Geopolitical risk, economic growth, economic uncertainty and international inbound tourism: an Indian Illustration

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Abstract

Purpose – This paper aims to consider the role of geopolitical risk in explaining tourism demand in India, a major tourist destination of the Asian region. Furthermore, the study also considers how in addition to geopolitical risk, economic policy uncertainty, economic growth, exchange rate, inflation and trade openness impact tourism demand.

Design/methodology/approach – The Bayer and Hanck (2013) method of cointegration is applied to explore the relationship between geopolitical risk and tourism demand. Furthermore, the study has also used the auto distributed lag model to determine whether there is a long-run cointegrating association between tourism demand, geopolitical risk, economic policy uncertainty, economic growth, exchange rate and trade openness. Finally, the vector error correction model confirms the direction of causality across the set of the major variables.

Findings – This paper finds that geopolitical risk adversely impacts inbound international travel to India. This study also obtains the consistency of the results across different estimation techniques controlling for important macro variables. The Granger causality test confirms the unidirectional causality from geopolitical risk to tourism and further from economic uncertainty to tourism. The findings from the study confirm that geopolitical risks have long-term repercussions on the tourism sector in India. The results indicate that there is an urgent need to develop a pre-crisis management plan to protect the aura of Indian tourism. The tourism business houses should develop skilful marketing strategies in the post-crisis to boost the confidence of the tourists.

Research limitations/implications – This paper provides valuable practical implications to tourism business houses. The tourism business houses can explore geopolitical risk measure and economic policy uncertainty measure to analyse the demand for international tourism in India. Further, the major stakeholders can establish platforms to help tourists to overcome the fear associated with geopolitical risk.

Originality/value – This study is the first of its kind to explore the geopolitical risks and their long-run consequences in the context of tourism in India. The study puts emphasis on the role of national policy to maintain peace otherwise it would be detrimental to tourism.

Keywords Geopolitical risk, Economic growth, Tourism, Economic policy uncertainly, Inflation, India

Paper type Research paper

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1. Introduction

The literature on tourism economics has firmly established that inbound tourism leads to economic expansion in the destination country. According to the reports of the World Tourism Organization (2018), tourism is the third-largest industry in terms of global export receipts. However, the tourism industry is facing a high degree of uncertainty owing to global tensions, terror attacks, geopolitical risk and economic uncertainty. Tourism responds adversely to geopolitical risk, economic uncertainty and political unrest. In this paper, we discuss how geopolitical risks impact tourism in India, based on monthly observations from January 2015 to December 2017. Caldara and Iacoviello (2018)) defines geopolitical risk as "the risk associated with wars, terrorist acts and tensions between states that affect the normal and peaceful course of international relations" (2018, p. 6).

However, the research on the impact of geopolitical risks impacting tourism continues to be scant (Demir *et al.*, 2019 and Lee *et al.*, 2020). The world today is facing an increasing rise in geopolitical risks and geo-economic tensions. Such instances are generating divergence among the major world economies. Against this backdrop, it is increasingly important to respond to the challenges associated with the geopolitical risks. The study by Caldara and Iacoviello (2018) constructed the geopolitical risk (GPR) index by enumerating the incidence of words associated with geopolitical tensions and pressures in the prominent newspapers. The major terms associated with geopolitical risk as identified in the dailies include "geopolitical concern", "geopolitical tension", "geopolitical uncertainty", "risk of war", "threats based on terror" and "geopolitical risk". The present study tries to investigate whether geopolitical risk using the concepts propounded by Caldara and Iacoviello (2018) has important repercussions upon the tourism sector in India. India is central to the geopolitics of South Asia because it occupies about three-quarters of the South Asian region and has a large population. Moreover, most countries in the South Asian region share borders with India. India with its diverse regional context also faces threats of internal security. So, the concept of geopolitical threats to India's security is not simply national but regional and global.

The uniqueness of this study lies in the application of robust econometric techniques to validate the adverse impact of geopolitical tensions on international inbound tourist arrivals controlling for major macro-economic variables in the context of India. Furthermore, as India has long-term strategic plans to diversify the tourism sector the findings of this study would have bearing on the broadening of policy in the context of uncertainty and tourism. The rest of the paper is designed as follows. Section 2 discusses the debate between geopolitical risk and tourism. Section 3 delves on data source and methodology. The results and discussion are found in Section 4. Section 5 concludes the paper with insights on policy implications.

2. Geopolitical risk tourism and economic growth

According to Flint (2016) geopolitics, meaning contains manifold definitions. In the past 20 years, any form of power struggle has been categorized under geopolitics. The definition comprises risks associated with wars, terrorist attacks, conflicts within and between states that cannot be decided in a peaceful democratic way. Balcilar *et al.* (2018) discuss that geopolitical risk is a crucial factor in explaining investments it can modify business cycles and thereby affects the economy of the concerned country. Webster and Ivanov (2014) observe that an alteration of the global command and control of power will influence major leaderships at the international level and this will affect the tourism and the hospitality industries. Webster and Ivanov (2014) further discuss that the new order of global power may not consent to the supply of low-cost fuel to all countries, therefore it would raise

transportation costs and affect directly the tourism industry. So, change in the power relations generates uncertainty, therefore, creates geopolitical risk for the tourism and the hospitality sector. The confidence of the tourists and travellers as consumers are affected by a multiplicity of factors. These factors will ultimately determine the prospects of the tourism industry. The consumer confidence of the travellers will boost tourism for some destinations while for others it may relegate the tourism business. The recent decade faced several challenges which shook the world tourism industry. For example, the financial crisis of 2008 continues to affect major national economies which hamper the tourism business. The (IMF, 2016) reports that the global crisis continues to hit economic growth. This has sufficiently reduced the confidence of the consumers and has badly hit the business of tourism. Marsiglio (2016) develops a theoretical model to discuss uncertainty and the preference pattern of both local and international tourists in choosing tourism destinations. The study concludes that the response of tourists to uncertainty is determined by the income effect and the utility effect. The net effect of uncertainty on tourist attractions requires a broad range of information and it cannot be simplistically determined. Demir and Gozgor (2018) grounded on a panel set of data from 17 developed and developing countries examined the effect of Economic Policy Uncertainty (EPU) on outbound travel expenditures. The study concludes that the effect of EPU was higher in developing countries compared to the developed ones. Demir and Gozgor'z=s (2018) study for the USA over the period 1978 to 2014, found that EPU negatively influences the total mileage for travel purposes. In a country case study of the USA, Baker *et al.* (2015) conclude that economic uncertainty measured by EPU negatively affected outbound tourism. Gozgor and Ongan (2017) assert that EPU negatively impacts domestic travel in the USA. Tsui *et al.* (2018) based on a panel data gravity model discusses the effect of economic uncertainty on the business tourism of New Zealand. The results proved that the EPU index is a significant factor in elucidating the dissimilarities in business tourism in New Zealand. Wu and Wu (2018) used the wavelength method to examine how EPU negatively affected tourism and travel in the BRIC countries. The study concluded that the government of these countries needs to strengthen wide-ranging policies to increase travel and tourism. Chatziantoniou *et Oal.* (2016) study, for the countries of Canada and the UK, show that consumer confidence is an important predictor of outbound tourism in these countries. Added to the economic tensions are the conditions of political instability, migration, terrorism which work counter to the strong expansion of the tourism industry. In today's uncertain world the concept of "place independence" is gaining prominence this implies that tension and fear are pervading all boundaries.

Das *et al.* (2019) conclude that geopolitical risks impact the volatility of growth significantly. Demir *et al.* (2019) for a set of 18 countries find that geopolitical risks significantly affect tourism demand. Tourists respond to externalities faster and gradually adjust to changing the political situation. Policy directions should focus on the management of internal and external risks so that tourist decision-making leads to expansionary tourism-led growth. Saint Akadiri *et al.* (2020) based on Toda and Yammoto's (1995) Granger causality method found for Turkey that there is unidirectional causality from geopolitical risk to tourism. The study used quarterly data sets from 1985Q1 to 2017Q4. Balli *et al.* (2019) using the wavelength method explores the impact of geopolitical risk on international tourist flows for Indonesia, Malaysia, Thailand, Philippines, South Korea, South Africa, Turkey and Mexico. The study concludes that the impact of geopolitical risk is not identical across all countries. For some countries, the impact is felt for two to three months while for others the thrust of the impact of geopolitical risks lasts for several months. Based on wavelength analysis (Tiwari *et al.*, 2019) explore the impact of geopolitical risk and economic uncertainty on tourist arrivals for India. The study concludes that geopolitical

risks have a long-run impact on tourism compared to economic policy uncertainty. Economic policy uncertainty impacts tourism in the short-run in India. Webster and Ivanov (2014) opine that unstable political conditions will hamper inbound tourist flows for some major tourist destinations. Tourists will continue to circumvent destinations, which are high risk and not secure. Political instability gets transpired into economic uncertainty which eventually lowers per head spending for tourism purposes.

Tourism is crucially affected when the tourist destination faces challenges of terror attacks or warfare. For example, the disappearance of the World Heritage Site owing to dynamite attacks in Syria brought perceptible changes in tourist flows. Webster and Ivanov (2014) studied a multiple set of geopolitical events that may impact tourism and drastically alter tourist flows at the international level. Morakabati *et al.* (2017) analysed the importance of tourist perception in the event of geopolitical risks and how it alters worldwide tourist flows. Geopolitical risks essentially alter the space of individual freedom, and thus it affects tourism because it is based on the game of power wars. The foregoing discussion establishes that tourism augments economic growth but the recent rise in geopolitical risks has adversely impacted the tourism industry. This study adds to the existing seam of current literature by quantitatively exploring how the geopolitical crisis impacts the tourism destination of India.

3. Choice of variables, data sets and methodology

3.1 Variables and data sets

3.1.1 Dependent Variable. Tourist arrivals denoted by T are the dependent variable. The unit of measurement is the number of tourists. The monthly observations from January 2015 to December 2017 is considered in this study. The data source for T is the Government of India, Tourism Statistics available at URL: https://data.gov.in/resources/month-wise-breakup-international-tourist-arrivalsitas-india-2015-17.

3.1.2 Explanatory variables. Geopolitical Risk denoted by GPR is the major explanatory variable. The monthly observations from January 2015 to December 2017 are obtained from the data sets prepared by Caldara, Dario and Matteo Iacoviello (2017), available at URL: www.policyuncertainty.com/gpr.html. According to Caldara, Dario and Matteo Iacoviello (2017), the GPR index shows the programmed search outcomes of electronic archives of national and international dailies. The index is calculated by the total count of the number of articles associated with geopolitical risk in each newspaper for each month. The main explanatory variable in the present econometric model of our study is the Geopolitical risk (GPR) index. This study contributes to the existing empirical literature by exploring the interconnections between GPR and tourism. We try to estimate the importance of GPR in tourism sector expansion by analysing whether GPR is a crucial forecaster in determining international inbound tourist arrivals to India. The GPR index is measured based on (Caldara and Iacoviello, 2018) geopolitical risk index. The study by Caldara and Iacoviello (2018) constructs the index from examinations of major newspapers which uses the words associated with geopolitical risks, for example, military -threats, terrorism, internal insurgency and external aggression. Thus, it is a comprehensive index encompassing all forms of shocks both internal and external related to war and military tensions. The monthly count in the leading dailies with the words associated with terrorism, war, unrest was made. The decade of 2000–2009 was set to a mean value of 100. By the process of normalization values greater than 100 meant higher levels of geopolitical risks and values lower than 100 meant lower levels of geopolitical risks.

According to Caldara and Iacoviello (2018), the construction of GPR is associated with three major steps obtaining a comprehensive definition, finding a suitable measurement and

auditing the measure. The study stresses that the index reflects the definition of the geopolitical index that captures risk related to wars, terrorism and tensions within and between states that impact peaceful international relations.

The other control variable used in this study is the Economic Policy Uncertainty Index denoted by EPU, available from the official portal URL: www.policyuncertainty.com/. The EPU is an aggregate of three components, namely, newspaper coverage highlighting policy relating to uncertainty, the second is the tax codes and the third component is the extent of disagreement among forecasters. Economic growth proxied by industrial production, denoted by IP; exchange rate denoted by EX; inflation denoted by CPI; and trade openness proxied by the ratio of exports to imports, denoted by EM are the other important control variables used in the study.

The data source for IP is Organization for Economic Co-operation and Development, Production of Total Industry in India [INDPROINDMISMEI], retrieved from FRED, Federal Reserve Bank of St.Louis; https://fred.stlouisfed.org/series/. According to the Organization for Economic Co-operation and Development:

> Industrial production refers to the output of industrial establishments and covers sectors such as mining, manufacturing, electricity, gas and steam and air-conditioning. This indicator is measured in an index based on a reference period that expresses the change in the volume of production output.

The data source for EM is Organization for Economic Co-operation and Development, Ratio of Exports to Imports for India [XTEITT01INM156N], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/. The data source for EX is Bank for International Settlements, Real Broad Effective Exchange Rate for India [RBINBIS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/. According to the FRED "Real effective exchange rates are calculated as weighted averages of bilateral exchange rates adjusted by relative consumer prices". The data source for CPI is Organization for Economic Co-operation and Development, Consumer Price Index: All Items for India [INDCPIALLMINMEI], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/. According to the Organization for Economic Co-operation and Development:

> Inflation measured by consumer price index (CPI) is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households. A consumer price index is estimated as a series of summary measures of the period-to-period proportional change in the prices of a fixed set of consumer goods and services of constant quantity and characteristics, acquired, used or paid for by the reference population.

The period of observations for all the variables is monthly, January 2015 to December 2017.

Table 1 presents the descriptive statistics and the correlation matrix. Based on Table 1 we find that all the variables are positively skewed, the standard deviation for EX is the lowest and it is maximum for T. The results of the correlation matrix show that tourism is negatively correlated with GPR and EPU; however, the correlation between tourism and industrial production is 0.30. As no substantial inference can be made based on the results of the correlation matrix, the subsequent unit presents the econometric model and the analysis thereof.

4. Methodology

4.1 Model

The study investigates how tourism in India is impacted by the geopolitical risk index, to avoid the problem of the omitted variable bias, economic policy uncertainty index, industrial production, inflation, exchange rate and trade openness are used as additional control

Variables	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis
T	1,205,470	1,201,536	1,619,649	853,944	173,630	0.19	2.56
IP	104.71	105.07	115.01	97.99	4.28	0.24	2.55
EM	69.39	68.44	83.89	59.97	5.91	0.51	2.57
CPI	104.16	105.00	110.17	96.78	3.76	−0.37	2.32
EPU	72.53	71.54	144.27	32.88	27.44	0.83	3.32
EX	99.78	99.22	104.59	95.25	2.82	0.35	1.88
GPR	81.39	80.73	104.01	56.24	12.47	0.22	2.30
Correlation matrix							
Variables	T	IP	EM	CPI	EPU	EX	GPR
T	1.00	0.30	0.093	0.25	−0.34	0.34	−0.05
IP	0.30	1.00	0.21	0.33	−0.04	0.43	−0.1
EM	0.093	0.21	1.00	−0.24	−0.25	−0.42	−0.01
CPI	0.25	0.33	−0.24	1.00	−0.12	0.32	−0.07
EPU	−0.34	−0.04	−0.25	−0.12	1.00	−0.16	0.38
EX	0.34	0.43	−0.42	0.32	−0.16	1.00	−0.09
GPR	−0.05	−0.1	−0.01	−0.07	0.38	−0.09	1.00

Source: author

Table 1. Descriptive statistics and correlation matrix

variables. The general functional form exploring the impact of geopolitical risk on tourism is expressed in equation (1).

$$T_t = \mathrm{f}(GPR_t, IP_t, EPU_t, EX_t, CPI_t, \in_{it}) \ldots\ldots\ldots \quad (1)$$

Here T denotes the tourist arrivals, GPR is the geopolitical index, IP is industrial production, EPU is the economic policy uncertainty index, EX denotes the effective exchange rate, EM is the ratio of exports to imports, CPI denotes the index of inflation and ϵ is the usual error term. A rise in the geopolitical index is expected to adversely impact tourism, economic policy uncertainty index will also negatively impact tourism, a rise in industrial production will boost tourism owing to the expansion of ancillary industries. Inflation will raise the cost of living which will dampen the tourism business. Trade expansion will positively affect tourism because it will create opportunities for business tourism. A rise in the exchange rate will imply a slowdown in the tourism business because the cost of currency in the destination country rises relative to other countries.

5. Econometric specification

5.1 Unit root testing

Before the use of any time series method, it is crucial to find out whether the observations are stationary or not, it would be spurious to obtain the results, with a time series, which are not-stationary, Newbold and Granger (1974).To examine the stationary properties of the time series, the unit root test of augmented Dickey-Fuller unit root test (ADF test), (Dickey and Fuller, 1979), the Phillips- Perron unit root test (PP), Phillips and Perron (1988) and the DF-GLS test, Elliot, Rothenberg and Stock (ERS), (1996) are applied.

5.2 Zivot and Andrews unit root test with one structural break

To find out structural break in the series the Zivot and Andrews (ZA) unit root test is applied. The ZA model is in equation (3).

$$H_0 : y_t = \mu + y_{t-1} + e_t \tag{2}$$

$$H_1 : y_t = \hat{\mu} + \hat{\theta} DU_t(\hat{T_b}) + \hat{\beta} t + \hat{\gamma} DT_t(\hat{T_b}) + \hat{\alpha} y_{t-1} + \sum_{j=1}^{k} \hat{c_j} \Delta y_{t-j} + \hat{e_t} \tag{3}$$

The model allows for the change in the intercept and a break in the trend. *DUt* is a dummy variable showing the shift in the intercept and *DTt* is another dummy variable explaining a shift in the trend occurring in the time TB. TB is the break date. The null hypothesis is rejected when α is statistically significant.

5.3 Cointegration analysis

To test the cointegrating relationship between T, GPR, EPU, IP, EX, CPI and EM, the Bayer and Hanck (2013) cointegration method is used. The Bayer and Hanck (2013) method try to explore the cointegrating relationship of the variables by taking a combination of Engle and Granger (1987), Johansen (1988), Boswijk (1994) and Banerjee *et al.* (1998) cointegration methodologies. Bayer and Hanck's (2013) method constructed a joint *t*-statistic based on these four cointegrating methods. The equations (4) and (5) show the Fisher equation of Bayer and Hanck (2013).

$$\text{ENG \& GRA} - \text{JOHAN} = -2\left[\ln(PENG\&GRA) + \ln(PJOHAN)\right] \tag{4}$$

$$\begin{aligned}\text{ENG \& GRA} - \text{JOHAN} - \text{BOS} - \text{BDM} = {} & -2\left[\ln(PENG\&GRA) + \ln(PJOHAN)\right. \\ & \left. + \ln(PBOS) + \ln(PBDM)\right]\end{aligned} \tag{5}$$

where *PENG&GRA*, *PJOHAN*, *PBOS*, *PBDM* are *p*-values.

Here the null hypothesis of no cointegration can be precluded when the critical value of Bayer and Hanck (2013) is less than the Fisher statistics.

5.4 Robustness test

5.4.1 Auto distributed lag model cointegration method. The auto distributed lag model (ARDL) developed by Pesaran *et al.* (2001) is applied to test the robustness of the results based on the Bayer and Hanck (2013) method. Equation (6) presents the ARDL model:

$$\begin{aligned}\Delta T_t = {} & \gamma_0 + \sum_{k=1}^{m} \gamma_{1k} \Delta T_{t-k} + \sum_{k=1}^{m} \gamma_{2k} \Delta GPR_{t-k} + \sum_{k=1}^{m} \gamma_{3k} \Delta EPU_{t-k} \\ & + \sum_{k=1}^{m} \gamma_{4k} \Delta EM_{t-k} + \sum_{k=1}^{m} \gamma_{5k} \Delta EX_{t-k} + \sum_{k=1}^{m} \gamma_{6k} \Delta CPI_{t-k} \\ & + \sum_{k=1}^{m} \gamma_{7k} \Delta IP_{t-k} + \lambda_1 T_{t-1} + \lambda_2 GPR_{t-1} + \lambda_3 EPU_{t-1} + \lambda_4 EM_{t-1} \\ & + \lambda_5 EX_{t-1} + \lambda_6 CPL_{t-1} + \lambda_7 IP_{t-1} + \mu_t\end{aligned} \tag{6}$$

Δ is the first difference operator, *the coefficients* γ_{ik} denote the short-run elasticities, i = 1…0.7. The coefficients λ_i, i = 1…7 denote the long-run elasticities. μ_t shows the usual white noise.

To obtain the cointegrating relation, the long-run null hypothesis is *H0*: λ_{11} to $\lambda_{77} = 0$. The alternative hypothesis is *H1*: λ_{11} to $\lambda_{77} \neq 0$. Again, the short-run null hypothesis is expressed as *H0*: γ_{11} to $\gamma_{77} = 0$, the alternative hypothesis is *H1*: γ_{11} to $\gamma_{77} \neq 0$. The acceptance of the null hypothesis is based on the critical values postulated by Pesaran *et al.* (2001). If the f statistic is greater than the upper bound of the critical value then it confirms the existence of the long-run cointegrating relationship among the variables.

The ARDL model has certain distinct advantages. For example, the model does not require the presence of a singular order of integration unlike other methods such as Johansen and Juselius (1990). The estimates for long-run and short-run relations can be found contemporaneously. However, a shortcoming of the ARDL model is that it does not give any estimation if the series are of I(2).

The error correction term is obtained in the ARDL through a linear transformation, explained in equation (7).

$$\begin{aligned}\Delta T_t = \gamma_0 &+ \sum_{k=1}^{m} \alpha_{1k}\Delta T_{t-k} + \sum_{k=1}^{m} \alpha_{2k}\Delta GPR_{t-k} + \sum_{k=1}^{m} \alpha_{3k}\Delta EPU_{t-k} \\ &+ \sum_{k=1}^{m} \alpha_{4k}\Delta EM_{t-k} + \sum_{k=1}^{m} \alpha_{5k}\Delta EX_{t-k} + \sum_{k=1}^{m} \alpha_{6k}\Delta CPI_{t-k} \\ &+ \sum_{k=1}^{m} \alpha_{7k}\Delta IP_{t-k} + \psi ECM_{t-i} + v_t \end{aligned} \tag{7}$$

Here ECM is the error correction term, ψ is the coefficient of the error correction term, it indicates the pace of adjustment to equilibrium.

The cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests explained by Shin and Pesaran (1999) are used to test the long-run stability of the model.

5.4.2 Causality analysis. To determine the direction of causality of the variables the vector error correction model (VECM) and Granger Causality Test is applied here. Equation (8) shows the VECM model.

$$\begin{aligned}(1-L)\begin{bmatrix} T_t \\ GPR_t \\ EPU_t \\ EM_t \\ EX_t \\ CPI_t \\ IP_t \end{bmatrix} &= \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \\ \beta_6 \\ \beta_7 \end{bmatrix} \\ &+ \sum_{i=1}^{p}(1-L)\begin{bmatrix} \partial_{11i} & \partial_{12i} & \partial_{13i} & \partial_{14i} & \partial_{15i} & \partial_{16i} & \partial_{17i} \\ \partial_{21i} & \partial_{22i} & \partial_{23i} & \partial_{24i} & \partial_{25i} & \partial_{26i} & \partial_{27i} \\ \partial_{31i} & \partial_{32i} & \partial_{33i} & \partial_{34i} & \partial_{35i} & \partial_{36i} & \partial_{37i} \\ \partial_{41i} & \partial_{42i} & \partial_{43i} & \partial_{44i} & \partial_{45i} & \partial_{46i} & \partial_{47i} \\ \partial_{51i} & \partial_{52i} & \partial_{53i} & \partial_{54i} & \partial_{55i} & \partial_{56i} & \partial_{57i} \\ \partial_{61i} & \partial_{62i} & \partial_{63i} & \partial_{64i} & \partial_{65i} & \partial_{66i} & \partial_{67i} \\ \partial_{71i} & \partial_{72i} & \partial_{73i} & \partial_{74i} & \partial_{75i} & \partial_{76i} & \partial_{77i} \end{bmatrix} \mathrm{X} \begin{bmatrix} T_{t-1} \\ GPR_{t-1} \\ EPU_{t-1} \\ EM_{t-1} \\ EX_{t-1} \\ CPI_{t-1} \\ IP_{t-1} \end{bmatrix} \\ &+ \begin{bmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \\ \delta_6 \\ \delta_7 \end{bmatrix} (ECT_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \\ \mu_{5t} \\ \mu_{6t} \\ \mu_{7t} \end{bmatrix} \end{aligned} \tag{8}$$

where $(1 - L))$ is s the difference operator, $ECT_{t\ -\ 1}$ is the one period lagged error correction term, derived from the cointegrating vector. $\mu_{1t}, \mu_{2t}, \ldots$ and μ_{7t} are the residual terms.

The statistical significance of $ECT_{t\ -\ 1}$ explains the long-run Granger-causality behaviour, the Wald's test statistics for the joint significance of lagged values of the variable demonstrates the short-run dynamics. Moreover, the variance decompositions (VDs) and impulse response functions (IRFs) are used for robustness checks.

6. Results and discussion

6.1 Unit root tests and cointegration

In this section, we discuss the empirical results. Firstly, we proceed to examine the stationary properties of the variables. The unit root test of ADF, DF-GLS and PP were applied. Furthermore, the ZA unit root test was applied with a structural break. The results based on Tables 2 and 3 confirm that the variables are integrated of I(1). As the variables are integrated of I(1) the cointegration test was performed. Table 4 presents the results of the Bayer and Hanck (2013) cointegration test. Based on the estimated value of Fisher-statistics for the EG-JOH-BO-BDM test we confirm the long-run cointegrating relationship across tourism, economic growth, geopolitical risk index, economic policy uncertainty index, exchange rate, inflation and trade openness. Furthermore, the results based on the ARDL model of cointegration confirm the earlier findings of the cointegrating properties of the variables, Table 5.

After establishing the cointegrating properties we explore the long-run and short-run impact of the explanatory variables on T. Based on the results of Table 6 we can ascertain the long-run impact of GPR, EPU, IP, EX EM and CPI on T, when tourism is the dependent variable. A 10% rise in GPR leads to a lowering of tourism growth by 6.2%. Again, a 10% rise in EPU leads to the lowering of tourism growth by 8%. A 10% rise in industrial production boosts tourism by 5.2%. When IP is the dependent variable a 10% rise in GPR leads to a decline in IP by 5.5% and a rise in EPU by 10% leads to a decline in IP by 1.1%. So, both the geopolitical risk index and economic policy uncertainty index are significant to dampen tourism and subsequently economic growth in the long-run.

Table 7 presents the short-run impact of GPR on T, we find that in the short-run GPR has no significant impact on tourism, confirming the findings of Tiwari *et al.* (2019). The diagnostic test confirm the model is free from non-normality and autocorrelation. Further, the parameter stability test is confirmed, Figures 1 and 2.

We next proceed to apply the Granger causality test that generates information about the direction of causality of the set of observations. The direction of causality will provide information for policymakers about the nature of interconnectedness of the variables in the Indian context in particular. Understanding the causality direction of the variables will improve our understanding as to what should be the policy tools to augment tourism expansion in the long-run.

6.2 Analysis of causality

The causality analysis of the relationship between T, GPR, EPU, EX, EM, CPI and IP based on the VECM model [Equation (8)] are reported in Table 8. The coefficient of the error correction term of GPR_t equation, EPU_t equation, IP_t *equation and* T_t are negative and statistically significant. Based on the significance of the coefficient of the error correction term we can say that there is unidirectional Granger causality from GPR to T and further from EPU to T. Such findings confirm the study of Saint Akadiri *et al.* (2020) in the context of Turkey. Thus, we can conclude that geopolitical risk index Granger causes tourism in India. Geopolitical tensions generate uncertainty in the economy which has a notable impact on tourist arrivals in India.

Table 2. Unit root test: ADF and Phillips Perron (PP) and DF-GLS test

Variables at level	ADF test statistic	Results	PP test statistic	Results	DF-GLS test statistic	Results
T	−2.96	Non-stationary	−3.52	Non-stationary	−2.89	Non-stationary
IP	−0.73	Non-stationary	−7.08	Non-stationary	−2.27	Non-stationary
EM	−2.06	Non-stationary	−6.01	Non-stationary	−1.90	Non-stationary
CPI	−1.69	Non-stationary	−1.70	Non-stationary	−2.22	Non-stationary
EPU	−1.02	Non-stationary	−6.08	Non-stationary	−1.08	Non-stationary
EX	−0.94	Non-stationary	−1.38	Non-stationary	−2.03	Non-stationary
GPR	−0.78	Non-stationary	−3.50	Non-stationary	−1.39	Non-stationary
Variables in the first differenced form	ADF test statistic	Results	PP Test statistic	Results	DF-GLS test statistic	Results
ΔT	−5.48	Stationary I(1)	−26.25	Stationary I(1)	−3.01	Stationary I(1)
ΔIP	−7.51	Stationary I(1)	−38.69	Stationary I(1)	−8.43	Stationary I(1)
ΔEM	−6.88	Stationary I(1)	−38.45	Stationary I(1)	−3.65	Stationary I(1)
ΔCPI	−8.72	Stationary I(1)	−21.83	Stationary I(1)	−3.31	Stationary I(1)
ΔEPU	6.78	Stationary I(1)	−37.94	Stationary I(1)	−8.03	Stationary I(1)
ΔEX	−6.02	Stationary I(1)	−29.26	Stationary I(1)	−6.94	Stationary I(1)
ΔGPR	−9.73	Stationary I(1)	−44.03	Stationary I(1)	−5.73	Stationary I(1)
Critical values	1% −4.12 5% −3.48 10% −3.17		1% −19.13 5% −13.40 10% −10.77		Critical values at 5% level of significance −3.05, lags 4	

Source: author

	TB	k	*t*	Inference
Variables at level				
T	January 2017	2	−4.04	Unit root
IP	November 2016	2	−3.98	Unit root
EM	January 2016	2	−3.41	Unit root
CPI	November 2016	2	−4.008	Unit root
EPU	May 2017	2	−4.07	Unit root
EX	February 2016	2	−3.46	Unit root
GPR	November 2016	2	−0.43	Unit root
Variables in their first difference	TB	k	*t*	Inference
ΔT	February 2017	2	−7.07	I(1)
ΔIP	July 2016	2	−6.07	I(1)
ΔEM	May 2016	2	−7.50	I(1)
ΔCPI	March 2017	2	−7.81	I(1)
ΔEPU	March 2017	2	−7.12	I(1)
ΔEX	May 2016	2	−6.89	I(1)
ΔGPR	July 2017	2	−7.81	I(1)

Notes: Critical values: 1%: −5.34, 5%: −4.80, 10%: −4.58.
Source: Author

Table 3. Zivot-Andrews test results: break in both intercept and trend

Model	EG-JOH-BOBDM	Critical value at 5% level	Inference
$T_t = f(IP_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)$	24.63*	21.01	Cointegration
$IP_t = f(T_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)$	35.61	21.01	Cointegration

Note: (*) Shows rejection of the null of no cointegration hypothesis at 5% level of significance

Table 4. Bayer and Hanck cointegration test

Estimated ARDL model	Optimal lag length	F-statistics	Lower bound critical value at 5% level	Upper bound critical value at 5% level	Inference
$f(T_t/IP_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)$	(2,0,2,2,1,2)	7.60*	4.24	5.07	Cointegration
$f(IP_t/T_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)$	(2,1,2,2,2,0)	12.01*	4.24	5.07	Cointegration

Note: (*) Shows rejection of the null of no cointegration hypothesis at 5% level of significance

Table 5. ARDL model (robustness check)

6.3 Impulse response and variance decomposition analyses

After establishing the unidirectional causality relation from GPR to T we use the structural VAR impulse response function to demonstrate how tourism and economic growth in India react to a shock in the geopolitical index and economic policy uncertainty index. Figure 3 reports the VAR impulse response function results of the responses of T to a shock in EPU and GPR. The impulse response findings reveal that in the initial stages the response of T to

Variable	Coefficient	T ratio	Prob
Model A	f(T_t/IP_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)		
IP_t	0.52*	2.49	0.02
EM_t	0.13*	2.46	0.02
CPI_t	−0.75*	−3.53	0.004
EPU_t	−0.80*	−5.73*	0.00
EX_t	0.46*	3.03	0.001
GPR_t	−0.62*	−2.93	0.02
constant	−0.23	1.96	0.23
Model B	f(IP_t/T$_t$, EM_t, CPI_t, EPU_t, EX_t, GPR_t)		
T_t	0.52*	2.12	0.04
EM_t	0.14	0.22	0.44
CPI_t	−0.54*	−3.54	0.002
EPU_t	−0.11*	−5.46	0.00
EX_t	0.37	0.23	0.78
GPR_t	−0.55*	3.94	0.02
constant	0.85	0.43	0.98

Note: (*) Indicates significant at the 1% level. Prob = probability

Table 6.
Long-run estimates (ARDL model)

Variable	Coefficient	T ratio	Probability
Model A	f(T_t/IP_t, EM_t, CPI_t, EPU_t, EX_t, GPR_t)		
IP_t	0.47*	4.71	0.00
EM_t	0.011	0.64	0.53
CPI_t	−0.25	−0.54	0.98
EPU_t	−0.04	−1.21	0.60
EX_t	−0.21	−0.09	0.92
GPR_t	−0.91	1.21	0.91
ECM_{t-1}	−0.14*	−3.49	0.002
Diagnostic test R^2 = 0.87 F-stat = 8.54*			
DW-statistic = 2.34			
Model B	f(IP_t/T$_t$, EM_t, CPI_t, EPU_t, EX_t, GPR_t)		
T_t	0.72*	3.49	0.00
EM_t	0.21	0.11	0.91
CPI_t	−0.55	−0.57	−0.57
EPU_t	−0.32	1.21	0.33
EX_t	0.02	0.48	0.63
GPR_t	−0.04	1.09	0.08
ECM_{t-1}	−0.35*	−5.33	0.00
Diagnostic test R^2 = 0.66 F-stat = 12.03*			
DW-statistic = 1.67			

Note: (*) Shows significance at 1% level

Table 7.
Error correction results (ARDL model)

a shock in EPU is fluctuating, however, over time, it becomes stable. The initial response of T to a shock in GPR is fluctuating, however, it becomes consistently stable after the first 10 periods are reached. Figure 4 also reports through the variance decomposition method that the response of T to a shock in EPU and GPR becomes stable in the long-run. Tourism in

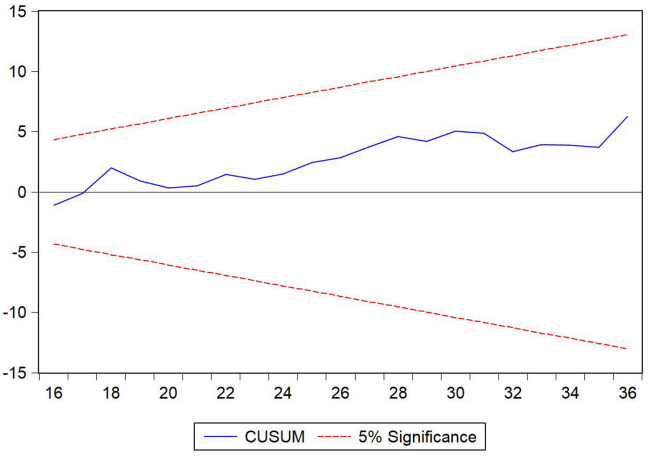


Figure 1.
Cusum test
(parameter stability)

Note: Parameter stability

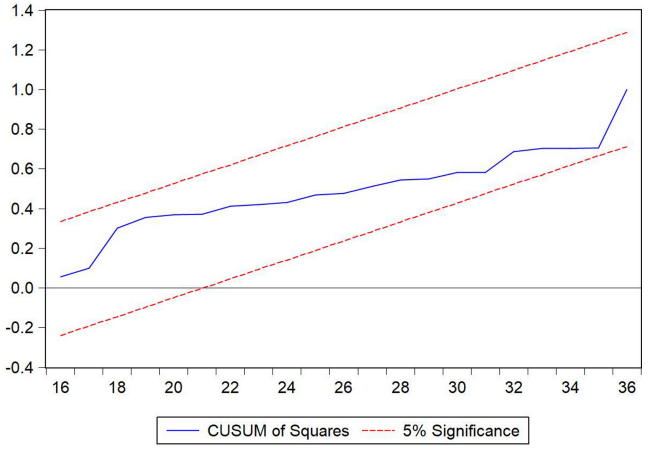


Figure 2.
Cusum square test
(parameter stability)

Note: Parameter stability

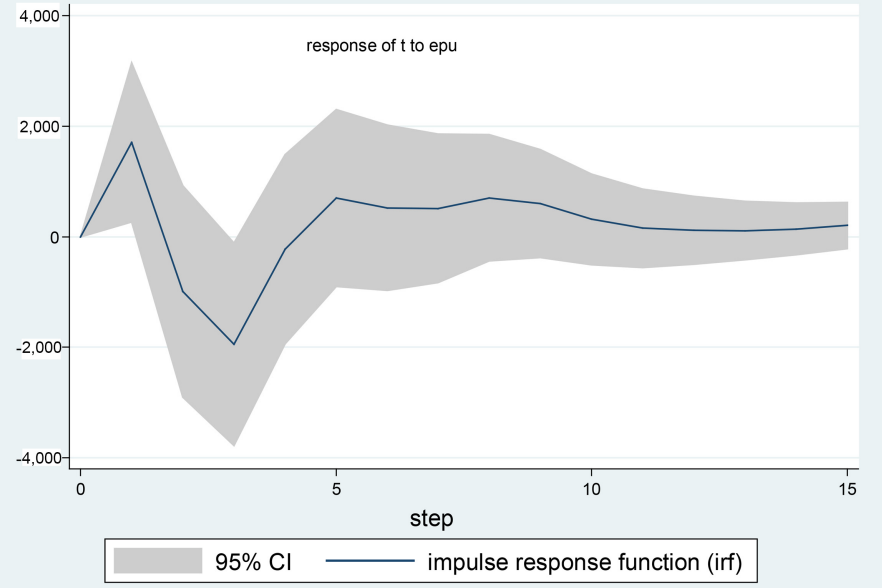
India responds to geopolitical risk and adapts to the situation by alteration in the travel plans, such findings confirm the work of Antonakakis *et al.* (2017) and Lanouar and Goaied (2019). Tourism is affected by the seasonality of events and it often long-lasting, Gil-Alana *et al.* (2014).

The results obtained from the empirical model indicate an adverse long-run impact of geopolitical risk on inbound tourism demand in the context of India. Thus, the dynamic features of both regional and international political situations considerably impact the tourist decisions regarding the choice of destinations. The results of this study emphasize the significance of geopolitical stability to ensure the peaceful expansion of inbound tourism. The studies of Akadiri *et al.* (2020; and Wu and Wu, 2019) discuss that tourism is an important contributory factor towards economic growth particularly for the emerging

Table 8.
VECM and Granger causality test

Dependent variable	Direction of causality Short-run (Wald test statistic) $\sum \Delta T_{t-1}$	$\sum \Delta IP_{t-1}$	$\sum \Delta EM_{t-1}$	$\sum \Delta CPI_{t-1}$	$\sum \Delta EPU_{t-1}$	$\sum \Delta EX_{t-1}$	$\sum \Delta GPR_{t-1}$	$ECM_{t\text{-}1}$
ΔT_t	–	9.65*(0.002)	1.42(0.67)	2.61(0.27)	8.83*(0.01)	0.063(0.96)	10.38*(0.002)	–0.58*(0.01)
ΔIP_t	1.50(0.47)	–	0.093(0.11)	0.44(0.80)	12.02*(0.002)	7.71*(0.002)	0.04(0.21)	–0.34* (0.002)
ΔEM_t	1.49(0.47)		–		6.57*(0.0038)	2.62(0.32)	0.09(0.08)	0.21 (0.43)
ΔCPI_t	2.40(0.36)	3.48*(0.001)		–	0.98(0.21)	0.77(0.52)	0.32(0.22)	0.34(0.98)
ΔEPU_t	0.44(0.80)	0.52(0.77)	1.21(0.33)	0.98(0.36)	–	0.11(0.21)	0.45(0.12)	–0.67* (0.003)
ΔEX_t	2.62(0.27)	0.21(0.43)	0.67(0.43)	3.41(0.001)	1.54(0.47)	–	0.98(0.1)	3.21 (0.98)
ΔGPR_t	0.73(0.44)	0.33(0.91)	0.43(0.11)	0.05(0.16)	0.21(0.98)	)0.32(0.12)	–	–0.43* (0.011)

Note: Figure in the parenthesis denotes the probability



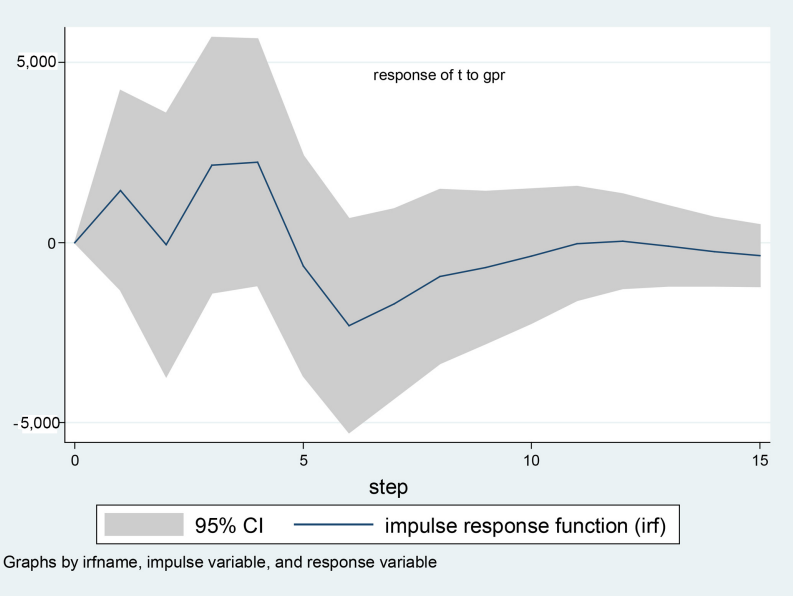
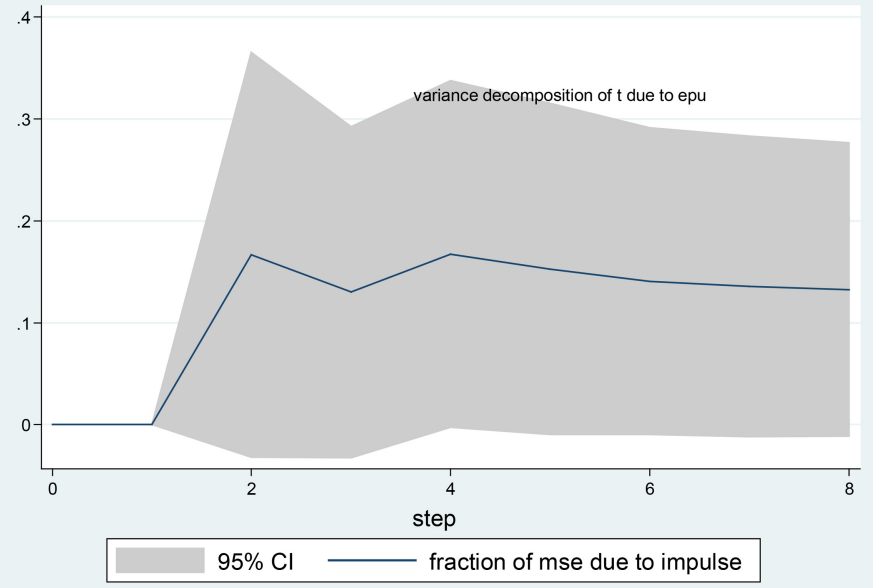


Figure 3.
Impulse response of the tourism



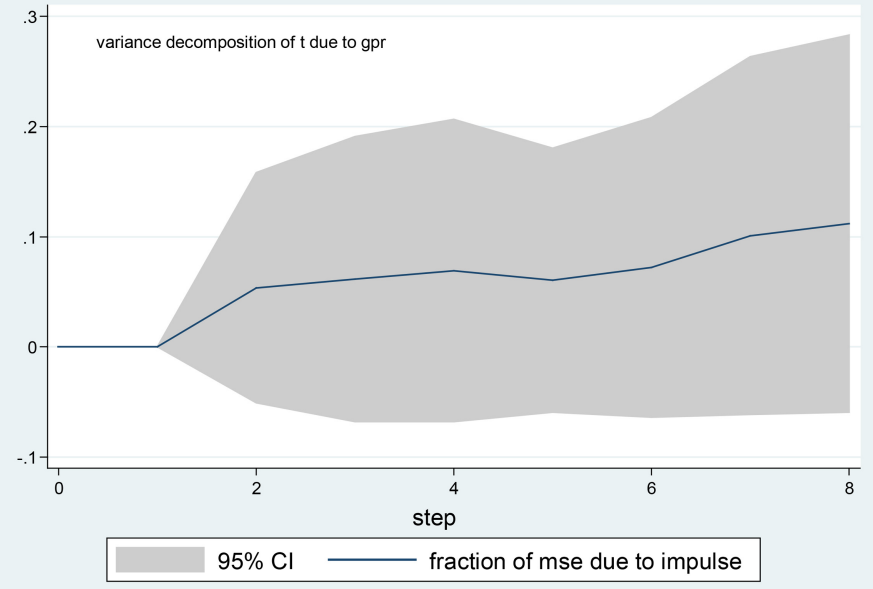


Figure 4. Variance decomposition of tourism

economies so rising geopolitical risks are detrimental for the long-run growth. Such findings stand to reason because tourists are often considered weak and easy targets during geopolitical conflicts.

7. Concluding remarks and policy suggestions

This paper empirically investigated the short-run and long-run effects of geopolitical unrest index, economic policy uncertainty, economic growth, exchange rate, inflation and trade openness on tourism in India using monthly data sets for the period January 2015 to December 2017. Apart from the application of the ADF, PP and GFLS unit root tests, the paper adopted the Zivot Andrews unit root test (Zivot and Andrews, 2002) to ascertain the structural breakpoints. The study established that geopolitical index and economic policy uncertainty impacts tourism in the short-run and the long-run.

The empirical results of both Bayer and Hanck (2013) and ARDL methods to cointegration demonstrated that India's tourism, economic policy uncertainty, geopolitical index, economic growth, inflation, exchange rate and trade openness are cointegrated. A 10% rise in the geopolitical risk index leads to a lowering of tourism growth by 6.2% in the long-run. Further, a 10% rise in the economic policy uncertainty index leads to the lowering of tourism growth by 8% in the long-run. So, both the geopolitical risk index and economic policy uncertainty index is significant to diminish tourism and successively economic growth in the long -run. The Granger causality analysis based on the VECM confirms a unidirectional relationship running from the geopolitical risk index to tourism and further from the economic policy uncertainty index to tourism. Economic growth and tourism fluctuate to one standard deviation shock to geopolitical risk and economic policy uncertainty in the long-run. Our findings indicate that geopolitical risks have an adverse effect on international tourism demand in India. Concerning the control variables as expected economic growth proxied by industrial production has a positive impact on tourism while inflation and economic uncertainty adversely impact tourism. The research on the interrelations between geopolitical risks and tourism is rather scant. However, this study reveals the important association between geopolitics and tourism. International tourists are easy targets during terrorism and internal conflicts which have negative consequences upon tourism. The lesson that the forgoing discussion presents is tourism in India is impacted by external shocks such as geopolitical tension, political instability and economic policy uncertainty. Visitors and tourists will always choose a destination, which is peaceful and secure. Econometric model building exercise in examining the causal connection between geopolitical risk and tourism needs to be appreciated for developing optimal decisions on management and marketing of tourism. Such model building exercises help in segregating the short-term and the long-term impact of shocks both geopolitical and economic uncertainty on tourism growth.

Our empirical analysis enables us to draw a number of policy implications. The foremost among them is India should cautiously budget its defence spending to put off potential attacks on the international front. Such actions will minimize the geopolitical risk. The private global corporations dealing with the hospitality industry should take care to ensure that travellers do not travel with tensions. There is an urgent need to increase security in most popular travel destinations. Indian Tourism Departments should abide by the standard of security developed and formulated by the International Civil Aviation Organization (ICAO). Such a system of adoption would reduce the degree of variability and the tourists would be aware that Indian tourism facilities meet the criteria of international security standards. The large corporations dealing with the tourism and hospitality industry should innovate new strategies to take the benefit of large tourism prospects in

India in the new global economic order. In sum, we suggest that policymakers in India should enforce a comprehensive strategy to minimize both internal and external shocks emanating from geopolitical risk. The tourism business houses should develop practices towards establishing confidence among travellers in India. Such steps will enhance tourism competitiveness and augment economic growth.

8. Limitations

It is important to discuss the two major limitations of the current study and the course of future research. The first is the inability of the study to disaggregate international travel by purpose (owing to a paucity of data) and explore thereof the implications of GPR. International travel is conducted for leisure and holiday, for medical tourism, for visiting family and friends, for business and conference and educational reasons. There are likely to be seasonal fluctuations in the inflow of international tourists and it is probable that the impact of GPR may not be homogenous. Secondly, the study owing to the problem of missing data could not analyse how GPR impacts varying components of tourism consumption expenditure and its possible effect upon the Gross Domestic Product of the country. As the database on tourism indicators expands the future research could be directed towards analysing the implications of GPR on different constituents of tourism expenditure for example expenditure in the hospitality sector, entertainment parks, shopping and travelling locally.

References

Akadiri, S.S., Lasisi, T.T., Uzuner, G. and Akadiri, A.C. (2020), "Examining the causal impacts of tourism, globalization, economic growth and carbon emissions in tourism island territories: bootstrap panel granger causality analysis", *Current Issues in Tourism*, Vol. 23 No. 4, pp. 470-484.

Antonakakis, N., Gupta, R., Kollias, C. and Papadamou, S. (2017), "Geopolitical risks and the oil-stock nexus over 1899–2016", *Finance Research Letters*, Vol. 23, pp. 165-173.

Baker, S.R., Bloom, N., (2015). and Davis, S.J. *Measuring Economic Policy Uncertainty" (No. w21633)*, National Bureau of Economic Research, Cambridge.

Balcilar, M., Bonato, M., Demirer, R. and Gupta, R. (2018), "Geopolitical risks and stock market dynamics of the BRICS", *Economic Systems*, Vol. 42 No. 2, pp. 295-306.

Balli, F., Uddin, G.S. and Shahzad, S.J.H. (2019), "Geopolitical risk and tourism demand in emerging economies", *Tourism Economics*, Vol. 25 No. 6, pp. 997-1005.

Balli, F., Uddin, G.S. and Shahzad, S.J.H. (2019), "Geopolitical risk and tourism demand in emerging economies", *Tourism Economics*, Vol. 25 No. 6, p. 1354816619831824.

Banerjee, A., Dolado, J. and Mestre, R. (1998), "Error-correction mechanism tests for cointegration in a single-equation framework", *Journal of Time Series Analysis*, Vol. 19 No. 3, pp. 267-283.

Bayer, C. and Hanck, C. (2013), "Combining non-cointegration tests", *Journal of Time Series Analysis*, Vol. 34 No. 1, pp. 83-95.

Boswijk, H.P. (1994), "Testing for an unstable root in conditional and structural error correction models", *Journal of Econometrics*, Vol. 63 No. 1, pp. 37-60.

Caldara, D. and Iacoviello, M. (2017), "Measuring geopolitical risk", *Unpublished Working Paper*, available at: www2.bc.edu/matteo-iacoviello/gpr_files/GPR_PAPER.pdf (accessed 24, April, 2021).

Caldara, D. and Iacoviello, M. (2018), "Measuring geopolitical risk. Board of governors of the federal reserve system", *International Finance Discussion Paper*, Vol. 2018 No. 1222.

Chatziantoniou, I., Degiannakis, S., Eeckels, B. and Filis, G. (2016), "Forecasting tourist arrivals using origin country macroeconomics", *Applied Economics*, pp. Vol. 48 No. 27, pp. 2571-2585.

Das, D., Kannadhasan, M. and Bhattacharyya, M. (2019), "Do the emerging stock markets react to international economic policy uncertainty, geopolitical risk and financial stress alike?", *The North American Journal of Economics and Finance*, Vol. 48, pp. 1-19.

Demir, E. and Gozgor, G. (2018), "Does economic policy uncertainty affect tourism?", *Annals of Tourism Research*, Vol. 69 No. C, pp. 15-17.

Demir, E., Gozgor, G. and Paramati, S.R. (2019), "Do geopolitical risks matter for inbound tourism?", *Eurasian Business Review*, Vol. 9 No. 2, pp. 183-191.

Dickey, D.A. and Fuller, W.A. (1979), "Distribution of the estimators for autoregressive time series with a unit root", *Journal of the American Statistical Association*, Vol. 74 No. 366a, pp. 427-431.

Engle, R.F. and Granger, C.W. (1987), "Co-integration and error correction: representation, estimation, and testing", *Econometrica*, Vol. 55 No. 2, pp. 251-276.

Flint, C. (2016), *Geopolitical Constructs: The Mulberry Harbours, World War Two, and the Making of a Militarized Transatlantic*, Rowman and Littlefield.

Gil-Alana, L.A., Mudida, R. and de Gracia, F.P. (2014), "Persistence, long memory and seasonality in kenyan tourism series", *Annals of Tourism Research*, Vol. 46, pp. 89-101.

Gozgor, G. and Ongan, S. (2017), "Economic policy uncertainty and tourism demand: empirical evidence from the USA", *International Journal of Tourism Research*, Vol. 19 No. 1, pp. 99-106.

International Monetary Funds (2016), *World Economic Outlook: Too Slow for Too Long*.

Johansen, S. (1988), "Statistical analysis of cointegration vectors", *Journal of Economic Dynamics and Control*, Vol. 12 Nos 2/3, pp. 231-254.

Johansen, S. and Juselius, K. (1990), "Maximum likelihood estimation and inference on cointegration – with applications to the demand for money", *Oxford Bulletin of Economics and Statistics*, Vol. 52 No. 2, pp. 169-210.

Lanouar, C. and Goaied, M. (2019), "Tourism, terrorism and political violence in Tunisia: evidence from markov-switching models", *Tourism Management*, Vol. 70, pp. 404-418.

Lee, C.C., Olasehinde-Williams, G. and Akadiri, S.S. (2020), "Geopolitical risk and tourism: evidence from dynamic heterogeneous panel models", *International Journal of Tourism Research*, Vol. 23 No. 1.

Marsiglio, S. (2016), "Uncertainty, crowding aversion and tourism aversion in tourism destinations", *Tourism Economics*, Vol. 22 No. 1, pp. 111-123.

Morakabati, Y., Fletcher, J. and Beavis, J. (2017), "State of play: the impact of geopolitical events on international tourism in 2017", available at: www.itbberlin.de/media/itb/itb_dl_en/itb_itb_berlin_en/itb_itb_academy_en.Travelzoo_Studie_ITB_2017.pdf (accessed 25 February 2018).

Newbold, P. and Granger, C.W.J. (1974), "Spurious regressions in econometrics", *Journal of Econometrics*, Vol. 2 No. 2, pp. 111-120.

Pesaran, M.H., Shin, Y. and Smith, R.J. (2001), "Bounds testing approaches to the analysis of level relationships", *Journal of Applied Econometrics*, Vol. 16 No. 3, pp. 289-326.

Phillips, P.C. and Perron, P. (1988), "Testing for a unit root in time series regression", *Biometrika*, Vol. 75 No. 2, pp. 335-346.

Saint Akadiri, S., Eluwole, K.K., Akadiri, A.C. and Avci, T. (2019), "Does causality between geopolitical risk, tourism and economic growth matter? Evidence from Turkey", *Journal of Hospitality and Tourism Management*, Vol. 43.

Shin, Y. and Pesaran, M.H. (1999), "An autoregressive distributed lag modelling approach to cointegration analysis", in Strom, S. (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frish Centennial Symposium*, Cambridge University Press, Cambridge, pp. 371-413.

Tiwari, A.K., Das, D. and Dutta, A. (2019), "Geopolitical risk, economic policy uncertainty and tourist arrivals: evidence from a developing country", *Tourism Management*, Vol. 75, pp. 323-327.

Toda, H.Y. and Yamamoto, T. (1995), "Statistical inference in vector autoregressions with possibly integrated processes", *Journal of Econometrics*, Vol. 66 No. 1/2, pp. 225-250.

Tsui, W.H.K., Balli, F., Tan, D.T.W., Lau, O. and Hasan, M. (2018), "New Zealand business tourism: 'exploring the impact of economic policy uncertainties'", *Tourism Economics*, Vol. 24 No. 4, pp. 386-417.

Webster, C. and Ivanov, S.H. (2014), "Geopolitical drivers of future tourist flows", *Journal of Tourism Futures*, Vol. 1 No. 1, pp. 59-69.

World Tourism Organization (2018), *UNWTO Tourism Highlights*, 2018 ed, UNWTO, Madrid, 10.18111/9789284419876.

Wu, T.P. and Wu, H.C. (2019), "The link between tourism activities and economic growth: evidence from China's provinces", *Tourism and Hospitality Research*, Vol. 19 No. 1, pp. 3-14.

Wu, T.P. and Wu, H.C. (2018), "Causality between European economic policy uncertainty and tourism using wavelet-based approaches", *Journal of Travel Research Published Research*, Vol. 58 No. 8.

Zivot, E. and Andrews, D.W.K. (2002), "Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis", *Journal of Business and Economic Statistics*, Vol. 20 No. 1, pp. 25-44.

Further reading

Batta, R.N. (2000), *Tourism and the Environment: A Quest for Sustainability: With Special Reference to Developing Countries, and Policy Analysis on Himachal Pradesh*, Indus Publishing.

Das, S.K. (2013), "Growth and prospects of Odisha tourism: an empirical study", *Odisha Review*, Vol. 125, pp. 134-142.

Elliott, G., Rothenberg, T.J. and Stock, J.H. (1996), "Efficient tests for an autoregressive unit root", *Econometrica*, Vol. 64 No. 4, pp. 813-836.

Saha, S., Su, J.J. and Campbell, N. (2017), "Does political and economic freedom matter for inbound tourism? A cross-national panel data estimation", *Journal of Travel Research*, Vol. 56 No. 2, pp. 221-234.

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