Journal of Tourism Theory and Research
Online, https://dergipark.org.tr/tr/pub/jttr
Volume: 7(2), 2021

JTTR
ISSN: 2548-7583

Impact of geopolitical risk on BIST tourism index and tourist arrivals in Turkey

Mehmet Polat[1]*, Yaşar Alptürk[2] and Samet Gürsoy[3]

[1]Kahramanmaraş Sütçü Imam University, Kahramanmaraş, Turkey, ORCID: https://orcid.org/0000-0002-5591-5422
[2]Kahramanmaraş Sütçü Imam University, Kahramanmaraş, Turkey, ORCID: https://orcid.org/0000-0003-0063-4479
[3]Burdur Mehmet Akif University, Burdur, Turkey, ORCID: https://orcid.org/0000-0003-1020-7438

Abstract

This study aims to explore the effects of geopolitical risk on the Borsa İstanbul (BIST) tourism index and tourist arrivals. The effects of the geopolitical risk index on the BIST tourism index and tourist arrivals were analyzed based on the data between January 1998 and October 2020, and the findings were presented. Time series analysis methods were used in the study. To investigate the relationship between variables, it was first tested whether the series of variables are stationary or not. Then, Lee-Strazicich unit root test was applied, considering the structural breaks. Finally, the causality relationship between variables and the direction of this relationship was determined by the Hatemi-J causality test. According to the findings, there is an asymmetrical relationship between Turkey's geopolitical risks with BIST tourism index. The increase in Turkey's geopolitical risks, causes a significant decrease in tourism BIST returns. Likewise, when the risk decreases, BIST tourism returns increase. On the other hand, the reduction of geopolitical risk in Turkey causes an increase in tourist arrivals.

Keywords: *Geopolitical risk, BIST tourism index, Tourist arrivals, Borsa Istanbul.*

1. Introduction

Income flow from tourism activities is an important driver of economic growth, especially for developing countries. Tourist arrivals to the host country stimulate the economy through various channels such as attracting foreign investment, generating foreign currency income, creating other tax-related revenues and employment opportunities. Therefore, developing countries need to promote and maintain a favorable tourism environment to attract visitors from all over the world (Tiwari, Das, & Dutta, 2019). From the perspective of developing countries such as Turkey, although tourism is a significant economic benefit created by the return in terms of these countries it is the fact that several risks in the host.

These risks, which are generally referred to as geopolitical risks, cause problems such as wars, terrorist incidents, tensions, risks related to ethnic and political violence, and a decrease in the flow of tourism to these regions by greatly affecting the socio-economic environment (Balli, Uddin, & Shahzad, 2019). When geopolitical risks increase in a country, tourists' concerns about their personal safety lead them to delay or cancel their travel plans (Demir, Simonyan, Chen, & Marco Lau, 2020).

The increase in geopolitical risks raises concerns about personal safety and stability which lead to the delay or cancellation of travel plans. Visitors are not willing to visit a country when geopolitical risks are high. This not only leads to a decrease in the number of inbound tourists, but also a decrease in tourism expenditures (Demir, Gozgor, & Paramati, 2019). While the perception of risk is an important factor that affects passengers' changing their travel plans (Kozak, 2007), passengers are willing to pay extra for products and services if more security is provided (Slevitch & Sharma, 2008).

While the development of tourism is not the only determinant of economic growth, it confirms that countries with well-developed tourism sectors generally exhibit higher rates of economic growth than others. In order to maximize the economic benefits that can be gained from the development of tourism businesses, there is a need to adequately identify risk factors affecting the tourism sector and develop possible tools to mitigate impacts. The sensitivity of the

*Corresponding author
E-mail addresses: *polat.m@outlook.com (M. Polat)*

Article info:
Research Article
Received: 23 April 2021
Received in revised form: 29 June 2021
Accepted: 13 July 2021

Ethics committee approval:
No potential competing interest was reported by the authors. All responsibility belongs to the researchers. All parties were involved in the research of their own free will.

To cite this article: Polat, M., Alptürk, Y. & Gürsoy, S. (2021). Impact of geopolitical risk on BIST tourism index and tourist arrivals in Turkey. *Journal of Tourism Theory and Research,* 7(2), 77-84. https://doi.org/10.24288/jttr.926617

tourism sector to external shocks such as geopolitical risks is key among these risk factors (Lee, Olasehinde-Williams, & Akadiri, 2020). In this context, considering the importance of tourism for global and national economies, it is important to analyze and monitor global risks at national and regional level (Asgary & Ozdemir, 2020). Previous studies on geopolitical risks mainly focused on the linear (symmetrical) relationship on tourism demand among variables such as oil prices, uncertainty, exchange rates, and geopolitical risk indices. Unlike previous research, this study examines, the impact of geopolitical risk on BIST tourism index and tourist arrivals to Turkey by using Hatemi-J asymmetric causality analysis. In this way, it is aimed to contribute to the literature by investigating the variables that have not been discovered before in the literature.

There are summaries of literature research on the subject. The third part consists of the methodology part. The method and methodology used in the analyzes are introduced. In addition, the findings obtained from the analyzes are shared as tables. Lastly, in the 4th part of the study, the findings obtained from the analyzes were interpreted and presented in comparison with the literature.

2. Literature review

The literature shows that most of the studies associated with tourism and risk are grouped under political headings. Hall and O'Sullivan (1996) found that political instability and perceptions of violence deeply affect tourist visits. Eilat and Einav (2004) state that the political risk of a destination country is a very important issue in the tourism economy. Endo (2006) shows that political or economic risks significantly affect foreign direct investment in tourism. Ghalia et al. (2019) found that the prevalence of political turbulence can cause a significant number of service providers and operators in the tourism industry to suspend their business activities (Eilat & Einav, 2004; Endo, 2006; Ghalia, Fidrmuc, Samargandi, & Sohag, 2019). According to Manaliyo (2016), the international tourism demand of emerging economies is significantly affected by political risk.

In addition to these, a limited number of studies have been associated with geopolitical risk and tourism. In a study by Asgary and Ozdemir (2020), aimed to measure global risk perceptions by conducting an 18-question online survey of participants from the tourism sector in Turkey. According to the results of the study, they stated that global economic and geopolitical risks are more likely and have more impact on the participants than environmental and technological risks. Demir et al. (2019) conducted the study panel data analysis on 166 hospitality firms, emerging seven economies such as Malaysia, Mexico, Thailand, Turkey, Argentina, Brazil and China using the data from 2017-2018. According to results they stated that geopolitical risks negatively affect the cash holdings of hospitality firms. It also results in confirms the high dependence of hospitality firms on geopolitical risk volatility.

Balli et al., (2019) using the wavelet squared coherence approach investigated the impact of geopolitical risk (GPR) on international tourism demand in emerging economies (Malaysia, Indonesia, Philippines, Thailand, Turkey, Mexico, South Africa, South Korea) and found that the impact of geopolitical risk is not homogeneous for each country. Some countries are heavily affected by GPR, while others are mostly immune to GPR shocks and GPR impact is minimal for countries with attractive tourism destinations.

Akadiri et al. (2020) examined the relationship between Turkey's geopolitical risk index with tourism and economic growth. The quarterly frequency data between 1985 and 2017 were evaluated using Toda-Yamamoto causality analysis. According to the findings of the study, they determined that there is a one-way causality from the geopolitical risk index to economic growth and tourism. In addition, it has been determined that sudden shocks to geopolitical risk have a negative effect on tourism and economic growth in the short and long term.

Tiwari et al. (2019) examined using monthly data (174 observations) from January 2003 to June 2017 with wavelet analysis of how geopolitical risks and the economic policy uncertainties affect tourist arrivals in developing India and found that the impact of geopolitical risks is stronger than economic policy uncertainties. Moreover, while geopolitical risks have long-term effects, economic policy uncertainties have short-term consequences on tourist arrivals. Demir et al. (2019) investigated fixed-effects (FE) and the least-squares dummy variable corrected (LSDVC) estimations of the effect of geopolitical risk index on foreign tourist arrivals using panel data of 18 countries between 1995 and 2016. According to the results, geopolitical risks negatively affect foreign tourist arrivals. They also stated that geopolitical risks are an obstacle to the development of the tourism sector.

Demir et al. (2020) explored the impact of geopolitical risk on tourist arrivals. The data, perid for 1990-2018 were analyzed by using the NARDL test. According to the findings, the impact of geopolitical risks on tourist arrivals is asymmetrical in the short term. In addition, it has been determined that while the increase in geopolitical risks decreases the number of tourists, the decrease in geopolitical risks has no effect in the short term. Lee et al. (2020) analyzed the data of 16 countries between 2005 and 2017 using panel data analysis to understand how geopolitical risks affect international tourism demand. According to the findings, they found that geopolitical risk negatively affects tourism demand. They also found that outbreaks aggravate the negative impact of geopolitical risks on tourism demand. On the other hand, according to the panel causality results, they determined that geopolitical risk is an important determinant of tourism demand.

Gürsoy (2021) investigated the relationship between EPU indexes of the Germany, Russia and UK which are considered important for Turkey's tourism sector, and BIST tourism index. According to the results of the study, it has been seen that the increase and decrease of the economic and political uncertainty in Germany and Russia have an effect on the BIST tourism index. Unlike previous studies, we add the number of the tourist arrivals to Turkey besides to Borsa Istanbul tourism index, which is a new variable, to the measurement of geopolitical risk indices, and examine the causality relationship between them using the Hatemi-J (2012) method. As far as we know, the geopolitical risk index, which is a new phenomenon, has not yet been associated with the BIST tourism index. Therefore, we hope that our research will bring a new perspective to the literature.

3. Methodology

3.1. Aim of the research and method

This study examines the potential impacts of geopolitical risk which calculated for turkey to BIST tourism returns and foreign entries. therefore, it was investigated asymmetric causal relationship between the geopolitical risks and BIST tourism, foreign entries return. To investigate the relationship between variables, the Lee-Strazicich unit root test, which also considers structural breaks and tests stationarity, was used. The analysis started by considering the Schwarz Information Criterion (SC), which tests the optimal lag length for the series. Asymmetric causality analysis was used by Hatemi-J (2012) to determine whether there is any causality between the series or not, if there is causality, to determine the direction. Gauss 10 econometric analysis package program was used in the analysis of the study.

3.2. Data set

The data on geopolitical risk index, BIST tourism index and tourist arrivals were arranged as monthly data (274 observations), covering the period from January 1998 to October 2020. The data between 1998 and 2020 reflect the widest time interval of the variables. The Geopolitical risk index, which we used in the study was developed by Caldara and Iacoviello. The index is composed of the number of words on geopolitical risks in 11 leading international newspapers. The GPR index reflects the automatic text search results of electronic archives of 11 international newspapers (Caldara and Iacoviello 2019). Geopolitical risk index data were obtained from policyuncertainty.com, BIST tourism index data were obtained from investing.com, and tourist arrivals data were obtained from http://ttyd.org.tr/tr/turizm-istatistikleri. The abbreviations, period range and source of the variables are given in table 1 below.

3.3. Research Hypotheses

The hypotheses related to the research are organized as follows.

H_0: There is no causal relationship between JEORISK variable and XTRZM, TNUMR variables.

H_1: There is causal relationship between JEORISK variable and XTRZM, TNUMR variables.

3.4. Lee-Strazicich Unit Root Test

In terms of reliability of results in time series; In order to prevent spurious regression, stationarity condition is sought. In order to investigate the relationship between variables, the stationarity of variables (whether unit-rooted or not) should be tested first. Augmented Dickey Fuller- ADF (1981), Phillips-Perron (1988), Ng Peron (2001) etc. unit root tests are also some of the stationarity tests (Oğuz, 2020: 32).

Unlike conventional ADF based structural break unit root tests, the LM unit root test also allows breaks under the null hypothesis. Accordingly, the LM unit root test has several advantages. Since the breakpoints are initially determined as endogenous, the test is not subject to false refusals in case of breaks and the presence of the unit root. The most important thing is that if the alternative hypothesis is correct, there are no false rejections.

In the LM test, the rejection of the null hypothesis necessarily refers to the rejection of the unit root without fractures, but without fractures (Özcan, 2012:10). As a correction to these criticisms by Lee and Strazicich (2003, 2004), a new unit root test has been added to the literature. According to this new test, structural breakage can be allowed in each of the basic and alternative hypotheses.

The method used in the LM unit root test is as follows;

$$y_1 = \delta Z_t + e_t \qquad e_t = \beta e_{t-1} + \varepsilon_t \tag{1}$$

In equation (1), the Z_t exogenous variables vector denotes error terms with the property $\varepsilon_t \sim iid\ N(0, \sigma^2)$) .The model that includes two changes in the level is expressed as A $Z_t = [1,\ t, D_{1t}, D_{2t}]$ Here; for $D_{jt} = 1\ , t \geq T_{bj} + 1,\ \ j =$ 1,2 and 0 for other cases. . T_{bj} shows the break time.

Model C contains 2 changes in trend and level, model $Z_t = [1,\ t, D_{1t}, D_{2t}, DT_{1t}, DT_{2t}]$. Here; $DT_{jt} = t - T_{bj}$ for $t \geq T_{bj} + 1,\ \ j = 1{,}2$ and 0 for other cases. While the process of data creation (DGP) includes breaks under the basic hypothesis (β = 1), it is in the form of an alternative hypothesis (β <1). Lee and Strazicich used the following equation to obtain the LM unit root test statistics.

Lee and Strazicich used the following equation to obtain LM unit root test statistics.

$$\Delta y_t = \delta' \Delta Z_t + \emptyset \tilde{S}_{t-1} + u \tag{2}$$

Here; $\tilde{S}_t = y_t - \tilde{\psi}_x - Z\delta$, *t=2,…,T;* and $\tilde{\delta}$ value is the coefficient obtained from ΔZ_t in the regression of Δ_{yt}. $\tilde{\psi}_x$, is found with $y_1 - Z_1\delta$ where y_1 and Z_1 are the first elements of y_t and Z_t in the order specified (Lee and Strazicich 2003: 1083).

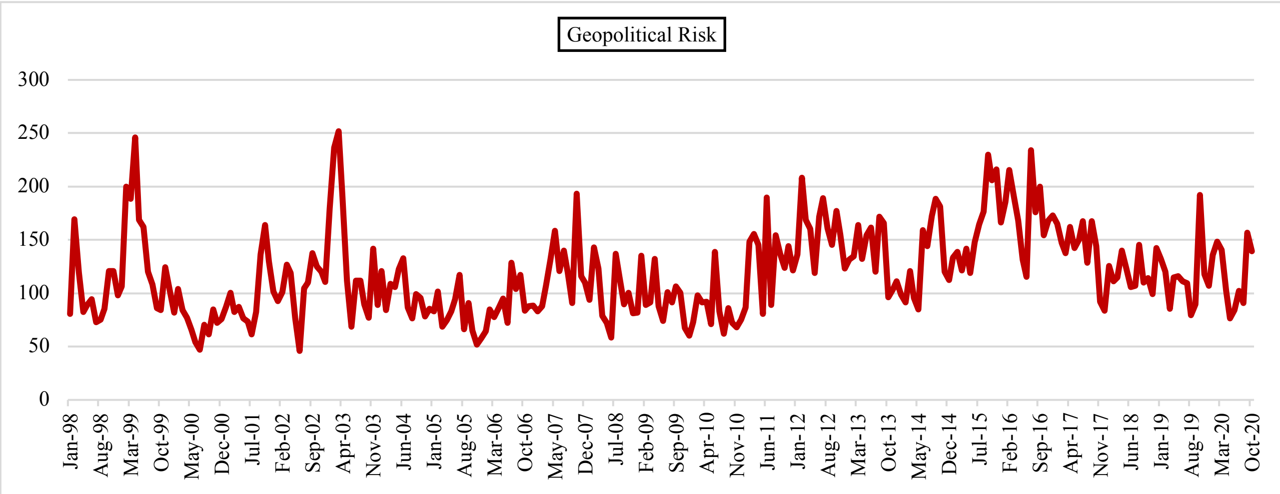
While determining the break times, the points where the $\tilde{\tau}$ test statistic value is the smallest are selected;

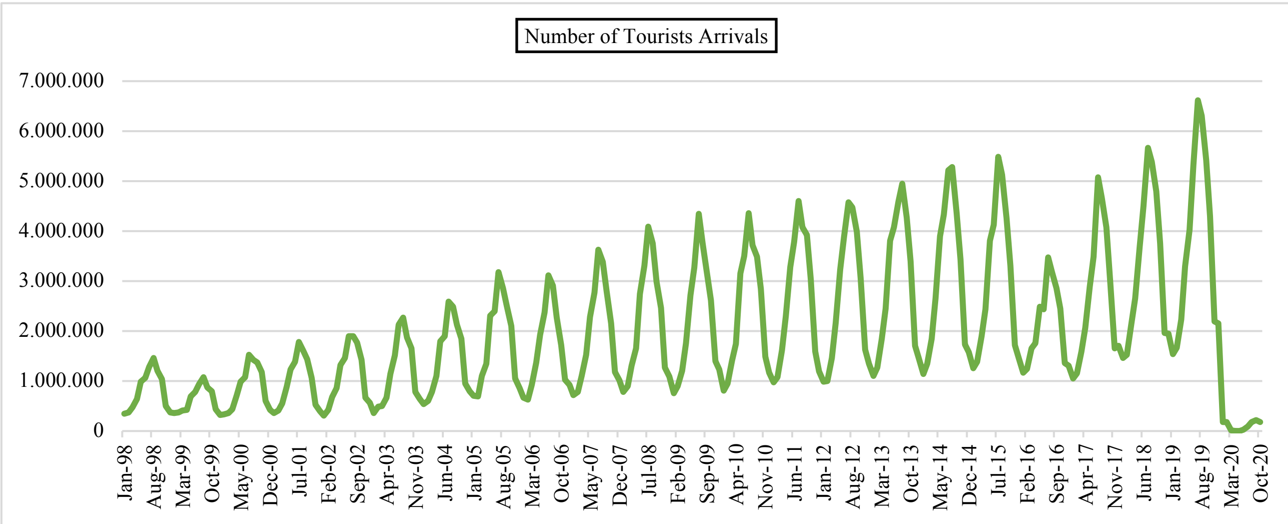
$$LM_\tau = \inf_{\lambda} \tilde{\tau}(\lambda) \tag{3}$$

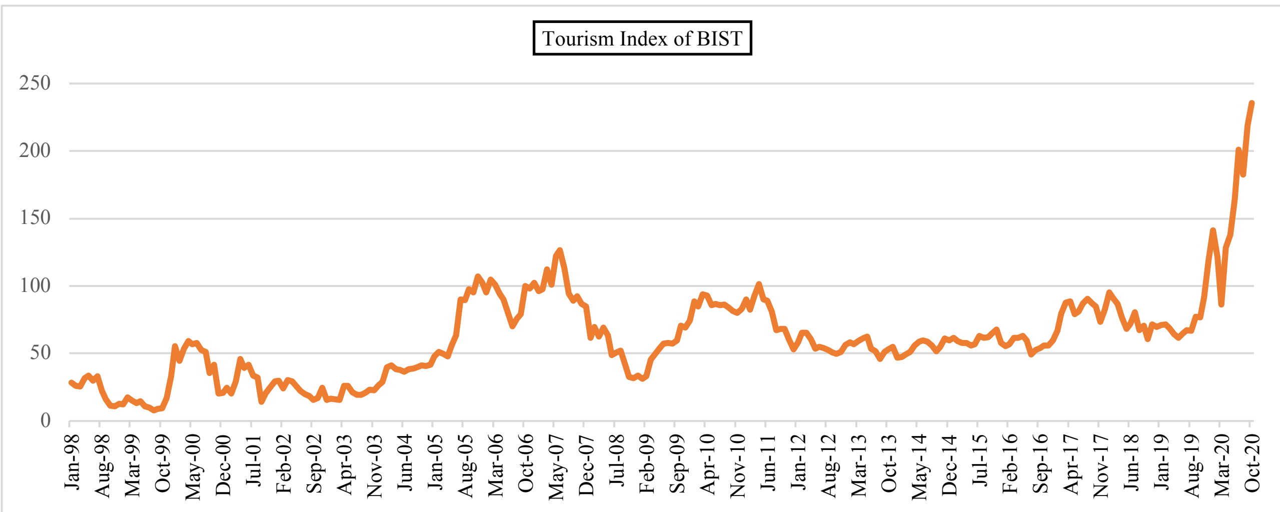
Table 1. Data Set

Variables	Variable description	Time period	Period of data
JEORISK	Turkey Geopolitical risk index	January 1998 - October 2020 Monthly data	policyuncertainty.com
XTRZM	Closing prices of the tourism index of BIST		tr.investing.com
TNUMR	Number of the tourist arrivals to Turkey		http://ttyd.org.tr/tr/turizm-istatistikleri

Figure 1. Charts of series







The formula $\lambda_i = T/TB_{\mathrm{i}}, i$ i=1,2 is used to show the break point. T, here refers to observations. While single break (LM) unit root test critical values are obtained from Lee and Strazicich (2004), the critical values of the unit root test with two break (LM) can be obtained from Lee and Strazicich (2003). If the test statistical values found as a result of the analysis exceed the critical value, the unit root base hypothesis with structural break is rejected (Yılancı, 2009: 330-331).

3.5. Hatemi-J asymmetric causality analysis

The asymmetric causality test, which was first introduced to the literature by Granger and Yoon (2002), was developed by Hatemi-J (2012), and causality is investigated by dividing variables into positive and negative components. In this asymmetric causality analysis, it is aimed to find hidden relationships that will help to understand the dynamics of the series and allow to develop possible predictions for the future (Yılancı and Bozoklu, 2014: 214).

In the case, we want to test the causality relationship between two integrated variables y_{1t} and y_{2t} (Hatemi-J, 2012: 449-450);

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{10} + \sum_{i=1}^{t} \varepsilon_{1i}$$

$$and$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{20} + \textstyle\sum_{i=1}^{t} \varepsilon_{2i} \quad (4)$$

Here, $t = 1, 2, \dots T$, denotes the constant terms, y_{1t} and y_{2t} denotes initial values, ε_{1i} *and* ε_{2i} error terms. Positive and negative shocks are expressed as in equation (2);

$$\varepsilon_{1i}^{+} = \max\ (\varepsilon_{1i}, 0), \varepsilon_{2i}^{+} = \max\ (\varepsilon_{2i}, 0), \varepsilon_{1i}^{-} = \min\ (\varepsilon_{1i}, 0) \ \ ve \ \ \varepsilon_{2i}^{-} = \min\ (\varepsilon_{2i}, 0), \quad (5)$$

However, Its expressed as $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$

Based on these, it is possible to rewrite equations (4) and (5) as follows

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}, \quad (6)$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-}. \quad (7)$$

lastly, the positive and negative shocks in each variable are expressed in cumulative form as

$$y_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}, \ \ y_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}, \ \ y_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, \ \ y_{2t}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-}, \quad (8)$$

Then, assuming that is $y_t^{+} = y_{1t}^{+}, y_{2t}^{+}$, the causality relationship between the positive components is tested through the p delayed vector autoregressive model (VAR). VAR (p) model is expressed as in equation (9);

$$y_t^{+} = v + A_1 y_{t-1}^{+} + \dots + A_p y_{t-1}^{+} + u_t^{+} \quad (9)$$

Here, y_t^{+} indicates a variable vector of size 2x1, v is constant variable vector of size 2x1, u_t^{+} is error term size of 2x1, and A_r is expressed as a parameter matrix of "r" order, which is determined using 2x2 size delay length information criteria. The following equation is used to determine the optimal lag length:

$$HJC = \ln\left(\left|\widehat{\Omega}_j\right|\right) + j\left(\frac{n^2 lnT + 2n^2 \ln(\ln T)}{2T}\right),$$

$$j = 0, \dots, p \quad (10)$$

$\left(\left|\widehat{\Omega}_j\right|\right)$ shows j length of the lag of, the estimated VAR model's error term is variance-covariance matrix, n is the number of equations in the VAR model, and T is the number of observations.*3.5.* After the lag length is determined, the Wald statistic is used to test the H_0 fundamental hypothesis, which indicates the absence of Granger-causality between series. The VAR model equation created in order to obtain the Wald statistics is as follows.

$Y = DZ + \delta$ the equation is more clearly expressed;

$$Y: = (y_1^{+}, y_2^{+}, \dots, y_T^{+})$$

$$D: = (v, A_1, A_2, \dots, A_p)$$

$$Z_t: = \begin{bmatrix} 1 \\ y_t^{+} \\ y_{t-1}^{+} \\ \vdots \\ y_{t-p+1}^{+} \end{bmatrix} \quad (11)$$

$$Z: = (Z_0, Z_1, \dots, Z_{T-1})$$

$$\delta: = (u_1^{+}, u_2^{+}, \dots, u_T^{+})$$

According to equation (11): it refers to matrixes of different sizes $Y: (n \ x \ T)$, $D: \left(n \ x \ (1 + np)\right)$, $Z_t: ((1 + np) \ x \ 1)$, $Z: ((1 + np) \ x \ T)$ and $\delta: (n \ x \ T)$.

The basic hypothesis $(H_0: C\beta = 0)$ which states that there is no Granger causality, is tested with the Wald statistic. The Wald statistics can be calculated with the help of the following equation;

$$Wald = (C\beta)'^{\left[c\left((z'z)^{-1} \otimes s_U\right)c'\right]^{-1}}(C\beta) \quad (12)$$

Equation in equation (12) is in the form of $\beta = vec(D)$ and indicates the column clustering operator. ⊗ Kronecker, C represents the indicator function including constraints. The variance-covariance matrix calculated for the unconstrained VAR model is expressed as $S_U = \frac{\widehat{\delta}_U' \widehat{\delta}_U}{T-q}$. And here, the q h represents the number of lags in the VAR model.

3.6. Findings

3.6.1. Lee-Strazicich unit root test

In this study, the C model was considered to determine the breakage of the series in the Lee-Strazicich (LS) test. The first difference of the series that were not stationary at level was taken and LS unit root test was applied again. The findings obtained are shown in Table 2.

In the case of looking at the results of the Lee-Strazicich Unit Root Test for the variables used in the study, it was observed that the XTRZM and TNUMR variables were stationary at the I (0) level, while the JEORISK variable became stationary at the I (1) level when a difference was taken.

3.6.2. The Results of the Hatemi-J Asymmetric Causality Analysis

The causality relations among the variables of the GEORISK, XTRZM, TNUMR indices in the study was analyzed with the asymmetric causality test brought to the literature by Hatemi-J (2012), and the findings obtained from the analysis are shared in Table 3.

Table 2. The results of Lee- Strazicich unit root test

Lee-Strazicich Unit Root Test (Model C)						
Variable	Level Test statistics	Level breaking date	Critic Value	1. Difference Test Statistics	1. Difference Breaking date	Critic value
GEORISK	-4.068755	May 2011	-4.076770	-9.130751**	January 2015	-4.000471
XTRZM	-4.134367**	November 2017	-3.951924	-	-	-
TNUMR	-4.572382**	October 2013	-4.023250	-	-	-

*Note: *It is significant at 5% level.*

Table 3. The results of the Hatemi-J asymmetric causality analysis

Direction of causality	Test statistics	Bootstrap critical values		
		%1	%5	%10
GEORISK (+)> XTRZM (+)	6.571	11.603	7.926	6.269
GEORISK (+)> XTRZM (-)	12.648**	12.290	8.043	6.403
GEORISK (-)> XTRZM (+)	9.997**	11.696	7.927	6.371
GEORISK (-)> XTRZM (-)	6.558	11.762	8.038	6.367
GEORISK (+)> TNUMR (+)	22.451**	12.123	8.110	6.390
GEORISK (+)> TNUMR (-)	26.592**	13.471	19.610	7.845
GEORISK (-)> TNUMR (+)	20.469**	11.866	8.025	6.385
GEORISK (-)> TNUMR (-)	16.684	11.927	17.954	6.451

*Note: *It is significant at 5% level.*

According to the results of the Hatemi-J asymmetric causality test, which investigates the causality relationship between the cumulative positive and negative changes of the variables, it was found that there were one-way and two-way partial causality relationships between GEORISK and TNUMR at the 5% significance level.

According to the results of the equation in which a positive causality relationship from the GEORISK index towards the XTRZM variable was tested, the (T) test statistic value (12.648) was found, and it is significant because it is more than the bootstrap critical value (8.043) H_0 hypothesis was not accepted H_1 hypothesis was accepted. In addition, according to the results from another positive equation, (T) test statistic value (6.571) was found, and it is not significant because it is less than the bootstrap critical value (7.926). Then, H_0 hypothesis was accepted and the H_1 hypothesis was rejected.

On the other hands, according to the results of the equation in which a negative causality relationship from the GEORISK index towards the XTRZM variable was tested, the (T) test statistic value (22.451) was found, and it is significant because it is more than the bootstrap critical value (8.110) H_0 hypothesis was not accepted H_1 hypothesis was accepted. In addition, according to the results from another negative equation, (T) test statistic value (6.558) was found, and it is not significant because it is less than the bootstrap critical value (8.038). Then, H_0 hypothesis was accepted and the H_1 hypothesis was rejected.

It indicates that there is an asymmetric causality relationship from GEORISK to XTRZM. More clearly, GEORISK's positive shocks were found to be effective on XTRZM on negative shocks. However, it has been observed that the negative shocks of GEORISK have an effect on the positive shocks on the XTRZM. Looking at the causality effects on TNUMR from GEORISK, it is concluded that positive shocks more demonstrate. According to the results of the equation in which a positive causality relationship from the GEORISK index towards the TNUMR variable was tested, the (T) test statistic value (12.648) was found, and it is significant because it is more than the bootstrap critical value (8.043) H0 hypothesis was not accepted H1 hypothesis was accepted. In addition, according to the results from another positive equation, (T) test statistic value (26.592) was found, and it is more than the bootstrap critical value (19.610). This time also, H0 hypothesis was not accepted H1 hypothesis was accepted.

According to the results of the equation in which a negative causality relationship from the GEORISK index towards the TNUMR variable was tested, the (T) test statistic value (20.469) was found, and it is significant because it is more than the bootstrap critical value (8.025H_0 hypothesis was not accepted H_1 hypothesis was accepted. In addition, according to the results from another negative equation, (T) test statistic value (16.684) was found, and it is not significant because it is less than the bootstrap critical value (17.954). Then, H_0 hypothesis was accepted and the H_1 hypothesis was rejected. Here was seen that positive shocks in GEORISK are effective on both positive and negative shocks on TNUMR, while negative shocks in GEORISK have only effect on positive shocks on TNUMR.

4. Conclusion

Tourism revenues are very important for a country in terms of gaining foreign currency and supporting economic growth. Countries use various promotional methods to attract tourists to their countries and increase their numbers. For a foreign visitor, not only is the holiday attractive but also an atmosphere of trust is extremely important. For this reason, countries try to minimize some uncertain situations called geopolitical risks such as terrorism, internal complexity, war and create a safe environment in the country. From this point of view, it is important for countries to know whether geopolitical risks affect the number of tourists, and this perspective makes it a subject worth exploring. On the other hand, factors affecting stocks are the subject of many studies in the field of finance. Therefore, the tourism index variable has also been included in the study.

In this study, based on GEORISK, XTRZM, and TNUMR monthly data, the period between January 1998 and October 2020, the asymmetric causality relationship between variables was investigated. For this purpose, unit root tests developed by Lee and Strazicich, which also take structural breaks into account, were applied to determine whether the time series were stationary or not. Then, with the Hatemi-J test, whether there is any causality between the variables and the direction of this causality were determined.

According to the results obtained from January 1998 and October 2020 monthly data of Lee-Strazicich unit root tests, it was observed that the BIST Tourism index and foreign visitor variables were stable at I (0) level, while the geopolitical risk variable became stable at I (1) level, that is, when the first difference is taken.

According to the Hatemi-J asymmetric causality test results, it has been determined that positive shocks of the geopolitical risk were found to be effective on negative shocks of the BIST tourism index. Increases in geopolitical risk are the reason for a decrease in BIST tourism returns, while decreases in geopolitical risk are the reason for a positive increase in BIST tourism returns. On the other hand, that positive shocks in geopolitical risk are effective on both positive and negative shocks on the number of the Foreign entrance while negative shocks in geopolitical risk have only effect on positive shocks on Number of the Foreign entrance. These results are similar to the studies of Demir et al. (2019), Demir et al. (2020), Lee et al. (2020).

Author contribution statements

Authors contributed equally to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

Disclosure statement

No potential competing interest was reported by the authors.

Ethics committee approval

All responsibility belongs to the researchers. All parties were involved in the research of their own free will.

References

Akadiri, S. Saint, Eluwole, K. K., Akadiri, A. C., & Avci, T. (2020). Does causality between geopolitical risk, tourism and economic growth matter? Evidence from Turkey. *Journal of Hospitality and Tourism Management,* 43(August 2019), 273–277. https://doi.org/10.1016/j.jhtm.2019.09.002

Asgary, A., & Ozdemir, A. I. (2020). Global risks and tourism industry in Turkey. *Quality and Quantity,* 54(5–6), 1513–1536. https://doi.org/10.1007/s11135-019-00902-9

Balli, F., Uddin, G. S., & Shahzad, S. J. H. (2019). Geopolitical risk and tourism demand in emerging economies. *Tourism Economics*, 25(6), 997–1005.

Caldara, D., & Iacoviello, M. (2019). Measuring geopolitical risk. FRB International Finance Discussion Paper, (1222).

Demir, E., Díez-Esteban, J. M., & García-Gómez, C. D. (2019). The impact of geopolitical risks on cash holdings of hospitality companies: Evidence from emerging countries. Journal of Hospitality and *Tourism Management*, 39(2018), 166–174. https://doi.org/10.1016/j.jhtm.2019.04.004

Demir, E., Gozgor, G., & Paramati, S. R. (2019). Do geopolitical risks matter for inbound tourism? *Eurasian Business Review,* 9(2), 183–191. https://doi.org/10.1007/s40821-019-00118-9

Demir, E., Simonyan, S., Chen, M. H., & Marco Lau, C. K. (2020). Asymmetric effects of geopolitical risks on Turkey's tourist arrivals. *Journal of Hospitality and Tourism Management*, 45(April), 23–26. https://doi.org/10.1016/j.jhtm.2020.04.006

Dickey, D. A. & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society,* 49(4), 1057-1072

Eilat, Y., & Einav, L. (2004). Determinants of international tourism: A three-dimensional panel data analysis. *Applied Economics*, 36(12), 1315–1327. https://doi.org/10.1080/000368404000180897

Endo, K. (2006). Foreign direct investment in tourism - Flows and volumes. *Tourism Management,* 27(4), 600–614. https://doi.org/10.1016/j.tourman.2005.02.004

Ghalia, T., Fidrmuc, J., Samargandi, N., & Sohag, K. (2019). Institutional quality, political risk and tourism. *Tourism Management Perspectives*, 32(September), 100576. https://doi.org/10.1016/j.tmp.2019.100576

Granger, C. W., & Yoon, G. (2002). Hidden cointegration. Un. of California, *Economics Working Paper,* (2002-02).

Gürsoy, S. (2021). Ekonomik Politik Belirsizliğin Turizm Getirileri Etkisi: Türkiye'den Kanıtlar. Hacettepe Üniversitesi Sosyal Bilimler Dergisi, 3 (1), 28-43. Retrieved from https://dergipark.org.tr/en/pub/husbdergi/issue/60365/852400

Hatemi-j, Abdulnasser (2012). Asymmetric causality tests with an application. *Empirical Economics,* 43(1), 447-456.

Https://www.policyuncertainty.com/monetary.html

Kozak, M. (2007). Tourist harassment. A Marketing Perspective. *Annals of Tourism Research*, 34(2), 384–399. https://doi.org/10.1016/j.annals.2006.10.003

Lee, C. C., Olasehinde-Williams, G., & Akadiri, S. Saint. (2020). Geopolitical risk and tourism: Evidence from dynamic heterogeneous panel models. *International Journal of Tourism Research*, (May 2020), 26–38. https://doi.org/10.1002/jtr.2389

Lee, J. & Strazicich, M. C. (2003) Minimum Lagrange Multiplier Unit Root Test With Two Structural Breaks, *Review of Economics and Statistics*, 85(4), 1082-1089.

Lee, J. ve Strazıcıch, M. C. (2004) Minimum LM Unit Root Test with One Structural Break, *Appalachian State University Working Papers*, 4(17), 1-15.

Manaliyo, J. C., & Muzindutsi, P. (2016). Effect of Political Risk Shocks on Tourism Revenue in South Africa: Time Series Analysis. *International Journal of Business and Management Studies*, 8(2), 169–186.

Ng, S. & Perron, P. (2001). Lag length selection and the construction of unit root tests with good size and power, *Econometrica,* 69(6), 1519-1554.

Onur, O. (2020). The influence of stock market returns on the ratio of Equıty in mutual funds portfolio: causality analysis. *International Journal of Economics, Politics, Humanities & Social Sciences,* 3(1), 24-35.

Özcan, B. (2012). Is unemployment hysterisis hypothesis valid for oecd countries? The analysis of unit root tests with structural breaks, *Journal of Erciyes University Faculty of Economics and Administrative Sciences,* (40), 95-117.

Phillips, P. CB & Perron, P. (1988). Testing for a unit root in time series regression. Biometrika, 75(2), 335-346.

Slevitch, L., & Sharma, A. (2008). Management of perceived risk in the context of destination choice. *International Journal of Hospitality and Tourism Administration*, 9(1), 85–103. https://doi.org/10.1080/15256480801910574

Tiwari, A. K., Das, D., & Dutta, A. (2019). Geopolitical risk, economic policy uncertainty and tourist arrivals: Evidence from a developing country. *Tourism Management,* 75(June), 323–327. https://doi.org/10.1016/j.tourman.2019.06.002

Yılancı, V. (2009). Analyzıng The Unemployment Hysteresis For Turkey Under Structural Breaks, *Dogus University Journal,* 10(2), 324-335.

Yılancı, V. & Bozoklu, Ş. (2014). "Price and Trade Volume Relationship in Turkish Stock Market: A Time-Varying Asymmetric Causality Analysis". *Ege Academic Review*, 14(2), 211-220.