenon, the change in development concepts and the enlightenment of the atmosphere are crucial.

COVID-19, which broke out globally in 2020 and continues to this day, has severely affected the development of international tourism. As of 2021, mainland China still has strict epidemic prevention restrictions for inbound arrivals to prevent the spread of imported cases abroad. This kind of globalization and large-scale impact on the economy and society of various countries is rare in history. Except for the two world wars and the US-Soviet cold war, it is difficult to find similar effects on the movement of people and economic growth globally caused by COVID-19. COVID-19, as an outbreak of infectious diseases, has its own characteristics similar but also different from wars. Therefore, when future data are sufficient, it is highly recommended to study rigorously the potential changes in the relationship between economic growth and international or domestic tourism development, the duration and the quantification of the changes caused by COVID-19 in order to facilitate policymakers and stakeholders to make plans beforehand to rationalize decisions in order to minimize losses for a potential future worldwide depression caused by an unprecedented reason.

Taking into account the rapid economic growth of Macao after its return to China from Portugal between 1999-2019, the real GDP per capita has increased by more than five times, surpassing some established European developed countries such as the United Kingdom, France and Germany, and even higher than the real GDP per capita of Hong Kong by about US$17,000 (World Bank, 2019). It will be very interesting to add it to the study as a province. However, in future research, it might be recommendable to not use foreign exchange income from tourism as a homogeneous variable because it will cause endogenous problems in the data of 31 provinces in mainland China. Which specific variable is more appropriate to study the 33 provinces within the actual jurisdiction of the entire People’s Republic of China remains to be discussed.

This article studies the long-term relationship between economic growth and tourism development, but it does not specifically explore the extent to which tourism development promotes economic growth or the extent to which economic growth promotes tourism development to obtain an influence coefficient. In addition, the duration of the potential impact of specific major events at home and abroad, such as China's accession to the World Trade Organization in 2001, the 2008 Beijing Olympic Games and the 2008 world financial crisis, has not been measured as well. This could also be the future in-depth study of interest.

BIBLIOGRAPHY

Balaguer, J., & Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. Applied Economics, 34(7), 877–884. https://doi.org/10.1080/00036840110058923

Belloumi, M. (2010). The relationship between tourism receipts, real effective exchange rate and economic growth in Tunisia. International journal of tourism research, 12(5), 550-560.

Brida, J. G., Sanchez Carrera, E. J.& Risso, W. A. (2008). Tourism's impact on long-run Mexican economic growth. Economics Bulletin, 23(21), 1-8.

Bruno, G. S. (2005). Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. Economics letters, 87(3), 361-366.

Chudik, A, Pesaran, MH (2015) Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. Journal of Econometrics 188: 393–420.

CW, J. G. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3), 424-438.

Dritsakis, N. (2004). Tourism as a long-run economic growth factor: an empirical investigation for Greece using causality analysis. Tourism economics, 10(3), 305-316.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. Economic modelling, 29(4), 1450-1460.

Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing (Vol. 55, Issue 2). https://about.jstor.org/terms

Eugenio-Martin, J. L., Martín Morales, N., & Scarpa, R. (2004). Tourism and economic growth in Latin American countries: A panel data approach.

Fayissa, B., Nsiah, C., & Tadasse, B. (2008). Impact of tourism on economic growth and development in Africa. Tourism Economics, 14(4), 807-818.

Gao, S. Y., Tian, L. F., Zhou, J., & Zhang, Y. L. (2009). Tourism foreign exchange income and economic growth in China: A panel cointegration approach. 2009 International Conference on Management Science and Engineering - 16th Annual Conference Proceedings, ICMSE 2009, 950–955. https://doi.org/10.1109/ICMSE.2009.5318217

GDP per capita (constant 2010 US$) | World Bank Data. (2021). Retrieved 11 June 2021, from https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?end=2019&most_recent_value_desc=true&start=2019&view=map

Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica: journal of the Econometric Society, 424-438.

Huang, H., & Wang, T. (2017). The total-factor energy efficiency of regions in China: based on three-stage SBM model. Sustainability, 9(9), 1664.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. Journal of econometrics, 115(1), 53-74.

Jin, J. C. (2011). The effects of tourism on economic growth in Hong Kong. Cornell Hospitality Quarterly, 52(3), 333-340.

Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. Journal of econometrics, 90(1), 1-44.

Lee, C. C., & Chang, C. P. (2008). Tourism development and economic growth: A closer look at panels. Tourism management, 29(1), 180-192.

Lee, C. C., & Chien, M. S. (2008). Structural breaks, tourism development, and economic growth: Evidence from Taiwan. Mathematics and Computers in Simulation, 77(4), 358-368.

Liu Chunji, & Feng Xuegang. (2014). The relationship between inbound tourism development and my country's economic growth. Economic Management, 2, 125-135. (in Chinese)

Liu Siwei, & Wu Zhongcai. (2007). An Empirical Study on the Relationship between China's Tourism Industry and Economic Growth. System Engineering, 25(9), 60-64. (in Chinese)

National Bureau of Statistics releases regional development report over the past 40 years of reform and opening up. (2021). The State Council of The People's Republic of China. Retrieved 11 June 2021, from http://www.gov.cn/shuju/2018-09/19/content_5323232.htm (in Chinese)

Oh, C. O. (2005). The contribution of tourism development to economic growth in the Korean economy. Tourism management, 26(1), 39-44.

Pang Li, Wang Zheng & Liu Qingchun. (2006). Analysis of the relationship between my country's inbound tourism and economic growth (Doctoral dissertation). (in Chinese)

Pesaran, MH (2006) Estimation and inference in large heterogeneous panels with multifactor error structure. Econometrica 74: 967–1012.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American statistical Association, 94(446), 621-634.

Pedroni P (1999) Critical values for cointegration tests in heterogeneous panels with multiple regressors.Oxford Bulletin of Economics and Statistics61: 653–670.

Pedroni P (2001) Purchasing power parity tests in cointegrated panels.Review of Economics and Statistics83:727–731.20Tourism Economics XX(X)

Pedroni P (2004) Panel cointegration: asymptotic and finite sample properties of pooled time series tests withan application to the PPP hypothesis.Econometric Theory20: 597–625.

Pérez-Rodríguez, J. v, Rachinger, H., & Santana-Gallego, M. (2020). Does tourism promote economic growth? A fractionally integrated heterogeneous panel data analysis. https://doi.org/10.1177/1354816620980665

Qiu Yali. (2013). Analysis of the Contribution of Inbound Tourism to National Economic Growth——An Empirical Study Based on Provincial Panel Data. Economic Issues, 1. (in Chinese)

Qu Hua, & Xia Jiechang. (2011). An Empirical Study on the Relationship between my country's Tourism Development and Economic Growth——Based on Data from 1985 to 2009. Finance and Trade Economics, 8, 106-112-137. (in Chinese)

Roodman, D. (2006). How to do xtabond2: an introduction to 'difference'and 'system. In GMM in STATA', Center for Global Development Working Paper No. 103.

Salman Saleh, A., George Assaf, A., Ihalanayake, R., & Lung, S. (2013). A Panel Cointegration Analysis of the Impact of Tourism on Economic Growth: Evidence from the Middle East Region. https://doi.org/10.1002/jtr.1976

Santana-Gallego, M., Ledesma-Rodríguez, F., & Pérez-Rodríguez, J. V. (2011). Tourism and trade in OECD countries. A dynamic heterogeneous panel data analysis. Empirical Economics, 41(2), 533-554.

Sequeira, T. N., & Nunes, P. M. (2008). Does country risk influence international tourism? A dynamic panel data analysis. Economic Record, 84(265), 223-236.

Sequeira, T. N., & Maçãs Nunes, P. (2008). Does tourism influence economic growth? A dynamic panel data approach. Applied Economics, 40(18), 2431-2441.

Tang, C. H. H., & Jang, S. S. (2009). The tourism–economy causality in the United States: A sub-industry level examination. Tourism Management, 30(4), 553-558.

The basic situation of the tourism market in 2019. (2020) Ministry of Culture and Tourism of the People's Republic of China. Retrieved 31 May 2021, from https://www.mct.gov.cn/whzx/whyw/202003/t20200310_851786.htm(in Chinese)

Wang Liangjian, Yuan Fengying, & He Qiongfeng. (2010). Research on my country's inter-provincial tourism development and economic growth based on the heterogeneous panel model. Economic Geography, 30(2), 311-316. (in Chinese)

World Economic Forum. (2019). The Travel & Tourism Competitiveness Report 2019 Travel and Tourism at a Tipping Point.

Wu Chunyou, Xie Fengyuan, & Quanhua. (2009). An Empirical Study on the Relationship between Tourism Development and my country's Economic Growth (Doctoral dissertation). (in Chinese)

Yang Yong. (2006). An Empirical Analysis of the Relationship between Tourism and my country's Economic Growth. Tourism Science, 20(2), 40-46. (in Chinese)

Zhao Lei. (2011). An Empirical Study on the Nonlinear Growth Effect of China's Tourism Market Development. Economic Management, 33(5), 110-122 (in Chinese)

Zhao Lei. (2012). Review of research on the hypothesis of foreign tourism-led growth hypothesis (TLGH) (Doctoral dissertation). (in Chinese)