Article Type: Research Paper

The Determinants of International Tourism: Evidence from European Countries and China's Provinces

Zhang Cheng[1,2] and Faiza Husnayeni Nahar[3,4]*

OPEN ACCESS

AFFILIATION:
[1] Faculty of Economics and Business, Universitat Autonòma de Barcelona, Spain

[2] Xizang Office of China Banking and Insurance Regulatory Commission, China

[3] Faculty of Economics and Business, Universidad de Granada, Spain

[4] Department of Economics, Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Indonesia

***CORRESPONDENCE:**
faizahusnayeni@umy.ac.id

THIS ARTICLE IS AVALILABLE IN:
http://journal.umy.ac.id/index.php/esp

DOI: 10.18196/jesp.v23i2.15714

CITATION:
Cheng, Z., & Nahar, F. H. (2022). The Determinants of International Tourism: Evidence from European Countries and China's Provinces. *Jurnal Ekonomi & Studi Pembangunan, 23*(2), 267-288.

ARTICLE HISTORY
Received:
03 Aug 2022
Revised:
29 Aug 2022
Accepted:
07 Nov 2022

Abstract: Tourism has been reported as one of the largest economic sectors in the world. It is shown by more than hundreds of jobs involved in this sector which directly escalate the welfare and economic growth of a country. Thus, government will support any actions that could improve competitiveness and profitability of tourism industry. The main objective of this paper is to determine the significant factors of international tourism receipts by 18 European countries and 12 provinces of Western China between 1995 and 2019. Based on data, Europe known as the world's largest international tourist receipt in 2019 followed by Asia and the Pacific including China. It is interesting to note that China, particularly in western part, has contributed more on achieving tourism receipt. China has potential to grow its tourism sector in significant trend due to its large land size and massive human resources that might further defeat Europe's total tourist receipt. By using panel Autoregressive Distributed lag (ARDL) model, there would be different responses related to determinant factors of tourism over long run and short run. The result revealed that population, carbon dioxide emission and trade openness have positive effect to the international tourism receipt in Europe in the long run while the rest explanatory variables such as transportation infrastructure and energy consumption have negative effect to the international tourism receipt in Europe. While in case of China, population and energy consumption are statistically significant and positive to international tourism receipt in the long-run correlation, but the rest variables are having negative effect. Unfortunately, in the short-run effect, it was found that all variables are not statistically significant at least at the ten percent significance level in both Europe and China. From the result, the Europe and Chinese policy makers can evaluate the policy based on each result. For instance, the fact that the high level of population density could reach larger tourism receipt is not always true, government need to provide some training for the party who will be involved in tourism industry to gain knowledge and encourage them to be more creative and innovative. Hence the good quality of listed tourism destination would attract more tourist to the destination country.
Keywords: Tourism; ARDL; China; Europe
JEL Classification: Z32; C23; Q43; B17

CC BY SA

Introduction

Tourism has become a key driver for the world wide's economics. According to World Travel & Tourism Council (2020), it is reported that there are 330 million jobs involved in this service-sector industry, which is equivalent to 1 out of 10 jobs on the planet in 2019. In total, tourism contributed to 10.3

percent of global GDP. The role of tourism is not only as a direct positive contribution but also it increases the overall economy as a result of tourism multiplier effects (Sabriye, 2015); such as employment promotion (Hughes, 1994) and increasing economic growth (Li et al., 2018). Thus, it is not surprising that tourism is becoming one of the most remarkable industries in this recent decades. Based on data of UNWTO (2020), in 2019, Europe remained the world's largest region in term of international tourist arrival and tourism receipt with about 744 million and USD 574 billion income, respectively. It is followed by Asia and Pacific with 362 million tourist arrival and USD 443 billion tourism receipt. Surprisingly, China remained at the top country in Asia and Pacific region in term of international tourist arrival and top 5 largest international tourism receipt. From the figure 1 of Europe's scale, it is found that Germany, Italy, France, and Spain's travel and tourisms are contributing more to their own GDP. While in China, especially in the western part known as Western China, also contribute better on tourism receipt. Due to the fact that Western China's size land is roughly 71.03 percent of China's total land size, and the population is nearly to 29 percent of the total population, it is very likely to be connected to the rise in international tourist arrivals and tourism receipts in the Western China (Wenjuan & Jixi, 2004). In addition, from the figure it also shown that four out of 12 provinces of Western China attracted more tourists with higher tourist receipts. Thus, provinces are Yunnan, Guangxi and Guizhou, and Shaanxi.

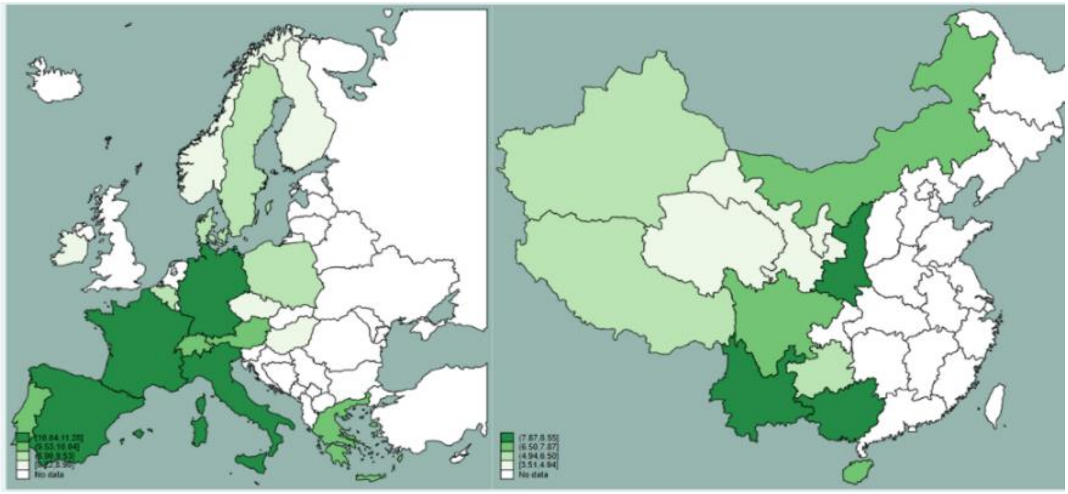

Figure 1 Tourism revenue of Europe countries and Chinese provinces in 2019

Note: the higher colour saturation represents the higher the international tourism receipts of the country (province). The data sources for Europe are from World Bank while the source for China is NBS.

Due to those reasons, this study would analyse the determinant factors of international tourism receipts by 18 European countries and 12 provinces of Western China between 1995 and 2019. In this study, the independent variables are determinant factors of international tourism, such as carbon dioxide emissions, population, transportation infrastructure, energy consumption, and trade openness. While the dependent variable is international tourist receipt. The methodology of this study is using panel

Autoregressive Distributed Lag (ARDL) model aimed to examine the short-run and long-run relationship between dependent variable to the explanatory variables. In this study, it is also necessary to select either Mean Group (MG) and Pooled Mean group (PMG) as appropriate estimator for measuring the model.

Many studies have been conducted to investigate the determinant factors of international tourism around the world. Relevant to carbon dioxide emission as one of factors that influence international tourism. Anser et al. (2020) explained that high carbon dioxide emissions damage tends to decrease international tourism receipts by 5.15 percent in across countries particularly in 132 countries from 1995 to 2018. In addition, by using GMM estimator, the ex-ante analysis shows that when carbon dioxide emissions damage is largely increased from 0.832 percent to 1.025 percent, international tourism receipts tend to decrease from 19.758 percent to 12.384 percent for the next 10 years. Thus, mitigating carbon dioxide emission through sustainable production and consumption, and strict environmental regulations are highly needed for making tourist visit a country regularly. Although tourist preferences are varied, for instance they tend to visit mountain rather than beach or tourist prefer to eat in traditional restaurant than the famous one, yet all tourists are definitely like to breath and enjoy fresh air. Thus, mitigating the carbon dioxide emission to be as low as possible would indirectly attract more tourist arrival thus increasing tourism receipt as well.

Furthermore, Zhang et al. (2019) also found that carbon dioxide emission had negative long run relationship toward inbound tourists in Thailand from 2001 to 2017. Inbound tourists are visitors who visit Thailand from outside of Thailand. By using ARDL model, the findings show that poor environmental sustainability caused greater carbon dioxide emission in Thailand and leading to the decline of inbound tourism. Thus, the government was suggested to implement green economy policy, for instance, giving heavy tax for non-green product and using green vehicle without polluting the air. On the other hand, Jianping et al. (2015) found that carbon dioxide emissions have a more pronounced positive effect on tourism industry in China since most regions, except eastern and central parts of China, mainly promote tourism as an economic growth at the expense of the ecological environment. In other word, they sacrifice their environmental sustainability in aim to gain more revenue from tourism activities. It is said that the increase of ecological damage caused by tourism has been interpreted as a fruitful development in economy.

While in the literature related to population and international tourism, Bernini and Cracolici (2015) used the Hurdle model to verify that the influence of population factors, such as age and groups, on tourism decision-making and tourism expenditure are statistically significant. Through the analysis of data on Italian household expenditures from 1997 to 2007, empirical evidence shows that the population’s age factor has a positive effect on tourism intentions and a negative effect on tourism consumption expenditures. Subsequently Hui et al. (2018) focused on the impact of population’s size and structure on China's tourism industry. They collected two sets of indicator data of China’s tourism industry and population from 1995 to 2014 and used canonical correlation analysis methods. The results show that the changes in population size and structure are highly related to the development of tourism. There is a significant positive correlation between population size and tourism. In addition, the process of aging is also highly positively correlated with tourism. This is because the increase in population size provides more labour for the tourism industry, and the elderly are more inclined to travel. Moreover, they also emphasized that the impact of demographic factors on tourism is important and comprehensive. They suggested that the Granger causality test can be deployed to further confirm the impacts of population on tourism.

In the context of transportation infrastructure, Khadaroo and Seetanah (2007) investigated the impact of Mauritius Island's transportation infrastructure on tourist arrivals. Through the random effects panel model, the study obtained that the transportation infrastructure has a positive impact on tourist arrivals at a ten percent significance level. A one percent increase in transportation infrastructure is likely to increase tourist arrivals by 0.36 percent. In addition, Wang et al. (2017) also found that high-speed rail strengthened the spatial connection of Beijing-Shanghai metropolitan area, expanded its tourism target range, and promoted the optimization of the large-scale regional tourism spatial structure of the metropolitan area. They employ GIS analysis method to investigate the effect of high-speed railway accessibility in 338 cities. They found that the transportation infrastructure of high-speed rail has a significant positive correlation with the field strength value of tourist destinations. Getahun (2016) also revealed that in Lake Tana, Northwest Ethiopia, transportation infrastructure and tourism are highly related internally. In particular, the road network and passenger arrivals showed a clear positive correlation.

Study related to energy consumption and tourism has been conducted by Işik et al. (2017). They used the Emirmahmutoglu–Kose bootstrap Granger non-causality method to investigate the relationship between tourism receipts and energy consumption in the ten countries with most tourists. They found that there is different response of causality test for each country. There is evidence of unidirectional causality from tourist arrivals to energy consumption in Spain, Turkey, Italy, the United States, and the United Kingdom. While at the same time, there is no causal relationship between tourism revenue and energy consumption in France, Germany, and Russia. In addition, Nižić et al. (2016) found that the impact of energy to the tourism industry is undeniable, as the increase in tourism activities is accompanied by an increase in the demand for energy for various functions. Becken et al. (2003) determined that transportation and accommodation are the main areas of energy consumption in the tourism industry. The energy supply in tourist areas is critical to the success of the tourism industry. Amin (2015) found that the price of oil is the main determinant of macroeconomic activities, and the tourism industry also heavily relies on oil for transportation and other tourism-related activities, such as accommodation and entertainment. As tourism prices remain high, the impact of oil price shocks will have a significant impact on the tourism industry.

In addition, Kulendran and Wilson (2000) took the lead in putting forward the hypo-study of "whether human tourism is related to international trade." The conclusion enhances that there is a relationship between trade openness and tourism. Chaisumpunsakul and Pholphirul (2018) used the data from Thailand and 207 trading partner countries, they found that the degree of trade openness is positively correlated with international tourism demand. Chenhao et al. (2018) employed a single co-integration equation to analyse the number of Chinese tourist arrivals from five middle Asian countries from 2001 to 2015 and their statistical data on imports/exports to China. They conducted an empirical study on the equilibrium relationship between inbound Chinese tourists and import and export trade volume in five Central Asian countries. They performed the Granger causality test on the relationship. The study results revealed a long-run stable equilibrium relationship between China's inbound tourism and import and export trade with the five middle Asian countries.

From the above previous literature explanation, it can be summarized that all variables are positively affecting tourism receipt, except carbon dioxide emission. Both developed and developing countries aimed to gain more GDP through external and internal revenue. The fact that tourism is a promising industry and being one of largest income source for a country, thus, it encourages the government and policy maker to find any best option for developing their country by any state. Transforming land into hotel, mall, theme park or any commercial places to attract people for visiting and expanding the main street for reducing traffic congestion are some of government agenda in improving their tourism activity. Unfortunately, those actions might harm ecological environment, whereas the environment is damaged as consequences for the developed tourism industry. The worsening air pollution and a smaller percentage of global farmland are the examples of tourism development's impacts. In addition, the government might think that damages to the environment could be a sign of fruitful tourism sector which leads to gain multiple benefit (Jianping et al., 2015). In other word, the damage has simply unbothered them to earn more and more income. Although some country might already offer green tourism activity, the impact of tourism to the nature still needs to be discussed.

Therefore, this study is expected to contribute better on finding the determinants factor on international tourism receipt across countries by using ARDL model in aim to examine its short-run effect and long-run impact of factors to tourism. By investigating the short and long-run impacts, government and policy maker could identify which part of variables need to be evaluated. Subsequently, after obtaining the results through effective research methods, this study compares the results of the two regions to gain a deeper understanding of the impact of these determinants. Thus, by understanding the relationship between five explanatory variables such as carbon dioxide emissions, population, transportation infrastructure, energy consumption, and trade openness toward international tourism receipt, this study might become a part of recommendation and suggestion for the government and policy maker in order to escalate tourism sector services. This study is continued by organizing the research method and how the discussion is conducted, such as how to get the data, variables and determining the methods. Then, the next section would interpret the econometric result and elaborate more on the discussion. Finally, the discussion would end with the conclusion, limitation, and suggestion for further research.

Research Method

Data

This paper aims to analyze the determinant factors of international tourism in Europe and China. The data source has been collected from the National Statistical Bureau of China, CEADs (Carbon dioxide emission Accounts & Datasets) and the World Bank, they covered the data on most of the required variables from 1995 to 2019. For Europe, the data is taken from 18 countries; Austria, Belgium, Czech, Demark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherland, Norway, Poland, Portugal, Spain, Sweden, and Switzerland. While China's data used 12 provinces in Western China; Gansu, Guangxi, Guizhou, Hainan, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Tibet, Xinjiang, and Yunnan. In this study, the explanatory variables are carbon dioxide emissions, population, transportation infrastructure, energy consumption, and trade openness while the dependent variable is international tourist receipt.

In the context of definition, energy consumption (EC) is counted as kilogram fossil fuel energy per capita and percent of total energy consumption (for European countries). While transport infrastructure (TRAN) is defined by the proxied of length of the highway in each region in China and the percentage of value-added in transport's equipment manufactures in Europe. Carbon dioxide emissions (CO2) is counted as ton per capita, where China' carbon dioxide emissions data are only derived from CEADs. CEADs is a jointly compiled multi-scale carbon accounting lists and socio-economic and trade databases for China, developing countries, and regions with the joint support of many research institutions. Furthermore, trade openness (TO) is referred to a proportion of international trade and international tourist receipt (TR) counted in current US Dollar as expenditure of international inbound tourist. Inbound tourist refers to a tourist who visit a country where they are not resident of that destination country.

Table 1 Data sources and definition

Variables	Definition	Transform	Sources
TR	International tourism receipts (million USD)	Natural Log form (LNTR)	World Bank (Europe); National Bureau of Statistics (China)
CO2	CO2 emission per capita (ton per capita)	Natural Log form (LNCO2)	World Bank (Europe); Carbon dioxide emission Account & Datasets (China)
POP	Total population (Europe: aged 15-16; million)	Natural Log form (LNPOP)	World Bank (Europe); National Bureau of Statistics (China)
TRAN	Percentage of value added in transport (Europe; %), Length of highway (China; km)	Natural Log form (LNTRAN)	World Bank (Europe); National Bureau of Statistics (China)
EC	il fuel energy consumption ıer capita)	Natural Log form (LNEC)	World Bank (Europe); National Bureau of Statistics (China)
TO	Trade openness, proportion of international trade	Natural Log form (LNTO)	World Bank (Europe); National Bureau of Statistics (China)

For case of population definition (POP), since both region data are collected from different source, World Bank for Europe and the National Bureau of Statistics of China for China, there is a difference on putting the definition of population. In Europe, population is counted between 15 and 64 years old, while the population variable of Chinese provinces represents the total population. However, because the two models are separated, the difference does not affect the results. In addition, international tourism income is the explained variable of current study, which also reflects the development of the region's tourism industry. In short, the data sources and definition are explained in the Table 1.

This study converted all variables into natural log form since the heteroscedasticity can be reduced due to the logarithmic transformation of the data by compressing the variable measurement scale (Gujarati, 2004). Table 2 showed the descriptive statistics of each variable. For European countries, the skewness and kurtosis values indicate that the distribution of all variables are skewed, which is different from the normal distribution (Kurniawan & A'yun, 2022). Furthermore, the Jarque-Bera (JB) statistical test reveals that the unconditional distribution of all variables is non-normal. Therefore, the traditional OLS linear regression method may lead to biased estimation results. In other words, it is more suitable to use the panel ARDL method to study the heterogeneous effects of factors such as carbon dioxide emissions on the tourism industry. For China's provinces, the skewness and kurtosis values represent that the distribution of all variables are different from the normal distribution. Furthermore, the Jarque-Bera (JB) statistical test shows that except for energy consumption (LNEC), other variables are significant at one percent level, and LNCO2 is significant at the ten percent level.

The panel ARDL model requires all variables as endogenous variables and assumes that there is a linear causal relationship between the variables. Moreover, by constructing a lag term, the panel ARDL model required an error correction mechanism (ECM) model, which can effectively estimate the long-term and short-term effects of variables and the short-term to long-term adjustment speed (Kurniawan & A'yun, 2022). In order to study the short-run and long-run relationship between tourism and determinants, based on the panel ARDL model proposed by Pesaran and Shin (1997), this paper constructs the test model by following:

$$\begin{aligned} Q_{LNTR}(\tau_k|\alpha_i, x_{it}, \xi_t) \\ &= \alpha_i + \beta_{1\tau} LNCO_{2_{it}} + \beta_{2\tau}\, LNPOP_{it} + \beta_{3\tau}\, LNTRAN_{it} + \beta_{4\tau}\, LNEC_{it} \\ &+ \beta_{5\tau}\, LNTO_{it} + \xi_t \qquad (1) \end{aligned}$$

The definition of the variables in equation (1) is consistent with Table 1., t represents the year. i represents a country in the European model, and its value range is i = 1, 2...,18. While in the Chinese model, *i* represents a province, and its value range is *i*=1, 2...,12.

Table 2 Descriptive Statistics

		LNTR (Tourism Receipt)	LNCO2 (Carbon dioxide emission)	LNPOP (Population)	LNTRAN (Transport infrastructure)	LNEC (Energy Consumption)	LNTO (Trade Openness)
European Countries	Mean	9.21	2.05	2.22	5.40	4.27	4.45
	Median	9.12	2.08	1.94	5.48	4.38	4.40
	Maximum	11.31	2.62	4.02	6.10	4.59	5.48
	Minimum	7.25	1.36	0.85	0.14	3.22	3.61
	Std. Dev.	0.93	0.29	0.93	0.58	0.28	0.39
	Skewness	0.30	-0.28	0.65	-4.98	-1.26	0.31
	Kurtosis	2.33	2.01	2.06	40.57	3.96	2.29
	Jarque-Bera	15.2***	21.2***	48.1***	27000***	114.9***	16.8***
	Observation	449	392	450	424	378	450
Chinese Provinces	Mean	7.15	3.78	4.86	4.22	3.20	2.87
	Median	7.23	3.73	4.86	4.30	3.17	2.34
	Maximum	10.85	5.55	6.52	5.82	5.17	17.22
	Minimum	2.13	2.27	2.90	2.15	0.57	0.14
	Std. Dev.	1.85	0.75	0.94	0.88	0.85	2.77
	Skewness	-0.48	0.37	-0.03	-0.26	0.07	4.35
	Kurtosis	2.91	2.88	1.72	2.12	3.27	21.17
	Jarque-Bera	11.7***	5.4*	20.6***	13.3***	1.0	5075***
	Observation	300	227	300	300	250	300

Note: *, **, *** represent significance of the coefficients at the 10%, 5%, and 1% levels respectively.
To ensure the logarithm form is positive, for China and Europe, the LNTR= ln (10*tourism receipts), and Carbon dioxide emission is calculated in same way.

According to Pesaran (2021), a panel autoregressive distributed lag model with long-term relationship coefficients can be represented as equation (2), which contains the short-run and long-run coefficients, moreover, there is also the error correction term to measure the adjustment speed from the short run to long run in this form.

$$\begin{aligned}\Delta \mathrm{LNTR}_{it} = \ & \beta_0 + \sum_{i=1}^{n} \alpha_{i1}\, \Delta \mathrm{LNTR}_{t-i} + \sum_{i=1}^{n} \gamma_{2i}\, \Delta \mathrm{LNTR}_{i,t-i} + \sum_{i=1}^{n} \sigma_3\, \Delta \mathrm{LNCO2}_{i,t-i} \\ & + \sum_{i=1}^{n} \theta_4\, \Delta \mathrm{LNPOP}_{i,t-i} + \sum_{i=1}^{n} \tau_5\, \Delta \mathrm{LNTRAN}_{i,t-i} + \sum_{i=1}^{n} \varphi_6\, \Delta \mathrm{LNEC}_{i,t-i} \\ & + \sum_{i=1}^{n} \omega_7\, \Delta \mathrm{LNTO}_{it} + \beta_{1\tau} \mathrm{LNCO2}_{it} + \beta_{2\tau}\, \mathrm{LNPOP}_{it} + \beta_{3\tau}\, \mathrm{LNTRAN}_{it} \\ & + \beta_{4\tau}\, \mathrm{LNEC}_{it} + \beta_{5\tau}\, \mathrm{LNTO}_{it} + \delta \mathrm{EC}_{i,t-1} + \mu_{it} \qquad (2)\end{aligned}$$

Thus, β_i measures the long-term impact of explanatory variables on the tourism industry, $\mathrm{EC}_{i,t-1}$ represents error correction, μ_{it} is the error term, and the α, γ, σ, θ, τ, ϕ and ω rest are the coefficients of short-term impact. When the coefficients in the estimation results are significant, it can be considered that there is a short-term or long-term dynamic relationship between the variables.

Furthermore, ARDL model also benefits this study by its characteristic. The advantages of the ARDL model are (1) The unnecessity to test whether the variable is single first-order integrality in advance, which is the biggest advantage of the ARDL method. Traditional methods almost require all variables to enter the model with single first-order integral, that is, I(1). The ARDL method does not have strict requirements on the stability of the data, no matter whether the data is I(1) or I(0), and whether there is a cointegration relationship between them, this method can be implemented (Pesaran & Shin, 1997). In other words, it is not necessary to consider whether the time series entering the model is pure I(0) or pure I(1) or a mixture of I(0) and I(1).

Next, (2) there is no need to consider whether the variable is endogenous. Pesaran et al. (1996) believes that cointegration vector autoregressive analysis involves many endogenous and exogenous variable selections, determination of lag order, determination of trend terms, and intercept terms so that the study's conclusions are filled with uncertainty. The robustness of the model is not high. The ARDL method will not affect the estimation of the model even when the explanatory variable is endogenous, and the estimation result is more robust. Lastly, (3) it simultaneously reflects the short-run and long-run relationship (Narayan & Narayan, 2006). The ARDL method can derive a dynamic error correction model through a simple linear transformation (Banerjee & Newman, 1993), integrating short-term and long-term dynamics. This paper applies Mean Group (MG) and Pooled Mean Group (PMG) to estimate the equation, whereas the final model is determined by Hausmann's test.

Result and Discussion

In this section, the econometric result and discussion would be further elaborated. Before ARDL model is executed, there are few steps need to be conducted. The first one is cross-sectional dependence (DC) and unit root test, followed by cointegration test, optimal lags selection, and the last step is estimating mean group (MG) or pooled mean group (PMG)

Econometric Result

a. Cross-sectional dependence (CD) test and unit root test

Due to the characteristics of panel data, a common cause may affect all individuals, which may lead to Cross-sectional Dependence. When there is cross-section correlation, the traditional panel unit root test will be invalid. Therefore, before the unit root test of the variables, this study first conducted the CD Test panel independence test, the results of this test are shown in Table 3.

Table 3 reveals that the variables are all strongly significant at the one percent level through the CD test, which rejecting the null hypo-study. Therefore, the panel data used in this paper does not have panel independence, so the unit root test is performed on the variables. Commonly used basic unit root testing methods, such as IPS and Fisher, assumed that the cross-section is irrelevant, but according to the results of the CD test, such assumption is rejected. Therefore, current study employs the second-generation unit root test method, the Cross-section Augmented Dickey-Fuller (CADF). The paper still applies the IPS and Fisher method as the reference for the CADF unit root test. The results are shown in Table 4.

Table 3 Results of CD test

		CD Test	P value
European Countries	LNTR	53.87***	0.00
	LNCO2	37.55***	0.00
	LNPOP	14.18***	0.00
	LNTRAN	15.40***	0.00
	LNEC	36.87***	0.00
	LNTO	47.63***	0.00
Chinese Provinces	LNTR	30.03***	0.00
	LNCO2	29.90***	0.00
	LNPOP	40.46***	0.00
	LNTRAN	37.71***	0.00
	LNEC	33.31***	0.00
	LNTO	39.95***	0.00

Note: *, **, *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively. Null hypo-study of CD test: panel independence exists.

From the Table 4, it can be concluded that all five determinants and tourism receipts are stationed at one percent significant level in first difference term since the p value of CADF test in first difference form are all smaller than 0.01. Even by looking through the traditional unit root test method such as IPS and Fisher methods, the results are consistent with CADF from the perspective of first differences term. It also reveals that LNTR, LNCO2, LNPOP in Europe and LNCO2, LNTRAN and LNEC in China rejected the null hypo-study within ten percent of significant level in level term. Hence all variables are I(0) or I(1) and it is plausible to estimate the panel ARDL model.

Table 4 Results of Unit Root Test

		Level			First difference		
		IPS	**FISHER**	**CADF**	**IPS**	**FISHER**	**CADF**
European Countries	LNTR	2.31	-8.02***	-2.15**	-10.98***	-11.86***	-5.69***
	LNCO2	4.68	-7.52***	-3.52***	-7.31***	-12.11***	-7.86***
	LNPOP	-2.21**	-5.24***	-1.49*	-2.43***	-7.56***	-2.87***
	LNTRAN	0.44	-4.90***	2.32	-9.79***	-12.88***	-7.30***
	LNEC	6.75	-3.89***	0.28	-6.49***	-11.85***	-6.20***
	LNTO	-1.70**	-7.76***	0.44	-12.09***	-12.24***	-5.11***
Chinese Provinces	LNTR	3.57	-5.32***	-1.17	-9.03***	-11.40***	-6.19***
	LNCO2	2.36	-5.13***	-4.30***	-3.91***	-9.87***	-6.25***
	LNPOP	3.68	-4.48***	-0.63	-3.08***	-9.29***	-3.68***
	LNTRAN	2.06	-5.81***	-1.59*	-6.16***	-9.57***	-4.85***
	LNEC	3.65	-3.03***	-6.00***	-2.89***	-9.14***	-4.86***
	LNTO	-7.20	-4.24***	2.98	-14.28***	-10.81***	-5.00***

Note: *, **, *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

b. Co-integration test

The common method for variables with unit roots is to make a first-order difference, hence this study obtains stationary series. However, the meaning of the variables after the first difference is different from the original sequence. Currently, we are still hoping to use the original sequence for regression. The Table 5 presents the result of Pedroni and Kao co-integration test. Since the most statistics are significant at one percent level, we can reject the null hypo-study of no co-integration. Furthermore, this study applied the Kao co-integration test and obtained the same output, the null hypo-study is rejected. So, we can conclude that there is a significant cointegration relationship between variables.

Table 5 Results Of Pedroni and Kao Co-Integration Test

		Statistics	P value
European Countries	Pedroni Modified Phillips–Perron	3.63***	0.00
	Pedroni Phillips–Perron	-1.68**	0.04
	Pedroni ADF	-1.17	0.12
	Kao test	-3.97***	0.00
Chinese Province	Pedroni Modified Phillips–Perron	2.74***	0.00
	Pedroni Phillips–Perron	-1.76**	0.04
	Pedroni ADF	-2.16**	0.02
	Kao test	3.08***	0.00

Note: *, **, *** represent significance of statistics value at the 10 percent, 5 percent, and 1 percent levels respectively. Null hypo-study of co-integration: cointegration relationship does not exist.

On the assumption of long-run homogeneity, the Pedroni or Kao Co-integration test can be skipped. Co-integration is ascertained from the statistical significance of the long-run coefficients and the error correction term. In other words, co-integration presents itself as the joint significance of the level equation.

c. Optimal lags selection

To obtain the best lags structure, this paper runs the ARDL model on the time series of each country (or province) and then counts the frequency of the lag term of each variable in each country (or province), and finally chooses the lags with the highest frequency as the final result. Table 6 showed the results of selecting the optimal lag structure. The maximum lags setting in this paper is two because more extensive lag will cause collinearity problems and make it impossible to run the ARDL model for some countries (or provinces). From Table 6, we can see that the optimal lag of European countries' data is (2 2 1 2 2 1). For variables such as LNTR, the frequency of lag 0 is 0, lag 1 is 8, and lag 2 is 10. Therefore, we should choose lag two which has the highest frequency, as the lag of LNTR. In addition, the sum of frequencies is 18, which is the same as the number of countries. This also verifies that each country runs the ARDL model individually. For Chinese provinces, the optimal lag structure is (1 1 2 2 1 0). We noticed that the sum of frequencies is 9, and the number of provinces is 12. The reason is because of an unbalanced panel. The missing data of some provinces and collinearity cause no results in the remaining three provinces, but the panel ARDL model can still work; and the optimal lag structure is adequate.

d. Panel ARDL: MG and PMG

The mean-group (MG) estimates N time-series-equations and averaging the coefficients while the pooled mean-group (PMG) uses a combination of pooling and averaging of coefficients (Blackburne & Frank, 2007). We applied international tourism receipts as dependent variables while carbon dioxide emission, population, energy consumption, transport infrastructure and trade openness as explanatory variables. The PMG estimation method can be applied to estimate the variables with cointegration relationship under the premise of satisfying the existence of cointegration relationship (Pesaran et al., 1999). The PMG method can estimate the relationship between the cointegration variables and gives an error correction coefficient, which confirms the existence of a long-term relationship (Darsono et al., 2022). Moreover, we can consider the relationship is significant and efficient only when the error correction coefficient is significantly negative

Hausman test is the judgment standard for selecting MG estimator and PMG estimator for panel ARDL analysis. According to the results of the Hausman test in Table 7, this paper believes that the PMG estimator is a more appropriate estimator for the model compared to the MG estimator.

Table 6 Optimal lags for European Countries and China's Provinces

		Lag 0 frequency	Lag 1 frequency	Lag 2 frequency	Results
European Countries	LNTR	0	8	10	2
	LNCO2	2	7	9	2
	LNPOP	5	13	0	1
	LNTRAN	3	5	10	2
	LNEC	3	4	11	2
	LNTO	7	11	0	1
Chinese Provinces	LNTR	0	6	3	1
	LNCO2	3	6	0	1
	LNPOP	3	1	5	2
	LNTRAN	2	0	7	2
	LNEC	4	5	0	1
	LNTO	6	3	0	0

Note: the method is to run ARDL model for each individual and then select the most common lags for each variable.

The reason is because the ECM's coefficients are significantly negative, which reveal that there is a significant long-term relationship between variables in European countries. In addition, from the results of PMG estimation, the coefficients of the variables are not significant at least at the ten percent level for the short-term relationship, but the coefficients of all determinants are statistically significant at the one percent significance level in long-term relationship.

Table 7 Results of MG and PMG Models for European Countries

	Variables	MG		PMG	
		Coefficients	**p-value**	**Coefficients**	**p-value**
Long-run	lnCO2	2.640*	0.063	2.026***	0.000
	lnPOP	6.708	0.108	4.047***	0.000
	lnTRAN	-0.458	0.419	-0.642***	0.000
	lnEC	-9.098**	0.027	-4.098***	0.000
	lnTO	0.116	0.810	1.811***	0.000
Short-run	ECM	-0.583***	0.000	-0.295***	0.000
	ΔlnCO2	-0.506	0.260	0.006	0.976
	ΔlnPOP	-5.405	0.420	-3.552	0.325
	ΔlnTRAN	0.004	0.979	0.101	0.475
	ΔlnEC	0.316	0.850	-0.281	0.685
	ΔlnTO	0.108	0.517	-0.068	0.568
	_cons	-1.024*	0.915	2.718***	0.000
Hausman test		Chi2:	5.40	Prob>Chi2	0.37
Dependent variable		LNTR		Observations	450

Note: *, **, *** represent statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

In the long run, carbon dioxide emissions, population, and trade openness are positively correlated with the explained variable (international tourism receipt); while transport infrastructure and energy consumption are negatively correlated with the explained variable. One percent increase in carbon dioxide emissions will increase international tourism receipt by 2.026 percent; a one percent population growth will increase international tourism receipt by 4.047 percent; an increase in trade openness by one percent will increase tourism receipt by 1.811 percent. Moreover, for every one percent increase in the value-added of transportation equipment, international tourism receipt will decrease by 0.642 percent; for every one percent increase in energy consumption, international tourism receipt will decrease by 4.098 percent.

Furthermore, Table 8 shows the results of the panel ARDL model for Chinese provinces. This table also applied similar step like Table 7. From the table, it can be concluded that PMG estimation is better than MG estimation by Hausmann's test. In the PMG model, the coefficient of the error correction term is negative and significant at the one percent level, which confirm that the determinant and the explained variable (international tourism receipts) are strongly correlated in the long run.

Like the European model, the coefficients of the determinants in China are not statistically significant in the short run. However, the coefficients of all variables are enormously significant at the one percent level in the long run. In the long-term relationship, carbon dioxide emissions, population, and transport infrastructure are positively correlated with the explained variable (international tourism receipt), while energy consumption and trade openness are all negatively correlated with international tourism receipt.

Table 8 Results of MG and PMG Models for China's Provinces

	Variables	MG		PMG	
		Coefficients	p-value	Coefficients	p-value
Long-run	lnCO2	1.821	0.32	-0.495*	0.07
	lnPOP	1.478***	0.00	0.929***	0.00
	lnTran	0.294	0.83	-0.893***	0.00
	lnEC	-2.422	0.33	1.255***	0.00
	lnTO	-0.064***	0.00	-0.022**	0.04
Short-run	ECM	-0.837***	0.00	-0.471***	0.00
	ΔlnCO2	-0.921	0.32	-0.091	0.85
	ΔlnPOP	-0.926	0.11	-0.268	0.46
	ΔlnTran	0.207	0.43	0.170	0.51
	ΔlnEC	0.143	0.84	-0.457	0.42
	ΔlnTO	0.011**	0.01	-0.004	0.40
	_cons	3.01***	0.00	2.34	0.00
Hausman test		Chi2:	2.86	Prob>Chi2	0.72
Dependent variable:		LNTR		Observations	300

Note: *, **, *** represent statistical significance of coefficients of determinants at the 10 percent, 5 percent, and 1 percent levels respectively.

In the long run, a percentage increase in carbon dioxide emissions will decrease international tourism receipts by 0.495 percent; a one percent increase in population will increase international tourism receipt by 0.929 percent. One percent increase in the length of highways as proxied of transport infrastructure will decrease the receipt of international tourism by 0.893 percent. At the same time, if energy consumption increases by one percent, tourism revenue will decrease by 1.255 percent; if trade openness increases by one percent, international tourism receipt will decrease by 0.022 percent.

Causality can be observed through ECM, long-term, and short-run coefficients. Because the coefficients of the error correction terms of the two models are enormously significant at the one percent level, we can conclude that joint causality is strong. While the short-run coefficients are not significant, it reveals that the short- run causality is not significant; the long- run coefficients are all enormously significant at the one percent level, so there is the strong long-run causality.

Comparison between Europe and China

To compare the results of Europe to China, the current study organizes the PMG model results of the two regions into Table 9. The pronounced difference lies in carbon dioxide emissions. It is interesting to note that the rise of carbon dioxide emission's damage by one percent led to a rise of the tourism receipt by 2.026 percent in Europe. The impact of greater carbon dioxide emission's damage in Europe has surprisingly contributed positively on tourism receipt in there. On the contrary, in China, a one percent increase in carbon dioxide emissions tends to reduce international tourism receipt by 0.495 percent. This phenomenon is interesting because the long-run effects of the same determinant in different regions are contrasting. In the original data, Chinese provinces' average carbon dioxide emissions are 5.93 tons per capita. In comparison, in European countries, it is 8.08

tons per person (in descriptive statistics and models) to avoid negative logarithms (this study transforms the original data). However, considering that the population of Chinese provinces are much larger compared to European countries, there would be a pronounced difference in the total amount.

In addition, according to Zha et al. (2015), most regions in China mainly promote tourism economic growth at the expense of the ecological environment. When tourism development is at the cost of increased carbon dioxide emissions, the environment may be further polluted, which will affect the development of tourism. From the current results, a reasonable explanation is that the increase in carbon dioxide emissions has already caused pollution to the environment, thus negatively impacting the tourism industry. This also explains the two-way causality between tourism receipts and CO2 emissions in the previous literature.

The negative relationship between carbon dioxide emission and tourism receipt in China is supported by the finding of previous studies. Sajjad et al. (2014) found that climatic factors and air pollution have a negative impact on tourism indicators in the form of deforestation and depletion of natural resources. The tourism industry has been systematically eroded due to severe climate changes and increasing air pollution. There are many causal relationships among climate factors, air pollution and tourism indicators. Zhou et al. (2019) employed the gravity model to study the effect of air pollution on tourism in Beijing. They found that air pollution has a significant negative impact on tourism. Furthermore, the result reveals that the effect of air pollution on international tourism is more pronounced than domestic tourism. In other words, foreign tourists are more sensitive to air quality. However, Liu et al. (2019) used random effects and fixed effects models to analyse the panel data of 17 provinces in China. They found the opposite result, that is, domestic tourists are more sensitive to air quality than foreign tourists.

While in Europe, greater carbon dioxide emission damage is likely to increase tourism receipt. This does not mean that there is a direct relationship between emission to tourism receipt, yet the rise of emission generates some activities that encourage more tourism receipt eventually. European countries, as many of them are categorized as developed countries already attract tourists to visit, both from developed and developing countries due to its economic development status. Developed countries are identic with sophisticated technology, centre of businesses, and modern life where they can access anything easily. For instance, easy access to get public transportation, easy to find item that they want to have, and plenty of job opportunity. Thus, an increase of carbon dioxide emission is likely representing the lively country where the emission is produced from its economic activities, such as emission from industry, vehicle, and household activity. Although green products are highly promoted in many areas, the percentage of activity producing carbon dioxide emission is still the larger in comparison. Thus, as time goes by, the percentage of carbon dioxide emission is likely to remain the same, and even increase eventually. This situation implies that an increase of carbon dioxide is rising the tourism receipt as well.

As for the determinants of population, the influence of population on international tourism is positive in China and Europe. An increased of population by one percent can increase European countries' international tourism receipt by 4.047 percent, but it can only increase China's international tourism receipt by 0.929 percent. The reason of this phenomenon could be caused by the fact that China's population is large enough already, and the marginal effect is diminishing. This is in line with empirical analysis since more population brings more labour force. Population with plenty of high qualified people, such as those who have a high education level would contribute better on improving tourism sector in country. Thus, the tourism receipt might escalate afterwards.

Particularly for population in productive age might significantly help country to achieve a good economic in tourism sector. Although Bernini and Cracolici (2015) argued that ageing population or elderly people population might negatively affect tourism demand, it is compensated by positive cohort effect whereas the elderly people are likely to be a tourist who travel more than younger generation.

Table 9 Comparison of Long Run Effects

	Variables	European Countries	China's Provinces
		Coefficients	**Coefficients**
Long run	LNCO2	2.026***	-0.495*
	LNPOP	4.047***	0.929***
	LNTRAN	-0.642***	-0.893***
	LNEC	-4.098***	1.255***
	LNTO	1.811***	-0.022**
ECM		-0.295***	-0.471***
Observations		450	300

Note: *, **, *** represent statistical significance of coefficients of determinants at the 10 percent, 5 percent, and 1 percent levels respectively.

The impact of transportation infrastructure is both negative in Europe and China. It is surprising to notice that good transport infrastructure might be the cause of a declining tourism receipt. As know, transport infrastructure such as length road is symbolized as good infrastructure and stable economic (Nahar et al., 2019). Supply and demand of product in country could easily be fulfilled if there is an accessible transporting facility that distributes product to any needed places. However, it might be plausible result since transport infrastructure is positively related to the numbers of transportations being operated. When many people used various mode of transportation to reach some destinations, the vehicle might pollute the air and destroys environment. For country who promoted their natural resources as their main highlight of tourism attraction, they will suffer the most due to the indirect impact of advanced transport infrastructure on tourism.

In the context of energy consumption, it is found that energy consumption has negative effect on tourism receipt in Europe but not for China. China has positive relationship between energy consumption and tourism receipt. According to Katircioglu (2014), energy consumption and tourism have a long term equilibrium relationship with carbon dioxide emission. When energy has been used for any activities including for tourism development, it might attract people for coming and it generates more revenue. Energy for transportation, catering, and accommodation are the examples of the energy usage's demands. Thus, the greater energy is used, the more tourist is coming as well as the tourism receipt. However, this condition might harm the energy sustainability. The energy used might be doubled than usual and it might threat the existence of energy proportion for the future (Sajjad et al., 2014). Therefore, it is plausible that some communities avoid visiting country that consume more energy, they choose to visit country that use less energy and focus on natural resources as the tourism attraction.

Meanwhile, the impact of trade openness on international tourism is positive in Europe and negative in China. When the trade is open freely, it would benefit both host or destination country since they could fulfil their supplies and demands. In the context of tourism, attracting tourist by improving trade openness is not enough, government is advocated to design some strategy to attract visitor for coming to the country (Azizurrohman et al., 2021). Thus, visitor could stay longer for spending their holiday. As the result, the number of tourist arrival is increasing along with the receipt.

Conclusion

This study collects China's provincial panel data and European country panel data. Then, it investigated the impacts of five determinants (carbon dioxide emissions per capita, population, transportation infrastructure, fossil energy consumption per capita, and trade openness) on international tourism by the same methods. In the panel ARDL model, this paper examines the Cross-sectional Dependence. Through the second-generation unit root test method, the current study obtained that all variables of the two panels are stationary at I(0) or I(1). Furthermore, the results of Pedroni and Kao co-integration indicate that there is a significant co-integration relationship between variables. After obtaining the optimal lag, this paper ran the MG and PMG models of panel ARDL and found that PMG is better through Hausmann's test. Therefore, we obtained the final estimation.

The results of comparison between Europe and China found that the population is positively correlated with international tourism receipts and transportation infrastructure. It is negatively affecting international tourism receipts in China and Europe. Carbon dioxide emission per capita has a positive impact on tourism in Europe but a negative effect in China. Fossil fuel energy consumption has a negative correlation with international tourism receipts in Europe but positively correlated in China. Trade openness has a positive effect in Europe while has a negative impact on tourism in China, all coefficients in the long run are significant, and most are significant at the level of one percent. The paper finds that carbon dioxide emission per capita has a positive impact on tourism in Europe but a negative effect in China. The reason might be caused by China's promotions on tourism economic growth at the expense of the ecological environment (Zha et al., 2015). Although, in the long run the increasing emission will restrain the tourism since the total carbon dioxide emission per capita in west provinces of China is already higher than European countries. Fossil energy consumption is negatively correlated with international tourism receipts in Europe but positively correlated in China. Trade openness has a positive effect in Europe while has a negative impact on tourism in China. All coefficients in the long run are significant, and most are significant at the level of one percent. The PMG model for individual countries or provinces provides the impacts of determinants in particular countries (or provinces).

The limitation of this study is that for European countries, the receipts generated by tourism between these countries are also regarded as a part of the international tourism revenue. However, for Chinese provinces, travel between these provinces is not considered international travel. For instance, the revenue generated by German tourists in Spain is counted as an international tourism income; but the income generated by Yunnan tourists in Sichuan is not included as an international tourism income. Therefore, the explained variables of the two databases, which is the international tourism industry income, has different contents. This weakens the comparison to a certain extent. In addition, the panel data is an unbalanced panel, the method which requires a strongly balanced panel in the analysis process cannot be used in this study. For example, the Granger causality test cannot be applied, so the study can only determine the causality by long-run coefficients and ECM coefficients of the PMG method.

This study is a significant reference for policymakers. According to the five determinants, European and Chinese policymakers can adjust to promote tourism. For example, since the carbon dioxide emission coefficient is negative in China, China's western provinces should reduce carbon dioxide emissions to increase international tourism income; meanwhile Europe should minimize fossil energy consumption because the energy consumption coefficient is negative and has a considerable value. The model results of this study can provide reference for creating policies or making decisions.

Appendix

Table A1 LSDV results for European countries and China’s provinces

Variables	LNTR	VARIABLES	LNTR
LNCO2	-0.0516	LNCO2	0.668*
LNPOP	1.003***	LNPOP	3.889***
LNTRAN	-0.520*	LNTRAN	0.0755
LNEC	0.296	LNEC	-2.575**
LNTO	-0.00823	LNTO	0.897***
Guangxi	3.129***	Belgium	-1.962***
Guizhou	1.613***	Czech	-2.232***
Hainan	1.076***	Demark	0.856**
Inner Mongolia	1.932***	Finland	-1.147
Ningxia	-3.278***	France	-6.960***
Qinghai	-1.332***	Germany	-7.902***
Shaanxi	2.859***	Greece	-0.273
Sichuan	2.658***	Hungru	-2.007***
Xinjiang	1.417***	Ireland	1.184
Yunnan	3.837***	Italy	-5.644***
Constant	2.502**	Netherland	-2.992***
		Norway	0.253
		Poland	-5.866***

Table A1 LSDV results for European countries and China's provinces (cont')

Variables	LNTR	VARIABLES	LNTR
		Portugal	-0.746**
		Spain	-4.637***
		Sweden	-2.765***
		Switzerland	-0.637**
		Constant	-45.55**

Table A2 PMG model for individual China's Provinces

VARIABLES	ECT	LNCO2	LNPOP	LNTRAN	LNEC	LNTO	Constant
Long-run		-0.495*	0.929***	-0.893***	1.255***	-0.0221**	
Gansu	-0.164	-2.073	-1.319	0.396	4.316	-0.0488	0.507
Guangxi	-0.728***	-0.218	0.682	-0.342	-1.449*	-0.00315	5.006***
Guizhou	-1.137***	-3.811**	0.825	1.154***	0.733	0.00573	5.295***
Hainan	-0.0276	-0.149	0.967	-1.570*	-0.142	-0.00497	0.2
InnerMongolia	-0.466***	1.808***	2.164***	0.131	-2.785***	0.0108**	2.029***
Ningxia	-0.183	0.431	-1.668	-0.714	-1.204	0.0118	0.316*
Qinghai	-0.416**	0.0196	0.881	1.549**	-1.544	-0.00789	0.627**
Shaanxi	-0.752***	0.907	0.0308	0.376	-1.835	0.00652	4.537***
Sichuan	-0.667***	0.539	-1.228	-0.0088	-0.907	-0.00077	4.232***
Tibet							
Xinjiang	-0.526***	1.436	0.402	0.588	0.358	-0.00899	2.130***
Yunnan	-0.114*	0.11	1.211***	0.311	-0.566**	-0.0065	0.824

Table A3 PMG model for individual European countries

VARIABLES	ECT	LNCO2	LNPOP	LNTRAN	LNEC	LNTO	Constant
Long run		2.026***	4.047***	-0.642***	-4.098***	1.811***	
Austria	-0.195***	1.403*	-7.919	0.525	-2.888	-0.412	-8.653**
Belgium	-0.219	-0.0609	3.092	1.286**	-1.136	0.239	-10.37
Czech	-0.369***	-0.196	4.418	-0.549	0.0707	0.025	-17.37**
Demark	-0.398***	-0.852**	-48.77***	-0.319*	2.259*	-0.790***	-17.19**
Finland	-0.483***	-0.359	-4.38	-0.0137	1.125	-0.0115	-22.30**
France	-0.548***	-1.178	-11	-0.39	1.358	-0.838**	-28.04**
Germany	-0.145	-0.565	-3.765	-0.0954	2.949	0.345	-7.558
Greece	-0.744***	-1.917**	-17.51	-0.0694	5.543	-0.249	-33.10**
Hungru	-0.660***	1.475**	-3.572	0.902***	-3.690*	-0.548***	-30.43***
Ireland	-0.0269	0.7	4.327	0.00468	-2.921	-0.862	-1.19
Italy	-0.119	0.386	16.10***	-0.64	1.29	-0.0575	-5.86
Netherland	-0.189	0.434	-10.69	-0.147	-2.499	-0.501	-8.999
Norway	-0.106*	-0.0529	18.80**	-0.281	-0.183	0.201	-4.862
Poland	-0.156	1.214	5.296	0.00525	-7.689	0.729	-7.879
Portugal	-0.339***	-0.18	-15.35***	0.0335	0.298	0.246	-15.09**
Spain	-0.326***	-0.479	0.715	1.585*	1.42	0.687**	-15.88**
Sweden	-0.169	0.348	-7.659	0.0194	0.15	0.464	-7.951
Switzerland	-0.122	-0.0111	13.94**	-0.031	-0.521	0.117	-5.62

References

Amin, S. (2015). *The Macroeconomics of Energy Price Shocks and Electricity Market Reforms:The Case of Bangladesh*. Durham University.

Anser, M. K., Yousaf, Z., Awan, U., Nassani, A. A., Qazi Abro, M. M., & Zaman, K. (2020). Identifying the Carbon Emissions Damage to International Tourism: Turn a Blind Eye. *Sustainability, 12*(5), 1937. https://doi.org/10.3390/su12051937

Azizurrohman, M., Hartarto, R. B., Lin, Y.-M., & Nahar, F. H. (2021). The Role of Foreign Tourists in Economic Growth: Evidence from Indonesia. *Jurnal Ekonomi & Studi Pembangunan, 22*(2), 313–322. https://doi.org/10.18196/jesp.v22i2.11591

Banerjee, A. V., & Newman, A. F. (1993). Occupational Choice and the Process of Development. *Journal of Political Economy, 101*(2), 274–298. https://doi.org/10.1086/261876

Becken, S., Simmons, D. G., & Frampton, C. (2003). Energy use associated with different travel choices. *Tourism Management, 24*(3), 267–277. https://doi.org/10.1016/s0261-5177(02)00066-3

Bernini, C., & Cracolici, M. F. (2015). Demographic change, tourism expenditure and life cycle behaviour. *Tourism Management, 47*, 191–205. https://doi.org/10.1016/j.tourman.2014.09.016

Blackburne, E. F., & Frank, M. W. (2007). Estimation of Nonstationary Heterogeneous Panels. *The Stata Journal: Promoting Communications on Statistics and Stata, 7*(2), 197–208. https://doi.org/10.1177/1536867x0700700204

Chaisumpunsakul, W., & Pholphirul, P. (2018). Does international trade promote international tourism demand? Evidence from Thailand's trading partners. *Kasetsart Journal of Social Sciences, 39*(3), 393–400. https://doi.org/10.1016/j.kjss.2017.06.007

Chenhao, X., Jie, R., & Duoping, Z. (2018). The Interaction Between Tourism and Import and Export Trade of Five Central Asian Countries Entering China from 2001 to 2015. *Development Research, 2*, 52–59.

Darsono, S. N. A. C., Wong, W.-K., Nguyen, T. T. H., & Wardani, D. T. K. (2022). The Economic Policy Uncertainty and Its Effect on Sustainable Investment: A Panel ARDL Approach. *Journal of Risk and Financial Management, 15*(6), 254. https://doi.org/10.3390/jrfm15060254

Getahun, T. B. (2016). *Impact of Transportation Infrastructure in Tourism Management in Ethiopia : Lake Tana region*. 9th International Conference On African Development.

Gujarati, D. N. (2004). *Basic Econometrics. 4th Edition*. McGraw-Hill Companies.

Hughes, H. L. (1994). Tourism multiplier studies: a more judicious approach. *Tourism Management, 15*(6), 403–406. https://doi.org/10.1016/0261-5177(94)90059-0

Hui, Z., Chengxuan, G., & Shenxiang, X. (2018). Demographic Factor Analysis of the Development of China's Tourism Industry. *Mathematical Practice and Cognition, 48*(18), 74–87.

Işik, C., Doğan, E., & Ongan, S. (2017). Analyzing the Tourism–Energy–Growth Nexus for the Top 10 Most-Visited Countries. *Economies, 5*(4), 40. https://doi.org/10.3390/economies5040040

Katircioglu, S. T. (2014). International tourism, energy consumption, and environmental pollution: The case of Turkey. *Renewable and Sustainable Energy Reviews, 36*, 180–187. https://doi.org/10.1016/j.rser.2014.04.058

Khadaroo, J., & Seetanah, B. (2007). Transport infrastructure and tourism development. *Annals of Tourism Research, 34*(4), 1021–1032. https://doi.org/10.1016/j.annals.2007.05.010

Kulendran, N., & Wilson, K. (2000). Is there a relationship between international trade and international travel? *Applied Economics, 32*(8), 1001–1009. https://doi.org/10.1080/000368400322057

Kurniawan, M., & A'yun, I. (2022). Dynamic Analysis On Export, FDI and Growth in Indonesia: An Autoregressive Distributed Lag (ARDL) Model. *Journal of Economics, Business, & Accountancy Ventura, 24*(3), 350-362. http://dx.doi.org/10.14414/jebav.v24i3.2717

Li, K. X., Jin, M., & Shi, W. (2018). Tourism as an important impetus to promoting economic growth: A critical review. *Tourism Management Perspectives, 26*, 135–142. https://doi.org/10.1016/j.tmp.2017.10.002
Liu, J., Pan, H., & Zheng, S. (2019). Tourism Development, Environment and Policies: Differences between Domestic and International Tourists. *Sustainability, 11*(5), 1390. https://doi.org/10.3390/su11051390
Nahar, F. H., Adha, M. A., Azizurrohman, M., Ulfi, I., & Karimah, H. (2019). Determinants of International Tourism in Indonesia. *JEJAK, 12*(2), 298–317. https://doi.org/10.15294/jejak.v12i2.19440
Narayan, P. K., & Narayan, S. (2006). Savings behaviour in Fiji: an empirical assessment using the ARDL approach to cointegration. *International Journal of Social Economics, 33*(7), 468–480. https://doi.org/10.1108/03068290610673243
Nižić, M. K., Grdić, Z. Š., & Hustić, A. (2016). The importance of energy for the tourism sector. *Academica Turistica, 9*(2), 77–83. Retrieved from https://academica.turistica.si/index.php/AT-TIJ/article/view/58
Pesaran, M. H. (2020). General diagnostic tests for cross-sectional dependence in panels. *Empirical Economics, 60*(1), 13–50. https://doi.org/10.1007/s00181-020-01875-7
Pesaran, M. H., & Shin, Y. (1997). An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, December 2013, 371–413. https://doi.org/10.1017/ccol0521633230.011
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. https://doi.org/10.1080/01621459.1999.10474156
Pesaran, M. H., Shin, Y., & Smith., R. J. (1996). *Testing for the Existence of a Long-run Relationship*. DAE Working Papers Amalgamated Series, No. 9622, University of Cambridge.
Sabriye, Ç. U. (2015). *Examination of Economic Impacts of Tourism with Multiplier Analysis*. In Tourism, Environment and Sustainability. St. Kliment Ohridski University Press.
Sajjad, F., Noreen, U., & Zaman, K. (2014). Climate change and air pollution jointly creating nightmare for tourism industry. *Environmental Science and Pollution Research, 21*(21), 12403–12418. https://doi.org/10.1007/s11356-014-3146-7
UNWTO. (2020). International Tourism Highlights International tourism trends 2019. Retrieved from https://www.e-unwto.org/doi/book/10.18111/9789284421152
Wang, D., Niu, Y., Sun, F., Wang, K., Qian, J., & Li, F. (2017). Evolution and spatial characteristics of tourism field strength of cities linked by high-speed rail (HSR) network in China. *Journal of Geographical Sciences, 27*(7), 835–856. https://doi.org/10.1007/s11442-017-1409-1
Wenjuan, Z., & Jixi, G. (2004). Problems of Ecological Environment in Western China. *Chinese Education & Society, 37*(3), 15–20. https://doi.org/10.1080/10611932.2004.11031642
World Travel & Tourism Council. (2020). *Travel & Tourism. Global Economic Impact Trends 2020*. In World Travel & Tourism Council (Issue June). Retrieved from https://wttc.org/Portals/0/Documents/Reports/2020/Global%20Economic%20Impact%20Trends%202020.pdf?ver=2021-02-25-183118-360
Zha, J., Wang, T., & Feng, Y. (2015). Research on the Development Model of China's Tourism Industry Under the Background of Low Carbon Economy. *Resources Science, 37*(3), 0565–0572.
Zhang, Y., Khan, S. A. R., Kumar, A., Golpîra, H., & Sharif, A. (2019). Is tourism really affected by logistical operations and environmental degradation? An empirical study

from the perspective of Thailand. *Journal of Cleaner Production, 227*, 158–166. https://doi.org/10.1016/j.jclepro.2019.04.164

Zhou, X., Santana Jiménez, Y., Pérez Rodríguez, J. V., & Hernández, J. M. (2019). Air pollution and tourism demand: A case study of Beijing, China. *International Journal of Tourism Research, 21*(6), 747–757. https://doi.org/10.1002/jtr.2301