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## RESEARCH LETTER

### Tourism demand: a panel data approach

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This paper estimates the coefficients of the determinants of international tourism demand for the period 1995–2014 in the USA using the gravity framework. The analysis is based on a panel dataset of tourist arrivals among 14 countries using autoregressive distributed lag methods. The results show real gross domestic product, consumer price index, real exchange rate and certain specific events have a significant impact on international tourism demand. The income elasticity suggests that tourism is non-luxury goods, and prices and real exchange rate have negative relation to tourist arrivals. We also find that tourism transport infrastructure is a significant determinant of tourist arrivals into USA. This implies that infrastructure to reinforce taste formation is important to attract more international tourists to USA. In addition, results also suggest implications for public and private tourism authorities.

**Keywords:** consumer price index; panel data; real exchange rate; tourism demand; USA

#### 1. Introduction

Tourism is an important social and economic phenomenon that follows a pattern of evolution which is important to understand. The macro econometric perspective considers that tourism-demand patterns are explained by economic and social conditions at an aggregate level (Santana-Gallego, Ledesma-Rodríguez, & Pérez-Rodríguez, 2011; Seetanah, 2011), since microeconomics approaches focus on variables at the individual level (Massidda & Etzo, 2012).

In the century, tourism becoming an important and the fastest growing sector in many countries after the telecommunication and information sectors (Crouch & Ritchie, 1999). Growing tourism sector has huge potential to generate income, investment, employment and foreign exchange. According to the World Tourism Travel Council (WTTC, 2010), the contribution of travel & tourism sector to gross domestic product (GDP), total employment, and total investments are 9.8%, 8.6% and 9.8%, respectively.

Because of the increase in the international tourism sector in terms of its contribution to the national economy, in recent years there have been conducted vast theoretical and empirical studies on tourism demand, particularly in the countries which has a high dependence on tourism sector.

With the drying up of other sources of foreign currency, such as agricultural and mining exports, the tourism sector has assumed an important role as the only remaining major source of foreign currency. Since tourism remains a vital sector in the economy, its

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rejuvenation in the short-term will contribute to the economy because the other sectors such as agriculture and mining will only find their feet in the medium-term and beyond, due to the drastic structural changes which are needed to revive them.

Tourism in the United States is a large industry that serves millions of international and domestic tourists yearly. Tourists visit the US to see natural wonders, cities, historic landmarks and entertainment venues. Americans seek similar attractions, as well as recreation and vacation areas.

The travel and tourism industry in the United States was among the first commercial casualties of the 11 September 2001 attacks, a series of terrorist attacks against the USA. The Terrorists used four commercial airliners as weapons of destruction, all of which are destroyed in the attacks with 3000 casualties. In the first full week after flights resumed, the passenger numbers fell by nearly 45%, from 9 million in the week before 11 September 2001 to 5 million. Hotels and travel agencies received cancellations across the world. The hotel industry suffered an estimated \$700 million loss in revenue during the four days after the attacks.

The situation recovered over the following months as the Federal Reserve kept the financial system afloat. The USA Congress issued a \$5 billion grant to the nation's airlines and \$10 billion in loan guarantees to keep them flying. In the USA, tourism is either the first, second or third largest employer in 29 states, employing 7.3 million in 2004, to take care of 1.19 billion trips tourists took in the USA in 2005 (Ryan, 2003).

Figure 1 shows the trends and growth rates in international tourist arrivals to US from 1995–2014. Two of the major international tourism source markets are the Canada and Mexico.

During this period, international tourist arrivals to the USA were rising. However, France has the highest tourism arrival and Venezuela has the lowest tourism arrival to the USA.

We use a gravity framework to evaluate the transport infrastructure in determining the tourism attractiveness of destinations for a panel dataset of bilateral tourist arrivals among 14 countries over the decade from 1995 to 2014. We use transport infrastructure as a significant determinant of tourist arrivals into a destination.

In this paper, using the dynamic panel data model, we seek to find and analyse the determinants of the international tourism demand for USA. The contribution of this paper is two-

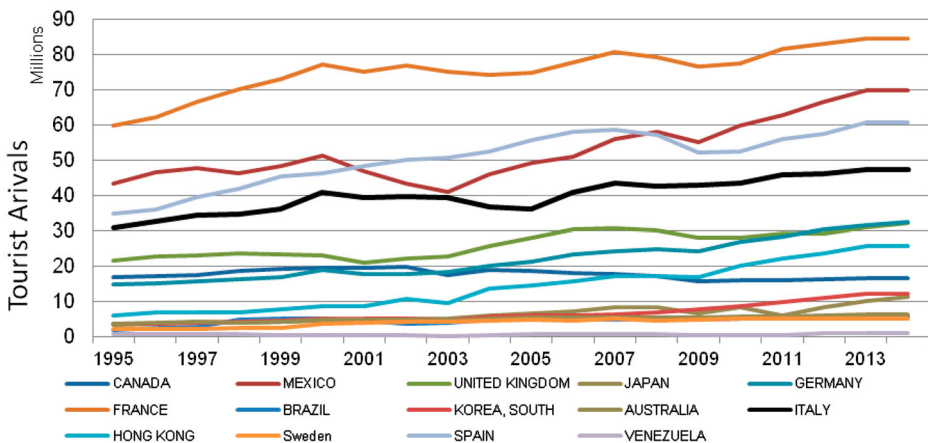


Figure 1. The trends and growth rates in international tourist arrivals to USA. Source: Tourism USA.

fold: (i) it expands the database using new variables and by including more countries and (ii) uses panel series data and applies the autoregressive distributed lag (ARDL) to investigate the determinants of international tourism demand. This study related to American tourism demand uses several variables (real per capita income, prices, real exchange rates, airport transportation and country-specific dummy).

The rest of the paper is organized as follows. Section 2 provides a background to international tourism in the USA. Section 3 provides the theoretical basis for investigating the determinants of the international tourism demand and the method used in this survey while Section 4 presents the empirical results. Section 5 concludes the paper by drawing policy implications.

## 2. Literature review and data

The literature review on econometric modelling of tourism demand shows that there is no standard measure of tourism flows universally acceptable. In fact, the majority of the empirical studies in this area to define international tourism demand using one of the following measures: several foreign visitors crossing the borders; the number of nights spent by visitors from abroad; the receipts originated from the visitors spending; or the stay-length of tourists visiting a country. None of these measures is fully satisfactory in encompassing all the aspects which characterize the demand for tourism in a specific location.

Gonzalez and Moral (1995), in a study about the international tourism demand in Spain, refer that one of the main problems in analysing the potential of the tourist sector is to find a precise indicator for measuring the external demand. Bearing in mind that the tourism demand is not a directly observable variable, it is necessary to find a suitable proxy to represent it. The authors used tourists spending as the dependent variable, defined as the product of three factors: the number of tourists, the length of their stay and the daily average spending. This is a more complete definition than using the number of entrances to express tourism demand. The latter does not take into account the stay – duration and spending behaviour.

Most studies tend to analyse the low demand in terms of departures and arrivals and tourism expenditures and receipts by destination and country of origin. Historically, demand studies tend to use number of tourists as the dependent variable (Crouch & Shaw, 1992).

Demand-side research, although with limitations, was widely used by destination marketers to create short-term tourism forecasts by measuring elasticity. The Researchers used various economic variables in their studies. Some of these variables include income, population, cost of living differences, transportation cost, exchange rate and other price factors, distance, destination attractiveness seasonality patterns and length of stay.

Kaul (1985) was among the first to recognize the importance of transport infrastructure as an essential component of successful development in that it induces the new attractions' creation and the growth of existing ones.

Smith (1994) investigated the role of service infrastructure in creating a product experience. He argued that service infrastructure houses within the larger macro-environment of the destination and that infrastructure and technology in a destination is key features that can enhance experience.

Crouch and Ritchie (1999) analysed the product in the context of comparative and competitive advantage, and states that tourism planning and development would not be possible without roads, airports, harbours, electricity, sewage and potable water. Prideaux (2000) argued that a destination should be easy to get to and easy to get around. Most tourists,

being citizens of developed countries, accustomed to modern and efficient transport infrastructure, and they expected to experience in the destination country comforts similar to home, failing which they will seek alternative destinations.

The standard demand theory is the theoretical foundations for the modelling international tourism demand. Middleton, Fyall, and Morgan (2009) summarized the main determinants in nine factors: economic factors; comparative prices; demographic factors; geographic factors; socio-cultural attitudes to tourism; mobility; government/regulatory; media communications; and information and communication technology. Income factors particularly used in many empirical studies that adopted econometric models measure tourism-demand elasticity. The results showed that the income elasticity of tourism demand is positive and greater than one.

Typically, economic products with such elasticities are perceived as luxury goods, as posited by Crouch (1995), Lim (1997) and Smeral (2012). They found that price is negatively related to international demand tourism. Tourism demand in the destination can be influenced by changes in the exchange rates. Changes in exchange rate will affect a currency value of the origin country. Any change in exchange rate will lead to an appreciation or depreciation of tourist currency. Transportation cost has been widely reviewed in tourism literature.

The use of panel data methods has several advantages. Ledesma-Rodriguez, Navarro-Ibanez, and Perez-Rodriguez (2011) used the number of visitors lodged in the destination country as the dependent variable to study the tourism demand in a panel data approach. The choice of this variable to express tourism demand (compared with the number of tourist arrivals) has the advantage to consider the length of stay and to exclude tourists who are hosted to family or friends' houses.

Naudee and Saayman (2004) studied the determinants of tourism flows in the case of African countries using a panel data regression approach. Applying cross-section ordinary least squares as well as static and dynamic panel data estimation, these authors showed political stability, personal safety, marketing efforts and available infrastructure as important factors in addition to the classical usual factors in nearly all panel sets analysed, namely aggregate arrivals, arrivals from America, Europe and Africa, respectively. However, the measure of infrastructure used relates to tourism infrastructure exclusively. Teresa and Martín (2007) investigated international tourist arrivals to the Balearic Islands from 14 major origin countries during 1991–2003, using the panel data. They suggested that after the terrorist attacks of 11 September 2001, international tourists have changed long-run for short-run destinations and destinations accessible by car were preferred over destinations that require air travel.

Khadaroo and Seetanah (2007) investigated the significance of transport infrastructure as a factor in destination development, showing it a part of the classical demand for international tourism functions in Mauritius. The findings showed that tourists from Europe/America and Asia are particularly sensitive to the island's transport infrastructure. Those from Europe/America are also sensitive to it's no transport infrastructure. Both types of infrastructure, as well as income of tourists, distance and relative prices are important ingredients in their own respect in the tourism-demand equation. Mauritius is an expanding destination, with the European and American markets being most promising.

Sequeira and Nunes (2008) studied the effect of country risk on tourism demand (tourist arrivals, tourism receipts as a per cent of export, and tourism receipts as a per cent of GDP), using the dynamic panel data approach namely system generalized Method of Moment. They indicated that the value of country risk coefficient is relatively stable in the

regressions, which means 1% increase in the risk rating (decrease in the country risk) allows for a near 0.2% increase in specialization.

Leitão (2010) applied static and dynamic panel data models of tourism demand in Portugal and estimated demand equations using tourism inflow data for the period 1995–2006. The results suggest that trade, population and income are the main determinants of tourism demand in Portugal, rather than relative prices. Santana-Gallego et al. (2011) introduced the static and dynamic models to analyse both long-run and short-run relationships for the Organisation for Economic Co-operation and Development (OECD) countries. A good agreement is generally found between tourism and trade in both relationships. They investigate the potential contribution of tourism to economic growth and development in 19 countries (island economies) using a dynamic panel data model. The results of the study suggest that tourism development is an important factor explaining economic performance in island economies.

Surugiu, Leitão, and Surugiu (2011) used the static and dynamic panel data analysis to study the impact of specific factors across countries on tourism demand in Romania. The results show that per capita GDP, trade and population have a positive effect on international arrivals. The study conducted by Deng and Athanasopoulos (2011) investigated Australian domestic and international inbound travel using an anisotropic dynamic spatial lag panel Origin–Destination travel flow model. These authors modelled tourism behaviour as travel flows between regions. This study is the first that formally incorporated both temporal and spatial dynamics into tourism-demand modelling. The results show that spatial patterns are found the most important during peak holiday seasons.

However, recently in tourism-demand studies, Gravity Model has attracted researcher's attention to use it into tourism-demand model. For example, Hanafiah and Harun (2010) studied tourism demand in Malaysia based on the key economic factors such as income, price, exchange rate, consumer price index (CPI), distance, population and economic crisis using a modified Gravity Model. The result indicates that there is a strong relationship between key economic factors and decision to travel among tourists. Income is the most important factor that affects tourism flows. Exchange rate was negatively related to tourism demand, as tourists with higher purchasing power prefers to visit Malaysia. CPI reduces number of tourist to travel. The growing number of tourist arrivals was influenced by population growth and distance may reduce tourism demand.

Based on a panel data analysis, Ibrahim (2011) used a dynamic demand model for tourism in Egypt to identify and estimate income, tourism price and trade value elasticities of tourism demand. The results show that tourism in Egypt is very sensitive to price. Keum (2011) proposed a dynamic econometric model for the causal analysis of panel data to examine bilateral tourism and trade flows between Korea and its 21 trading partners worldwide over a 12-year period. The finding suggests that policies to stimulate international human interchange may lead to an increase in tradable goods.

In another study conducted in Mediterranean countries, Dritsakis (2012) suggested an analysis of the relationship between economic growth and tourism development. The results show that there is strong evidence of panel cointegration relationships between tourism development and GDP in seven Mediterranean countries. In light of this, tourist receipts have a higher impact on GDP in these countries. Using a dynamic panel data model, Seetaram (2012) analysed the main determinants of international tourism demand in Spain. The results suggested a high fidelity of visitors to the destination and the economic conditions of visitors seemed to be very significant in determining international tourism demand. Keum (2011) proposed a dynamic econometric model for the causal analysis of panel data to examine bilateral tourism and trade flows between Korea and its 21 trading

partners worldwide over a 12-year period. The results suggest that policies to stimulate international human interchange may lead to increased tradable goods.

Finally, according to Ramos and Rodrigues (2013), it allows one to control for individual heterogeneity, to consider more information, more variability, less collinearity between variables; it provides more degrees of freedom and greater efficiency and allows one to study the dynamic adjustment process. It also allows for the identification and measurement of effects that simply are not detected in data that are purely temporal or cross-sectional, and it allows for small samples.

### 3. Data, model estimation and methodology

#### 3.1. Data

According to Song and Li (2008), the number of tourist arrivals is still the most popular measure in tourism-demand studies. The main reason for this choice is the easy availability of tourist arrivals' data. In this study, tourism demand is defined in terms of number of tourist arrivals from an origin country to destination country (USA). CPI is CPIs of origin country to CPI of USA and GDP is GDP per capita of origin country to USA GDP per capita. We use the total number of flights in international airports in each country (Airport).

We estimate a model to explain the demand for USA international tourism using data on the number of tourists arrivals from 14 major origin countries: Canada, Mexico, United Kingdom, Japan, Germany, France, Korea, Australia, Brazil, Italy, Hong Kong, Spain, Sweden and Venezuela. The dataset corresponds to the annual tourist arrivals during the 15-year period between 1995 and 2014. Consequently, we have a complete panel dataset with  $102 \cdot 14 \cdot 15 = 210$ .

The measure for the volume of tourism used in this paper is the annual number of arrivals to the USA. The data for tourist arrivals are taken from Tourism USA. Data for GDP, population and CPIs, real exchange rate data are from world development indicators (WDI, 2015) and ITA (2015).

#### 3.2. Model estimation

Stucka (2002) reveals that the majority of empirical studies try to model the tourism flows between the receiving and the supplying countries, specifying a demand function of the type  $Q = f(Y, P)$ , where  $Q$  stands for tourist consumption in the receiving country,  $Y$  is income per capita of the supplying country as a measure of its purchasing power capacity and  $P$  is a relative price index to measure price levels between the origin and the destination countries.

The Gravity Model is a more common formulation of the spatial interaction method as it is understandable and practical to measure the relationship of one zone to another zone, such as trade volume, migration and capital flows. It was originally proposed by Newton's gravitational law.

Tinbergen (1962) was first used the Gravity Model in analysis of international trade flows. The basic assumption of the Gravity Model states that there is positive relation between bilateral trade and GDP, while between bilateral trade and distance it becomes a negative relation. The basic formulation model is expressed as follows:

$$\text{Trade}_{ij} = A \frac{(\text{GDP}_i \cdot \text{GDP}_j)}{\text{DISTANCE}_{ij}}. \quad (1)$$

For the econometric purposes, Equation (1) can change into a linear form Equation (2) using logarithm:

$$\text{Ln}(\text{Trade}_{ij}) = A + \beta_1 \text{Ln}(\text{GDP}_i \cdot \text{GDP}_j) - \beta_2 \text{LnDistance}_{ij} + \epsilon_{ij}. \quad (2)$$

In estimating tourism demand, Rodrigue (2004) has used Tinbergen Gravity Model and to suit the tourism and variables, some adjustment were made with the model. The model proposed by Rodrigue (2004) is as follows:

$$\text{TD}_{ij} = K \frac{(m_i \cdot m_j)}{D_{ij}}, \quad (3)$$

where  $\text{TD}_{ij}$  stands for tourist arrival from country  $i$  to destination country  $j$ ,  $K$  is constant,  $m_i$  is a factor to generate the international tourism movement,  $m_j$  is a factor in attracting the movement of international tourism and  $D_{ij}$  is distance between origin country  $i$  and destination country  $j$ .

For a several decades, many researchers have worked to explain international trade flows between countries using Gravity Model. However, the early empirical use model was criticized because of its lack of theoretical foundation. The Gravity Model can derive from different theoretical models such as Ricardian models, Heckscher–Olin (HO) Models and Increasing Return to Scale (IRS) Models of the New Trade Theory.

Recently, in the international tourism empirical literature, the Gravity Model has been widely used to investigate the role of tourism. The study uses panel data to investigate the importance of transport capital in the overall attractiveness of USA. A classical demand function is specified for international tourism along the lines of Witt and Witt (1995) and Naudee and Saayman (2004), augmented with the transport and non-transport capital stocks (these adding up to the public capital stock). The basic Gravity Model can specific as linear equation form of natural logs, and is expressed as follows:

$$\begin{aligned} \text{LnTOUR}_{\text{mst}} = & \beta_0 + \beta_1 \text{LnGDP}_{\text{mt}} + \beta_2 \text{LnCPI}_{\text{mt}} + \beta_3 \text{LnREER}_{\text{mt}} + \beta_3 \text{AIRPORT}_{\text{mt}} \\ & + \text{DUM2011} + \epsilon_{\text{mst}}. \end{aligned} \quad (4)$$

This study uses tourist arrivals as dependent variable. However, this study distinguished itself by using tourist receipt to measure tourism demand since this variable may be important to raise revenue for a country. As regards independent variables, this study focuses on income, CPI, exchange rate and airport transportation. Dummy variables were also included to explain tourism. DUM2011 is dummy variable to capture 11 September 2011.

The real per capita GDP of origin countries is as a proxy for national income. The ratio of real GDP per capita in country of origin (GDP) to GDP of USA is used as a proxy for the spending capacity of tourists.

An increase in the price level of the destination country to origin country discourages tourists to travel to this place or reallocate their demand to other relatively cheaper alternative tourism destinations. The choice of the price variable is also very important. In our study, we are going to consider the ratio of CPI in the destination to CPI of USA. This measure of relative prices captures changes in the real exchange rate over time as well as cross-sectional variation in the cost of travel. Demand for the product in a particular destination is likely negatively related to relative tourism prices, as higher cost of living within



the destination would make tourists less enthusiastic about it. Also we used the ratio of real exchange rate in the origin country to real exchange rate of USA.

To assess the airport transport as infrastructure of the countries in the sample, it is important to note that this measure has been used by many authors, particularly in the economic importance of the overall transport infrastructure (Canning, 1999; Canning & Benathan, 2000). Distance between the origin and destination countries has also been widely included when modelling arrivals (Witt & Witt, 1995). The longer the distance, the higher the airfare and the higher the level of discomfort and opportunity cost. Distance is likely to have a negative effect on arrivals. Air is a measure of airport infrastructure and is important as tourism is overwhelmingly dependent on this mode of transport.

### 3.3. Methodology

The first step for estimating tourism demand is to determine whether the series has any integration orders. For this purpose, this study employs panel unit root tests developed by Levin, Lin, and Chu (2002, hereafter LLC) and Im, Pesaran, and Shin (2003). Levin, Lin, and Chu (2002) proposed a panel unit root test based on Augmented Dickey–Fuller (ADF) and assumed homogeneity in the dynamics of autoregressive coefficients for all units of the panel. Since each variable contains a unit root panel, we proceed if there is a long-run relationship between the variables.

This paper employs Kao (1999) and Pedroni's panel cointegration test. Gutierrez (2003) shows that the result of Kao's panel test has higher power than Pedroni (1999)'s test when a few observations are included in a homogeneous (p. 9) used both Dickey–Fuller (DF) and ADF tests for panel cointegration testing.

The following system is the cointegrated regressions for tourists from the source countries. The first is a DF type and the second is an ADF type. The both tests can be computed from:

$$\hat{u}_{it} = \rho \hat{u}_{it-1} + V_{it}, \quad (5)$$

$$\hat{u}_{it} = \rho \hat{u}_{it-1} + \sum_{j=1}^p \varphi_j \Delta \hat{u}_{it-j} + V_{it}, \quad (6)$$

where the residuals  $\hat{u}_{it}$ . Equations (5) and (6) are obtained from Equation (4). The following specification of null and alternative hypotheses is as follows:

$$H_0: \rho = 1,$$

$$H_a: \rho < 1.$$

## 4. Empirical results

In this section, test results for stationarity are presented for the series used in the regressions of the previous section in order to ensure that the spurious correlation problem has been avoided. Should this be the case, estimators could be inconsistent, rendering  $t$ -statistics unreliable. These test results are depicted in Table 1. More specifically, the results of the Levin et al. (2002) test assuming one unit root for the panel series, along with the results of the Im et al. (2003) and Maddala and Wu (1999) tests, based on which the ADF – Fisher Chi-square and PP – Fisher Chi-square statistics are computed. These last three

Table 1. Panel unit root test.

Unit root test	LTOUR	LGDP	LCPI	LREER	LAIRPORT
<i>Level</i>					
Levin, Lin & Chut*	-2.94791**	-1.11160	-1.31462***	-1.20010	1.73255
Im, Pesaran and Shin W-stat	-1.10708	0.03063	1.81465	-1.31903	-0.39993
ADF – Fisher Chi-square	33.9034	31.6961	12.1485	38.7003	38.3853***
PP – Fisher Chi-square	30.9266	21.0334	59.2846**	34.6304	43.7522
<i>Level 1</i>					
Levin, Lin & Chut*	-8.23520**	-3.98050**	-4.29736**	-4.30820**	-6.67326**
Im, Pesaran and Shin W-stat	-6.42917**	-4.26179**	-5.35710**	-4.80737**	-7.20179**
ADF – Fisher Chi-square	92.9400**	64.6976**	79.4628**	71.6774**	104.103**
PP – Fisher Chi-square	197.727**	88.6793**	347.337**	106.386**	190.232**

Notes: All unit root tests were performed with individual intercept for each series. The optimal lag length was selected automatically using the Schwarz information criteria. The null hypothesis is a unit root for all the tests.

\*\*Denotes statistical significance at the (5%).

\*\*\*Denotes statistical significance at the (10%).

statistics are based on the assumption that a distinct unit root exists for each unit of the panel. In most cases, the test results coincide with the rejection of the hypothesis of a unit root at conventional levels of statistical significance.

The panel unit root tests are conducted on levels and first differences of the variables. The results are shown in Table 1. The null hypothesis of a unit root against the alternative of a judgment rejects in varying levels, but is not rejected in their first differences. Therefore, the variables are integrated of order one,  $I(1)$ .

This paper employs Kao (1999)'s panel cointegration test because Gutierrez (2003) showed that the result of Kao's panel test has higher power than Pedroni (1999)'s test when a small number of observations are included in a homogeneous panel. The Pedroni panel and Johansen cointegration test was performed and the results are shown in Table 2.

Regarding the results of cointegration tests, the null hypothesis, which suggests that there is no cointegration between the variables at the 5% significance, rejected both in terms of panel and group statistics. In other words, there is a long-run relationship between the variables.

Table 3 presents the regression results based on the ARDL method, panel over the 1995–2014 period.

In order to interpret the results, the estimated coefficients are long-run demand elasticities. The results are still consistent with correct sign and the level of significance except CPI.

Table 2. Pedroni cointegration test results.

	<i>t</i> -Statistic	<i>p</i> value	Weighted <i>t</i> -statistic	<i>p</i> value
Panel <i>v</i> -Statistic	16.50583**	[.0000]	-0.098424	[.5392]
Panel <i>rho</i> -Statistic	-1.634523**	[.0511]	2.264210	[.9882]
Panel PP-Statistic	-0.271156	[.3931]	0.383074	[.6492]
Panel ADF-Statistic	-2.837309**	[.0023]	1.136315	[.8721]
Group <i>rho</i> -Statistic	2.783833	[.9973]		
Group PP-Statistic	0.211722	[.5838]		
Group ADF-Statistic	0.836761	[.7986]		

Note: Critical value is at the 5%, significance level denoted by (\*\*).

Table 3. Panel ARDL (3, 1, 1, 1, 1, 1) long-run estimator.

Dependent variable: LTOUR				
Variable	Coefficient	Std. error	t-Statistic	Prob.
LGDP	0.33**	0.0223951	3.518525	[0.0142]
LREER	-0.68**	0.056764	-11.97333	[0.0000]
LCPI	-0.08	0.135471	-0.584653	[0.5598]
LAIRPORT	0.10**	0.013874	6.971467	[0.0000]
DUM2011	-0.21**	0.038495	-5.407679	[0.0000]

\*\*Shows significant at 5% level.

The long-run elasticity values are income elasticity (0.81). According to the estimated long-run elasticity value (0.33), tourism to the USA is considered by foreigners as a non-luxury service. However, the estimated values of the income elasticity suggest that the economic conditions of tourists who visit are an important factor in determining tourism demand in the USA.

The estimated long-run price-elasticity (-0.08) could lead to the conclusion that the tourism arrival in the USA could be increased by decreasing prices. Meanwhile the result of the estimated coefficient for CPI is negative and significant, which implies that the role of cost of living in destination countries is still important even though a slight change in CPI ratio decrease American tourist. A tourism price index would be more accurate, which is easily available (Katafono & Gounder, 2004). The tourists are not price sensitive to these destinations.

The result shows that a 1% \$ depreciation increase 0.68% of tourist arrival in the USA. The real exchange rate changes may have a significant effect on decision of international tourists. If the price of foreign currency decreases (travel become cheaper), then more people are willing to travel and tourism demand increases. In general, due to easy comparisons, tourists use real exchange rates as a proxy for destination prices.

The dummy variable DUM 2011 shows the impact of the terrorist attacks of September 2011. The dummy variable takes the value of one after 2011 and zero otherwise. The results confirm the expected positive sign and show that it is not significant in explaining tourism arrival.

The transport infrastructure is confirmed to have played an important role together with tourism infrastructure. The airport infrastructure is observed to have been a relatively non-important element in tourism generation, this being especially true to USA destinations. Tourism infrastructure is also seen to play an important part in explaining tourism development. Investigating the other determinants, the intercept is positive and significant in all destinations, implying that tourism in general carries a good perception (Naudee & Saayman, 2004) in the USA. As expected, tourists travelling American destinations face a lower income and price elasticities. Relatively lower-income elasticity confirms that these destinations are non-luxury products.

The explanation based on Cohen (1979) may be relevant, namely that tourists prefer to support the same comforts as in their home country while travelling. Transport might have also enhanced their experience as spelled out in the theoretical review.

## 5. Conclusion and policy implication

Tourism in the USA is considered as one of the largest foreign-exchange-generating industry after manufacturing sector. Tourism has experienced continued growth and deepening

diversification to become one of the fastest growing economic sectors in the world. Modern tourism is closely linked to development and encompasses a growing number of new destinations. Thus, it is important to identify what are the major demand factors that attract tourists. This study investigates the international tourism demand factors for the USA. This paper employs a Gravity Model of trade to the tourism services industry for 14 countries over period 1995–2014 to investigate the role of transportation infrastructure in tourist arrivals using the ARDL methods for the case of dynamic panel data model. The Gravity Model used to estimate factors that contribute to tourist arrivals.

The estimated elasticities are plausible in terms of their economic signs, magnitudes and statistical significance in the USA. The income elasticity shows that tourism is a non-luxury good. The result reveals that the GDP of country destination is equally important with the source country of prices. Real exchange rate negatively relates with demand for tourist in the USA. The finding suggests that a \$ depreciation lowering the cost of living is also an important factor in demand for tourists to USA. We have found that external shocks may have an impact on tourism demand. It seems reasonable to assume that after the terrorist attacks of 11 September 2001, foreign tourists have changed.

Based on estimation results, we can make following suggestions to policy-makers and tourism supplier. First, when tourists decide to travel, they care more about prices and real exchange rates. Therefore, government should provide investment in tourism infrastructure, and private tourism sector increases accommodation capacity. Second, the policy implication of this result is that, in order to attract more tourists to the destination, the suppliers of tourism products/services should improve their service quality and upgrade their brand image. Third, the presence of repeat guests may also possibly be considered as a deterrent to quality cheating. The tourism promotion should also focus more on the neighbouring countries since these countries can contribute more to tourism growth, in addition to maintaining the \$ currency stability and controlling the cost of living in the USA.

The findings of this paper have important implications for tourism policy decision-making in the USA. American tourists are sensitive to both tourism price and income in the long-run. As policy implications are concerned government should integrate transportation policies into tourism planning. Investing in tourism infrastructure, marketing efforts and liberalizing air access might not enough without efficient transportation support infrastructure. Policy-makers should have an explicit focus on long-term planning and requirements. They should develop an integrated, efficient and affordable transport system sustainable from social, economic and environmental points of view.

In addition the case of private financing and joint public/private financing arrangements should encourage as long as there is addition to the country's stock of transport capital, no matter who is financing it. Governments should ensure that the private sector has enough incentives to invest in transport capital and in its services as well by developing an efficient institutional framework, improving the law and regulatory environment and removing unnecessary bureaucratic rules and practices. However, independent analysis should be undertaken at each country's level to investigate the relationship between transport capital and tourism further as this may allow prescription of more country-specific implications and suggestions.

The findings lend support to the current policy of the government whereby significant marketing effort is being made at the international level to further promote the USA tourism product. The authorities should also be given due credit for constantly upgrading the infrastructure. Diversification into ecotourism is also a commendable strategy and the island should continue to target high-spending tourists.

Tourists seem to be highly sensitive to the price variable. Hence, policy-makers and suppliers must closely monitor all tourism service providers such as hotels, restaurants, tourist operators and transportation companies such as airport taxis and tourist buses to ensure that they do not charge ‘unreasonable’ prices for their services. The negative sign of substitute tourism price indicates that alternative destinations are complementary destinations to USA.

As far as policy implications are concerned, government should integrate policies into tourism planning, especially for development of hotels and supported private sector to invest in this industry. In addition our analysis suggests that policy-makers in tourist destinations are rightly concerned about safety and stability. Policy-makers should be aware of the negative effect of political instability on tourism demand. Therefore increasing the political stability of a country is significantly dependent on governments’ actions.

In addition our analysis suggests that policy-makers in tourist destinations are rightly concerned about safety and stability. Policy-makers should be aware of the negative effect of political instability on tourism demand. Therefore increasing the political stability of a country is definitely dependent on governments’ actions.

### Disclosure statement

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