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IMPACT OF TERRORIST INCIDENTS ON TOURISM IN AFRICA, THE MIDDLE EAST, AND SOUTH ASIA: A DYNAMIC HETEROGENEOUS PANEL APPROACH

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Impact of Terrorist Incidents on Tourism in Africa, the Middle East, and South Asia: A Dynamic Heterogeneous Panel Approach

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Abstract:
Africa, the Middle East, and South Asian countries have been attracting the lowest number of tourists in recent decades and consequently, have the lowest share from the tourism industry. In this research paper, we investigated whether the aforementioned regions' poor performance in the tourism industry is due to growing terrorism in the region. Our results indicate that terrorism plays a deterrent role in the tourist's decision-making process for traveling to those countries. By using both the cross-sectional augmented distributed lag (CS-DL) and the cross-sectional ARDL (CS-ARDL) estimators, we found that there is a significant negative impact of terrorism on tourism.

JEL: D74, C33, H56, L83
Keywords: Tourism, terrorism, CS-ARDL, CS-DL, cross-sectional dependence

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Introduction

The negative implications of terrorism on economic and social development of nations have gained weight especially after the September 11 (9/11) attacks –commanding just a handful of studies related to terrorism (Enders and Sandler, 2008; Blomberg, Hess, and Orphanides, 2004; Abadie, and Gardeazabal, 2008). Several negative implications of terrorist attacks on economic growth, financial markets, and social welfare have equally been documented (Frey, Luechinger, and Stutzer, 2007; Karolyi, and Martell, 2010). In the recent past, the direct and indirect impacts of terrorism on specific sectoral composition of countries, such as the tourism sector have equally proliferated. Nevertheless, a significant majority of the related research papers on terrorism and tourism relationships are studied at single country level (Feridun, 2011; Raza and Jawaid, 2013; Lanouar and Goaied, 2019). Even though single country study merits attention in terms of investigating country specific factors, it however does not capture regional specific issues. Second majority of these country-specific analysis are qualitative in nature (Sönmez, 1998; Radić, and Barišić, 2018; Romagnoli, 2016; Survila, Mikėnas, and Žuromskaitė, 2019) and quite a few conducted panel data analysis (Ahlfeldt, Franke, and Maennig, 2015; Liu and Pratt, 2017; Harb, 2019).

In this study, our motivation is not only derived from the lacuna of empirical literature on terrorism and tourism relationships on a panel of 36 countries in Africa, Middle East and South-Asia, but also based on historical statistical facts about the contribution of tourism across these regions. According to the Tourism Annual Report of 2017, the percentage share of tourism in Africa, the Middle East, and South Asia is 5%, 4%, and 2%, respectively and also being the lowest in the world. Similarly, countries of these regions also have the lowest market share from the tourism sector in the world. Despite the poor performance of these countries in terms of value-added due to tourism, the financial and socioeconomic significance of tourism across these regions cannot be overemphasized. The financial benefits reflect are associated with increased financial revenue flows while the socioeconomic effects rely on its indirect effect on human welfare. Thus, tourism could be one of the major sources of economic growth in the region and therefore, carries the extreme importance.

However, terrorism could present significant obstacles to the tourism industry. In the recent decades, terrorism incidents have largely centralized in Africa, the Middle East, and South Asia. According to the Global Terrorism Database annual report of 2015, 84% of terrorist attacks and 95% of deaths occurred in these regions. Due to the high concentration of terrorist attacks on the above mentioned regions could potentially deter tourists' arrivals

which also potentially dampens economic performance. In this respect tourism sector, according to various studies in the literature, could potentially be affected adversely from the terrorist incidents (Hartz, 1989; Enders and Sandler, 1991; Mansfeld, 1996; Enders, Sandler, and Parise, 1992).

Another motivation behind this study is the spatial correlation of terrorist incidents across regions. In recent study by Gaibulloev and Sandler (2013) found that there is significant association between terrorist attacks. There are several reasons behind such correlation. First, a terrorist attack in a given economy is associated with greater anti-terrorism measures and policies by governments. Such measures may either force potential terrorists to focusing on other vulnerable economies or deter further attacks. The former is usually the case. Second, terrorist groups tend to identify group of countries that are against their principles as enemy which further impinges negatively on such states. Consequently, this creates cross-country correlation of terrorism. Several papers estimated tourism and terrorism relationship without the controlling for cross-sectional dependence (Corbet, O'Connell, Efthymiou, Guiomard, and Lucey, 2019; Liu and Pratt, 2017; Ahlfeldt, Franke, and Maennig, 2015) Estimating the models without addressing the cross-country correlation will lead to biased estimates and this issue has been largely ignored in the literature. In this paper, we adopt the estimation models as initially proposed by Pesaran (2006) and later by Chudik, Mohaddes, Pesaran, and Raissi (2016) to adequately control for cross-sectional dependence which is expected to arise due to common factor in our study.

This research intends to explore the relationship between terrorism and tourism in Africa, the Middle East, and South Asian countries by using both the cross-sectional augmented distributed lag (CS-DL) and the cross-sectional ARDL (CS-ARDL) estimators to address the issue of cross-country correlation.

Terrorism, Tourism, and Economy

Terrorism as a concept have not been concisely defined, and many experts have chosen to describe it with open ended definitions. In this paper, terrorism is defined as "premeditated *use or threat of use of extranormal violence or brutality by subnational groups to obtain a political, religious, or ideological objective through intimidation of a huge audience, usually not directly involved with the policymaking that the terrorists seek to influence*" (Enders and Sandler, 2002). The fundamental motivation behind terrorism relies on factors such as political, religious, and socioeconomic (Global Terrorism Index, 2016).

These factors could be even triggered in developed countries such as in Spain, France, and Ireland, to name a few. Terrorist attacks could be part of a campaign that may last for decades, such as Euskadi Ta Askatasuna (ETA), which started in 1959 and declared a ceasefire in 1989 or the case in Northern Ireland from 1968-1998.

All terrorist groups, during their active period, use every available avenue to raise their voices. International media advanced a particular method of scrutinizing terrorism-related incidents, which further aided terrorist groups activities to gain international attention and publicity (Weimann, and Winn, 1994). In the 21st century, terrorism approaches have become even more media sophisticated that is not primarily built on killing several thousands of people, but instead terrifying millions of people through the images of the attacks (Seib and Janbek, 2010). Media oriented terrorism uses the advantage of technology, and it has been an increasingly substantial element of terrorism (Surette, Hansen, and Noble, 2009). The advent of postmodern mass media communication systems immensely increased the benefits of media coverage for terrorists, and media-oriented terrorist events are now a commonly accepted element of terrorism (Crelinsten, 2002; Martin, 2006; Ross, 2007).

Global dissemination of terrorist news does not only advance the terrorist groups' agenda but also encourages them towards further attacks (Seib and Janbek, 2010). In this regard, tourism destinations have become a veritable tool at their disposal, specifically for raising their voice or sending a message through international media. According to Richter (1983), travelers and tourists could fall victims of terrorist attacks since they are perceived as ambassadors of their countries who can easily sway public sympathy to their yearnings. By implications, when the target is the tourist, such tendencies may eventually magnify the effect on international media, and an attack can be cited as a success in terms of securing global media coverage. Therefore, it will serve the purpose of the terrorist groups. From terrorist's perspective, tourism destinations offer a cost-effective and attractive way of delivering an extensive ideological message to both masses and their ideological oppositions (Sonmez, Apostolopoulos, and Tarlow, 1999). Consequently, terrorist attacks could potentially affect the tourism industry more severely than any other type of shocks, such as financial crises or natural disasters (Sonmez, 1998; Araña and León, 2008; Wolff and Larsen, 2014). The rationale behind the impact of terrorism on tourism is based on the fact that terrorist attacks possess a thread for the tourists.

Over the few decades, terrorist threats and terrorist attacks have become significant problems for the tourism industry, and continuous media attention to terrorist attacks raises another obstacle for the governments and industry leaders to find a solution. Extensive

coverage of terrorist attacks on international media could develop exposure and could have a potential influence on tourists' decisions on their next trip. As of today, terrorism has grown into an essential threat to the tourism industry by affecting the tourists' decision-making process. Tourists could change their decision to a region that is characterized as peaceful environments. Safety and infrastructure of the destination are the two main factors that are affecting the decision-making process of tourists (Khan and Mendes 2018). Endless terrorism news on international media can eventually deter tourists from visiting those particular destinations or even those countries (Sonmez, 1998).

Historical data shows that terrorist attacks in Africa, the Middle East, and South Asia, have been steadily increasing over the last three decades. According to the findings of Pizam and Fleischer (2002), frequency of the terrorist attacks has a more significant impact than the severity of the attacks, which indicates that the tourism industry will stagnate if the terrorist activities are not prevented.

Terrorism does not only adversely affect tourism but also spills over at the macroeconomic level such that terrorism leads to reduced economic growth, capital movement, trade flows, business activity, production, and many other segments in the country (Liu and Pratt, 2017). The impact of terrorism is always negative for the economy.

It is also important to note that the impacts of terrorist attacks can extend beyond the national borders of the country where terrorism occurs. A study by Pham and Doucouliagos (2007) shows that terrorist attacks in countries' contiguous next-door-neighbor significantly reduce the bilateral trade. Trade is one of the most powerful engines for growth and development. However, growing terrorist incidents like in Africa, the Middle East, and South Asia are not helping to fuel this engine. Furthermore, another study by Kılıçlar, Uşaklı, and Tayfun (2018), found that terrorism in Israel due to the spillover effect decreases the number of tourist arrivals to Turkey by 27.99 percent. Transnational terrorism has increasingly impacted profoundly peaceful countries (Global terrorism index, 2016).

Data and Preliminary Analysis[1]

This section aims to provide insight into the descriptive side of the data. In order to focus on our motivation for this research, this study examines a panel of 36 countries in Africa, the Middle East, and South Asia for the periods between 1995 to 2015. Thus, our data is drawn different sources such as the World Bank, Global Terrorism Database, and KOF

[1] Data description and sources are presented in the appendix A.

Swiss Economic Institute.[2] The choice of these time interval (1995-2015), together with the sampled number of countries relies on comparable data availability. For instance, data availability for countries like Afghanistan, Iraq, Syria, and some of the African countries are limited. For this reason, those countries are excluded from our research.

Consistent with the literature, five determinants of tourism are used in our research, notably: terrorism, globalization index, human rights, GDP per capita and price level index. These variables are extensively documented in tourism literature (Llorca-Vivero, 2008; Sönmez & Graefe, 1998; Viscusi and Zeckhauser, 2003; Nanthakumar, Ibrahim, and Harun, 2007; Salifou and Haq, 2017). Hence, selected variables are associated with tourism demand function.

Table 1 below presents the descriptive statistics of the data across the sampled 36 countries from 1995 to 2015. Given the variations as can be seen from the table 1, we can expect reasonable estimated linkages to emerge.

Table 1
Summary statistics of the variables

Variables	**Mean**	**Std. Dev.**	**Min**	**Max**	**Observations**
Tourism (TOR)	2260005	4545271	2900	39811000	749
Terrorism (TER)	52.52	178	0	2214	756
Globalization Index (KOFGI)	50.45	12	22.40	80.37	756
GDP per Capita (GDPpc)	4928	11359	102	85076	752
Price Level Index (PLI)	0.36	0.15	0.10	1.10	747
Human Rights (HR)	-0.94	1.06	-3.23	2.04	756

Table 2 presents the correlation matrix for the variables. The purpose of the correlation matrix is to identify issues of multicollinearity which could bias the signs of the estimated coefficients. Results indicate that there is no evidence of too high correlations (0.80 or more) between the variables. The correlation between the explanatory variables is less than 0.8. This indicates that the regressors do not have perfect or exact linear representations of one and another.

[2] Full detail of the data source explained in the appendix A.

Table 2
Correlation Matrix

	Tourist	Terrorism	KOFGI	PLI	GDPpc	HR
Tourist	1					
Terrorism	0.116	1				
KOFGI	0.4914	0.1109	1			
PLI	0.2206	-0.0482	0.5052	1		
GDPpc	0.1158	-0.0554	0.4942	0.5075	1	
HR	0.0634	-0.2635	0.3558	0.2080	0.4343	1

Notes: TOR: Number of tourist arrival. TER: Number of terrorist attacks. KOFGI: Globalization Index. PLI: Price Level Index. GDPpc: Gross Domestic Product per capita. HR: Human Rights.

By using Pesaran's (2004) cross sectional dependence (CD) test we can analyze the features of our data. As can be seen from table 3, we reject null hypothesis of cross section independence for each of the variable, which means that all of the variables in our model consist cross sectional dependence. This is an important feature of our data, which plays a decisive role in choosing the appropriate estimation strategy.

Table 3
Cross Sectional Dependence Test

Variable	**CD-Test**	**P-value**
Tourist (TOR)	71.60	(0.000)
Terrorism (TER)	17.47	(0.000)
Human Rights (HR)	3.38	(0.001)
GDP per capita (GDPpc)	102.21	(0.000)
Globalization Index (KOFGI)	104.53	(0.000)
Price Level Index (PLI)	68.89	(0.000)

Notes: Under the null hypothesis of cross-section independence, CD ~ N(0,1)

Descriptive Statistics

Prior to an indepth econometric analysis, we present the descriptive side of the data. In Figure 1 below, we use GTD data to show the trend of terrorist attacks in Africa, the Middle East, and South Asia. The horizontal axis in the graphs shows the number of years, and the vertical axis shows number of attacks. As observed from Figure 1, over the last decade, the number of terrorist attacks has been rapidly increasing across the regions of interest. The countries in the region, as mentioned earlier, suffered the most from terrorist attacks in the world. The reason behind the sharp increase is because the deadliest terrorist groups such as ISIL, Boko Haram, and al-Qaeda recently gained strength and expand their activities in these regions.

Figure 2 presents the trend of number of tourist arrival in Africa, the Middle East, and South Asia. It is clear from the figure 2 that despite the existence of rising terrorism in the region, tourism is steadily growing over the last 2 decades. However, when it is compared to Southeast Asia or Europe it is considerably behind the growth level and market share of these regions.

Figure 1: Trend of terrorist attacks in Africa, the Middle East, and South Asia

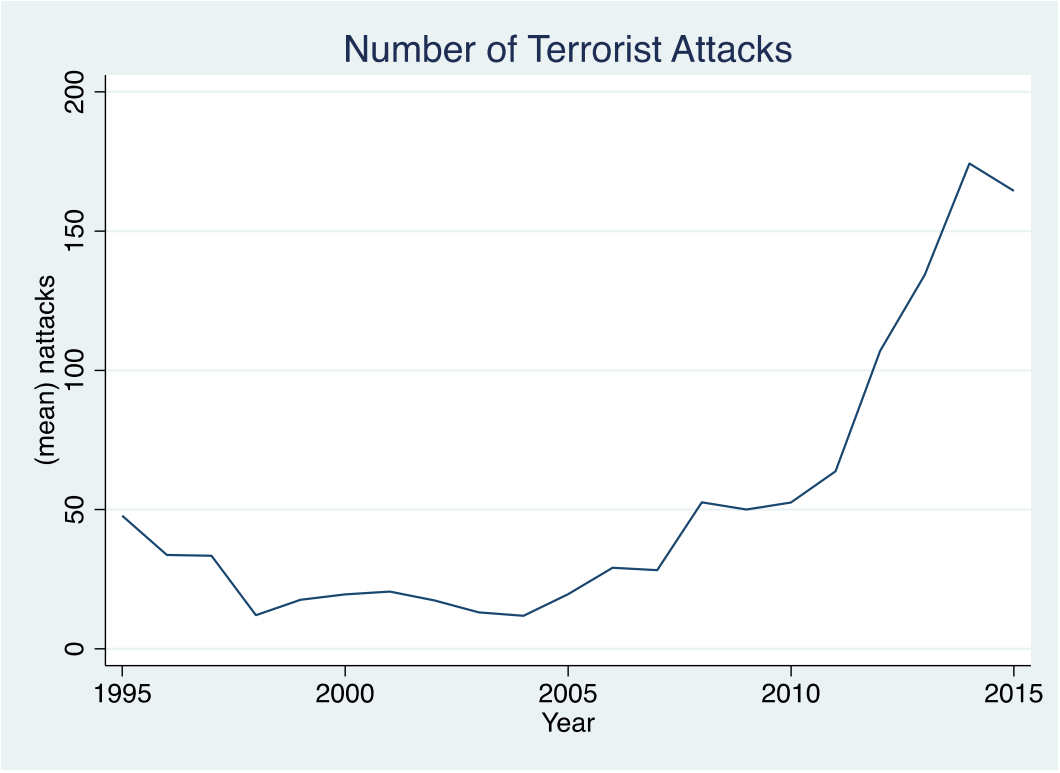
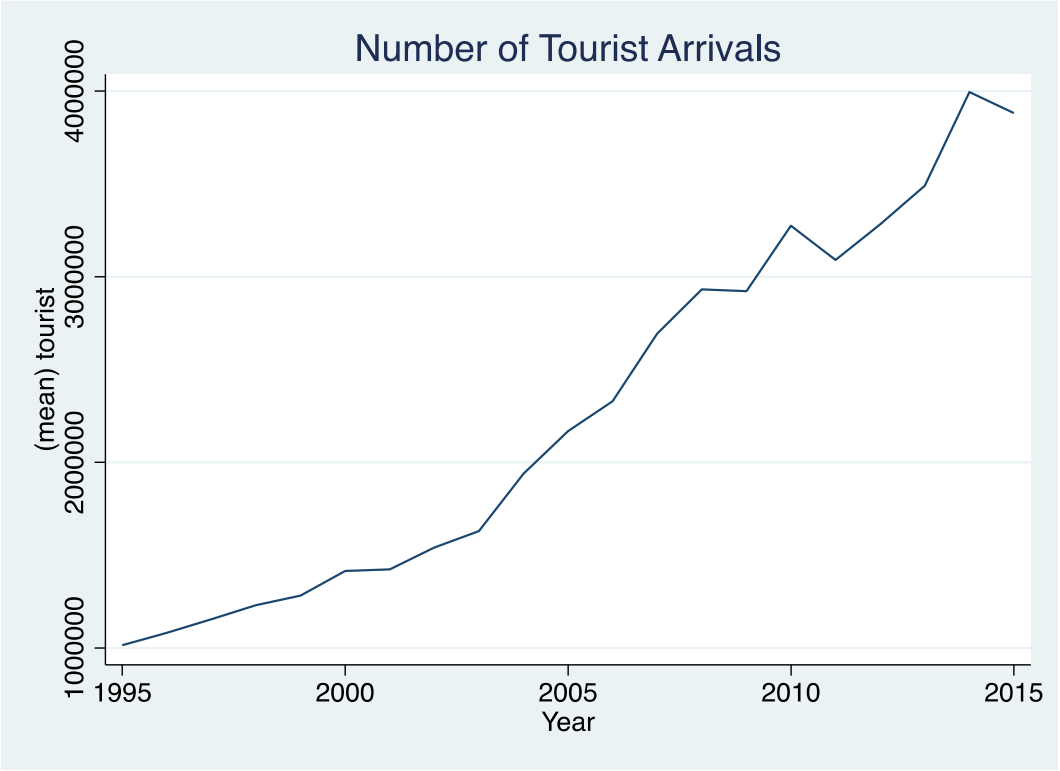


Figure 2: Trend of number of tourist arrivals



The descriptive evidences presented above does not properly highlight any dynamic relationship between the control variables and tourism in the group of countries investigated. We further present the econometric methodologies and results in the following sections.

Empirical Approach

There is a large and growing body of literature on panel data studies in the recent past. Nonetheless, it is typically assumed that disturbances in panel data models are cross sectionally independent (Pesaran, 2004). Common hypothesis in panel data models based on

strong homogeneity assumption without considering cross-sectional dependencies that exist across countries due to unobserved common factors (Chudik et al. 2016). Quite a significant numbers of panel data studies in the literature failed to address the cross-sectional dependence in the errors, which can arise as a result of several factors such as spatial dependence or presence of unobserved common factors. Nevertheless, when a panel of countries is analyzed it is important to consider the possibility of cross-sectional dependence. If the underlying model omits the common factors then these unobserved common factors enter into error terms and generate correlation across countries therefore leading to biased estimates. Considering the findings of the recent studies in the literature, which indicates that terrorism is highly integrated across countries, it is becoming increasingly difficult to ignore cross sectional dependence for terrorism related studies (Teoman, 2017; Khusrav, Todd, and Donggyu, 2013; Lutz and Lutz, 2017).

Estimated results under the presence of cross-sectional dependence in the errors, if not addressed, will lead to biased coefficients. Consider the following simple illustrative model, where the number of tourist arrivals depends on the frequency of terrorism;

$$TOR_{it} = \beta TER_{i,t} + \varepsilon_{it} \quad (1)$$

$$\varepsilon_{it} = \alpha_i + \gamma_i f_t + u_{it} \quad (2)$$

$$TER_{it} = \delta_i + \lambda_i f_t + \omega_i g_t + \zeta_{it} \quad (3)$$

where f_t is the common factors which indicates the correlation of terrorist incidents across countries and g_t is other factors which effects terrorism. α_i is time invariant fixed effects.

By using equation (3) we can solve for f_t ;

$$f_t = \frac{1}{\lambda_i}\left(TER_{i,t} - \delta_i - \omega_i g_t - \zeta_{it}\right) \quad (4)$$

Integrating equation (4) and (2) into (1);

$$TOR_{it} = \beta TER_{i,t} + \alpha_i + \frac{\gamma_i}{\lambda_i}(TER_{i,t} - \delta_i - \omega_i g_t - \zeta_{it}) + u_{it} \quad (5)$$

$$TOR_{it} = (\beta + \frac{\gamma_i}{\lambda_i})TER_{i,t} + \alpha_i - \left(\frac{\gamma_i}{\lambda_i}\right)\delta_i + \frac{\gamma_i}{\lambda_i}(-\omega_i g_t - \zeta_{it}) + u_{it} \quad (6)$$

$$TOR_{it} = (\beta')TER_{i,t} + \alpha_i - \left(\frac{\gamma_i}{\lambda_i}\right)\delta_i + \frac{\gamma_i}{\lambda_i}(-\omega_i g_t - \zeta_{it}) + u_{it} \quad (7)$$

where the estimate such as $\beta' = \beta + \frac{\gamma_i}{\lambda_i}$ implies estimating the model with traditional panel data estimation techniques such as Fixed Effects or Random Effects. The traditional Fixed Effects or Random Effects estimation techniques are may result be biased due to the possibility that the parameters may contain common factors. Pesaran (2006) and later Chudik et al. (2016) proposes to solve this problem by augmenting the regression with the cross-sectional averages of the regressors and dependent variable. In order to address this issue and obtain unbiased estimates, Chudik et al. (2016) proposed two estimation techniques namely; the cross-sectional augmented distributed lag (CS-DL) and the cross-sectional ARDL (CS-ARDL) estimators. Consider the following illustrative model;

We take the cross-sectional averages in year t:

$$\overline{TOR_t} = \frac{1}{N}\sum_{i=1}^{N} TOR_{it}$$

$$\overline{TER_t} = \frac{1}{M}\sum_{i=1}^{M} TER_{it}$$

$$\bar{\alpha} = \frac{1}{N}\sum_{i=1}^{N} \alpha_i$$

$$\bar{\beta} = \frac{1}{N}\sum_{i=1}^{N} \beta_i = \beta$$

$$\bar{\gamma} = \frac{1}{N}\sum_{i=1}^{N} \gamma_i$$

Taking all the cross-sectional averages above into equation (2) and (1):

$$\overline{TOR_t} = \beta\overline{TER_t} + \bar{\alpha} + \bar{\gamma} f_t$$

After solving for f_t we obtain;

$$f_t = \frac{1}{\bar{\gamma}}(\overline{TOR_t} - \bar{\alpha} - \beta\overline{TER_t}) \qquad (8)$$

Integrating equation (8) into (2);

$$\varepsilon_{it} = \alpha_i + \frac{\gamma_i}{\bar{\gamma}}(\overline{TOR_t} - \bar{\alpha} - \beta\overline{TER_t}) + u_{it} \quad (9)$$

By using equation (9) in (1) we get;

$$TOR_{it} = \beta TER_{i,t} + \alpha_i + \frac{\gamma_i}{\bar{\gamma}}(\overline{TOR_t} - \bar{\alpha} - \beta\overline{TER_t}) + u_{it}$$

$$TOR_{it} = \beta TER_{i,t} + (\alpha_i - \frac{\gamma_i}{\bar{\gamma}}\bar{\alpha}) + \frac{\gamma_i}{\bar{\gamma}}(\overline{TOR_t}) - \frac{\gamma_i}{\bar{\gamma}}(\beta\overline{TER_t}) + u_{it} \quad (10)$$

As reflected from the illustrations above, any bias associated with the presence of cross-sectional dependence in the errors we can eliminated the bias by adding cross-sectional averages as suggested by Pesaran (2006) and later extended study by Chudik et al. (2016) which obtains unbiased estimates of β.

In order to estimate the impact of terrorism on tourism, we use an extended version of autoregressive distributed lag (ARDL) method. ARDL models are widely used estimation techniques in tourism (Narayan, 2004; Adnan Hye, and Ali Khan, 2013; Feridun, 2011) and also terrorism related studies (Liu and Pratt, 2017; Shahzad, Zakaria, Rehman, Ahmed, and Fida, 2016). This approach is appropriate for the dataset available and by extending ARDL method into the cross sectionally augmented distributed lag (CS-DL) and the cross sectionally augmented ARDL (CS-ARDL) estimator as suggested by Chudik, et al. (2016) we can estimate the impact of terrorism by controlling the cross-sectional dependence.

The general form of the empirical representation of the CS-ARDL model is formulated as follows;

$$lnTOR_{it} = \sum_{j=1}^{P_y} \alpha_{ij}\, lnTOR_{i,t-j} + \sum_{j=0}^{P_x} \delta_{ij}'\, X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (11)$$

where ln(.) indicates the logarithmic operator and μ_i represent the time invariant fixed effect. TOR_{it} is the dependent variable for each country and indicating the number of tourist arrival. $X_{i,t}$ is set of explanatory variables, which consist set of economic and non-economic control variables in addition to terrorism. Economic control variables are price level index and GDP per capita. Terrorism related studies in the literature mainly use GDP or GDP per capita as a control variable (Liu and Prat, 2017). Additionally, we incorporated price level index to capture the effect of cost of travelling. Increase price level index indicates increase cost of travelling and thus expected to have an impact on tourist decision to travel alternative destination.

Furthermore, we introduce non-economic control variables such as globalization index and human rights. This set of factors takes into account social, political, and cultural factors, which could hinder or boost number of tourist arrivals.

As mentioned in the previous illustration, the standard panel data models do not account for cross-sectional dependence in the errors. In order to address this potential issue, we estimate our model while taking the cross-sectional averages of the dependent and independent variables, as introduced in equation (11). Our CS-ARDL model takes the following form;

$$lnTOR_{it} = \sum_{j=1}^{P_y} \alpha_{ij}\, lnTOR_{i,t-j} + \sum_{j=0}^{P_x} \delta'_{ij}\, X_{i,t-j} + \sum_{j=0}^{P_{\bar{z}}} \psi'_{ij}\, \bar{Z}_{i,t-j} + \mu_i + \varepsilon_{it}$$

Where $\bar{Z}_{t-j} = (\overline{lnTOR}_{t-j}, \bar{X}_{t-j})$

We can rewrite the equation (11) in error correction form to highlight the long-term relationship and the short-term adjustment. Reparametrizing the model, it becomes as;

$$lnTOR_{it} = \phi_i\left(lnTOR_{i,t-1} - \beta'_i X_{it} - \lambda\bar{Z}_t\right) + \sum_{j=1}^{P_y-1} \alpha_{ij}\, \Delta lnTOR_{i,t-j} + \sum_{j=0}^{P_x} \delta'_{ij}\, \Delta X_{i,t-j} + \sum_{j=0}^{P_Z} \psi'_{ij}\, \Delta\bar{Z}_{t-j} + \mu_i + u_{it} \quad (12)$$

Where $\Delta\bar{Z}_{t-j} = (\Delta\overline{lnTOR}_{t-j}, \bar{X}'_{t-j})'$

$\overline{lnTOR}_t = N^{-1}\sum_{i=1}^{N} lnTOR_{it}$

$\bar{X}_t = N^{-1}\sum_{i=1}^{N} X_{it}$

And $\left(lnTOR_{i,t-1} - \beta'_i X_{it} - \lambda\bar{Z}_t\right)$ is the error correction term, which represents the long-run relationship between tourism and the rest of the explanatory variables. Thus, the coefficient ϕ_i is the short run adjustment to long run relationship.

Our CS-DL model can be presented from the general form of the ARDL model in equation (11) by rewriting it as a level equation;

$$lnTOR_{it} = \theta_i X_{i,t} + \delta_i(L)\Delta X_{i,t} + \mu_i + \tilde{\varepsilon}_{i,t} \quad (13)$$

Where L is the lag operator. In order to account for the cross-sectional dependence, we add cross sectional averages and together with the lags. Equation (13) can be written as:

$$lnTOR_{it} = \theta_i X_{i,t} + \sum_{j=1}^{P_x-1} \delta_{ij} \Delta X_{i,t-j} + \sum_{j=0}^{P_{\bar{y}}} \gamma_{y,i,j} \overline{lnTOR}_{i,t-j} + \sum_{j=0}^{P_{\bar{x}}} \gamma_{x,i,j} \bar{X}_{i,t-j} + \mu_i + u_{it} \quad (14)$$

In order to prove that our estimation results under CS-ARDL and CS-DL that are effectively dealing with the cross sectional dependence issue, we estimate Cross Sectional Dependence test (CD) of Pesaran (2004). The CD test is based on simple average of all pair-wise correlation coefficients of the Ordinary Least Squares (OLS) residuals from the individual regressions in the panel. Under null the CD test statistic is asymptotically CD ~ N(0,1)

$$H_0: E(u_{it}u_{jt}) = 0, \forall\ t\ and\ i \neq j$$

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}\right)$$

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^{T} \hat{u}_{it}\, \hat{u}_{jt}}{(\sum_{t=1}^{T} \hat{u}_{it}^2)^{\frac{1}{2}} (\sum_{t=1}^{T} \hat{u}_{it}^2)^{\frac{1}{2}}}$$

Empirical Result

Panel Unit Root Test

Before going into cointegration test and results of the estimates, analysis of the stationarity of the proposed dataset is required. Unit root tests are necessary to determine the order of integration due to the problems of fallacious regressions, which could arise if the variables are not stationary. Since there is no clear unit root test which is superior to others, we preferred widely used of Im, Pesaran and Shin (1997) IPS-panel unit root test.

IPS test is a set of Dicket-Fuller regression of the form as below:

$$\Delta TOR_{it} = \alpha_i + \phi_i TOR_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta X_{i,t-j} + \varepsilon_{it}$$

where ε_{it}, i=1,2,…,N , t=1,2,…,T are independently distributed as normal variates with zero means and finite heterogeneous variances. Table 4 shows the results of panel unit root tests.

Table 4

Results from IPS panel root test

	TOR	TER	GDPpc	PLI	KOFGI	HR
I(0)	1.99	1.97	6.57	2.78	-1.76**	-0.46
P-values	(0.97)	(0.97)	(1.00)	(0.99)	(0.038)	(0.32)
I(1)	-10***	-10.14***	-6.33***	-7.72***		-5.64***
P-values	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)

Notes: p-values in square parenthesis
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

As the IPS unit root test results indicate, variables tourism, terrorism, GDP per capita, price level index, and human rights are integrated of I(1) at levels and stationary at first difference. Remaining variable, globalization index is integrated of I(0) and stationary at levels. Considering that none of the variables are integrated of I(2), we can proceed with our estimation and apply the cointegration test to show that whether any longrun relationship exist between the variables. In this regard, we run Pedroni and Westerlund's panel cointegration tests.

Table 5 shows both Pedroni and Westerlund's cointegration test results. Both Pedroni and Westerlund's cointegration test results indicate that all variables tourism, terrorism, globalization index, price level index, GDP per capita, and human rights are significant. Meaning that the null hypothesis of no cointegration is rejected. Tourism and the rest of the explanatory variables are cointegrated.

Table 5

Cointegration tests

Pedroni Test		**Westerlund Test**	
	Statistics		Statistics
Modified Phillips-Perron	4.9586***	Variance ratio	-2.8832***
	(0.000)		(0.002)
Phillips-Perron	-4.3334***		
	(0.000)		
Augmented Dickey-Fuller	-4.9584***		
	(0.000)		

Notes: p-values in square parenthesis
*** Significant at the 1 percent level.

CS-DL and CS-ARDL Estimation

In order to investigate the causal effects of terrorism on tourism in the Middle East, Africa, and South Asian countries, a balanced panel of time series data is constructed, i.e., the same time periods are available for all cross-section units. The variables of interest are calculated using annual data for the countries of the aforementioned regions (N=36) during the period 1995–2015 (T=21). Thus, the pooled sample consists of NT=756 observations. With the purpose of interpreting the parameter estimates as the percentage changes of the dependent variable, the data related to tourism was transformed into a natural logarithm.

Since both Pedroni and Kao's cointegration test results confirmed that the variables are cointegrated for all country groups, we then rely on the CS-DL and CS-ARDL estimators in order to examine the relationship between terrorism and tourism.

Table 6
Estimation Results for Panel of the Middle East, Africa, and South Asia (CS-DL Model)

Variable	
Terrorism	-0.0137*
	(0.051)
Globalization Index	1.349*
	(0.097)
Price Level Index	-0.947***
	(0.003)
Human rights	0.205**
	(0.024)
GDP per capita	0.894***
	(0.000)

Notes: Coefficients estimated by CS-DL. Standard errors are in the parenthesis.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

CS-DL estimation results are presented in table 6. All variables are statistically significantly different from zero at different levels of significance. As commonly established in the literature, GDP per capita positively and significantly affect tourism. The negative and significant effect of price level index indicate the importance of how the increased cost of travelling decreases number of tourist arrival. Monetary costs of travelling as many of the tourism studies in the literature indicates adversely affects the decision of tourists (Dwyer, Forsyth, and Rao, 2000; Patsouratis, Frangouli, and Anastasopoulos, 2005). Increased cost of

traveling creates substitution effect and play an important role in determining the number of tourist arrival. Positive and significant effect of globalization emphasizes the relevance of social, political, and economic collaboration on tourism. Our findings also suggest that human rights considered to be positively linked with tourism and increased human rights positively associated with tourist decisions on traveling.

The main variable of interest terrorism shows negative and significant impact on number of tourist arrival. This means that holding other factors constant, additional increase in terrorist attacks is associated with a 1.37% fall in tourist arrivals in the analyzed countries. Additional terrorist attacks significantly reduce the number of tourist arrivals. This is in line with recent findings of Harb (2019).

In order to investigate, short-run and long-run relationship between terrorism and tourism we estimated presented model with CS-ARDL approach. For the optimal lag length selection of our model, we used Bayesian Information Criteria (BIC). Summary of our key findings is presented in Table 7 below:

Table 7
Estimation Results for Panel of the Middle East, Africa, and South Asia (CS-ARDL model)

Short-Run Estimates		Long-Run Estimates	
(L)Tourist	0.095	GDP per capita	0.656
	(0.220)		(0.327)
Terrorism	-0.019*	KOFGI	-0.275
	(0.071)		(0.888)
KOFGI	0.913	Price Level Index	-1.03*
	(0.276)		(0.092)
Price Leve Index	-1.01***	Terrorism	-0.088
	(0.007)		(0.341)
Human rights	0.786***	Human rights	0.786
	(0.009)		(0.273)
GDP per capita	0.944***		
	(0.002)		
	ECT	-0.90 (0.000) ***	

Notes: Coefficients estimated by CS-ARDL. Standard errors are in the parenthesis.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Reported results in Table 7 shows that, except price level index, there is no statistically significant long-run relationship. However, in the short-run results of CS-ARDL model indicate significant negative impact of terrorism on tourism, which is in line with recent findings of Liu and Pratt (2017).

On the other hand, impact of the other explanatory variables except terrorism and globalization index, slightly increased. One percent increase in price level index decreases the number of tourist arrival by 1.01 percent in the short run. Indicating that tourists are more responsive to increased cost in the short run.

In order to show there is no cross-sectional dependence in the errors we run the CD test and the result of CD test is reported in Table 8 below:

Table 8
Cross Sectional Dependence of Residuals

	Test statistic	p-value
CS-ARDL	-.992	0.321
CS-DL	-1.623	0.105

Notes: Under the null hypothesis of cross-section independence the test is distributed as N(0,1).

The null hypothesis of the CD test indicates the cross-section independence of the residuals. As CD test results indicates not to reject null hypothesis of cross-section independence. Meaning that there is no cross-sectional dependence in the errors across countries in the estimated model.

In addition to our findings with CS-DL and CS-ARDL methods, we also estimated our models with common panel estimation methods such as Dynamic Fixed Effect (DFE) and Pooled Mean Group (PMG) estimators to show the differences.[3] We found that the estimated results as expectedly are underestimating the effect of terrorism since aforementioned approaches do not account for cross section correlation in the errors.

Conclusion

[3] DFE and PMG estimation results are presented in appendix B.

The main objective of this study is to examine the impact of terrorist attacks on tourism in Africa, the Middle East, and South Asian countries by using annual time-series data from the period 1995 to 2015. This paper explores the relationship between terrorism and tourism based on dynamic heterogenous and cross-sectionally correlated panel of countries. Since cross-sectional correlation is a prominent feature of our data, we have to deal with the presence of cross-section dependent errors due to unobserved common factors. In order to account for aforementioned problem, we used Chudik et al. (2016) proposed estimation methods.

Our findings suggest that there is a significant negative effect of terrorism on tourism under both CS-DL and CS-ARDL estimation. We have also contributed to tourism and terrorism related literature by incorporating Chudik et al. (2016) proposed CS-DL and CS-ARDL estimation techniques to address cross-sectional correlation. In addition to our findings with CS-DL and CS-ARDL, we also show that estimating the effect of terrorism on panel data without addressing to cross sectional dependence in the errors will lead to underestimate the impact of terrorism.

As a policy recommendation, governments need to boost tourist arrivals not only investing in tourism infrastructure and services but also by eliminating all the negative factors, which has detrimental effects on tourism. The governments of underdeveloped countries can promote tourism activities as a means of achieving economic growth (Perles, Ramon, Rubia, and Moreno, 2017). In the light of our findings, governments' primary agenda should be acting proactively and planning anti-terrorism policies in order to reduce terrorism. As a result, achieve higher economic prosperity through by utilizing the tourism sector and create peaceful societies.

References

Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American economic review*, *93*(1), 113-132.

Abadie, A., & Gardeazabal, J. (2008). Terrorism and the world economy. European Economic Review, 52(1), 1-27.

Adnan Hye, Q. M., & Ali Khan, R. E. (2013). Tourism-led growth hypothesis: a case study of Pakistan. Asia Pacific Journal of Tourism Research, 18(4), 303-313.

Ahlfeldt, G. M., Franke, B., & Maennig, W. (2015). Terrorism and international tourism: the case of Germany. Jahrbücher für Nationalökonomie und Statistik, 235(1), 3-21.

Araña, J. E., & León, C. J. (2008). The impact of terrorism on tourism demand. *Annals of Tourism Research*, *35*(2), 299-315.

Araz-Takay, B., Arin, K. P., & Omay, T. (2009). The endogenous and non-linear relationship between terrorism and economic performance: Turkish evidence. *Defence and Peace Economics*, *20*(1), 1-10.

Balaguer, J., & Cantavella-Jorda, M. (2002). Tourism as a long-run economic growth factor: the Spanish case. *Applied economics*, *34*(7), 877-884.

Bandyopadhyay, S., Sandler, T., & Younas, J. (2013). Foreign direct investment, aid, and terrorism. *Oxford Economic Papers*, *66*(1), 25-50.

Bianchi, R. (2006). Tourism and the globalisation of fear: Analysing the politics of risk and (in) security in global travel. *Tourism and Hospitality Research*, *7*(1), 64-74.

Blomberg, S. B., Hess, G. D., & Orphanides, A. (2004). The macroeconomic consequences of terrorism. Journal of monetary economics, 51(5), 1007-1032.

Chou, M. C. (2013). Does tourism development promote economic growth in transition countries? A panel data analysis. *Economic Modelling*, *33*, 226-232.

Corbet, S., O'Connell, J. F., Efthymiou, M., Guiomard, C., & Lucey, B. (2019). The impact of terrorism on European tourism. Annals of Tourism Research, 75, 1-17.

Crelinsten, R. D. (2002). Analysing terrorism and counter-terrorism: A communication model. *Terrorism and Political Violence*, *14*(2), 77-122.

Raza, S. A., & Jawaid, S. T. (2013). Terrorism and tourism: A conjunction and ramification in Pakistan. *Economic Modelling*, *33*, 65-70.

Dritsakis, N. (2004). Tourism as a long-run economic growth factor: an empirical investigation for Greece using causality analysis. *Tourism economics*, *10*(3), 305-316.

Dwyer, L., Forsyth, P., & Rao, P. (2000). The price competitiveness of travel and tourism: a comparison of 19 destinations. Tourism management, 21(1), 9-22.

Enders, W., Sandler, T., & Parise, G. F. (1992). An econometric analysis of the impact of terrorism on tourism. *Kyklos*, *45*(4), 531-554.

Enders, W., & Sandler, T. (1991). Causality between transnational terrorism and tourism: The case of Spain. *Studies in Conflict & Terrorism*, *14*(1), 49-58.

Enders, W., & Sandler, T. (2002). Patterns of transnational terrorism, 1970–1999: Alternative time-series estimates. *International Studies Quarterly*, *46*(2), 145-165.

Enders, W., Hoover, G. A., & Sandler, T. (2016). The changing nonlinear relationship between income and terrorism. *Journal of Conflict Resolution*, *60*(2), 195-225.

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

Frey, B. S., Luechinger, S., & Stutzer, A. (2007). Calculating tragedy: Assessing the costs of terrorism. Journal of Economic Surveys, 21(1), 1-24.

Gunduz, L., & Hatemi-J, A. (2005). Is the tourism-led growth hypothesis valid for Turkey?. *Applied Economics Letters*, *12*(8), 499-504.

Hartz, C. (1989). Business executives as international terrorist targets. *International Terrorism: The Decade Ahead*, 21-28.

Ian Ross, J. (2007). Deconstructing the terrorism–news media relationship. *Crime, media, culture*, *3*(2), 215-225.

Index, G. T. (2015). Measuring And Understanding The Impact Of Terrorism (2017). *Institute for Economics & Peace, http://economicsandpeace. org/wp-content/uploads/2015/11/Global-Terrorism-Index-2015. pdf (17.06. 2017)*.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of econometrics*, *115*(1), 53-74.

Karolyi, G. A., & Martell, R. (2010). Terrorism and the Stock Market. International Review of Applied Financial Issues & Economics, 2(2).

Khusrav, Gaibulloev, Sandler Todd, and Sul Donggyu. "Common drivers of transnational terrorism: Principal component analysis." Economic Inquiry 51, no. 1 (2013): 707-721.

Kreishan, F. M. (2010). Tourism and economic growth: The case of Jordan. *European Journal of Social Sciences*, *15*(2), 63-68.

Kılıçlar, A., Uşaklı, A., & Tayfun, A. (2018). Terrorism prevention in tourism destinations: Security forces vs. civil authority perspectives. *Journal of destination marketing & management*, *8*, 232-246.

Khan, H., Yusuf, M. D., & Costa Mendes, J. D. (2018). The Impact of Terrorism on Tourism Destination Image and Development. *Asian Administration & Management Review*, *1*(2).

Lee, J. W., & Brahmasrene, T. (2013). Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European Union. *Tourism management*, *38*, 69-76.

Liu, A., & Pratt, S. (2017). Tourism's vulnerability and resilience to terrorism. *Tourism Management*, *60*, 404-417.

Lutz, B. J., & Lutz, J. M. (2017). Globalization and the economic consequences of terrorism. London: Palgrave Macmillan.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of economic geography*, *6*(4), 395-437.

Max Roser (2019) - "Human Rights". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/human-rights' [Online Resource]

Nanthakumar, L., Ibrahim, Y., & Harun, M. (2007). Tourism development policy, strategic alliances and impact of consumer price index on tourist arrivals: The case of Malaysia.

Narayan, P. K. (2004). Fiji's tourism demand: the ARDL approach to cointegration. Tourism Economics, 10(2), 193-206.

Nowak, J. J., Sahli, M., & Cortés-Jiménez, I. (2007). Tourism, capital good imports and economic growth: theory and evidence for Spain. *Tourism Economics*, *13*(4), 515-536.

Patsouratis, V., Frangouli, Z., & Anastasopoulos, G. (2005). Competition in tourism among the Mediterranean countries. Applied economics, 37(16), 1865-1870.

Perles-Ribes, J. F., Ramón-Rodríguez, A. B., Rubia, A., & Moreno-Izquierdo, L. (2017). Is the tourism-led growth hypothesis valid after the global economic and financial crisis? The case of Spain 1957–2014. *Tourism Management*, *61*, 96-109.

Pesaran, H. H., & Shin, Y. (1998). Generalized impulse response analysis in linear multivariate models. *Economics letters*, *58*(1), 17-29.

Pham, C. S., & Doucouliagos, C. (2017). *An Injury to one is an injury to all: Terrorism's Spillover Effects on bilateral Trade* (No. 10859). IZA Discussion Papers.

Pizam, A., & Fleischer, A. (2002). Severity versus frequency of acts of terrorism: Which has a larger impact on tourism demand? *Journal of Travel research*, *40*(3), 337-339.

Pizam, A., & Mansfeld, Y. (1996). *Tourism, crime, and international security issues*. John Wiley & Son Ltd.

Radić, M. N., & Barišić, M. (2018). Does Terrorism have a Limited Impact on International Investments in Tourism? Some Theoretical Considerations. Almatourism-Journal of Tourism, Culture and Territorial Development, 9(17), 153-164.

Raza, S. A., & Jawaid, S. T. (2013). Terrorism and tourism: A conjunction and ramification in Pakistan. Economic Modelling, 33, 65-70.

Richter, L. K. (1983). Tourism politics and political science: A case of not so benign neglect. *Annals of Tourism Research*, *10*(3), 313-335.

Romagnoli, M. (2016). The effects of terrorism on tourism:(inter) relations, motives & risks. Almatourism-Journal of Tourism, Culture and Territorial Development, 7(5), 125-133.

Salifou, C. K., & Haq, I. U. (2017). Tourism, globalization and economic growth: a panel cointegration analysis for selected West African States. *Current Issues in Tourism*, *20*(6), 664-667.

Seib, P., & Janbek, D. M. (2010). *Global terrorism and new media: The post-Al Qaeda generation*. Routledge.

Shahzad, S. J. H., Zakaria, M., Rehman, M. U., Ahmed, T., & Fida, B. A. (2016). Relationship between FDI, terrorism and economic growth in Pakistan: pre and post 9/11 analysis. Social Indicators Research, 127(1), 179-194.

Sönmez, S. F. (1998). Tourism, terrorism, and political instability. *Annals of tourism research*, *25*(2), 416-456.

Sönmez, S. F., Apostolopoulos, Y., & Tarlow, P. (1999). Tourism in crisis: Managing the effects of terrorism. *Journal of travel research*, *38*(1), 13-18.

Sönmez, S. F., & Graefe, A. R. (1998). Influence of terrorism risk on foreign tourism decisions. *Annals of tourism research*, *25*(1), 112-144.

Surette, R., Hansen, K., & Noble, G. (2009). Measuring media oriented terrorism. *Journal of Criminal Justice*, *37*(4), 360-370.

Survila, A., Mikėnas, E., & Žuromskaitė, B. (2019). The impact of terrorism on the tourism sector of Lithuania.

Teoman, D. C. (2017). Terrorism and tourism in Europe, new partners. *European Journal of Geography*, *8*(2), 132-142.

Travel, W. T. T. C. (2017). Tourism: Global Economic Impact & Issue 2018. *WTTC: London, UK*.

Viscusi, W. K., & Zeckhauser, R. J. (2003). Sacrificing civil liberties to reduce terrorism risks. *Journal of Risk and Uncertainty*, *26*(2-3), 99-120.

Weimann, G., & Winn, C. (1994). The theater of terror: Mass media and international terrorism (pp. 17-50). New York: Longman.

Wolff, K., & Larsen, S. (2014). Can terrorism make us feel safer? Risk perceptions and worries before and after the July 22nd attacks. *Annals of Tourism Research*, *44*, 200-209.

UNWTO. (2017). 2016 Annual report–world tourism organization.

Appendix A.1: Description of Data

Table A.1: List of countries

Africa	**Middle East**	**South Asia**
Algeria	Bahrain	Bangladesh
Angola	Iran	India
Burundi	Israel	Nepal
Central African Republic	Jordan	Pakistan
Democratic Republic of Congo	Kuwait	Sri Lanka
Egypt	Lebanon	
Eritrea	Qatar	
Ethiopia	Turkey	
Kenya	Yemen	
Mali		
Morocco		

Niger
Nigeria
Republic of the Congo
Senegal
Sierra Leone
South Africa
Sudan
Tanzania
Tunisa
Uganda
Zimbabwe

Table A.2: Data description and sources used

Variable	Source	Description
Tourist	The World Bank	Tourism (TOR) variable accounts for number of tourist arrivals per year (in logs)
Terrorism	Global Terrorism Database	Terrorism (TER) variable corresponds to number of terrorist attacks per year. We preferred to use number of terrorist attacks due to the fact that some of the countries has no terrorism for several years and creating an index will inflate the values of our main variable of interest.
GDP per capita	The World Bank	GDP per capita (GDPpc) in current US dollars (in logs)
Globalization Index	KOF Swiss Economic Institute	Globalization Index (KOFGI) measures the economic, social, and political dimensions of globalization.

		(in logs)
Price Level Index	The World Bank	The price level index (PLI) is the ratio of the PPP of a currency in a given economy and the US dollars. Higher PLI indicates country is expensive. (in logs)
Human Rights	https://ourworldindata.org/	Human rights (HR) encompass a wide variety of rights, including but not limited to the right to a fair trial, protection of physical integrity, protection against enslavement, the right to free speech, and the right to education.

Appendix B.1: Estimation results of Standard Panel models

	DFE	PMG
Long-run coefficients		
Terrorism	-0.00097	-0.0000
	(0.162)	(0.678)
logGDPPCurrent	0.677*	0.756***
	(0.089)	(0.000)
logKOFGI	1.986**	-0.0.80
	(0.015)	(0.757)
logPriceIndexLevels	-0.139	0.144

	(0.800)	(0.324)
Human Rights	-0.165	-0.081***
	(0.164)	(0.002)
Short-run coefficients		
Terrorism	-0.0000	-0.0095*
	(0.739)	(0.066)
logGDPPCurrent	0.867***	1.087***
	(0.000)	(0.000)
logKOFGI	0.841***	1.364**
	(0.008)	(0.008)
logPriceIndexLevels	-0.753***	-0.948***
	(0.001)	(0.004)
Human Rights	0.080*	0.111
	(0.077)	(0.361)
ECT	-0.163***	-0.299***
	(0.000)	(0.000)

Notes: Coefficients estimated by Pooled Mean Group (PMG) in the first column, Dynamic Fixed Effect (DFE) in the second column. Standard errors are in the parenthesis.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

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