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Measuring Tourism Flows: The Asian Case

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Abstract

This article provides a comprehensive analysis of the determinants of inbound tourism to Asia. The research will focus on a combination of economic and non-economic variables applying a gravity model to a panel of 46 Asian countries of destination and 197 countries of origin for the period 1995-2016. The findings show that moderate levels of corruption, good quality institutions, a shared common language, religion, and border could boost international tourist arrivals to Asia. Politically unstable Asian destinations are most likely to lose tourist arrivals from Europe. Good quality institutions, strong colonial ties, language closeness, common religion and borders increase the number of international tourist arrivals to Asia from Europe, Africa, North and South America and the Pacific. A surge in rainfall and temperature would not change the willingness of tourists to travel to Asia from Europe.

Keywords: *Asia, tourism flows, gravity model, governance indicators, climate variables*

Introduction

Asia has immense tourism potential owing to its historical monuments, traditions, and a wide variety of cultures and natural resources. According to UNWTO 2020, international tourist arrivals to Asia grew by 5% in 2019. The continent received 364 million international tourists, accounting for 25% of world tourist arrivals. Particularly, South and South-East Asia recorded an 8% growth in 2019 while North-East Asia grew at a slower pace of 2% compared to the 7% rise in 2018.

Most of the studies initially focus on demand factors such as the level of income, relative prices, relative exchange rates, or trade ties (Eilat, Einav, 2004; Song, Lin, 2010; Martins et al., 2017; Demir, Gozgor, 2019; Khalid et al., 2020). However, non-economic factors can play significant roles in attracting or repelling international tourists in Asia such as governance indicators, cultural affinity, or climate change. Only a few researchers have analyzed the effect

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of non-economic factors on the tourism demand of Asia at the macro level. For instance, the studies have explored the effect of non-economic factors such as a common language, common border, world heritage sites, colonial ties, civil liberty, area, social index, political stability, terrorism, crime or transport infrastructure on the tourism demand of Asia (Eilat, Einav, 2004; Cho, 2010; Balli et al., 2016; Permatasari, Esquivias, 2020; Ulucak et al., 2020; Khalid et al., 2020). One of the main obstacles, very little attention has been paid to the role of the quality of governance (e.g., voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption) in the analysis of the tourism demand in Asia. Moreover, the analysis of economic and non-economic determinants of tourism demand in Asia from the perspective of origin and destination countries and the five regions i.e., Asia, Europe, Africa, Americas and the Pacific, remain unclear in the tourism literature.

It is important to explore how local authorities deal with visitors, the level of efficiency of the services provided by local authorities, the presence and absence of corruption and the level of accessibility, accountability, and many other circumstances, all of which provide evidence about the institutional quality of governance existing in the destination countries (Dredge, Jenkins, 2007; Detotto et al., 2021).

In this study, we provide data on updated international tourism flows from 197 countries of origin to 46 countries of Asia for the period 1995-2016 to analyze whether the quality of governance, cultural affinity, trade, income, price, geographical indicators, cultural affinity and climate variables result in driving international tourists to visit Asia from Europe, Asia, Africa, South and North America and the Pacific. The findings of the paper can contribute to the tourism and economic advancement of Asia and facilitate information for policymakers, tourism promoters and investors so they may formulate stable tourism policies to increase the number of international visitors. The exhaustive use of economic and non-economic determinants is the main novelty of our paper.

Literature review

Determinants of tourism demand and competitiveness

Tourism demand explains the tangible and intangible set of goods and services consumed by tourists during their specific stays in the destination. Tourist arrivals, tourist expenditure, or tourist overnight stays are used mostly as dependent variables to explain tourism demand (Song et al., 2008; Rosselló-Nadal, HE, 2019; Khalid et al., 2020; Liu et al., 2021). Tourism determinants can be identified by the effect of economic and non-economic factors such as travel costs and income (Morley, 1992; Song et al., 2019; Inchausti-Sintes et al., 2021); relative price (Crouch, 1994; Morley, 1998; Permatasari, Esquivias, 2020; Ulucak et al., 2020); marketing expenditure (Crouch, 1995; Govers et al., 2007); cultural/natural heritage, political stability, governance quality (Cho, 2010; Tang, 2018; Detotto et al., 2021); terrorism, crime, and corruption (Poprawe, 2015; Saha, Yap, 2014; Fourie et al., 2020; Detotto et al., 2021); temperature and precipitation (Rosselló, Santana-Gallego, 2014; Qiang, 2020; Tang, Lau, 2021).

Tourism competitiveness is a complex concept and plays an important role in developing the tourism industry. Tourism competitiveness tends to improve the tourism infrastructure and the quality of life in the destination which leads to a surge in international tourist arrivals (Crouch, Ritchie, 1999). Accordingly, Ribes et al. (2011) explain the determinants of tourism competitiveness in residential destinations. The study shows that pleasant weather, modern transport infrastructure, good-quality airport services, close bilateral distance between airports and cities interact positively in the competitiveness of residential tourism in a destination. Rehman Khan et al. (2017) endorse similar assumptions that the quality of the air transport infrastructure and international transport network constitute essential factors for inbound and outbound tourism competitiveness. Moreover, Francisco Perles-Ribes et al. (2021) analyze the perception of overtourism in Spanish urban destinations. The findings emphasize tourism competitiveness as a key driver of the causes of overtourism in the tourist destination. Similarly, as stated by Zadeh Bazargani and Kiliç (2021), improving the tourism competitiveness in tourist destinations has led to a rise in the number of international tourist arrivals to Asia by 2.44%. Using an economic policy tool, Dogru et al. (2021) investigate the competitiveness of tourism destinations across 150 countries for 2000-2017. The results reveal that Asian countries such as Turkey, Japan and Thailand are found to be more competitive when tourist arrivals are regarded as the base indicator

Driving factors of international tourism demand

Many researchers investigate international tourism demand. Specifically, Martins, Gan, and Ferreira-Lopes (2017) analyze the impact of macroeconomic determinants on world tourism demand for 218 countries during 1995-2012 including relative price, exchange rate and income level. Rosselló-Nadal and HE (2019) show the effect of income level and purchasing power parity on international tourism demand for 191 countries during 1998-2016. Eilat and Einav (2004) review determinants of international tourism demand for all developed and developing countries during 1985-1998 by introducing bilateral trade volumes and travel costs. Moreover, Santana-Gallego et al. (2016) examine the correlation between international trade and tourism for 195 countries.

From non-economic perspectives, Saha and Yap (2014) identify the effect of terrorism and political instability on inbound tourism for 139 countries during 1999-2009. Fourie et al. (2020) investigate the impact of corruption, crime and terrorism on tourism for 171 countries from 1995 to 2016. Cho (2010), Balli et al. (2016), Demir and Gozgor (2019) investigate the influence of world heritage sites, sharing a common language and border, a colonial relationship, the length of the coastline and country on international tourism demand. Moreover, Bulut et al. (2019) review the effect of civil freedom on tourist arrivals to eight countries for 1998-2016. Rosselló-Nadal and HE (2019) estimate international tourism demand for 191 countries for the period 1998-2016 by introducing visa obtainment, world heritage site, coastline and bilateral border variables.

The outcomes of empirical studies show that income, the exchange rate(Martins et al., 2017; Rosselló-Nadal, HE, 2019), bilateral trade volumes (Santana-Gallego et al., 2016) positively while the relative prices and transport costs (Demir, Gozgor, 2019; Rosselló et al., 2017) negatively impact on international tourist arrivals. The non-economic determinants of world heritages sites, sharing a common language and religion, bilateral border, the length of the coastline, country colonial ties, country area and the number of internet users have a positive impact on international tourist arrivals (Eilat, Einav, 2004; Naudé, Saayman, 2005; Cho, 2010; Rosselló, Santana-Gallego, 2014) Inversely, high amount of rainfall in a destination, political instability and terrorism have a negative influence on international tourist arrivals (Eilat, Einav, 2004; Rosselló, Santana-Gallego, 2014; Saha, Yap, 2014).

Determinants of international tourism in Asia

Many determinants have been analyzed for Asian countries. Studies such as Permatasari ND Esquivias, (2020), Ulucak et al. (2020), Xu et al. (2019), Tang (2018), Habibi (2017) and Song and Lin (2010), Chaudhry et al. (2021) investigate the effect of the exchange rate, transport cost, personal income and bilateral trade ties on the tourism demand of Asian countries. According to the non-economic determinants such as tourism infrastructure (Habibi, 2017; Permatasari, Esquivias, 2020), governance indicators (Tang, 2018; Xu et al., 2019), terrorism (Feridun, 2011; Ulucak et al., 2020), world heritage sites (Cho, 2010; Yang et al., 2010), cultural affinity (Khadaroo, Seetanah, 2008a), crime rates (Huang et al., 2012; Tang, Tan, 2016), SARS (Yang et al., 2010; Huang et al., 2012), trade openness, institutional performance (Chaudhry et al., 2021) and tourism competitiveness index (Zadeh Bazargani, Kiliç, 2021) have been used to explain the tourism determinants of Asian countries. The recent study by Chaudhry et al. (2021) explores the impact of institutional performance and real exchange rates on 20 countries of East Asia and the Pacific region for the period between 1991 and 2018. With respect to the cross-country analysis of the Asian tourism market, many studies have analyzed tourism determinants. Specifically, using the dynamic panel data technique, Muryani et al., (2020) explore the determinants of inbound tourism in Indonesia from 2000 to 2014 including variables of interest such as income, travel costs, relative price, tourism infrastructure and tourism investment. Chokethaworn et al. (2020) examine the tourism demand in seven countries of South-East Asia based on panel data for the period from 2013 to 2019. The proposed variables of interests include average annual temperature, tourism price, exchange rates and income. Using the gravity model, Altaf (2021) analyzes the economic determinants of tourism in India from 19 countries of origin for the period between 2000 and 2018. The economic determinants such as gross domestic product, tourism price, exchange rate, distance, exports and imports are considered in the gravity model.

The outcomes indicate that relative prices (Tang, Tan, 2016; Habibi, 2017; Xu et al., 2019; Ulucak et al., 2020), and transport costs (Khadaroo, Seetanah, 2008a; Cho, 2010; Habibi, 2017; Permatasari, Esquivias, 2020) negatively affect tourism flows to Asian countries, while income has a positive influence (Song, Lin, 2010; Habibi, 2017; Xu et al., 2019; Ulucak et al., 2020; Permatasari, Esquivias, 2020). According to the results of non-economic variables, tourism infrastructure (Yang et al., 2010; Permatasari, Esquivias, 2020), social and cultural variables, world heritage sites (Cho, 2010; Yang et al., 2010), sharing a common language and border (Khadaroo, Seetanah, 2008a; Balli et al., 2016), governance indicators (Balli et al., 2016; Tang, 2018), and social indices (Cho, 2010; Ulucak et al., 2020) tend to increase the number of international tourist arrivals to Asian countries. Conversely, political instability, crime rates, corruption, and pollution have a negative influence (Saha, Yap, 2015; Tang, Tan, 2016). Moreover, detailed outcomes such as those generated by using the dynamic common correlated effects model are found by Chaudhry et al. (2021) who identify the significant and positive relationship between the institutional performance exchange rate and tourism receipts of East Asia and the Pacific. Specifically, an increase of 1% in the real exchange rate and institutional performance in the countries of East Asia and the Pacific encourage inbound tourism receipts by 0.78% and 0.45% respectively. Similar assumptions made by Chokethaworn et al. (2020) suggest that economic development and, the relative price of tourism products in the South-East Asia region encourage the volume of international visitors. However, a surge in the average temperature in this region has led to a fall in the number of visitors. The outcomes of empirical exercises for cross-country analysis of the Asian tourism market show interesting assumptions. Specifically, Muryani et al. (2020) emphasize that tourist income, relative price and tourism infrastructure are positively related to the inbound tourism demand of Indonesia while travel costs are negatively associated with the demand. Similarly, Altaf (2021) finds that tourism demand in India is considered to be highly price sensitive. Moreover, a rise in the volume of import ratio and peaceful political stability considerably encourage tourism flows to India.

To conclude the review of several previous studies on the determinants of tourism in Asia, we identify some limitations in the literature that the current research aims to address. There have been no detailed studies analyzing tourism demand in Asia that contemplate a large set of relevant economic and non-economic determinants from the perspective of origin-destination related factors and the five regions of Asia, Europe, Africa, Americas, and the Pacific. Second, the impact of World Governance Indicators (e.g., quality governance, voice accountability, quality of public services, political stability and control of corruption) on international tourism flows to Asia remains unclear in the tourism literature. Specifically, recent studies, such as Tang (2018) and Detotto et al. (2021), have investigated the impact of governance and institutional quality on international tourist arrivals in Malaysia and tourism receipts including 100 countries. However, the outcome of these studies focused on individual countries such as Malaysia or a global level aggregating all regions, which implies that the Asian case requires deep analysis. Thus, this current study fills these gaps and makes a novel contribution to the literature.

Methodology and Data

The gravity model

A gravity model is employed to estimate Asian tourism demand. Gravity models are widely used in the social sciences, namely for estimating international trade flows between two countries (Deardorff, 1998; Anderson, van Wincoop, 2003) and international tourism flows (Santana-Gallego et al., 2016; Santeramo, Morelli, 2016; Fourie et al., 2020; Altaf, 2021). According to Morley et al. (2014) a simple equation of trade between two countries i and j can be written as follows:

$$F_{ij} = B\frac{GDP_i^{\alpha} GDP_j^{\gamma}}{Dist_{ij}^{\beta}} U_{ij} \qquad (1)$$

Where, F_{ij}, GDP_i, GDP_j, $Dist_{ij}$ refer respectively to international trade flows, gross domestic product, distance between two areas i and j; B is a constant; U_{ij} is a log-normal distributed error term; α, β, γ are estimated parameters.

Based on equation (1), Witt and Witt (1995) state that gravity models can explain tourism flows between areas which are proportional to the economic mass and inversely associated with their bilateral distance. The connectivity of gravity models in measuring tourism flows forms the basis for understanding consumer choice theory (Morley, 1992). Accordingly, the aggregated tourism demand can be written as:

$$Q_{ijt} = f(TC_{ijt}, Y_{it}, ZO_{it}, ZD_{jt}) \qquad (2)$$

Where, Q_{ijt} is the number of tourist arrivals from the country of origin i to the country of destination j at time t; TC_{ijt} is transport costs; Y_{it} is personal income in the country of origin; ZO_{it} and ZO_{jt} are vectors, indicating qualitative factors related to the country of origin and destination. f is a multiplicative function.

Thus, the simple way of estimating gravity equations for modeling tourism demand is to transform equation (2) into a natural logarithms functional form (Morley et al., 2014) so as to obtain the following gravity equation (3).

$$Qi_{jt} = \beta_0 + \beta_1 LnDist_{ij} + \beta_2 LnGDPpc_{it} + \beta_3 ZO_{it} + \beta_4 ZD_{jt} \quad (3)$$

According to Prideaux (2005), equation (3) can be expanded by a set of variables in natural log form. Consequently, we obtain an augmented version of the gravity equation (4).

$$\begin{aligned} LnQi_{jt} = {} & \beta_0 + \beta_1 \ln DIST_{ij} + \beta_2 lnGDPpc_{it} + \beta_3 lnGDPpc_{jt} + \beta_4 RPRICEi_{ijt} + \beta_5 BORDER_{ij} \\ & + \beta_6 COL_{ij} + \beta_7 LANG_{ij} + \beta_8 RELIG_{ij} + \beta_9 CC_{ij} + \beta_{10} \ln AREA_i \\ & + \beta_{11} \ln AREA_j + \beta_{12} COAST_i + \beta_{13} COAST_j + \beta_{14} \ln POP_{it} + \beta_{15} \ln POP_{jt} \\ & + \beta_{16} TEMP_i + \beta_{17} TEMP_j + \beta_{18} RAIN_i + \beta_{19} RAIN_j + \beta_{20} WHS_i + \beta_{21} WHS_j \\ & + \beta_{22} STAB_{it} + \beta_{23} STAB_{jt} + \beta_{24} COR_{jt} + \beta_{25} COR_{it} + \beta_{26} VOICE_{jt} \\ & + \beta_{27} VOICE_{it} + \beta_{28} TR_{jit} + \beta_{29} TO_{jit} + \mu_{ijt} \end{aligned} \quad (4)$$

Where, Ln represents natural logarithms (used to reduce heteroscedasticity); i and j are sub-indexes denoting country of origin and destination, t is time: twenty-two years period (1995-2016); β_o is an intercept, $(\beta_1,\dots,\beta_{29})$ are parameters to be estimated; μ_{ijt} is a well-behaved disturbance term.

Data

The variables used in this article are represented in Table 1. Panel data is strongly balanced from 1995 to 2016. Panel data captures the period of 1995 to 2016, the main reason behind that is to provide the data available as complete as possible for all countries of origin and destination across the cross-sectional entities.

Table 1. *Data definitions and sources*

Variables	Definition	Source
Tou_{ijt}	Dependent variable: number of tourist arrivals (in thousands) from country of origin (*i*) to destination (*j*) at time (*t*);	UNWTO
Standard Gravity		
$GDPpc_{jt}$	Per capita of gross domestic product (current US dollars) of country (j) and (i) at time (t);	WDI, ECD
$GDPpc_{it}$		
$DIST_{ijt}$	Great circle distance (km) from country of (i) to (j);	CEPII
POP_{jt}	Total Population (in millions) of country (j) and (i) at time (t);	WDI
POP_{it}		

Variables	Definition	Source
	Economic relationship	
$RPRICE_{ijt}$	Relative price of (j) relatively to (i) at time (t);	IMF
$INVEST_{jt}$	Capital investment in travel and tourism in terms of GDP (percentage), in (j) and (i) at time (t);	WTTC
$INVEST_{it}$		
EXP_{ijt}	Volume of exports and imports (US dollars) between countries of (i) and (j) at time (t);	IMF
IMP_{ijt}		
TO_{ijt}	Trade openness between (i) and (j) at time (t);	
TR_{ijt}	Sum of exports and imports at time (t);	
$UNEM_{jt}$	Unemployment, total (% of total labor force) in (j) and (i) at time (t);	ILOSTAT
$UNEM_{it}$		
	Terrorism	
TER_{jt}	Number of Terror attacks in (j) and (i) country at time (t);	GTD
TER_{it}		
$DEATH_{jt}$	Number of deaths by terror attacks in (j) and (i) country at time (t);	
$DEATH_{it}$		
	Governance Indicators	
COR_{jt}	Control of corruption in (j) and (i) at time (t): scale of corruption;	WGI
COR_{it}		
GOV_{jt}	Government effectiveness in (j) and (i) at time (t): quality of public services, civil service and policy implementation;	
GOV_{it}		
$STAB_{jt}$	Political stability in (j) and (i) at time (t): politically-motivated violence and terrorism;	
$STAB_{jt}$		
LAW_{jt}	Rule of law in (j) and (i) at time (t): confidence in the rules of society (contract enforcement, property rights, the police, the courts);	
LAW_{it}		
$VOICE_{jt}$	Voice and accountability in (j) and (i) at time (t): liberty of the country's citizens (in government selection, freedom of expression and media);	
$VOICE_{it}$		
$QUAL_{jt}$	Regulatory quality in (j) and (i) at time (t): government fulfillment to formulate and implement policies for supporting the private sector;	
$QUAL_{it}$		
	Geographical indicators	
$BORDER_{ij}$	Sharing common border between (i) and (j); (Dummy Variable)	CEPII CIA
COL_{ij}	Colonial relationship between (i) and (j);(Dummy Variable)	
$LAND_{j}$	Land-locked country of (j) and (i);	
$LAND_{i}$		
$COAST_{j}$	The length of coastline (km) in (j) and (i);	
$COAST_{i}$		
$AREA_{j}$	Total area (square kilometers) of (j) and (i);	WDI
$AREA_{i}$		

Variables	Definition	Source
Cultural affinity		
$LANG_{ij}$	Sharing common: language; common currency; religion between (i) and (j); (Dummy Variable)	CEPII
CC_{ij}		
$RELIG_{ij}$		CIA
WHS_j	Number of World heritage sites in (j) and (i); (Dummy Variable)	UNESCO
WHS_i		
Climate		
$RAIN_j$	Precipitation (in millimeters) in (j) and (i);	(TYN CY 1.1)
$RAIN_i$		
$TEMP_j$	Annual average temperature (Celsius) in the (j) and (i);	
$TEMP_i$		
Development		
$LIFE_{jt}$	Life expectancy at birth (years) in (j) and (i) at time (t);	UN
$LIFE_{it}$		
NET_{jt}	Individuals using the internet (% of population) in (j) and (i);	ICT
NET_{it}		

Note: GTD: Global Terrorism Database; WGI: World Governance Indicators; TYN CY 1.1: Tyndall Centre for Climate Change Research; UN: United Nations Population Division; ICT: Information Communication Technology; ILOSTAT: International Labour Organization.

Economic variables such as GDP per capita and Distance is used to explain income and transport costs (Lim, 1997; Crouch, 1995). Population denotes the market size, the larger population size is the higher volume of tourism flows (Xu et al., 2019; Rosselló-Nadal, HE, 2019). The *RPRICE* represents the relative price of goods and services in Asia. According to the theoretical assumption of Morley (1994), the relative price can be written as:

$$RPRICE_{jt} = \frac{CPI_{jt}}{CPI_{it}} \cdot ER_t \tag{5}$$

Where, CPI_{jt} and CPI_{it} is the consumer price index in a destination (*j*) and origin (*i*) in the period of time (t) respectively; ER_t (or ER_{jt} / ER_{it}) represents the nominal exchange rate. Export, import and trade openness strengthen trade ties between countries and encourage tourism (Santana-Gallego et al., 2016). Unemployment rates are introduced to capture the effect of crime and joblessness on tourist' destination choice (Alegre et al., 2019). Capital investment in travel and tourism can support tourism in the region (Fourie, Santana-Gallego, 2013).

Non-economic explanatory variables such as the number of terror attacks and the number of deaths are introduced to capture changes in the behavior of potential visitors (Fourie et al., 2020). Sharing a common border, a colonial relationship, landlocked and the length of the coastline are assigned as dummy variables and used to capture the purpose of a tourist traveling to a destination (Rosselló, Santana-Gallego, 2014; Khalid et al., 2020). The bigger the area of the country, the greater its sightseeing capacity and attractiveness to visitors (Eilat, Einav, 2004). Sharing a common language, religion and common currency are dummy variables and included to capture tourists' cultural preferences for destination choice (Khadaroo, Seetanah, 2008b; Balli et al., 2016). The number of world heritage sites is introduced to capture how relevant this element is for tourists while selecting an ideal destination (Yang et al., 2010; Su, Lin, 2014). Climate variables are used to measure the influence of temperature and precipitation on the travel plans of visitors (Tol, Walsh, 2012). Life expectancy is included as a proxy for human development (Rosselló et al., 2017). The number of internet users is used as a proxy for information technology development to support tourism in the country (Naudé, Saayman, 2005). Worldwide governance indicators are composed of six indicators and used to capture governance perceptions in the range from -2.5 to 2.5 (Kaufmann et al., 2011).

Panel data estimations

There are three main econometric methods to estimate tourism demand which produce three different assumptions about the intercept term. With pooled ordinary least squares (POLS), the intercept remains as a constant along with all cross-sectional entities; in the Fixed Effects model, the intercept alters between cross-sectional entities so that each unit has a fixed intercept; with the Random Effects model the intercept varies randomly over cross-sectional entities (Hsiao, 2014; Song et al., 2008).

In line with the aim of this paper, which is to analyze the effect of economic and non-economic determinants (time-variant and time-invariant explanatory variables) on the tourism demand of Asia, the gravity equation is estimated by Pooled ordinary least squares (POLS) and Random effect (GLS). POLS and RE(GLS) are widely employed in panel data estimation since it provides a better understanding of the preliminary sign of each determinant of tourism demand with a high goodness of fit, on the other hand, it is a strongly proposed estimation technique to deal with time-invariant explanatory variables in the model (Saha, Yap, 2014; Rosselló, Santana-Gallego, 2014; Martins et al., 2017; Rosselló et al., 2017). In order to control unobserved heterogeneity which might cause a problem of bias, clustered standard error is added in the estimation to capture individual observations of country pairs (Anderson, van Wincoop, 2003; Schmidheiny, Basel, 2011).

Results

Table 2 represents the descriptive statistics and Table 3 performs the diagnostic tests for panel data such as Probability test, Wald test and Fisher-type unit-root tests. Fisher-type unit-root tests with Phillips-Perron options, the null hypothesis strongly rejected that all the panels contain unit-roots for the included estimators. However, the diagnostic test suggests that the data suffer from heteroscedasticity, thus robust standard errors are added in the estimation.

Table 2. *Descriptive statistics*

Variables	Mean	Std.Dev.	Min	Max	Variables	Mean	Std.Dev.	Min	Max
$LnTou_{ijt}$	6.97	3.21	-0.20	18.2	$LnEXP_{ijt}$	17.2	6.50	0	34.5
$LnGDPpc_{jt}$	8.35	1.47	5.51	11.2	$LnIMP_{ijt}$	16.8	6.37	0	34.5
$LnGDPpc_{it}$	8.61	1.53	5.14	12.2	$LnTO_{ijt}$	-7.15	6.00	-27.5	13.0
$LnPOP_{jt}$	16.4	1.96	12.5	21.1	$LnTR_{t}$	18.3	6.19	0	35.2
$LnPOP_{it}$	15.2	2.42	8.38	21.1	NET_{it}	21.7	26.5	0	98
$LnAREA_{i}$	10.8	2.99	3.22	16.7	NET_{jt}	17.5	23.2	0	93
$LnAREA_{j}$	11.6	2.71	3.22	16.7	TER_{it}	21.2	140.5	0	3.92

Variables	Mean	Std.Dev.	Min	Max	Variables	Mean	Std.Dev.	Min	Max
$LnDIST_{ij}$	8.82	0.76	0.63	9.89	TER_{jt}	66	276.1	0	3.92
$BORDER_{ij}$	0.02	0.13	0	1	$DEATH_{it}$	51	429	0	13.07
$LANG_{ij}$	0.07	0.26	0	1	$DEATH_{jt}$	149	795	0	13.07
COL_{ij}	0.01	0.09	0	1	COR_{jt}	-0.28	0.88	-1.67	2.33
CC_{ij}	0.01	0.07	0	1	$STAB_{jt}$	-0.34	0.98	-3.18	1.53
$LAND_{j}$	0.24	0.43	0	1	$QUAL_{jt}$	-0.17	0.94	-2.34	2.26
$LAND_{i}$	0.17	0.38	0	1	LAW_{jt}	-0.24	0.85	-2.01	1.86
$COAST_{i}$	215	1.14	0	15.6	$VOICE_{jt}$	-0.63	0.80	-2.26	1.11
$COAST_{j}$	482	2.29	0	15.6	COR_{it}	0.08	0.99	-1.72	2.47
$RELIG_{ij}$	0.10	0.23	0	1.00	GOV_{it}	0.10	0.97	-2.27	2.44
WHS_{j}	7.13	9.50	1	48	$STAB_{jt}$	0.08	0.94	-3.18	1.76
WHS_{i}	6.79	9.33	1	51	$QUAL_{it}$	0.10	0.96	-2.63	2.26
$RAIN_{i}$	1.31	955	50.6	7.4	LAW_{it}	0.09	0.97	-2.18	2.10
$RAIN_{j}$	1.1	922	74.4	2.9	$VOICE_{it}$	0.10	0.97	-2.26	1.80
$TEMP_{i}$	15.0	6.88	-5.40	28.2	$UNEM_{jt}$	6.73	4.91	0.10	28.1
$TEMP_{j}$	17.9	8.98	-5.10	27.6	$UNEM_{it}$	8.17	6.85	0	39.3
$INVEST_{jt}$	145	228	0	995.3	$LIFE_{it}$	65	19.6	0	85
$INVEST_{it}$	95.8	183	0	995.3	$LIFE_{jt}$	71	5.94	54	84
$RPrice_{ijt}$	2.85	66.5	0.02	5540.8	GOV_{jt}	-0.09	0.86	-2.09	2.44

Table 3. *Diagnostic tests*

Poolability test	F (840, 11394) = 24102.17	Prob > F = 0.0000
Wald test	F (30, 12213) = 1371.25	Prob > F = 0.0000
Panel unit root test		
Fisher-type unit-root test	$LnTou_{ijt}$ Gov_{jt}	$RPrice_{ijt}$
Inverse normal (Z)	-31.96*** -4.840***	-3.525***
Inverse logit (L*)	-49.69*** -3.228***	-26.89***

The estimated POLS and RE(GLS) models for equation (4) are reported in Table 4 and 5. Table 4 and 5 show the result of international tourism determinants to Asia from 197 countries of origin (World) and the five continents separately.

Table 4. *The Determinants of International Tourism to Asia (POLS)*

Variables	World (Total Arrivals) (1)	EUROPE to ASIA (2)	ASIA to ASIA (3)	AFRICA to ASIA (4)	AMERICA to ASIA (5)	PACIFIC to ASIA (6)
$GDPpc_{jt}$	0.32529***	0.59941***	0.64474***	0.39763***	0.43344***	0.39532***
	(0.02452)	(0.02814)	(0.05294)	(0.05508)	(0.04481)	(0.06725)
$GDPpc_{it}$	0.48937***	0.11901**	1.01123***	0.67245***	0.88093***	2.48565***
	(0.02398)	(0.05227)	(0.05969)	(0.09866)	(0.05855)	(0.10737)
POP_{jt}					0.13855***	
					(0.02872)	

Variables	World (Total Arrivals) (1)	EUROPE to ASIA (2)	ASIA to ASIA (3)	AFRICA to ASIA (4)	AMERICA to ASIA (5)	PACIFIC to ASIA (6)
POP_{it}	0.75237***	0.91709***	0.89410***	0.57092***	0.80027***	-0.05696
	(0.01284)	(0.01243)	(0.02581)	(0.04511)	(0.02202)	(0.06472)
$DIST_{ij}$	-1.54182***	-1.44761***	-1.72289***	0.89881***	-2.09727***	-4.03309***
	(0.02608)	(0.04883)	(0.05751)	(0.14283)	(0.19248)	(0.22567)
$RPRICE_{ijt}$	-0.00124***	-0.01313**	-0.07981***	-0.00064***	-0.09511**	-0.10417
	(0.00035)	(0.00551)	(0.02617)	(0.00015)	(0.03972)	(0.10006)
TR_{ijt}	0.04823***		0.05049***			0.02095**
	(0.00353)		(0.01011)			(0.00836)
TO_{ijt}		0.03002***		0.07715***		
		(0.00374)		(0.01452)		
$INVEST_{jt}$	0.03288***	0.02412***		0.10102***		0.02225***
	(0.00349)	(0.00318)		(0.01094)		(0.00836)
$INVEST_{it}$		-0.01398***	-0.05301***		-0.02152***	
		(0.00308)	(0.00975)		(0.00674)	
$UNEM_{jt}$	-0.03240***		-0.02868**		-0.13908***	-0.08092***
	(0.00650)		(0.01325)		(0.00937)	(0.01664)
$UNEM_{it}$		-0.03911***			-0.03265***	
		(0.00336)			(0.00660)	
$BORDER_{ij}$	1.77329***	1.37302***	1.64795***			
	(0.10899)	(0.16748)	(0.13952)			
$AREA_j$			0.20057***	0.18142***		
			(0.02475)	(0.02697)		
$AREA_i$	0.05775***					
	(0.01014)					
$COAST_j$	-0.00194***					
	(0.00028)					
$COAST_i$		-0.00050***				
		(0.00009)				
$LAND_j$	-0.44159***	-0.21739***			2.17214***	
	(0.12051)	(0.07018)			(0.19038)	
$LAND_i$		-0.43233***		-0.53808***		
		(0.03009)		(0.13683)		
COL_{ij}	2.13529***	1.98022***	3.27678***		2.43918***	
	(0.14346)	(0.14236)	(0.32995)		(0.11983)	
$LANG_{ij}$	1.08831***	0.35947***	0.84716***	1.45431***		0.72163***
	(0.04071)	(0.08316)	(0.08205)	(0.11411)		(0.10065)
$RELIG_{ij}$	1.77382***	-0.28437**	2.61302***	0.51206***		2.10819***
	(0.08960)	(0.11840)	(0.19498)	(0.16508)		(0.76435)
CC_{ij}	-3.14728***		-4.02862***			
	(0.28145)		(0.33836)			

Variables	World (Total Arrivals) (1)	EUROPE to ASIA (2)	ASIA to ASIA (3)	AFRICA to ASIA (4)	AMERICA to ASIA (5)	PACIFIC to ASIA (6)
WHS_j	0.08864***	0.11668***	0.09472***		0.08810***	0.06392***
	(0.00124)	(0.00188)	(0.00494)		(0.00366)	(0.00325)
$RAIN_j$	0.00058***	0.00096***	0.00095***	-0.00077***	0.00069***	
	(0.00003)	(0.00003)	(0.00005)	(0.00009)	(0.00006)	
$RAIN_i$	0.00027***		0.00098***	-0.00037***	0.00012***	
	(0.00002)		(0.00005)	(0.00012)	(0.00004)	
$TEMP_j$		0.02647***	0.05254***			
		(0.00226)	(0.00607)			
$TEMP_i$	0.00811***		-0.01716***	0.03586***		
	(0.00242)		(0.00474)	(0.00981)		
$LIFE_{jt}$	-0.04913***	-0.16576***	-0.06372***			-0.03525**
	(0.00491)	(0.00500)	(0.01386)			(0.01448)
$LIFE_{it}$		0.06172***				
		(0.00873)				
NET_{it}	0.01003***	0.01280***		0.02133***		
	(0.00061)	(0.00061)		(0.00257)		
$DEATH_{jt}$	-0.00018***		-0.00087***			
	(0.00005)		(0.00018)			
$DEATH_{it}$			-0.00035***			
			(0.00009)			
TER_{jt}			0.00109***			
			(0.00031)			
$STAB_{jt}$	-0.23172***	-0.22552***	-0.13809**	0.76733***	-0.56775***	
	(0.02965)	(0.02717)	(0.05919)	(0.06895)	(0.04833)	
$STAB_{it}$	-0.09860***		-0.66436***			
	(0.02548)		(0.06420)			
$QUAL_{jt}$	1.11023***	1.05974***	0.87551***			0.80542***
	(0.04420)	(0.02773)	(0.08856)			(0.09725)
$QUAL_{it}$	0.20436***					
	(0.03906)					
$VOICE_{jt}$	-0.18971***		-0.25389***			-0.29851***
	(0.02147)		(0.05588)			(0.05453)
$VOICE_{it}$	0.20465***		0.25271***			-0.64758***
	(0.03123)		(0.04915)			(0.11100)
GOV_{jt}					0.79326***	
					(0.06947)	
GOV_{it}		0.26772***				
		(0.03563)				
COR_{it}	0.17053***				0.55453***	
	(0.02882)				(0.04719)	

Variables	World (Total Arrivals) (1)	EUROPE to ASIA (2)	ASIA to ASIA (3)	AFRICA to ASIA (4)	AMERICA to ASIA (5)	PACIFIC to ASIA (6)
Const	0.21222	3.35685***	-9.58229***	-21.88368***	-2.24383	20.17442***
	(0.47182)	(0.70984)	(1.10455)	(1.75999)	(2.29588)	(2.49581)
Obs	12,244	5,909	2,278	1,288	3,038	662
F-stat	F(30, 12213)	F(25, 5883)	F(28, 2249)	F(16, 1271)	F(17, 3020)	F(15, 646)
	1371.25	1159.23	306.97	235.51	1492.76	462.95
Prob > F	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Root MSE	1.2601	0.89158	1.3604	1.32	1.382	0.83884
R-squared	0.78890	0.84526	0.75737	0.72225	0.81988	0.92739

i and j - countries of origin and destination;
Robust standard errors in parentheses;
*Significant level at *** p<0.01, ** p<0.05, * p<0.1;*

Table 5. *The Determinants of International Tourism to Asia (RE)*

Variables	World (Total arrivals) (7)	EUROPE to ASIA (8)	ASIA to ASIA (9)	AFRICA to ASIA (10)	AMERICA to ASIA (11)	PACIFIC to ASIA (12)
$GDPpc_{jt}$	0.70474***	0.70366***	0.70056***	1.31468***	0.93301***	0.73661***
	(0.06387)	(0.07171)	(0.13645)	(0.11665)	(0.15657)	(0.14650)
$GDPpc_{it}$	1.00925***	0.60724***	1.12525***	0.80914***	1.20644***	2.27157***
	(0.07141)	(0.12536)	(0.14145)	(0.25044)	(0.15736)	(0.22980)
POP_{jt}					0.42495***	
					(0.09864)	
POP_{it}	0.83396***	0.87261***	1.07755***	0.84268***	0.63102***	-0.13355
	(0.05399)	(0.03949)	(0.07938)	(0.15228)	(0.05537)	(0.17027)
$DIST_{ij}$	-1.38080***	-1.42980***	-1.87437***	1.93041***	-1.17221*	-4.65238***
	(0.10044)	(0.20695)	(0.26091)	(0.44704)	(0.61189)	(0.52965)
$RPRICE_{ijt}$	-0.00038***	-0.00780*	-0.00820	0.00013*	-0.01176	0.03715
	(0.00013)	(0.00422)	(0.01674)	(0.00008)	(0.03935)	(0.07937)
TR_{ijt}	0.00329		0.00826			0.00014
	(0.00285)		(0.00816)			(0.00765)
TO_{ijt}		0.00441		-0.01597		
		(0.00339)		(0.01378)		
$INVEST_{jt}$	0.01639***	0.01989***		-0.02591*		0.01408
	(0.00316)	(0.00411)		(0.01477)		(0.01122)
$INVEST_{it}$		-0.00432	-0.03705***		0.01475	
		(0.00401)	(0.01009)		(0.00969)	
$UNEM_{jt}$	0.00411		-0.03115*		-0.01847	-0.03546**
	(0.00732)		(0.01869)		(0.01973)	(0.01794)
$UNEM_{it}$		-0.00273			-0.03031***	
		(0.00452)			(0.00966)	

Variables	World (Total arrivals) (7)	EUROPE to ASIA (8)	ASIA to ASIA (9)	AFRICA to ASIA (10)	AMERICA to ASIA (11)	PACIFIC to ASIA (12)
$BORDER_{ij}$	2.13567***	1.58813**	1.89443***			
	(0.40955)	(0.80987)	(0.61090)			
$AREA_j$			0.35929***	0.40891***		
			(0.07453)	(0.07300)		
$AREA_i$	-0.03812					
	(0.04427)					
$COAST_j$	-0.00255***					
	(0.00065)					
$COAST_i$		-0.00026				
		(0.00036)				
$LAND_j$	-0.78996***	-0.48207**			1.11152**	
	(0.24294)	(0.20942)			(0.51333)	
$LAND_i$		-0.39746***		-0.27705		
		(0.11639)		(0.41969)		
COL_{ij}	2.24724***	2.33303***	3.67986**		3.25062***	
	(0.60891)	(0.72209)	(1.51490)		(0.35180)	
$LANG_{ij}$	1.63319***	0.63381	0.81002*	1.60365***		0.95067***
	(0.15719)	(0.41157)	(0.45545)	(0.34362)		(0.32602)
$RELIG_{ij}$	2.00136***	0.61731	3.26833***	1.35549***		1.67715
	(0.29923)	(0.53321)	(0.65521)	(0.49106)		(1.96902)
CC_{ij}	-2.54228**		-3.87489***			
	(1.20940)		(1.44749)			
WHS_j	0.09449***	0.10178***	0.09942***		0.05354***	0.06463***
	(0.00355)	(0.00656)	(0.01492)		(0.01237)	(0.00994)
$RAIN_j$	0.00064***	0.00083***	0.00080***	-0.00015	0.00047***	
	(0.00006)	(0.00010)	(0.00018)	(0.00021)	(0.00014)	
$RAIN_i$	0.00029***		0.00116***	-0.00049*	0.00013	
	(0.00008)		(0.00020)	(0.00029)	(0.00014)	
$TEMP_j$		0.00775	0.06900***			
		(0.00941)	(0.02169)			
$TEMP_i$	-0.01189		-0.02645	0.02423		
	(0.00966)		(0.02007)	(0.03680)		
$LIFE_{jt}$	-0.03376***	-0.09297***	-0.01168			-0.03020
	(0.01174)	(0.01213)	(0.02707)			(0.02640)
$LIFE_{it}$		0.10580***				
		(0.01689)				
NET_{it}	0.00605***	0.00516***		0.00439		
	(0.00094)	(0.00117)		(0.00341)		
$DEATH_{jt}$	-0.00000		-0.00021			
	(0.00004)		(0.00015)			

Variables	World (Total arrivals) (7)	EUROPE to ASIA (8)	ASIA to ASIA (9)	AFRICA to ASIA (10)	AMERICA to ASIA (11)	PACIFIC to ASIA (12)
$DEATH_{it}$			-0.00026**			
			(0.00012)			
TER_{jt}			0.00039*			
			(0.00020)			
$STAB_{jt}$	0.06443*	0.01872	0.03594	0.05597	0.05859	
	(0.03705)	(0.04190)	(0.09378)	(0.10657)	(0.08262)	
$STAB_{it}$	-0.01627		-0.33540***			
	(0.04219)		(0.09905)			
$QUAL_{jt}$	0.65819***	0.65897***	0.92500***			0.43055***
	(0.05398)	(0.05769)	(0.14102)			(0.13938)
$QUAL_{it}$	-0.01829					
	(0.07925)					
$VOICE_{jt}$	-0.12159**		0.23642			-0.04178
	(0.06091)		(0.18996)			(0.13306)
$VOICE_{it}$	0.12474*		-0.08447			-0.08928
	(0.07244)		(0.16705)			(0.16946)
GOV_{jt}					0.14030	
					(0.14540)	
GOV_{it}		-0.09944				
		(0.07995)				
COR_{it}	-0.19914**				0.18587	
	(0.07888)				(0.12402)	
Const	-9.15901***	-9.76363***	-18.34366***	-48.09637***	-20.58511***	25.40368***
	(1.37360)	(2.26741)	(3.13856)	(5.77412)	(6.86780)	(6.25298)
Obs	12,244	5,909	2,278	1,288	3,038	662
R-squared	0.7548	0.7969	0.7123	0.642	0.7813	0.9091
Wald chi2	30	25	28	16	17	15
	4182.14	2667.29	819.71	7488.22	9202.36	742.79
Prob > chi2	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
№ of idpair	833	349	137	109	217	47

i and j - countries of origin and destination;
Robust standard errors in parentheses;
*Significant level at *** p<0.01, ** p<0.05, * p<0.1;*

Regarding the result of the POLS models (Table 4), the goodness of fit test using R2 is high, on average for six estimated models R^2 indicating 81% which implies that the estimated predictors explain 81% of the variation in international tourism arrivals to Asia. The P-value of all models (Prob>F=0.000) is statistically significant, which means that the estimated predictors reliably predict international tourism arrivals to Asia. The variance inflation factor (VIF mean) and model specification test are applied to check for multicollinearity and the reliability of the estimated model. VIF indicates less than 5 for all explanatory variables in all models and the model specification tests significantly demonstrate that all predictors in all models fit to explain the dependent variable.

The results show that GDP per capita (GDPpc) in the destination and origin countries is statistically significant at the 1% level in each model and has a positive effect. This implies that an increase in economic outputs and income level in the destination country generates more tourist arrivals to Asia from the World (0.32%), Europe (0.59%), Asia (0.64%), Africa (0.39%), North and South America (0.43%) and the Pacific (0.39%). GDP per capita in the origin country suggests that an increase in income produces more trips to Asia specifically from the World (0.48%), Europe (0.11%), Asia (1.01%), Africa (0.67%), North and South America (0.88%) and the Pacific (2.48%). Previous studies found that GDPpc has a significant positive effect on tourism (Martins et al., 2017; Rosselló-Nadal, HE, 2019).

The population size in the destination and origin countries is statistically significant at the 1% level. Essentially, a 1% growth of the population in the country of origin increases international tourism to Asia from the World (0.75%), Europe (0.91%), Asia (0.89%), Africa (0.57%), North and South America (0.80%); conversely, there is a decrease in tourism flows from the Pacific (0.05%). Tourists from the Pacific region prefer to travel to Asian countries with a small population density. Similarly, the population in the destination is positively associated with tourism arrivals to Asia only from North and South America (0.13%). The results confirm those of previous studies (Cho, 2010; Xu et al., 2019).

A great circle distance between countries of origin and destination is statistically significant at the 1% level. Surprisingly, distance is not found as a prominent factor for tourists from the African regions traveling to Asia. Tourists from Europe, Asia, North and South America, the Pacific and the World are highly sensitive to distant destinations and prefer to travel to nearby destinations to save on transport costs and time. Accordingly, distant destinations reduce international tourist arrivals to Asia from the World (1.54%), Europe (1.44%), Asia (1.72%), North and South America (2.09%) and the Pacific (4.03%). These findings are corroborated by previous literature (Fourie, Santana-Gallego, 2013; Rosselló, Santana-Gallego, 2014).

Relative price generates a negative sign and is statistically significant at the 1% and 5% level for all estimated models besides model (6). The tourism demand in Asia is price elastic and quite robust across the groups. The absolute value of relative price elasticity is negligible and shows that a rise in the price of goods and services in the destination slightly reduces the number of international tourist arrivals to Asia. Similar results have been observed by Martins et al. (2017).

The high rate of unemployment in the bilateral countries could hit tourist flows to Asia and it is statistically significant at the 1% and 5% level in the estimation. This outcome is corroborated by the study of Alegre et al. (2019).

The positive sign of sharing a bilateral border between countries especially from Europe and Asia could generate more tourism to Asia by 1.37% and 1.64% respectively. Rosselló and Santana-Gallego (2014) find that the number of international tourists from neighboring countries greatly increases.

Investment in the tourism sector in the destination and origin countries highlights the positive and negative impact on tourism in Asia and is statistically significant at the 1% level. Capital investment in tourism of the destination countries stimulates government revenue, generates new employment, promotes tourism infrastructure and, as a result, creates more tourism to Asia from the European, African and the Pacific regions. Conversely, the promotion of tourism investment in Europe, Asia and North and South America drives tourists to travel to their host countries rather than to Asia. This result is consistent with Fourie and Santana-Gallego (2013).

Moreover, strong bilateral trade is found to be statistically significant in increasing the tourism demand of Asia. A positive association of trade with tourism demand has been highlighted in previous studies (Santana-Gallego et al., 2016). The larger the area of the destination country, the greater its sightseeing capacity and consequently the tourism flows to Asia from Asian and African regions tend to increase. This result is supported in the literature (Rosselló, Santana-Gallego, 2014; Rosselló-Nadal, HE, 2019).

The landlocked countries of destination welcome more tourists from North and South America (2.17). However, tourists from landlocked countries of Europe and Africa prefer to travel to a destination near the sea. This result is corroborated in the literature (Yang et al., 2010; Cho, 2010). The cultural variables are robust across the estimated models. As a strong determinant of tourism, sharing a common language, religion and a colonial relationship between countries attract more tourists to Asia. Religion is found as not a key motivation for European tourists traveling to Asia. These results are consistent with previous studies (Santana-Gallego et al., 2016).

The number of heritage sites in destination countries is statistically significant and has a positive influence. This proves that having natural and cultural heritage sites increases international tourist arrivals to Asia by 0.08% (World), 0.11% (Europe), 0.09% (Asia), 0.08% (Asia) and 0.06% (Pacific). This result is consistent with previous studies (Yang et al., 2010; Su, Lin, 2014).

Precipitation and temperature have a slight effect on Asian tourism demand. The findings show that precipitation in the countries of origin would not change the willingness of tourists to travel to Asia from Asia and North and South America. Tourists from Europe and Asia show an indifferent reaction towards rising average temperatures in destination countries. This result is widely supported in previous studies (Tol, Walsh, 2012; Rosselló, Santana-Gallego, 2014).

Life expectancy shows significantly negative and positive impacts for destination and origin respectively. Increasing life expectancy in destination countries leads to a surge in the old-age population and a high risk of infectious disease. This is having a slight declining effect on tourist arrivals to Asia from Europe, Asia, the Pacific and the World. Specifically, tourists from Europe, Asia and the Pacific prefer to travel to destinations with a constrictive population (middle life expectancy). A surge in the life expectancy of Europe has resulted in a small rise in the Asia tourism demand of 0.06%. Previous research is consistent with a negative correlation of life expectancy (Rosselló et al., 2017).

The number of internet users has a positive relationship with tourism demand but the effect is smaller than cultural affinity variables. It boosts tourist arrivals to Asia from the World (0.01%), Europe (0.01%) and Africa (0.02%). The result obtained is consistent with Naudé and Saayman (2005).

According to the results of governance indicators, political stability, regulatory quality, voice accountability, government effectiveness and corruption are statistically significant at the 1% level in the estimated models. Political stability in the destination countries shows a negative effect on tourism demand. Specifically, tourists from the World, Europe, Asia, North and South America are very sensitive to politically unstable destinations, causing the number of international tourist arrivals to Asia to fall with an elasticity of 0.23%, 0.22%, 0.13% and 0.56% respectively. North and South America care more than the other regions about political stability, the absence of violence and terrorism in the destination country. Interestingly, tourists from African countries are not concerned about political stability, absence of violence and terrorism in destination countries hence the number of travelers from Africa to Asia can be expected to rise by 0.76%. These results are consistent with the previous literature (Fourie, Santana-Gallego, 2013; Saha, Yap, 2014). The quality of institutions in the destination and origin countries is statistically significant at the 1% level and positively related to tourist flows. Improving the quality of institutions in the destination countries encourages Asian tourism and boosts the total number of international tourist arrivals by 1.11% and respectively from Europe (1.05%), Asia (0.87%) and the Pacific (0.8%). The higher regulatory quality of institutions in the origin countries could boost total tourist arrivals to Asia by 0.20%. Voice and accountability are statistically significant at the 1% level in the destination and origin countries. A poor level of freedom of government selection, the media, or expression in the destination countries could negatively affect the total number of international tourist arrivals to Asia by 0.18%, from Asia (0.25%) and the Pacific (0.29%). On the contrary, origin countries could generate more outbound tourists through a good level of voice and accountability in society and produce 0.20% growth of total international tourist arrivals to Asia. It must be noted that voice and accountability is not key determinant to stimulate tourists from Pacific countries to visit Asia, thus it is negatively related to Asian tourism demand. This result is consistent with the previous study (Bulut et al., 2019). Government effectiveness is significant at the 1% level and has a positive relationship for North and South America and Europe. Improving the quality of public services and implementing effective tourism-related policies in the destination tend to attract more tourists from North and South America to Asia by 0.7%. Similarly, a one-unit increase in government effectiveness in the countries of Europe led to a growth in the number of international tourist arrivals to Asia by 0.26%. Interestingly, corruption shows a positive impact on tourism demand. Accordingly, the control of corruption in the origin countries tends to enhance the total number of international tourist arrivals to Asia by 0.17% and 0.55% from North and South America. This estimated outcome is corroborated by previous studies (Saha, Yap, 2015).

According to the results of the random effect (RE) model, it is clear from Table 5 that R^2 across the estimated groups is less than that of the POLS model. However, the RE (GLS) model represents partly similar results compared to the POLS. For instance, GDP per capita, distance, population, border, colony, common currency, and some other variables are statistically significant and have a positive impact on Asian tourism demand. In contrast, some variables in the RE model show completely inverse results with respect to POLS. The relative price is statistically insignificant for the Asian, American and the Pacific regions, although surprisingly, it had a positive, significant effect for the African region. Variables such as TR, TO, UNEM, AREA, TEMP QUAL in origin as well as DEATH, STAB, GOV in the destination show robust insignificance across all estimated groups. Regional analysis reveals that religion and language variables are not significant for Europe. Climate variables show that tourists from African regions are indifferent to the effect of precipitation in the destination. Rainfall in South and North America determined insignificant relationships. Similarly, average temperatures in Asia and Africa are not significant. Life expectancy in the destination countries does not have impact on tourist arrivals from Asian and Pacific regions. Concerning governance indicators, political stability in destinations has no impact on tourist arrivals from Europe, Asia, Africa and Americas but does correlate positively and significantly with total arrivals (World). Voice and accountability in the destination and origin are statistically significant for Asia and the Pacific regions. Government effectiveness in destinations and Europe (origin) reveals insignificant effects on tourism flows. Interestingly, corruption in the origin (World) has a significant, negative influence on tourist arrivals.

Conclusion

This article explores the determinants of international tourist arrivals to Asia from 197 countries of origin for the period (1995-2016). One of the main advantages of the paper is that it focuses on how economic and non-economic variables affect tourism demand using three-dimensional panel data (origin, destination, year). Second, it shows how Asian tourism demand fluctuates in terms of tourist arrivals by five continents and the World. A dynamic gravity model is used to estimate relevant determinants. The findings show that standard gravity variables are significant in measuring tourism demand.

Political risk in the countries of destination could damage tourist flows to Asia, especially from North and South America (-0.56%). A low level of freedom as to government election, the media and self-expression in Asia reduce considerably the number of tourist arrivals from the Pacific by 0.29%. Improving the quality of institutions and formulating effective tourism-related policies in Asia tend to welcome more tourists from Europe (1.05%) compared with the Pacific, Asia regions. A positive shift in the quality of public services in Asia highly encourages the number of tourist arrivals from North and South America. The number of world heritage sites, having a common language, religion, border and colonial ties between countries origin and Asia increase considerably the number of international tourist arrivals to Asia. Climate variables reveal that rainfall and temperature have a very tiny effect on Asian tourism. Essentially, tourists from Asia care more about temperature than rainfall.

Strong trade ties between countries of Asia and Europe, Africa the Pacific generate more international tourists in Asia. Transport costs significantly reduce the tourism demand of Asia from all regions. Tourists from the Pacific, North and South America, Asia and Europe are highly sensitive to travel costs rather than the price of tourism products. The price of goods and services has a negligible influence on the tourism demand of Asia.

According to the results, we suggest that tourism policymakers are informed of the following implications. In order to increase the number of tourist arrivals to Asia politically-unstable countries of Asia should attempt to stabilize themselves and regulate politically-motivated violence. The level of freedom for the country's citizens to participate in government selection as well as freedom of the media and self-expression in Asia should be improved. Excessive corruption should be controlled to welcome more tourists from North and South America (0.55%). The goods and services should be offered at a moderate price for tourists traveling from the Pacific, North and South America. Travel companies should moderate transport costs for tourists traveling from the Pacific, North and South America. Sharing a common language, religion, colonial ties, borders and a mutual trade relationship between Asia and tourists issuing countries should be strengthened.

For future study, we would suggest the application of the model not only to a World or region scale but also for analyzing domestic tourism for specific country cases (e.g., Central Asian countries). Second, a visa indicator could be introduced in the model to capture how visa issues of destinations affect the destination choices of tourists.

With respect to the limitations of this study, the sample data should be updated with the latest database. The tourist arrivals could be classified by objectives (education, business, leisure etc.) in order to explain the tourism determinants more precisely. However, this limitation stems from the United Nations World Tourism Organization (UN-WTO). Moreover, the determinants of tourism should be estimated in terms of inbound tourism expenditure in Asia as a way to obtain a broad vision of tourism development in this region. In terms of which methodology to apply, it is highly recommended that the gravity model using the Poisson pseudo maximum likelihood (PPML) estimator should be estimated as a way to compare the consistency of outcomes between the static panel data estimator and the PPML technique.

References

Alegre, J., Pou, L., Sard, M. 2019. High unemployment and tourism participation. *Current Issues in Tourism* 22(10), 1138–1149.

Altaf, N. 2021. Modelling the International Tourist Arrivals in India. *Tourism Planning & Development* 18(6), 699-708.

Anderson, J. E., van Wincoop, E. 2003. Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review* 93(1), 170–192.

Balli, F., Balli, H. O., Jean Louis, R. (2016). The impacts of immigrants and institutions on bilateral tourism flows. *Tourism Management* 52, 221–229.

Bulut, U., Kocak, E., Suess, C. 2019. The effect of freedom on international tourism demand: Empirical evidence from the top eight most visited countries. *Tourism Economics*, 26(8), 1358-1373.

Chaudhry, I. S., Nazar, R., Ali, S., Meo, M. S., Faheem, M. 2021. Impact of environmental quality, real exchange rate and institutional performance on tourism receipts in East-Asia and Pacific region. *Current Issues in Tourism*, 1–21.

Cho, V. 2010. A study of the non-economic determinants in tourism demand. *International Journal of Tourism Research* 12(4), 307–320.

Chokethaworn, K., Chaiboonsri, C., Wannapan, S. 2020. A Spatial Analysis of International Tourism Demand Model: The Exploration of ASEAN Countries. In V.-N. Huynh, T. Entani, C. Jeenanunta, M. Inuiguchi, P. Yenradee (Eds.), *Integrated Uncertainty in Knowledge Modelling and Decision Making* (pp. 310–321). Springer International Publishing.

Crouch, G.I. 1994. The Study of International Tourism Demand: A Review of Findings. *Journal of Travel Research* 33(1), 12–23.

Crouch, G.I. 1995. A meta-analysis of tourism demand. *Annals of Tourism Research* 22(1), 103–118.

Crouch, G.I., Ritchie, J.R.B. 1999. Tourism, Competitiveness, and Societal Prosperity. *Journal of Business Research* 44(3), 137–152.

Deardorff, A. 1998. Determinants of bilateral trade: Does gravity work in a neoclassical world? In *The regionalization of the world economy* (pp. 7–32). University of Chicago Press.

Demir, E., Gozgor, G. 2019. Does freedom of the press enhance inbound tourism? *Current Issues in Tourism* 22(20), 2550–2565.

Detotto, C., Giannoni, S., Goavec, C. 2021. Does good governance attract tourists? *Tourism Management* 82, 104155.

Dogru, T., Suess, C., Sirakaya-Turk, E. 2021. Why Do Some Countries Prosper More in Tourism than Others? Global Competitiveness of Tourism Development. *Journal of Hospitality & Tourism Research* 45(1), 215–256.

Dredge, D., Jenkins, J. 2007. Tourism planning and policy. *School of Business and Tourism*.

Eilat, Y., Einav, L. 2004. Determinants of international tourism: A three-dimensional panel data analysis. *Applied Economics* 36(12), 1315–1327.

Feridun, M. 2011. Impact of terrorism on tourism in Turkey: Empirical evidence from Turkey. *Applied Economics* 43(24), 3349–3354.

Fourie, J., Rosselló-Nadal, J., Santana-Gallego, M. 2020. Fatal Attraction: How Security Threats Hurt Tourism. *Journal of Travel Research* 59(2), 209–219.

Fourie, J., Santana-Gallego, M. (2013). The determinants of African tourism. *Development Southern Africa* 30(3), 347–366.

Francisco Perles-Ribes, J., Belén Ramón-Rodríguez, A., Moreno-Izquierdo, L., Such-Devesa, M. J. 2021. Competitiveness and overtourism: A proposal for an early warning system in Spanish urban destinations. *European Journal of Tourism Research* 27(1), 1–27.

Govers, R., Go, F. M., Kumar, K. 2007. Promoting Tourism Destination Image. *Journal of Travel Research* 46(1), 15–23.

Habibi, F. 2017. The determinants of inbound tourism to Malaysia: A panel data analysis. *Current Issues in Tourism* 20(9), 909–930.

Hsiao, C. (2014). *Analysis of panel data*. Cambridge University Press.

Huang, C.H., Tsaur, J.R., Yang, C.H. 2012. Does world heritage list really induce more tourists? Evidence from Macau. *Tourism Management* 33(6), 1450–1457.

Inchausti-Sintes, F., Voltes-Dorta, A., Suau-Sánchez, P. 2021. The income elasticity gap and its implications for economic growth and tourism development: The Balearic vs the Canary Islands. *Current Issues in Tourism* 24(1), 98–116.

Kaufmann, D., Kraay, A., Mastruzzi, M. 2011. The Worldwide Governance Indicators: Methodology and Analytical Issues. *Hague Journal on the Rule of Law* 3(2), 220–246.

Khadaroo, J., Seetanah, B. 2008a. The role of transport infrastructure in international tourism development: A gravity model approach. *Tourism Management* 29(5), 831–840.

Khadaroo, J., Seetanah, B. 2008b. The role of transport infrastructure in international tourism development: A gravity model approach. *Tourism Management* 29(5), 831–840.

Khalid, U., Okafor, L. E., Shafiullah, M. 2020. The Effects of Economic and Financial Crises on International Tourist Flows: A Cross-Country Analysis. *Journal of Travel Research* 59(2), 315–334.

Lim, C. 1997. Review of international tourism demand models. *Annals of Tourism Research* 24(4), 835–849.

Liu, A., Fan, D.X.F., Qiu, R.T.R. 2021. Does Culture Affect Tourism Demand? A Global Perspective. *Journal of Hospitality & Tourism Research* 45(1), 192–214.

Martins, L.F., Gan, Y., Ferreira-Lopes, A. 2017. An empirical analysis of the influence of macroeconomic determinants on World tourism demand. *Tourism Management* 61, 248–260.

Morley, C.L. 1992. A microeconomic theory of international tourism demand. *Annals of Tourism Research* 19(2), 250–267.

Morley, C.L. 1994. The use of CPI for tourism prices in demand modelling. *Tourism Management* 15(5), 342–346.

Morley, C.L. 1998. A dynamic international demand model. *Annals of Tourism Research* 25(1), 70–84.

Morley, C., Rosselló, J., Santana-Gallego, M. 2014. Gravity models for tourism demand: Theory and use. *Annals of Tourism Research* 48, 1–10.

Muryani, M., Permatasari, M.F., Padilla, M.A.E. 2020. Determinants Of Tourism Demand in Indonesia: A Panel Data Analysis. *Tourism Analysis* 25(1) 77-89.

Naudé, W.A., Saayman, A. 2005. Determinants of Tourist Arrivals in Africa: A Panel Data Regression Analysis. *Tourism Economics* 11(3), 365–391.

Permatasari, M.F., Esquivias, M.A. 2020. Determinants of Tourism Demand in Indonesia: A Panel Data Analysis. *Tourism Analysis* 25(1), 77–89.

Poprawe, M. 2015. A panel data analysis of the effect of corruption on tourism. *Applied Economics* 47(23), 2399–2412.

Prideaux, B. 2005. Factors affecting bilateral tourism flows. *Annals of Tourism Research* 32(3), 780–801.

Qiang, M. 2020. Does climate drive tourism seasonality in cultural destinations? A comparative study. *Current Issues in Tourism* 23(22), 2756–2761.

Rehman Khan, S. A., Qianli, D., SongBo, W., Zaman, K., Zhang, Y. 2017. Travel and tourism competitiveness index: The impact of air transportation, railways transportation, travel and transport services on international inbound and outbound tourism. *Journal of Air Transport Management* 58, 125–134.

Ribes, J.F.P., Rodríguez, A.R., Jiménez, M.S. 2011. Determinants of the Competitive Advantage of Residential Tourism Destinations in Spain. *Tourism Economics* 17(2), 373–403.

Rosselló, J., Santana-Gallego, M. 2014. Recent trends in international tourist climate preferences: A revised picture for climatic change scenarios. *Climatic Change* 124(1), 119–132.

Rosselló, J., Santana-Gallego, M., Awan, W. 2017. Infectious disease risk and international tourism demand. *Health Policy and Planning* 32(4), 538–548.

Rosselló-Nadal, J., HE, J. 2019. Tourist arrivals versus tourist expenditures in modelling tourism demand. *Tourism Economics* 26(8), 1311-1326.

Saha, S., Yap, G. 2014. The Moderation Effects of Political Instability and Terrorism on Tourism Development: A Cross-Country Panel Analysis. *Journal of Travel Research* 53(4), 509–521.

Saha, S., Yap, G. 2015. Corruption and Tourism: An Empirical Investigation in a Non-linear Framework. *International Journal of Tourism Research* 17(3), 272–281.

Santana-Gallego, M., Ledesma-Rodríguez, F.J., Pérez-Rodríguez, J.V. 2016. International trade and tourism flows: An extension of the gravity model. *Economic Modelling* 52, 1026–1033.

Santeramo, F.G., Morelli, M. 2016. Modelling tourism flows through gravity models: A quantile regression approach. *Current Issues in Tourism* 19(11), 1077–1083.

Schmidheiny, K., Basel, U. 2011. Panel data: Fixed and random effects. *Short Guides to Microeconometrics* 7(1), 2–7.

Song, H., Lin, S. 2010. Impacts of the Financial and Economic Crisis on Tourism in Asia. *Journal of Travel Research* 49(1), 16–30.

Song, H., Qiu, R.T.R., Park, J. 2019. A review of research on tourism demand forecasting: Launching the Annals of Tourism Research Curated Collection on tourism demand forecasting. *Annals of Tourism Research* 75, 338–362.

Song, H., Witt, S.F., Li, G. 2008. *The Advanced Econometrics of Tourism Demand*. Routledge.

Su, Y.W., Lin, H.L. 2014. Analysis of international tourist arrivals worldwide: The role of world heritage sites. *Tourism Management* 40, 46–58.

Tang, C.F. 2018. The impacts of governance and institutions on inbound tourism demand: Evidence from a dynamic panel data study. *Asia Pacific Journal of Tourism Research* 23(10), 1000–1007.

Tang, C.F., Lau, E. 2021. Exploring the Impact of Political Stability and Climate Change on Inbound Tourism Demand: Evidence from Dynamic Panel Data Analysis. In M. Ferrante, O. Fritz, Ö. Öner (Eds.), *Regional Science Perspectives on Tourism and Hospitality* (pp. 403–419). Springer International Publishing.

Tang, C.F., Tan, E.C. 2016. The determinants of inbound tourism demand in Malaysia: Another visit with non-stationary panel data approach. Anatolia 27(2), 189–200.

Tol, R.S.J., Walsh, S. 2012. *The impact of climate on tourist destination choice*, ESRI Working Paper No. 423 (1-18).

Ulucak, R., Yücel, A.G., İlkay, S.Ç. 2020. Dynamics of tourism demand in Turkey: Panel data analysis using gravity model. *Tourism Economics* 26(8), 1394-1414.

Witt, S.F., Witt, C.A. 1995. Forecasting tourism demand: A review of empirical research. *International Journal of Forecasting* 11(3), 447–475.

Xu, L., Wang, S., Li, J., Tang, L., Shao, Y. 2019. Modelling international tourism flows to China: A panel data analysis with the gravity model. *Tourism Economics* 25(7), 1047–1069.

Yang, C.H., Lin, H.L., Han, C.C. 2010. Analysis of international tourist arrivals in China: The role of World Heritage Sites. *Tourism Management* 31(6), 827–837.

Zadeh Bazargani, R.H., Kiliç, H. 2021. Tourism competitiveness and tourism sector performance: Empirical insights from new data. *Journal of Hospitality and Tourism Management* 46, 73–82.