

Effective International Tourism Management: A Strategic Approach

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Abstract The objective of the study was to explore the relationship between international tourism indicators, crime rate, and vulnerability in a panel of 16 tourist-oriented countries over the period of 1990–2014. The study constructed a vulnerability index by using three socioeconomic factors, (1) poverty, (2) income inequality, and (3) unemployment rate. The results show that crime rate and vulnerability both decreases international tourism demand, which were mediated through inadequate education and health resources. Trade openness moderately supported the international tourism demand under the crime rate and vulnerability index. The results confirmed the crime Kuznets curve that turned into inverted U-shaped relationship between crime rate and per capita income, while this relationship was not confirmed for vulnerability index. The panel causality relationships confirmed the unidirectional causality between crime-vulnerability and international tourism. Growth-fueled tourism demand was analyzed under a crime and vulnerability index. The study concludes that international tourism is an implied solution to reduce human costs by involving tourists to in pleasure activities to at tourists' destinations.

Keywords International tourism · Crime rate · Vulnerability · Per capita GDP · Educational expenditures · Health expenditures · Trade openness · Dynamic panel GMM estimator

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1 Introduction

The effective international tourism management is the strategic approach to sustained livelihood of the marginally poor from developing nations. International tourism in some countries was indirectly related to the implied relationship between vulnerability and crime rate reduction. Income strategy group that needs stronger vision towards international sustaining tourism to reduce poverty to leads to better understanding. Further, global (or the country) leadership needs to improve strategies to build a stronger vision towards the reduction of poverty and more balanced income to enhance tourism. Although the direct relationship is difficult, the channel through which an increase in education and health expenditures connect with economic prosperity and health (Pizam et al. 1997; Barker et al. 2002; George 2003; Akama and Kieti 2007; Gonzalez 2015). The latest report of UNWTO-World Tourism Barometer (2016) presented two highlights about international tourism in the first half of 2016, (1) the positive tendency of international tourist arrivals was reported by an average growth rate of 4% between January and June which is compared to the same period, (2) more than 21 million overnight visitors joined in the first half of 2016 that reached up to total 561 million visitors as compared to the last year (UNWTO 2016). There is an increase in international arrivals to Asia and the Pacific region. Those regions maintained the highest growth of more than 9% during 2016 across world regions (ADB 2016). Europe maintained the tourist growth at 3% which included of 5% in North, Central and Eastern Europe, 1% in Western Europe, and 2% recorded in Southern Mediterranean Europe in the first half of 2016. There is a significant growth in terms of international tourist arrival viewed in South and Central America of 6% while North and Caribbean America increased to 4%. North Africa and Middle East decreases tourist arrival by an estimated 9% at destinations a 6 month period (UNWTO 2016).

The United Nations Office on Drugs and Crime (UNODC 2014) global study illustrated that Brazil showed the higher murder counts of 50,108 people during 2012 for a rate of 25.2 per 100,000 inhabitants per year. A countries' breakdown is listed as,

- (a) India 43,355 inhabitants, 3.5 rate of murder count
- (b) Nigeria 33,817 inhabitants, 20 rate of murder count
- (c) Mexico 26,037 inhabitants, 21.5 rate of murder count
- (d) Democratic Republic of Congo 18,586 inhabitants, 28.3 rate of murder count
- (e) South Africa 16,259 inhabitants, 31 rate of murder count
- (f) Venezuela 16,072 inhabitants, 53.7 rate of murder count
- (g) Colombia 14,670 inhabitants, 30.8 rate of murder count
- (h) Pakistan 13,846 inhabitants, 7.7 rate of murder count
- (i) China 13,410 inhabitants, 1 rate of murder count
- (j) United States 12,253 inhabitants, 3.8 rate of murder count
- (k) Ethiopia 11,048 inhabitants, 12 rate of murder count etc.

(Source, UNWTO 2015 and UNODC 2014).

Figure 1 listed a set of key indicators about pro-poor growth such as the crime rate and the most visited countries.

The study emphasized the importance of international tourism indicators that may generate sufficient foreign reserves to stabilize our economies by providing job opportunities to the vulnerable peoples. It was hoped that these target groups could adjust to pleasure-based tourism activities present at tourist locations. Chiu and Lin (2011) argued that criminal activity in the tourists' destinations not only harmed the tourists' willingness

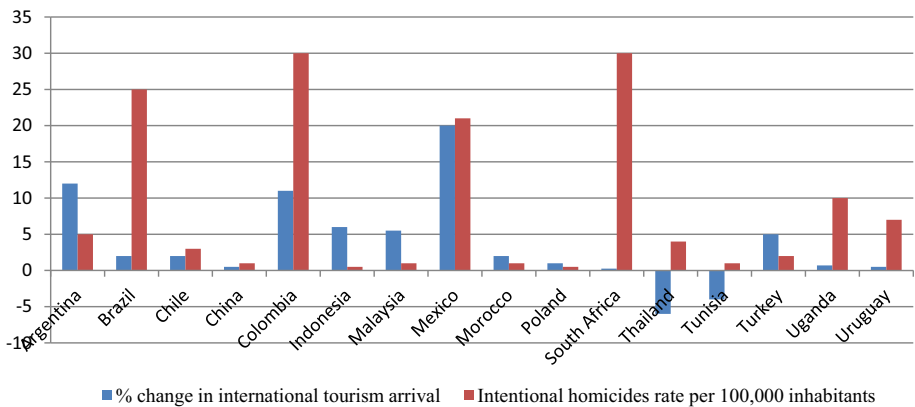


Fig. 1 Most-Visited Countries and Crime rate. *Source:* UNWTO (2015) and UNODC (2014)

to visit but also affected the development of the local tourism industry. Therefore, it was advisable to be aware and educate international tourists' regarding the nature of risks by after followed the remediation technique. Eugenio-Martin et al. (2006) evaluated different socio-economic and health related risks that faced international tourists' during their visitations and found that the September 11th Terrorist Attack affected the behavior of German tourists, while French tourists suffered with the viral illness mostly in tourist destinations. The study concluded that the intensity of crisis for different nationalities in the tourists' destinations needed effective crisis management guide to respond to diverse types of crises. Detotto and Otranto (2010) argued that criminal activities created additional imposed taxes that affected the entire economy; it was desirable to reduce this cost by improving economic decision choices. Cohen et al. (2004) collected the data from a large sample of 1300 U.S. residents for evaluating the willingness to pay to reduced crimes and found that the respondents in favor to pay between US\$100 and US\$150 per year for such programs. Hong (2009) determined the global tourism competitiveness scale was composed of natural abundant resources with higher degree (5) factors of technology, (1) globalization, (2) trade mechanism, (3) education, (4) skilled training, and (5) environmental concerns. These five factors helped to shed light on the competitiveness of tourist destinations.

Baker and Stockton (2014) investigated the correlation between international tourism and crime rate in major American tourists' cities and found that there was an indirect relationship between violent crimes and number of international visitors in Honolulu, and conversely, a direct relationship was found with between the same factors in Las Vegas. The results further suggested the strong relationship between law enforcement employees and crime reduction in the U.S. Becken and Hughey (2013) linked the international tourism indicators together with the disaster risk reduction, and found that disaster management planning needed volatile measures in order to provide the strong safety nets for tourists for safe and secure visitation. In related research, Becken et al. (2014) further emphasized the role of efficient disaster planning management for preventing the international tourism industry by natural hazards and vulnerabilities in the Caribbean, South Pacific and Indian Oceans' region. Truong et al. (2014) surveyed the impact of international tourism on poverty reduction in Sapa, Vietnam and argued that international tourism supported the marginalized low income, poverty groups and non-marginalized low income, poverty

groups due to many socio-economic problems including marginalized low income, poverty groups have less resources and knowledge to received the benefits from international tourism. More specifically, illiteracy from foreign language was a major hindrance to the benefits of international tourism in improving livelihoods. The study enforced the need for pro-poor tourism by adding the perceived values of marginalized low income, poverty groups who visit tourism destinations. Chok et al. (2007) considered international tourism as a viable policy instrument for poverty reduction in the absence of structural inequalities. It was increased international tourism demand. Zhao and Ritchie (2007) enforced the need of an integrated research framework for evaluating the positive impact of international tourism on poverty reduction. Scheyvens and Russell (2012) evaluated the pro-poor tourism in Fiji and argued that although international tourism boosts the local industries by increasing employment and revenue generation, however, it does not trickle down to the lower income and that needs a stronger vision among international decision makers to help to increase sustaining tourism measures potentially reduce poverty.

Table 1 shows the some recent strikes on tourism and crime data in a diversified panel of countries.

Table 1 suggests a strong correlation between international tourism indicators, crime rate and humans' vulnerability across the countries. This study examined the relationship

Table 1 Literature on tourism and crime nexus

Authors	Time period	Country	Results
Jaafar et al. (2015)	Primary survey collected from 378 local residents	Kinabalu National (KN) Park, Malaysia	Anti-social behavior of respondents affect visitation of KN Park
Palanca-Tan et al. (2015)	2009–2011	Philippines	No significantly relationship between crime and tourism, while positive relationship between tourism, robbery, and theft cases been found
Mayne (2015)	2003–2012	Jamaica	Crime affects tourism and country's development
Santana-Gallego et al. (2016)	1995–2013	171 countries	Terrorism and crime rates both affect leisure tourism while corruption affects business tourism
Mawby et al. (2016)	Primary and secondary data	Braşov, Romania	Robberies, social factors, health care facilities, and money changing services affects visitation of international tourists in a country
Ghaderi et al. (2017)	2006–2012	45 developing and 29 developed countries	Socio-economic and political stability substantially increases tourism growth in developed countries while reverse is hold in developing countries
Radovic and Arabska (2016)	Descriptive study	Serbia	Security companies are imperative for tourism development
Goldman and Neubauer-Shani (2017)	1995–2007	98 countries	An inverted U-shaped relationship has been found between tourist arrivals and number of attacks
Motta (2016)	Firm-level data of 2010	Latin America	Criminal activities affect hospitality sector-SME's firms under different macroeconomic indicators

between international tourism indicators and socio-economic factors (including per capita income, health expenditures, educational expenditures, and trade openness crime rate, and vulnerability) in a panel of 16 tourist-oriented countries over the period of 1990–2014. The more specific objectives are:

- (i) To examine the relationship between international tourism indicators, crime rate, and vulnerability in a panel of countries.
- (ii) To investigate the impact of social expenditures, per capita income, and trade openness on tourism receipts.
- (iii) To evaluate an inverted U-shaped crime induced Kuznets curve and vulnerability induced Kuznets curve in a region.
- (iv) To substantiate the causality relationships between the variables.

These objectives achieved by the tool of panel Generalized Method of Moments (GMM) differenced estimators that observed the country shocks and possible endogeneity in a prescribed model. The some recommended courses of actions listed here for future endeavors, i.e.,

- (i) Pro-poor tourism and social safety nets programmes required for promotion of social well-beings of the common peoples.
- (ii) Dynamics of social expenditures and its impact on livelihood of the marginalized peoples required public–private partnerships for the development of tourism infrastructure.
- (iii) Tourism, security, and safety approaches used for increase tourists' visitation towards specific safe destinations, and
- (iv) Sustainable tourism and increased domestic jobs are hoped for outcomes for future research in this area.

This study has some advantages over previous studies in a light of review major factors that affected the international tourism demand across the globe, for example, studies by de Vita et al. (2015) utilized the Kuznets curve in a tourism development context linked to economic and environmental indicators. This research differed from de Vita et al. (2015), which used variables of GDP growth, energy consumption, urbanization, and trade openness, while contrasted the present study employs the use of different variables with proxy measures (i.e. crime rate, poverty and low-income, poverty rates, illnesses scaring away tourists with the ZIKA virus, etc.). The study by Khan et al. (2017) utilized the travel and tourism competitiveness index in a diversified panel of countries that linked with air-railways transportation, travel and transportation system, trade openness, and international tourism, while it contrasted with the presented study that employs social expenditures, crime rate, and vulnerable index to evaluate the tourism demand function across countries. Malik et al. (2016) connected tourism demand function with environmental sustainability, growth factors, and biodiversity to propose an interactive environmental model for sustainability, while the present study proposed social-tourism model for safe and secure tourism. Khan et al. (2015) identified different socio-economic factors that affect crime rates while the present study contrasted in a way to utilize crime rate was the explanatory factors that influenced tourism demand function in a panel of countries. Sajjad et al. (2014) linked tourism with environmental sustainability, which was contrasted by the current study that proceeds for pro-poor tourism. Zaman et al. (2016b) utilized the Kuznets curve under the premises of tourism demand function and used different factors including energy demand, carbon emissions, economic growth, investment, and health expenditures in a diversified panel of countries. This study differed with the Zaman et al. (2016b) by using

socio-economic factors including crime rate, vulnerability, education expenditures, and health expenditures and their resulting impact on tourism demand across nations. Further, Zaman et al. (2016a) utilized energy demand, carbon emissions, economic growth, and tourism transportation for broad-based sustainability growth reforms in transition economies, which was differed by the present study in order to present the long-term tourism demand function connected with the crime rate and vulnerability. Paramati et al. (2017), Ozturk et al. (2016), and Tang and Abosedra (2016) connected tourism demand function with the environment, ecological footprints, and economic growth respectively. This study differed with these studies on the ground of developing tourism framework for reducing crime rate and vulnerability in a panel of 16 tourist-oriented countries.

This study has unique standing in the existing literature on the basis of following key listed i.e.,

- (i) The study constructed vulnerable index by using key promising socio-economic variables i.e., (1) poverty headcount, (2) poverty gap, (3) GINI coefficient, (4) income share for the lowest 20% population, and (5) total unemployment rate.
- (ii) Crime rate and vulnerability index both served as explanatory variables and examined their resulting impact on international tourism receipts in a panel of countries.
- (iii) Tourism demand factors include receipts from passenger transport items, receipts from travel items, and total tourism receipts, all these factors served as ‘response’ variables in this study.
- (iv) Social expenditures included in the tourism–crime model to minimize the omitted variables issues.
- (v) The dynamic panel GMM modeling technique is used to address both the endogeneity and serial correlations from the estimated models for robust policy results.

The study divided into the following sub-sections: Introduction is presented in Sect. 1 above, Sect. 2 shows data and methodology, results presented in Sect. 3, and final section concludes the study.

2 Data Source and Methodological Framework

The study comprises the following: (1) crime rate proxied by intentional homicides (per 100,000 people), (2) GINI index (World Bank estimate), (3) poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population), (4) poverty gap at \$1.90 a day (2011 PPP) (%), (5) income share held by lowest 20%, (6) total unemployment (% of total labor force) (national estimate), (7) international tourism receipts for passenger transport items (current US\$), (8) international tourism receipts for travel items (current US\$), (9) total international tourism receipts (current US\$), (10) Government expenditure on education as % of GDP, (11) health expenditure per capita (current US\$), (12) GDP per capita (constant 2005 US\$), and (13) trade (% of GDP), in a panel of 16 tourist-oriented nations that have a devastating crime rates for the period of 1990–2014. The data of the variables are taken from UNWTO (2015), UNODC (2014), and World Bank (2015). The study filled the missing data in the variables series through forward and backward interpolation technique where required. The sample of countries includes high income countries, upper middle income countries, and low & lower middle income countries. High income countries are

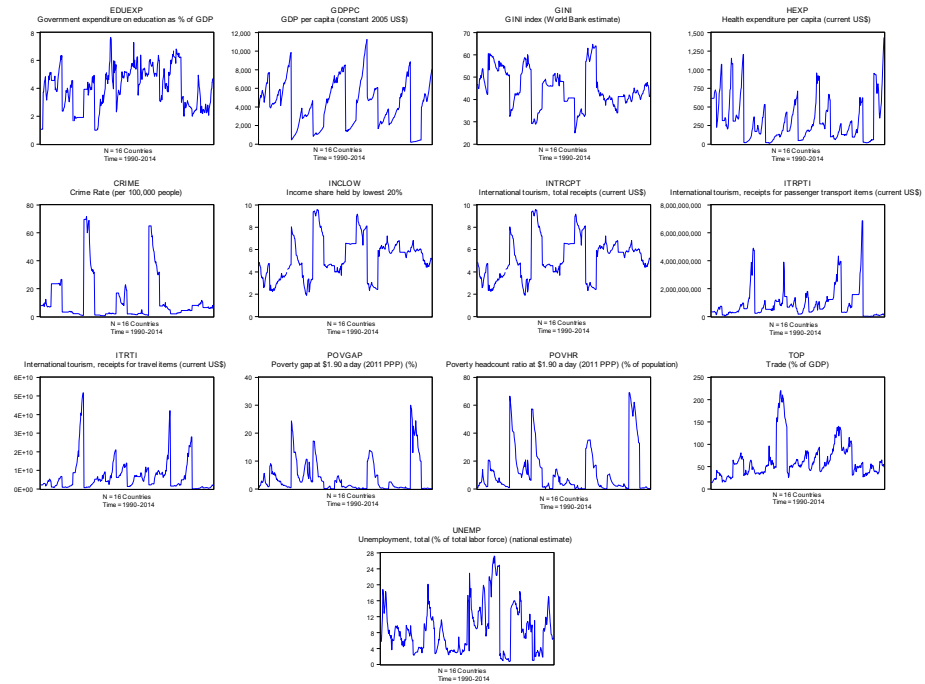


Fig. 2 Leveled trends data. *Source:* UNWTO (2015), UNODC (2014), and World Bank (2015)

Argentina, Chile, Poland, and Uruguay; upper middle income countries are Brazil, China, Colombia, Malaysia, Mexico, South Africa, Thailand, Tunisia, and Turkey; and low & lower middle income countries are Indonesia, Morocco, and Uganda. Figure 2 shows the trend of the studied variables at their current level.

These countries are selected due to safety and security concerns of visitations, as the U.S embassy issue alerted to their visitors regarding to make precautions of ‘Zika Virus’ in Argentina (U.S. Embassy in Argentina 2016), while crime rate was listed in four categories, (1) ATM scans, (2) credit card, (3) kidnappings, and (4) armed robberies. These crimes are remains high in Brazil that need the travelers to made safety measures especially from street theft and robberies in the evening (U.S. Embassy in Brazil 2016). The U.S. embassy consulate issues various warning signals to their travelers to beware of specific barriers to travel, (1) strikes in Chile, (2) tourist sea scams, (3) phone scams, (4) black cabs, and (5) counterfeit currency. These are vigilant problem may faced the tourists in China; violence threat in Colombia; extremist threat in Indonesia; risk of armed terrorist and criminal groups in Malaysia; risks of organized criminal groups including kidnapping, homicide, robbery, and carjacking in various Mexican states; terrorists violence in Morocco; moderate risk of street crimes in Poland; civil unrest, internet financial scams, romance scams, domestic violence, and outdoor safety measures should be required during visitation in South Africa; Narathiwat, Pattani, and Yala provinces of South Thailand are prohibited for travelling due to criminal and politically motivated violence in that places; risks of protests, demonstrations, and civil unrest is linked to visit Tunisia; Travelers are restricted to visit southeastern Turkey for security threats; financial crime including wire transfer, check, and credit card fraud is more vigilant in Uganda; and to enrolled with

“smart traveler enrollment programme” would helpful to the travelers to keep in touch with latest updates in Uruguay (U.S. Embassy Country Reports 2016).

The study constructed ‘vulnerability index’ that was the combination of most promising socio-economic variables: (1) poverty headcount, (2) poverty gap, (3) GINI coefficient, (4) income share for the lowest 20% population, and (5) total unemployment rate. The study used principal component matrix for assigning the relative weights to the prescribed socio-economic factors and constructed into a single weighted component, which we designate for ‘vulnerability index’.

The construction of ‘vulnerable index’ was shown in the Table 2 for ready reference. Table 2 has three panels i.e., panel A shows the eigenvalue of the respective components with the difference change by the other components and having a proportional variance to describe their relative weights for the vulnerable index. Panel B shows the eigenvectors loadings, while panel C shows the ordinary correlation between the respective vulnerable items for intensifying their magnitude and directions between the variables.

Table 2 panel A shows that there were five component matrix, among which two of the component matrix have an eigenvalue of 2.192 and 1.884 that have a difference between

Table 2 Construction of vulnerability index by principal component matrix

Panel A: Eigenvalues (sum = 5, average = 1)					
Number	Value	Difference	Proportion	Cumulative value	Cumulative proportion
1	2.192	0.308	0.438	2.192	0.438
2	1.884	1.017	0.376	4.076	0.815
3	0.866	0.825	0.173	4.943	0.988
4	0.041	0.025	0.008	4.984	0.996
5	0.015	–	0.003	5	1

Panel B: Eigenvectors (loadings)					
Variable	PC 1	PC 2	PC 3	PC 4	PC 5
GINI	–0.511	0.446	–0.193	0.672	0.223
INCLLOW	0.544	–0.388	0.231	0.638	0.300
POVGAP	0.386	0.591	0.063	–0.293	0.640
POVHR	0.445	0.539	0.091	0.229	–0.670
UNEMP	–0.306	0.094	0.946	–0.021	–0.005

Panel C: Ordinary correlations					
	GINI	INCLLOW	POVGAP	POVHR	UNEMP
GINI	1				
INCLLOW	–0.957	1			
POVGAP	0.048	0.036	1		
POVHR	–0.057	0.159	0.974	1	
UNEMP	0.263	–0.245	–0.101	–0.128	1

PC1 to PC5 indicates principal component loadings 1–5. GINI indicates GINI coefficient, INCLLOW indicates income share held by lowest 20%, POVGAP indicates poverty gap, POVHCR indicates poverty headcount ratio, and UNEMP indicates total unemployment

about 0.308, while remaining three component matrix have an eigenvalue of 0.866, 0.041, and 0.015 with the respective change of 1.017, 0.825, and 0.025 respectively. The first two components explained 81.53% variations, while remaining three components combined together to explain 18.47% variations. Table 2, panel B shows the eigenvectors loadings and found the different relative weights for principal component—one (PC1) to PC5. The highest additive and average value was the PC2 eigenvectors' loadings that were used for relative weights of the socio-economic factors to construct the single relative weighted component, which we denote to the 'vulnerable index'. Finally, Table 2 panel C shows the ordinary correlation between the components of vulnerable index and found that there was a negative and high correlation between GINI coefficient and income share held by lowest 20% i.e., correlation coefficient i.e., $r = -0.957$, while there was a positive and medium correlation between GINI coefficient and unemployment rate i.e., $r = 0.263$ respectively. The remaining variables including poverty headcount ratio and poverty gap had a negative and positive low correlation with the GINI coefficient. The ordinary correlation was presented for examining the interrelationship between the five vulnerable components while the individual assessment of these socio-economic factors was not been estimated with the crime rate and vulnerability index in a panel of countries. Subsequent to making the vulnerability index, the study clearly exhibits the list of the variables and presented in Table 3.

Table 3 shows the list of variables, measurement, symbol, expected relationships and variables' data source. The study hypothesize that gains from international tourism was affected by crime rate and humans' sufferings, therefore, the expected relationship between the variables were 'negative'. This hypothesis argued that government should have to build safety nets for vulnerable peoples by economic gains from international tourism receipts and engage them in pleasure destinations. The education and health expenditures further included in a given model that assess the government social action plans to amplify international tourism receipts in a region, therefore, the expected relationship was positive between them. The expected relationship of GDP per capita and squared per capita GDP with tourism indices was positive, as we believe that international tourism considerably increases along with the increase economic growth at initial and later stages of economic development. This study further assessed crime-induced Kuznets curve, and vulnerability-induced Kuznets curve in another regression apparatus, where international tourism indices served as regressors while crime rate and vulnerability index worked as a 'response' variable. Finally, we assume that trade openness considerably increases international tourism; therefore, the expected relationship was positive between them. On the basis of significant discussions, the study formulated the following hypothesis i.e.,

- (i) Higher the crime rate, lower will be the international tourism receipts.
- (ii) Higher the vulnerability, lower will be the international tourism receipts.
- (iii) Higher the social expenditures, higher will be the international tourism receipts.
- (iv) Sound economic growth and trade openness will lead to increase international tourism receipts.
- (v) Economic growth initially increases crime rate and vulnerability, and it will later down the crime rate and vulnerability to support crime—Kuznets curve and vulnerability Kuznets curve in a panel of 16 tourists-oriented countries.

The results of the study proved the negative impact of crime rate and vulnerability on tourism receipts, which further confirmed the crime—Kuznets curve for a selected panel of countries. The education and health expenditures positively impact on tourism receipts mediated by economic growth and trade openness. The uniqueness of this study compared

Table 3 List of variables

Variables	Symbol	Measurement	Expected sign	Data source
<i>Dependent variables</i>				
International tourism receipts for passenger transport items	ITRPTI	Current US\$		World Bank (2015)
International tourism receipts for travel items	ITRTI	Current US\$		
International tourism receipts	ITRCPT	Current US\$		
<i>Independent variables</i>				
Crime rate	CRIME	Per 100,000 inhabitants	Negative	UNWTO (2015), UNODC (2014) and World Bank (2015)
Vulnerability Index	VLNINDEX	Constructs of the following variables i.e., Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population) Poverty gap at \$1.90 a day (2011 PPP) (%) Income share held by lowest 20% and Total unemployment (% of total labor force) (national estimate)	Negative	
Government expenditure on education	EDUEXP	% of GDP	Positive	World Bank (2015)
Health expenditure per capita	HEXP	Current US\$	Positive	
GDP per capita	GDPPC	Constant 2005 US\$	Positive	
Squared of GDP per capita	GDPPC ²	Constant 2005 US\$	Positive	
Trade	TOP	Exports + imports/GDP	Positive	

to the previous studies is to utilize different socio-economic factors including crime rate and vulnerability, which was mediated by social expenditures i.e., health and education expenditures, trade openness, and economic growth to support Kuznets curve for crime and vulnerability in a diversified panel of countries. The previous studies mostly limited with the energy, environment, and trade openness, while few other studies utilized poverty, and income inequality in pro-poor tourism framework. The present study is well-versed with the five major elements of pro-poor tourism including poverty headcount ratio, poverty gap, income inequality, poorest quantile, and unemployment that combines together to form a vulnerability index, which was first ever study, as per authors believe, to construct it by principle components analysis. This study further evaluated key hypothesis by dynamic

panel GMM estimator that addressed the stochastic disturbance issues in a form of endogeneity and serial correlation for robust inferences.

On the basis of above discussion, the study used a non-linear simultaneous equations modeling in order to evaluate the relationship between international tourism and social expenditures in a panel of countries. The study used panel Generalized Method of Moments (GMM) estimator that address the country specific shocks and endogeneity problem by using the appropriate instrumental variables. The number of previous studies that were used dynamic panel GMM estimator in tourism demand modeling framework including, Garín-Muñoz and Montero-Martín (2007), Sequeira and Maças Nunes (2008), Sequeira and Nunes (2008), Garín-Mun (2006), Durbarry et al. (2009), Yang (2012), Gomez and Vassallo (2015), and Gomez et al. (2016) etc. These studies utilized dynamic panel modeling technique to evaluate tourism demand function in different economic settings.

It was a special case that may used in ordinary least square regression, generalized least square, two stage least square, three stage least square etc., for robust inference of parameter estimates. The additional benefit of GMM estimator was related with the estimation of linear and polynomial regressions by including lagged dependent variables. This technique was applied on different types of data series including time series, cross-sectional and longitudinal data sets. The conventional regression model starts with functional relationship between the two variables, i.e., one was dependent and other was independent variable, while the residual of the relationship was being evaluated for possible stochastic disturbances that violates the basic regression assumptions. The linear regression model was as follows:

$$Y_t = \alpha_0 + \alpha_1 X_t + \mu_t$$

where 'Y' is dependent variable, 'X' is a set of regressors, 't' is time period and μ is error term. If the residual term is correlated with the regressors, the properties of stochastic term deviates from the actual mean and may produce biased results. Therefore, this technique includes instrumental variables that were comprised by first lagged of the regressors. In dynamic panel setting, the lagged endogenous term further been used as a regressor to minimize the size of the residual to give unbiased results.

The dynamic version of panel GMM estimator was now in a fashion to apply in longitudinal data sets, which was proposed by Arellano and Bond (1991). Conventional panel models including fixed effects and random effects estimators that was used to estimate large 'time dominant models' or 'country dominant models', while the presence of endogenous regressors in the panel estimations may produce the biased results that controlled by lagged endogenous variables in the regressors. The set of instrumental variables i.e., 'z' was being used in most of the cases that controlled endogeneity problems in the model, as Anderson and Hsiao (1981) firstly used instrumental variables by taking difference of the regression equation to reduce the country's fixed effect, along with taken number of endogenous lagged term included as differenced instruments in a regression equations for robust inferences. Although, the Anderson–Hsiao (AH) estimator eliminate the fixed effects in a regression equations, the efficiency of asymptotic estimator still be in a question as it was assumed that larger the instrument will increase the efficiency of estimator, while its asymptotic variance was estimated higher than the Arellano–Bond estimator that leads to asymptotically inefficient of AH estimator. Blundell et al. (2001) concluded that system GMM estimator greatly improves the estimate accuracies and reduces the finite sample bias. Andrews and Lu (2001) favored the procedure of dynamic

panel GMM estimator in terms of moment selection procedure and argued that J-statistics criteria was used for evaluating the over identifying restrictions for model selection. Bowsher (2002) further tested the Sarjan tests for overidentifying restrictions in the finite sample size and found that as many used moment's conditions undersized the test with less power. Windmeijer (2005) showed that two-step GMM estimator was biased downward for small sample size that corrected with the variance estimates for robust inferences by Monte Carlo estimation procedures. Hayakawa (2007) discussed that system GMM estimator was less biased than the differenced GMM estimator in a finite sample biases. Arellano–Bond estimator validate the efficiency of parameters by using the set of instruments, which was confirmed by the Sargan J-statistics, as lower the value of J-statistics confirmed the efficiency of instruments that do not fall on the critical value of 5% confidence interval, this lead to eliminate country fixed effects and possible endogeneity problem in the regressors. The study used the following non-linear models that contain the set of simultaneous equations i.e.,

Model I: International tourism indicators, crime rate, and crime-induced Kuznets curve

Equation for international tourism indicators and crime rate

$$\begin{aligned} \ln(INTRCPT)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(INTRCPT)_{i,t-1} + \alpha_2 \ln(CRIME)_i + \alpha_3 \ln(EDUEXP)_{i,t} \\ & + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} + \alpha_6 \ln(GDPPC)_{i,t} \\ & + \alpha_7 \log(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned} \ln(ITRPTI)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(ITRPTI)_{i,t-1} + \alpha_2 \ln(CRIME)_i + \alpha_3 \ln(EDUEXP)_{i,t} \\ & + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} + \alpha_6 \ln(GDPPC)_{i,t} + \alpha_7 \log(GDPPC)_{i,t}^2 \\ & + z_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} \ln(ITRTI)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(ITRTI)_{i,t-1} + \alpha_2 \ln(CRIME)_i + \alpha_3 \ln(EDUEXP)_{i,t} \\ & + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} + \alpha_6 \ln(GDPPC)_{i,t} + \alpha_7 \log(GDPPC)_{i,t}^2 \\ & + z_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Equation for crime-induced Kuznets curve

$$\begin{aligned} \ln(CRIME)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(CRIME)_{i,t-1} + \alpha_2 \ln(CRIME)_{i,t-2} + \alpha_3 \ln(INTRCPT)_{i,t} \\ & + \alpha_4 \ln(ITRPTI)_{i,t} + \alpha_5 \ln(ITRTI)_{i,t} + \alpha_6 \ln(EDUEXP)_{i,t} + \alpha_7 \ln(HEXP)_{i,t} \\ & + \alpha_8 \ln(TOP)_{i,t} + \alpha_9 \ln(GDPPC) + \alpha_{10} \ln(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

Model II: International tourism indicators, vulnerability index, and vulnerability-induced Kuznets curve

Equation for international tourism indicators and vulnerability indicators

$$\begin{aligned} \ln(INTRCPT)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(INTRCPT)_{i,t-1} + \alpha_2 \ln(VLNINDEX)_i \\ & + \alpha_3 \ln(EDUEXP)_{i,t} + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} \\ & + \alpha_6 \ln(GDPPC)_{i,t} + \alpha_7 \log(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{5}$$

$$\begin{aligned} \ln(INTRCPT)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(INTRCPT)_{i,t-1} + \alpha_2 \ln(VLNINDEX)_i \\ & + \alpha_3 \ln(EDUEXP)_{i,t} + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} \\ & + \alpha_6 \ln(GDPPC)_{i,t} + \alpha_7 \log(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{6}$$

$$\begin{aligned} \ln(INTRCPT)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(INTRCPT)_{i,t-1} + \alpha_2 \ln(VLNINDEX)_i \\ & + \alpha_3 \ln(EDUEXP)_{i,t} + \alpha_4 \ln(HEXP)_{i,t} + \alpha_5 \ln(TOP)_{i,t} \\ & + \alpha_6 \ln(GDPPC)_{i,t} + \alpha_7 \log(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{7}$$

Equation for vulnerability-induced Kuznets curve

$$\begin{aligned} \ln(VLNINDEX)_{i,t} = & \alpha_0 + \lambda_t + \alpha_1 \ln(VLNINDEX)_{i,t-1} + \alpha_2 \ln(VLNINDEX)_{i,t-2} \\ & + \alpha_3 \ln(INTRCPT)_{i,t} + \alpha_4 \ln(ITRPTI)_{i,t} + \alpha_5 \ln(ITRTI)_{i,t} \\ & + \alpha_6 \ln(EDUEXP)_{i,t} + \alpha_7 \ln(HEXP)_{i,t} + \alpha_8 \ln(TOP)_{i,t} \\ & + \alpha_9 \ln(GDPPC) + \alpha_{10} \ln(GDPPC)_{i,t}^2 + z_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{8}$$

where, CRIME indicates crime rate, VLNINDEX indicate vulnerability index, INTRCPT indicates international tourism receipts, ITRPTI indicates international tourism receipts for passenger items, ITRTI indicates international tourism receipts for travel items, EDUEXP indicates education expenditures, HEXP indicates health expenditures per capita, TOP indicates trade openness, GDPPC indicates GDP per capita, GDPPC² indicates square of GDP per capita, ‘ln’ indicates natural logarithm, λ indicates fixed effect shocks, ‘z’ indicates instrumental variables list, ‘i’ indicates 16 countries, ‘t’ indicates time period from 1990 to 2014, ‘t – 1’ indicates first lagged of dependent variable, ‘t – 2’ indicates second lagged of dependent variable, and ε indicates white noise error term.

Equation (1) to (3) shows the functional relationship between international tourism indicators and crime rate, while (5) to (7) shows the relationship between international tourism indicators and vulnerability index. Equations (4) and (8) was the reverse equations where crime rate and vulnerability index was the ‘response’ variable and international tourism indices and other social factors served as a ‘regressors’ to assessed the crime-induced Kuznets curve and vulnerability-induced Kuznets curve in a region. The study further estimated panel causality relationship between international tourism indices, crime rate, and vulnerability by panel Wald F-statistics (Dumitrescu and Hurlin 2012).

3 Results

Before we are going to estimate the overall panel results by GMM estimator, we estimated the impact of crime rate, vulnerability, social expenditures, per capita income, and economic growth on international tourism demand in high income countries, upper middle income countries and low income & lower middle income countries by dynamic pool least square regression model. The results are presented in Table 4.

Table 4 Estimates of dynamic panel least square model in high income, upper middle income, and low income & lower middle income countries

Variables	Panel of selected high income countries		Panel of selected upper middle income countries		Panel of selected low income & lower middle income countries	
	$\log(\text{ITRPTI})_t$	$\log(\text{INTRCPT})_{t-1}$	$\log(\text{ITRPTI})_t$	$\log(\text{INTRCPT})_t$	$\log(\text{ITRPTI})_t$	$\log(\text{INTRCPT})_t$
Constant	-3.686**	2.208	3.585*	4.220*	8.730*	0.003
$\log(\text{ITRPTI})_{t-1}$	0.628*	-	0.750*	-	0.511*	-
$\log(\text{ITRPTI})_{t-1}$	-	0.530*	-	0.702*	-	0.561*
$\log(\text{INTRCPT})_{t-1}$	-	0.531*	-	-	-	0.538*
$\log(\text{CRIME})_t$	-0.073	-0.105	0.009	-0.095*	-0.481**	-0.203**
$\log(\text{VLNINDEX})_t$	0.180	-0.668*	-0.022	0.155	-0.686	0.670**
$\log(\text{EDUEXP})_t$	-0.082	0.286*	-0.633*	-0.775*	-0.874*	-0.315**
$\log(\text{HEXP})_t$	-0.362*	-0.414*	0.112**	0.263*	0.457*	0.295*
$\log(\text{GDPPC})_t$	1.644*	1.684*	0.060	0.073	-0.058	0.577**
$\log(\text{TOP})_t$	-0.369**	-0.867*	0.345*	0.315*	0.704	0.674**
<i>Statistical tests</i>						
R-squared	0.888	0.931	0.897	0.876	0.928	0.973
Adjusted R-squared	0.879	0.925	0.894	0.872	0.920	0.972
F-statistic	101.963*	174.046*	268.367*	216.894*	121.786*	340.084*

*, **, and *** indicates 1, 5, and 10% level of significance

The results show that the lagged dependent variables in all the three model specifications in different world income countries were significantly explain with their nominal terms that confirmed the long-run convergence in the model. The impact of vulnerable index on receipts of travel items and total tourism receipts were negative in a panel of high income countries which tends to show that higher vulnerability index substantially declines the tourism receipts, as if there was a 1% increase in vulnerable index, receipts of travel items and total tourism receipts decreases by -0.668 and -0.526% respectively. The education expenditures and per capita income both increases tourism receipts while health expenditures and trade factor both decreases tourism receipts in a panel of high income countries. It is fact that the growth of international tourism was obstruct by law and order problems that need safety considerations to boosts tourism growth (Levantis and Gani 2000). Mehmood et al. (2016) concluded that tourist arrival in the United States had a positive connectivity with crime rate which supports the 'hot spot theories'. Lorde and Jackman (2013) calculated direct and indirect income losses due to criminal activity in Barbados and found that tourism income substantially decreases through criminal activity that destructs the country's balance of payment. Altindag (2014) confirmed the negative impact of crime on international tourists' arrival that subsequently decreases tourism revenue in European countries, while the study concluded that tourists required more information to choose safe destinations to minimize the risks of criminal activity. Nassani et al. (2016) argued that for safety and healthy visitation, the nexus between military expenditures and tourism growth was imperative.

The impact of crime rate on tourism receipts are negative in a panel of upper middle income countries, as if there was 1% increase in crime rates, tourism receipts from travel items and total tourism receipts decreases by -0.095 and -0.076% respectively. Health expenditures and trade factor both escalates tourism demand while education expenditures does not support to increase tourism receipts in a region. In a panel of low income & lower middle income countries, crime rates decreases tourism receipts while vulnerability index increases along with an increase in tourism factors. Public spending on health, per capita income, and trade factors supports to increase tourism receipts while education expenditures decreases tourism receipts in a region. International tourism was imperative for poverty reduction, as tourism provides more job oriented growth to different income strata groups, however it was evident that lower income strata group was less benefited as compared to higher income strata group (Blake et al. 2008). Hoogue et al. (2011) presented some crucial facts regarding income inequality, unemployment, economic growth and crime in Belgium and found that unemployment had a greater magnitude in order to influence crime rates followed by per capita income, while income inequality induce property right crime rates in a country. These statistics would helpful to understand the key conjunctions between the social indicators to inflame crime rates across nations. Wattanakuljarus and Coxhead (2008) concluded that international tourists' arrival considerably increases household income while its' worsens income distribution pattern between rich and poor; therefore, the policy to redistribute incomes through tourism support is desirable for pro-poor tourism in Thailand. Alam and Paramati (2016) further endorse that tourism increases income inequality before reaching the growth maturity stage while it substantially decline inequality in the later stages of tourism development in developing economies. These results confirmed that vulnerability is the main predictor that affects tourism receipts in high income countries while crime rates considerably affected the tourism income in a panel of upper middle income countries and lower income & lower middle income countries.

Table 5 Results of panel GMM estimator for international tourism and crime rate

Variables	Equation (1) $\log(\text{INTRCPT})_t$	Equation (2) $\log(\text{ITRPTI})_t$	Equation (3) $\log(\text{ITRTI})_t$
Constant	2.741*	9.792**	10.929*
$\log(\text{INTRCPT})_{t-1}$	1.009*	–	–
$\log(\text{ITRPTI})_{t-1}$	–	0.725*	–
$\log(\text{ITRTI})_{t-1}$	–	–	1.021*
$\log(\text{CRIME})_t$	–0.084**	–0.212*	–0.085***
$\log(\text{EDUEXP})_t$	0.015	–0.140***	–0.008
$\log(\text{HEXP})_t$	–0.037**	0.021	–0.165*
$\log(\text{TOP})_t$	0.010	0.246**	0.089
$\log(\text{GDPPC})_t$	–0.772*	–1.650***	–3.049*
$\log(\text{GDPPC})_t^2$	0.052*	0.124***	0.211*
<i>Statistical tests</i>			
R-squared	0.9866	0.9607	0.9831
Adjusted R-squared	0.9864	0.9583	0.9820
J-statistic	4.74E–14	3.62E–11	6.09E–11

*, **, and *** indicates 1, 5, and 10% significance level

The study now proceeds to obtain parameter estimates by panel GMM estimator and presented the results in Table 5. The results confirm the significance of lagged dependent variable at 1% level from Eqs. (1) to (3), which indicates the good rationale to use panel GMM estimator. The Sargan J-statistic validate the prescribed instrumental lists for Eqs. (1)–(3), as the probability value for J-statistic insignificantly counter the strength of described instrumental lists for the crime model. This study used first lagged of the explanatory variables as an instrument for the Model I.

The results show that there was a negative relationship between international tourism receipts and crime rate, as if there was 1% increase in the crime rate, international tourism receipts decreases by –0.084 percentage points. The other two indices of international tourism receipts including receipts from passengers transportation and receipts from travel items both also affected by higher crime rate with the elasticity values of –0.212, $p < 0.000$ and –0.085, $p < 0.090$ respectively, which implied that crime rate considerably decline the international tourism receipts that in turn to provoke the government unproductive efforts to reduce crime rate in a region. The governmental social actions i.e., education and health expenditures further decline the international tourism indicators, which in turn to show an inadequate education and health resources to promote international tourism. There was a positive relationship between international tourism and trade openness in Eq. (2), which supports the positivity of globalization to promote tourism across nations. Finally, the results confirmed the U-shaped Kuznets curve between international tourism and per capita income under the premises of crime rate, as international tourism decreases with initial level of economic development while it increases at later development stages. The results emphasized the need of corroborative efforts to effectively utilized international tourism to decrease crime rate by providing a healthy opportunity to the vulnerable peoples to involve in the pleasure activities for offering job that helpful to reduce the humans' sufferings and make their life healthy and wealthy. Fajnzylber et al. (2002) argued that income inequality was the major factor that increases crime rates across nations. Heinemann and Verner (2006) found that the curse of increasing violence and crime rate centered due to inequitable income distribution, lack of educational

Table 6 Results of panel GMM estimator for international tourism and vulnerability index

Variables	Equation (5) $\log(\text{INTRCPT})_t$	Equation (6) $\log(\text{ITRPTI})_t$	Equation (7) $\log(\text{ITRTI})_t$
Constant	15.973*	15.332*	16.755*
$\log(\text{INTRCPT})_{t-1}$	1.017*	–	–
$\log(\text{ITRPTI})_{t-1}$	–	0.713*	–
$\log(\text{ITRTI})_{t-1}$	–	–	1.008*
$\log(\text{VLNINDEX})_t$	–0.466*	–0.433**	–0.494*
$\log(\text{EDUEXP})_t$	–0.029	–0.180**	–0.038
$\log(\text{HEXP})_t$	–0.205*	–0.014	–0.207*
$\log(\text{TOP})_t$	0.084	0.253**	0.102
$\log(\text{GDPPC})_t$	–3.866*	–2.626**	–4.020*
$\log(\text{GDPPC})_t^2$	0.259	0.185**	0.269*
<i>Statistical tests</i>			
R-squared	0.9819	0.9603	0.9809
Adjusted R-squared	0.9808	0.9579	0.9797
J-statistic	1.55E–12	1.39E–11	9.01E–11

* and ** indicates 1 and 5% level of significance

opportunities, unemployment, inefficient judicial crime systems and low safety net programmes. Lochner and Moretti (2004) concluded that social returns to completing high school significantly reduce the crime rates. Gonzalez (2015) in a similar lines argued that education was one of the open secret that helpful to reduce crime in nations. Therefore, a strong policy intervention was required to judiciously distributed income among the lower income strata group to ensure the provision of basic health and educational facilities, increasing employment opportunities, efficient justice system and social safety nets for the vulnerable peoples.

Table 6 shows the results for Model II, which was based on the functional relationship between vulnerability index, international tourism indicators, and socio-economic factors. The first lagged of the international tourism indices confirmed the significant gains from tourism at 1% level. The Sargan J-statistics confirms the instrumental validity for Model II that gives a rationale to use the panel GMM estimator.

The results show that vulnerability index considerably decreases the receipts of international tourism indices, as if there was 1% increase in the vulnerability index, international tourism indices decreases by –0.466% in Eq. (5), –0.433% in Eq. (6), and –0.494% in Eq. (7) respectively. The lack of education and health expenditures further decreases international tourism demand that in turned to raise the serious question about existing social action plans to support the livelihoods of the peoples. Trade openness supported the international tourism demand that shows the competitiveness of international tourism under globalization era. Finally, the study supported U-shaped Kuznets curve in relation between income and tourism demand under the premises of vulnerability index. The results concluded that gains from international tourism were the desirable way to reduce the humans' sufferings by providing the safety nets and invest to their livelihoods for healthier region. Education and health spending had a powerful policy tool that used to reduce humans' sufferings by increasing tourism demand across nations. Trade liberalization policy should be formulated in a way to reduce humans' vulnerability through increasing tourism demand, and it would be possible when trade policy should be elastic and timely adjustable to support international tourism. Ashley et al. (2000) found that

Table 7 Results of Arellano–Bond dynamic panel GMM estimator for crime and vulnerable model

Variables	Equation (4) $\log(\text{CRIME})_t$	Equation (8) $\log(\text{VLNINDEX})_t$
$\log(\text{CRIME})_{t-1}$	-0.011	-
$\log(\text{CRIME})_{t-2}$	-0.115*	-
$\log(\text{VLNINDEX})_{t-1}$	-	0.093*
$\log(\text{VLNINDEX})_{t-2}$	-	0.029*
$\log(\text{INTRCPT})_t$	-0.100*	-0.651*
$\log(\text{ITRPTI})_t$	-0.033*	0.0003
$\log(\text{ITRTI})_t$	0.022	-0.013*
$\log(\text{EDUEXP})_t$	-0.073*	-0.010***
$\log(\text{HEXP})_t$	-0.197*	0.017*
$\log(\text{TOP})_t$	0.134*	0.054*
$\log(\text{GDPPC})_t$	0.136***	-0.328*
$\log(\text{GDPPC})_t^2$	-0.087*	-0.025*
<i>Cross-section fixed (first differences)</i>		
<i>Period fixed (dummy variables)</i>		
Sargan J-statistic	158.108	221.040
Prob(J-statistic)	0.593	0.718

* and *** indicates 1 and 10% significance level

international tourism positively affects the livelihoods of the poor, i.e., it reduces humans' vulnerability for promotion of pro-poor tourism across nations. De Silva and Sumarto (2014) concluded that education and health expenditures significantly reduces the livelihood of the poors and emphasize the importance of pro-poor growth, health and educational expenditures across nations. Lyer and Topalova (2014) concluded that trade related shocks raise the poverty incidence, rate of violence and crime in India. Mabugu and Mabugu (2014) argued that globalization hurts the poor in the short-run, while in the long-run globalization significantly reduces the poverty by implementing broad-based economic policies.

The study further established the crime-induced Kuznets curve and vulnerability-induced Kuznets curve by taken crime rate and vulnerability index as a 'response' variable while international tourism demand, education expenditures, health expenditures, economic growth, and trade openness taken as a regressors. Table 7 shows the estimation results of Eqs. (4) and (8) in a panel GMM technique.

The results confirmed the significance of lagged dependent variable at 1% level in Eqs. (4) and (8). The study includes up to second lagged dependent variable due to confirming the inertia in the crime rates and vulnerability index. The results reveal that international tourism had a considerable role to decrease crime rate and vulnerability, as along with increase in international tourism receipts, crime rate decreases by -0.100 , $p < 0.000$ and vulnerability index decreases by -0.651 , $p < 0.000$. The intensity of decreasing vulnerability was far greater than crime rate through gains of international tourism. Health expenditures decreases crime rate, while vulnerability increases along with increase health expenditures in a region. Education expenditures, however, reduces both the crime rates and vulnerability across nations. The study confirmed the inverted U-shaped crime Kuznets curve, as crime rate initially increases with economic growth while decreases at the later stages of economic development. The results did not confirm the vulnerability induced Kuznets curve, as vulnerability decreases at initial level of

Table 8 Panel causality test by Wald F-statistics

Variables	$\log(\text{INTRCPT})_t$	$\log(\text{ITRPTI})_t$	$\log(\text{ITRTI})_t$
<i>CRIME</i>			
$\log(\text{CRIME})_t$	→ (32.208)*	→ (23.559)*	→ (34.125)*
$\log(\text{EDUEXP})_t$	≠ (0.435)	≠ (0.054)	≠ (0.278)
$\log(\text{HEXP})_t$	→ (5.059)**	≠ (1.811)	→ (4.461)**
$\log(\text{TOP})_t$	≠ (0.231)	≠ (0.063)	≠ (0.815)
$\log(\text{GDPPC})_t$	→ (25.539)*	≠ (0.036)	→ (25.724)*
<i>VLNINDEX</i>			
$\log(\text{VLNINDEX})_t$	→ (15.592)*	→ (4.736)**	→ (16.129)*
$\log(\text{EDUEXP})_t$	≠ (0.381)	→ (4.855)**	≠ (0.623)
$\log(\text{HEXP})_t$	→ (13.634)*	≠ (0.046)	→ (13.950)*
$\log(\text{TOP})_t$	≠ (1.245)	→ (4.899)**	≠ (1.782)
$\log(\text{GDPPC})_t$	→ (25.600)*	→ (4.973)**	→ (26.566)*

* and ** indicates 1 and 5% significance level
 → shows unidirectional causality and ≠ shows no causality between the variables. Small bracket shows Wald F-statistics value

economic development, which trickle down to the subsequent growth phases (Zaman 2015). The gains from international tourism received from a sustainability policies related to socio-economic and environmental development across nations (Ozturk 2015).

Finally, the study estimated the causal relationship between international tourism indicators, crime rate, and humans’ vulnerability in a panel of countries (see in Table 8).

The results confirmed the unidirectional causality between international tourism demand and crime rate, and between tourism demand and vulnerability, which implied that crime rate and vulnerability both reduced the international tourism demand in a region. Education expenditures did not have a causal relationship with the international tourism demand under the premises of crime rate, while it displayed a unidirectional causality relationship with travel items receipts in case of vulnerability index. Health expenditures Granger cause passengers transport and travel items both in the case of both crime rate and vulnerability index. Trade openness had no causal relationship with international tourism demand under crime rate while it caused passengers to transport item receipts under the vulnerability index. Finally, per capita income had differential impacts on international tourism, as under the premises of crime rate, it confirmed the GDP led tourism receipts and the GDP led travel items receipts. In case of vulnerability index, it confirmed the GDP led international tourism demand in a region.

4 Conclusions

This study examined the relationship between international tourism indicators, crime rate, and humans' vulnerability to devise a long-term strategy to reduce humans' costs by gaining the massive reforms in the international tourism and provide job opportunities in the pleasure destinations. The researchers selected a panel of 16 tourist-oriented countries that had a high rate of crime during the period of 1990–2014. The study constructed the 'vulnerability index' by using the principal component matrix which included the following variables i.e., poverty, income inequality and unemployment rate. These variables were widely used in the context of human costs modeling; therefore, we used these variables to construct vulnerability index. The results suggested that international tourism was affected by the factors of crime and vulnerability. Also, factors of insufficient health and educational resources increases both the crime rate and human's vulnerability that led to decrease tourism receipts in a panel of countries. Trade liberalization policies although supported to generate tourism income, however, economic growth does not align with tourism income due to the challenges of globalization and financial crisis. The results further established a U-shaped relationship between tourism income and economic growth, as economic growth supported tourism income at later stages of economic development. The study supported crime Kuznets curve that turned into an inverted U-shaped Kuznets curve, as higher economic growth lead to increase crime rate while at later stages of economic development, economic growth considerably reduces crime rate in a region. In case of human's vulnerability, economic growth considerably decreases at initial and mature stages of economic development under the premises of tourism development. The causality relationships confirmed the unidirectional causality between crime-vulnerability and tourism demand, trade induced tourism demand, and GDP led tourism demand in a region.

Crime rate and human's suffering had a negative impact on international tourism development, which further affect the country's economic growth (Altindag 2014; Moyo and Akanbi 2013; Carla 2014, etc.). The law and order situation is crucial for the development of international tourism, as tourists were highly reluctant to visit on those pleasure destinations where the law and order situation was worse. One of the remedial options was to increase expenditures on law and order situation included increases the police force and defense forces in order to control the crime and violence in a state, as some of the crime was associated with the increased tourist arrivals controlled by investigating agencies (Tang 2011). Economic growth derived from tourism development under the premises of social expenditures, energy, investment, etc., required strong policy framework to support economic factors for international tourism gains (Zaman et al. 2016b). The reverse phenomenon related with tourism led economic growth in different economic settings (Gunduz and Hatemi-J (2005), Zaman et al. (2016a). In some cases, economic growth and tourism demand grew together at the same rate (Demiröz and Ongan 2005; Kim and Chen 2006 etc.), while in some reverse cases both were neutrality independent (Katircioglu 2009). Access to finances was considered to be a significant barrier to develop and attract international tourists (Petrevska and Serafimova 2016). The country's current situation showed a balance of tourism development was seriously affected by crime rate (Lorde and Jackman 2013). The development of tourism infrastructure in the widespread poverty areas was the need of the policy actions for reducing poverty, however, it has faced severe challenges of strong business coalition and bureaucratic powers to slow down the process of tourism development due to their own political and business objectives (Chok et al. 2007). Further, the tendency of higher crime rates in the tourist destinations also have a

detrimental factor that affects international tourism demand, which required strong actions by law enforcement agencies to provide safe and secure visitations (George 2003). These results led to strong trends promotion and research to support the development of international tourism. The researchers suggested that more balanced agenda in the set of 16 international-tourist countries study need to be incorporated in the development of a new action plan that relates to the expansion of education and health priorities. The increase of allocation of financial support in these priorities might have some hoped for impact in reducing crime rate, thus increasing job opportunities and tourists' vitiation. Sustainable tourism and increased domestic economy jobs are hoped for outcomes for future research in this area.

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References

- ADB. (2016). *Asian development outlook 2016: Asia's potential growth*. Manila: Asian Development Bank. <https://www.adb.org/sites/default/files/publication/182221/ado2016.pdf>. Accessed December 17, 2016.
- Akama, J. S., & Kieti, D. (2007). Tourism and socio-economic development in developing countries: A case study of Mombasa Resort in Kenya. *Journal of Sustainable Tourism*, 15(6), 735–748.
- Alam, M. S., & Paramati, S. R. (2016). The impact of tourism on income inequality in developing economies: Does Kuznets curve hypothesis exist? *Annals of Tourism Research*, 61, 111–126.
- Altindag, D. T. (2014). Crime and international tourism. *Journal of Labor Research*, 35(1), 1–14.
- Anderson, T. W., & Hsiao, C. (1981). Estimation of dynamic models with error components. *Journal of the American statistical Association*, 76(375), 598–606.
- Andrews, D. W., & Lu, B. (2001). Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. *Journal of Econometrics*, 101(1), 123–164.
- Arellano, M., & Bond, S. R. (1991). Some tests of specification of panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277–297.
- Ashley, C., Boyd, C., & Goodwin, H. (2000). *Pro-poor tourism: putting poverty at the heart of the tourism agenda*. London: Overseas Development Institute (ODI). <http://195.130.87.21:8080/dspace/bitstream/123456789/444/1/Pro-poor%20tourism%20%20putting%20poverty%20at%20the%20heart%20of%20the%20tourism%20agenda.pdf>. Accessed December 22, 2015.
- Baker, D., & Stockton, S. (2014). Tourism and crime in America: A preliminary assessment of the relationship between the number of tourists and crime, two major American tourist cities. *International Journal of Safety and Security in Tourism*, 5, 1–25.
- Barker, M., Page, S. J., & Meyer, D. (2002). Modeling tourism crime: The 2000 America's cup. *Annals of Tourism Research*, 29(3), 762–782.
- Becken, S., & Hughey, K. F. (2013). Linking tourism into emergency management structures to enhance disaster risk reduction. *Tourism Management*, 36, 77–85.
- Becken, S., Mahon, R., Rennie, H. G., & Shakeela, A. (2014). The tourism disaster vulnerability framework: An application to tourism in small island destinations. *Natural Hazards*, 71(1), 955–972.
- Blake, A., Arbache, J. S., Sinclair, M. T., & Teles, V. (2008). Tourism and poverty relief. *Annals of Tourism Research*, 35(1), 107–126.
- Blundell, R., Bond, S., & Windmeijer, F. (2001). Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimator. *Nonstationary Panels, Panel Cointegration, and Dynamic Panels*, 15, 53–91.
- Bowsher, C. G. (2002). On testing overidentifying restrictions in dynamic panel data models. *Economics letters*, 77(2), 211–220.
- Carla, C. (2014). *How does the crime rate and violence in Mexico affect tourism to and in Mexico?* http://www.travel-conference.co.uk/commentaries.php?paper=253#V4XcY_krLIU. Accessed July 12, 2016.
- Chiu, S. P., & Lin, S. Y. (2011). Study on risk perceptions of international tourists in India. *African Journal of Business Management*, 5(7), 2742–2752.
- Chok, S., Macbeth, J., & Warren, C. (2007). Tourism as a tool for poverty alleviation: A critical analysis of 'pro-poor tourism' and implications for sustainability. *Current Issues in Tourism*, 10(2–3), 144–165.

- Cohen, M. A., Rust, R. T., Steen, S., & Tidd, S. T. (2004). Willingness-to-pay for crime control programs. *Criminology*, 42(1), 89–110.
- De Silva, I., & Sumarto, S. (2014). Dynamics of growth, poverty and human capital: Evidence from Indonesian sub-national data. *Journal of Economic Development*, 40(2), 1–48.
- Demiröz, D. M., & Ongan, S. (2005). The contribution of tourism to the long-run Turkish economic growth. *Ekonomický časopis*, 53(09), 880–894.
- Detotto, C., & Otranto, E. (2010). Does crime affect economic growth? *Kyklos*, 63(3), 330–345.
- de Vita, G., Katircioglu, S., Altinay, L., Fethi, S., & Mercan, M. (2015). Revisiting the environmental Kuznets curve hypothesis in a tourism development context. *Environmental Science and Pollution Research*, 22(21), 16652–16663.
- Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, 29(4), 1450–1460.
- Durbarray, R., Nicolas, J. F., & Seetanah, B. (2009). The determinants of tourism demand in South Africa using a dynamic panel data approach. *Tourism Analysis*, 14(3), 375–385.
- Eugenio-Martin, J. L., Sinclair, M. T., & Yeoman, I. (2006). Quantifying the effects of tourism crises: An application to Scotland. *Journal of Travel & Tourism Marketing*, 19(2–3), 21–34.
- Fajnzylber, P., Lederman, D., & Loayza, N. (2002). What causes violent crime? *European Economic Review*, 46(7), 1323–1357.
- Garín-Mun, T. (2006). Inbound international tourism to Canary Islands: A dynamic panel data model. *Tourism Management*, 27(2), 281–291.
- Garín-Muñoz, T., & Montero-Martín, L. F. (2007). Tourism in the Balearic Islands: A dynamic model for international demand using panel data. *Tourism Management*, 28(5), 1224–1235.
- George, R. (2003). Tourist's perceptions of safety and security while visiting Cape Town. *Tourism Management*, 24(5), 575–585.
- Ghaderi, Z., Saboori, B., & Khoshkam, M. (2017). Does security matter in tourism demand? *Current Issues in Tourism*, 20(6), 552–565.
- Goldman, O. S., Neubauer-Shani, M. (2017). Does international tourism affect transnational terrorism? *Journal of Travel Research*, 56(4), 451–467.
- Gomez, J., & Vassallo, J. M. (2015). Evolution over time of heavy vehicle volume in toll roads: A dynamic panel data to identify key explanatory variables in Spain. *Transportation Research Part A: Policy and Practice*, 74, 282–297.
- Gomez, J., Vassallo, J. M., & Herraiz, I. (2016). Explaining light vehicle demand evolution in interurban toll roads: A dynamic panel data analysis in Spain. *Transportation*, 43(4), 677–703.
- Gonzalez, A. (2015). *Education: The secret to crime reduction?* Unpublished thesis draft, New York University. <http://www.politics.as.nyu.edu/docs/IO/5628/Gonzalez.pdf>. Accessed December 22, 2015.
- Gunduz, L., & Hatemi-J, A. (2005). Is the tourism-led growth hypothesis valid for Turkey? *Applied Economics Letters*, 12(8), 499–504.
- Hayakawa, K. (2007). Small sample bias properties of the system GMM estimator in dynamic panel data models. *Economics Letters*, 95(1), 32–38.
- Heinemann, A., & Verner, D. (2006). Crime and violence in development: A literature review of Latin America and the Caribbean (October 1, 2006). World Bank Policy Research Working Paper No. 4041. SSRN. <http://ssrn.com/abstract=938907>. Accessed December 21, 2015.
- Hong, W. C. (2009). Global competitiveness measurement for the tourism sector. *Current Issues in Tourism*, 12(2), 105–132.
- Hoogue, M., Vanhoutte, B., Hardyns, W., & Birgan, T. (2011). Unemployment, inequality, poverty and crime. *British Journal of Criminology*, 51, 1–20.
- Jaafar, M., Ismail, S., & Rasoolimanesh, S. M. (2015). Perceived social effects of tourism development: A case study of Kinabalu National Park. *Theoretical and Empirical Researches in Urban Management*, 10(2), 5–20.
- Katircioglu, S. T. (2009). Revisiting the tourism-led-growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration. *Tourism Management*, 30(1), 17–20.
- Khan, N., Ahmed, J., Nawaz, M., & Zaman, K. (2015). The socio-economic determinants of crime in Pakistan: New evidence on an old debate. *Arab Economic and Business Journal*, 10(2), 73–81.
- Khan, S. A. R., 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.
- Kim, H. J., & Chen, M. H. (2006). Tourism expansion and economic development: The case of Taiwan. *Tourism Management*, 27(5), 925–933.
- Levantis, T., & Gani, A. (2000). Tourism demand and the nuisance of crime. *International Journal of Social Economics*, 27, 959–967.

- Lochner, L., & Moretti, E. (2004). The effect of education on crime: Evidence from prison inmates, arrests, and self-reports. *The American Economic Review*, 94(1), 155–189.
- Lorde, T., & Jackman, M. (2013). Evaluating the impact of crime on tourism in Barbados: A transfer function approach. *Tourism Analysis*, 18(2), 183–191.
- Lyer, L., & Topalova, P. B. (2014). Poverty and crime: Evidence from rainfall and trade shocks in India (September 2, 2014). Harvard Business School BGIE Unit Working Paper No. 14-067. SSRN. <http://ssrn.com/abstract=2419522>. doi:10.2139/ssrn.2419522. Accessed December 22, 2015.
- Mabugu, R., & Mabugu, M. C. (2014). Can trade liberalisation in South Africa reduce poverty and inequality while boosting economic growth? Macro–micro reflections. *Development Southern Africa*, 31(2), 257–274.
- Malik, M. A. S., Shah, S. A., & Zaman, K. (2016). Tourism in Austria: Biodiversity, environmental sustainability, and growth issues. *Environmental Science and Pollution Research*, 23(23), 24178–24194.
- Mawby, R. I., Tecău, A. S., Constantin, C. P., Chițu, I. B., & Tescașiu, B. (2016). Addressing the security concerns of locals and visitors for the sustainable development of tourist destinations. *Sustainability*, 8(6), 524–535.
- Mayne, D. (2015). *The effects of crime and tourism development in Jamaica* (Doctoral dissertation, Capella University). <http://gradworks.umi.com/37/23/3723187.html>. Accessed October 22, 2016.
- Mehmood, S., Ahmad, Z., & Khan, A. A. (2016). Dynamic relationships between tourist arrivals, immigrants, and crimes in the United States. *Tourism Management*, 54, 383–392.
- Motta, V. (2016). The impact of crime on the performance of small and medium-sized enterprises: Evidence from the service and hospitality sectors in Latin America. *Tourism Economics*, 1354816616657940.
- Moyo, B., & Akanbi, O. A. (2013). Crime and the regional disparities in tourist inflows: A case study of South Africa. *Journal of Economics and Behavioral Studies*, 5(6), 356–375.
- Nassani, A. A., Zaman, K., Aldakhil, A. M., & Abro, M. M. Q. (2016). War economy and pleasure: Assessing the effects of military expenditure on tourism growth. *Quality & Quantity*. doi:10.1007/s11356-017-8888-6.
- Ozturk, I. (2015). The relationships among tourism development, energy demand, and growth factors in developed and developing countries. *International Journal of Sustainable Development and World Ecology*. doi:10.1080/13504509.2015.1092000.
- Ozturk, I., Al-Mulali, U., & Saboori, B. (2016). Investigating the environmental Kuznets curve hypothesis: The role of tourism and ecological footprint. *Environmental Science and Pollution Research*, 23(2), 1916–1928.
- Palanca-Tan, R., Garcés, L. P. D. M., Purisima, A. N. C., & Zaratan, A. C. L. (2015). Tourism and crime: Evidence from the Philippines. *Southeast Asian Studies*, 4(3), 565–580.
- Paramati, S. R., Shahbaz, M., & Alam, M. S. (2017). Does tourism degrade environmental quality? A comparative study of Eastern and Western European Union. *Transportation Research Part D: Transport and Environment*, 50, 1–13.
- Petrevska, B., & Serafimova, M. (2016). Assessing access to finance for tourism development: Entrepreneurial approach. *International Journal of Information, Business and Management*, 8(1), 35–45.
- Pizam, A., Tarlow, P. E., & Bloom, J. (1997). Making tourists feel safe: Whose responsibility is it? *Journal of Travel Research*, 36(1), 23–28.
- Radovic, V. M., & Arabska, E. (2016). Why should security aspects be more seriously considered in development of Serbian tourism industry? *Tims.acts: Scientific Journal for Sports, Tourism and Wellness*, 10(1), 71–80.
- Sajjad, F., Noreen, U., & Zaman, K. (2014). Climate change and air pollution jointly creating nightmare for tourism industry. *Environmental Science and Pollution Research*, 21(21), 12403–12418.
- Santana-Gallego, M., RossellÀ-Nadal, J., & Fourie, J. (2016). *The effects of terrorism, crime and corruption on tourism*. ERSA Working Paper 595, Economic Research Southern Africa (ERSA), South Africa. http://www.econrsa.org/system/files/publications/working_papers/working_paper_595.pdf. Accessed October 22, 2016.
- Scheyvens, R., & Russell, M. (2012). Tourism and poverty alleviation in Fiji: Comparing the impacts of small-and large-scale tourism enterprises. *Journal of Sustainable Tourism*, 20(3), 417–436.
- Sequeira, T. N., & Maças Nunes, P. (2008). Does tourism influence economic growth? A dynamic panel data approach. *Applied Economics*, 40(18), 2431–2441.
- Sequeira, T. N., & Nunes, P. (2008). Does country risk influence international tourism? A dynamic panel data analysis. *Economic Record*, 84(265), 223–236.
- Tang, C. F. (2011). An exploration of dynamic relationship between tourist arrivals, inflation, unemployment and crime rates in Malaysia. *International Journal of Social Economics*, 38(1), 50–69.

- Tang, C. F., & Abosedra, S. (2016). Does tourism expansion effectively spur economic growth in Morocco and Tunisia? Evidence from time series and panel data. *Journal of Policy Research in Tourism, Leisure and Events*, 8(2), 127–145.
- Truong, V. D., Hall, C. M., & Garry, T. (2014). Tourism and poverty alleviation: Perceptions and experiences of poor people in Sapa. *Vietnam. Journal of Sustainable Tourism*, 22(7), 1071–1089.
- U.S. Embassy Country Reports. (2016). Country reports—Chile, China, Colombia, Indonesia, Malaysia, Mexico, Morocco, Poland, South Africa, Thailand, Tunisia, Turkey, Uganda, and Uruguay. U.S. Passport and International Travel, U.S. Department of State—Bureau of Councillor Affairs, Washington, DC
- UNODC. (2014). *Global study on homicide—2013*. United Nations Office on Drugs and Crime (UNODC). http://www.unodc.org/documents/gsh/pdfs/2014_GLOBAL_HOMICIDE_BOOK_web.pdf. Accessed December 17, 2015.
- U.S. Embassy in Argentina. (2016). *Update on the Zika virus in Argentina*. U.S. Embassy. <https://ar.usembassy.gov/update-zika-virus-argentina/>. Accessed October 21, 2016.
- U.S. Embassy in Brazil. (2016). *Brazil. U.S. passport and international travel*. U.S. Department of State—Bureau of Councillor Affairs. <https://travel.state.gov/content/passports/en/country/brazil.html>. Accessed October 21, 2016.
- UNWTO. (2015). *Tourism highlights, 2015 Edition*. United Nations World Tourism Organization, Madrid, Spain. Online available at: <http://www.e-unwto.org/doi/pdf/10.18111/9789284416899>. Accessed December 11, 2015.
- UNWTO-World Tourism Barometer. (2016). *International tourist arrivals up 4% in the first half of 2016*. Madrid: United Nations World Tourism Organization. <http://media.unwto.org/press-release/2016-09-26/international-tourist-arrivals-4-first-half-2016>. Accessed October 22, 2016.
- Wattanukuljarus, A., & Coxhead, I. (2008). Is tourism-based development good for the poor?: A general equilibrium analysis for Thailand. *Journal of Policy Modeling*, 30(6), 929–955.
- Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25–51.
- World Bank. (2015). *World development indicators*. Washington, DC: World Bank.
- Yang, Y. (2012). Agglomeration density and tourism development in China: An empirical research based on dynamic panel data model. *Tourism Management*, 33(6), 1347–1359.
- Zaman, K. (2015). Measurement issues of income and non-income welfare indicators: Assessment of Pakistan's pro-poor growth. *International Journal of Economics and Financial Issues*, 5(3), 802–811.
- Zaman, K., Moemen, M. A. E., & Islam, T. (2016a). Dynamic linkages between tourism transportation expenditures, carbon dioxide emission, energy consumption and growth factors: Evidence from the transition economies. *Current Issues in Tourism*. doi:10.1080/13683500.2015.1135107.
- Zaman, K., Shahbaz, M., Loganathan, N., & Raza, S. A. (2016b). Tourism development, energy consumption and Environmental Kuznets Curve: Trivariate analysis in the panel of developed and developing countries. *Tourism Management*, 54, 275–283.
- Zhao, W., & Ritchie, J. B. (2007). Tourism and poverty alleviation: An integrative research framework. *Current Issues in Tourism*, 10(2–3), 119–143.