

*Araştırma Makalesi/Research Article*

**EXAMINING THE CAUSAL NEXUS BETWEEN TOURIST  
ARRIVALS AND TERRORISM IN EMERGING COUNTRIES**

***GELİŞMEKTE OLAN ÜLKELERDE TURİST GELİŞLERİ İLE  
TERÖRİZM ARASINDAKİ NEDENSEL İLİŞKİSİNİN İNCELENMESİ***

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**Öz**

Bu çalışmanın amacı, turist gelişleri ile terörizm arasındaki nedensellik ilişkisini incelemektir. Çalışmada, diğer çalışmaların aksine, bir ülkenin terörizm düzeyinin belirlenmesi için Ekonomi ve Barış Enstitüsü tarafından hazırlanan Küresel Terörizm Endeksi (GTI) kullanılmıştır. 2006-2016 dönemi için on üç gelişmekte olan ülkeyi kapsayan çalışmada, daha yansız ve güvenilir sonuçlar elde edebilmek için turist gelişleri ile terörizm arasındaki nedensellik ilişkisi, Dumitrescu ve Hurlin (2012) testi ile incelenmiştir. Sonuçlar, terörizmden turist gelişlerine doğru tek yönlü bir nedenselliğin olduğunu ortaya koymuştur. Buna göre gelişmekte olan ülke yetkililerinin diğer değişkenler sabitken, turistlerin kendilerini güvende hissetmeleri ve daha fazla turist çekebilmek için güvenlik önlemleri almaları gerektiğini göstermektedir.

**Anahtar Kelimeler:** Gelen Turist, Terörizm, Yatay-Kesit Bağımlılığı, Panel Nedensellik Testi

**Abstract**

The aim of the paper is to analyze the causal nexus between tourist arrivals and terrorism. In this paper, unlike other studies, we used the Global Terrorism Index (GTI) prepared by the Institute for Economics & Peace for the determination of terrorism level of a country. For more unbiased and robust estimates, Dumitrescu and Hurlin (2012) method is employed to examine the causal nexus between tourist arrivals and terrorism in thirteen emerging countries cover the period 2006-2016. The results indicated that there is a one-way causality running from terrorism to tourist arrivals. Results suggest that emerging country authorities should increase security precautions to ensure that tourists feel safe and in order to attract more tourists, ceteris paribus.

**Keywords:** Tourist Arrivals, Terrorism, Cross-Sectional Dependence, Panel Causality Test

## GENİŞLETİLMİŞ ÖZET

### Çalışmanın Amacı:

Turizm sektörü birçok ülkede, en hızlı büyüyen ekonomik sektördür. Bir ülkedeki olumsuz olaylara hemen tepki veren sektörlerin başında turizm sektörü gelmektedir. Bu olumsuz olaylardan biri şüphesiz ki terör olaylarıdır. Bu çalışmanın amacı, turist gelişleri ile terörizm arasındaki nedensellik ilişkisini incelemektir.

### Araştırma Soruları:

Terör ile ülkeye gelen turist sayıları arasında herhangi bir nedensellik ilişkisi var mıdır?

### Literatür Araştırması:

Literatürde terör ve turizm arasındaki ilişkiyi test eden çalışmalar oldukça sınırlıdır (Enders ve Sandler, 1991; Enders vd., 1992; Fleischer ve Buccola, 2002; Drakos ve Kutun, 2003; Vivero, 2008; Yap ve Saha, 2013). Bu çalışmaların birçoğu, terörizmin turizm üzerinde önemli derecede negatif etki yarattığını ve turizm sektörüne ciddi zararlar verdiğini gösteren ampirik kanıtlar sunmuştur.

### Yöntem:

Çalışmada, diğer çalışmaların aksine, bir ülkenin terörizm düzeyinin belirlenmesi için Ekonomi ve Barış Enstitüsü tarafından hazırlanan Küresel Terörizm Endeksi kullanılmıştır. 2006-2016 dönemi için 13 gelişmekte olan ülkeyi kapsayan çalışmada, daha güvenilir sonuçlar elde edebilmek için turist gelişleri ile terörizm arasındaki nedensellik ilişkisi, Dumitrescu ve Hurlin (2012) testi ile incelenmiştir. Dumitrescu ve Hurlin (2012) panel nedensellik testinde, x ve y gibi iki durağan seri göz önünde bulundurularak panel modeli şu şekilde yazılabilir;

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t}$$
$$x_{i,t} = \delta_i + \sum_{k=1}^K \theta_i^{(k)} x_{i,t-k} + \sum_{k=1}^K \lambda_i^{(k)} y_{i,t-k} + \varepsilon_{i,t}$$

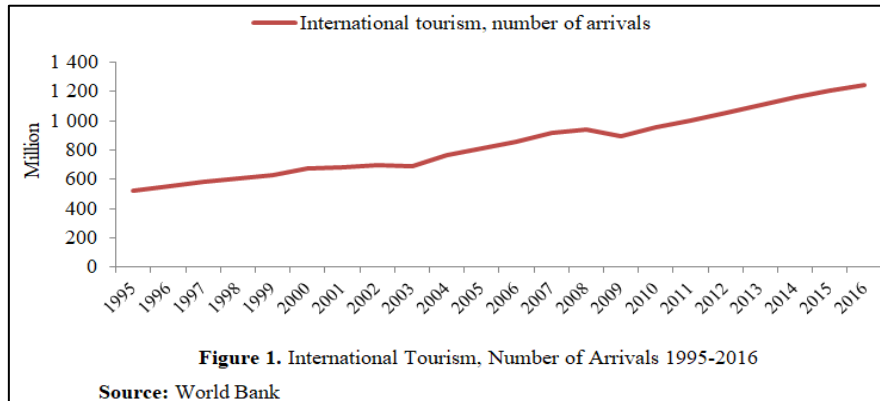
### Sonuç ve Değerlendirme:

Sonuçlar, terörizmden turist gelişlerine doğru bir nedensellik ilişkisinin olduğunu göstermiştir. Bu nedenle, politika yapıcılar sürdürülebilir turistik gelişleri için terörist saldırıları önlemek için yollar bulmalıdırlar. Ayrıca, hükümetler, turizm sektörünün terörist faaliyetlerden sonra yeniden yapılandırılabilmesi için turist destinasyonuna maddi destek sağlamalıdır. Hükümet, terörist tarafından saldırıya uğramış olan bölgeleri kredi, vergi indirimi ve çeşitli mali yardımlarla desteklemelidir. Terör eylemleri nedeniyle ülkeler için olumsuz bir imaj varsa, uluslararası düzeyde tanıtım kampanyaları düzenleyerek bu imajı kaldırmak için çalışmalar yapılmalıdır.

## INTRODUCTION

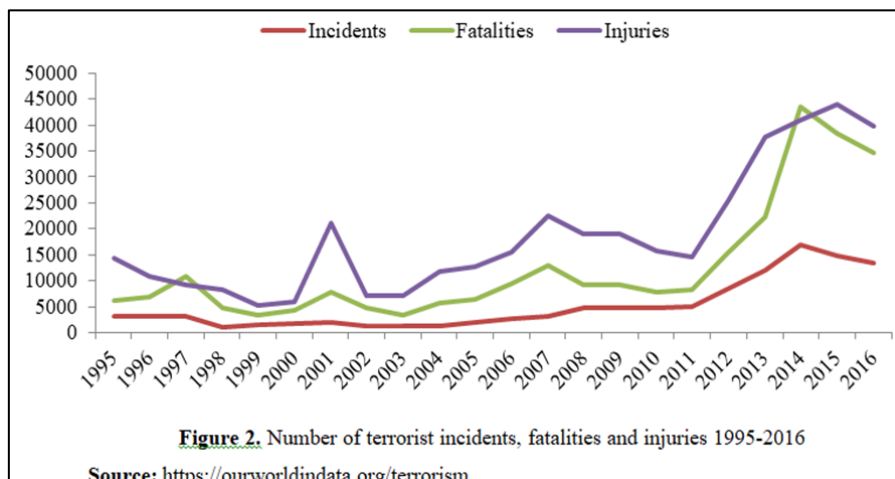
The tourism sector is one of the world's well-known economic sectors. In many countries, it is the fastest growing economic sector. According to the World Tourism Organization, the number of tourist arrivals raised from 25 million in 1950 to 677 million in 2000 to 1322 million in 2017 (Figure 1).

The sector provides many benefits, including creating jobs and foreign exchange earnings, especially for emerging countries. In these countries developing of the tourism sector is the major driving force of growth, prosperity and contributes to the reduction of poverty. The sector also has contributions on improving the country's infrastructure such as roads, internet, electricity and public transport networks.



Researchers suggested that tourism has positive effects on economic growth, foreign exchange earnings, investments, and employment. In this respect, the tourism sector offers an opportunity to integrate developing countries with the world economy. On the other hand, contraction of the tourism sector for any reason will affect economic growth as well as other sectors of the economy. The sector that immediately responds to the negative actions and events in a country is the tourism sector. One of these negative actions and events is undoubtedly terror events.

Piterman (2000) and Lennon & O'Leary (2004) stated that terrorism has a very rapid effect on tourism and that the tourism is more influenced sector by terrorism than other sectors. If a country is exposed to terrorist incidents, tourists may worry about their lives and give up traveling. Tourists are rational consumers. While tourists compare two trips, they consider the relative prices of destinations. If the benefits of the two destinations are equal, then the tourist will prefer a destination that has a smaller relative price. These relative prices include the exchange rate, travel and accommodation costs, and trip-related risk factors. The threat of terrorism in the destination will increase the relative cost of travel and encourage tourists to travel elsewhere. Rafael (2008) and Thompson (2011) stated that emerging countries are more affected by terrorist incidents than developed countries.



In recent years, terrorist activities have increased in many countries. According to the Institute for Economics & Peace Global Terrorism Index 2017 Report, since 2002, terrorist activities have increased in eight of the nine regions and at least one terrorist attack occurred in 106 countries in 2016. The report also stated that the deaths from terrorism increased by 67 percent from 2006 to 2016 in the world (Figure 2).

The studies testing the nexus between terror and tourism are very limited. There have been few empirical studies such as Enders & Sandler, 1991; Enders et al., 1992; Fleischer & Buccola, 2002; Drakos & Kutan, 2003; Vivero, 2008; Yap & Saha, 2013. Most of the studies provide empirical evidence that terrorism has significant reverse effects on tourism and it causes significant damage on tourism sector. Enders & Sandler (1991) argued the relationship over the period 1970-1988 in Spain and found a significant reverse impact of terrorism on tourism. Also they stated there is causality running from terrorism to tourism that our evidence is consistent with their result. Enders et al. (1992) studied the linkage in twelve Europe countries and they concluded that terrorism has a reverse effect on tourism revenues. Fleischer & Buccola (2002) tested the impact of terrorism on tourism in Israel and revealed terrorism had negative effects on tourism revenues. Drakos & Kutan (2003) studied the impact of terrorism on tourist demand in Greece, Turkey, and Israel and found that terrorist incidents had a reverse effect on tourism demand. Vivero (2008) analyzed the effect of terrorism on tourism taking into account 134 destinations, concluded that tourism revenues were negatively affected by terrorism. Yap & Saha (2013) tested the impacts terrorism and corruption on tourism and stated that terrorism has a reverse impact on tourism demand.

In Turkey, Feridun (2011) stated that there is a reverse nexus between tourism and terrorism in the long-term. Guvenek & Alptekin (2015) found that terrorist attacks on tourists had no impact on the tourist arrivals to Turkey. Karacuka & Celik (2016), Celik & Karacuka (2017) determined that whether terrorist activities had a weak effect on the tourism demand in Turkey.

This study differs from the current literature in several ways. First, the study focuses on the cross-country relationship between terrorism and tourist arrivals in emerging countries which is exposed to increasing number of terrorist incidents. Second, we provide new empirical evidence, whereas earlier cross-sectional papers cover data from the 1970s to 2000s. Third, unlike other studies, Global Terrorism Index (GTI) considered as the most comprehensive dataset on the level of terrorism has been taken into account in determining the level of terrorism in the country. GTI prepared by the Institute of Economics & Peace is used to determine terrorism level of an individual country. The GTI scores for each country range from 0 to 10; where 0 indicates no terrorism effect and 10 indicates the highest effect of terrorism in the country.

Finally, although causality between tourist arrivals and terrorism has been previously tested in panel data, it is observed that the literature mostly does not take into account the heterogeneity and cross-sectional dependence of the series. For this reason, the study aims to contribute to the literature by applying Dumitrescu & Hurlin (2012) panel causality test considering cross-sectional dependence and heterogeneity in panel data, to present more robust estimates.

The rest of the study is structured as follows. Section 1 explains the data and methodology employed in this study. Section 2 presents the findings. Finally, Section 3 summarizes and concludes the study.

## 1. DATA AND METHODOLOGY

We used annual data of tourist arrivals and terrorism index obtained from the World Bank and Institute for Economics & Peace Global Terrorism Index respectively, for Argentina, Brazil, China, Egypt, Hungary, Indonesia, Malaysia, Mexico, Philippines, Russia, South Africa, Thailand and Turkey during the period 2006 to 2016 to examine the causality nexus between tourist arrivals and terrorism. The countries included in the study are dictated by data availability. All series are in their natural logarithms.

The GTI is published by the Institute for Economics and Peace. In the GTI, the terrorism of score each country is calculated based on four indicators. These indicators include the number of terrorist activities in a year, the number of deaths due to terrorism in a year, the number of injuries due to terrorism in a year, and total property damage due to terrorism in a year. GTI scores scale from 0 to 10; where 0 shows terrorism has no effect in the country, while 10 shows terrorism effect is very high in the country.

Prior to examining the causal relationship, due to cross-sectional dependence and heterogeneity makes the estimation results biased in panel data, it is very crucial to test whether there are cross-sectional dependence and heterogeneity in the whole panel data. To test slope homogeneity, we used Pesaran-Yamagata (2008) Swamy test. The null hypothesis of the test is slope coefficients are homogeneous. test can be calculated as following steps (Dogru & Bulut, 2018: 432):

$$\bar{S} = \sum_{i=1}^N (\hat{\beta}_i - \bar{\beta}_{WFE})' \frac{X_i' M_T X_i}{\hat{\sigma}_i^2} (\hat{\beta}_i - \bar{\beta}_{WFE}) \tag{1}$$

where

$$\hat{\sigma}_i^2 = \frac{(y_i - X_i \hat{\beta}_i)' M_T (y_i - X_i \hat{\beta}_i)}{(T - k - 1)}$$

where  $M_T$  is an identity matrix of order  $T$  and  $\hat{\beta}_{WFE}$  is the weighted fixed effect pooled estimator defined as

$$\bar{\beta}_{WFE} = \left( \sum_{i=1}^N \frac{X_i' M_T X_i}{\hat{\sigma}_i^2} \right)^{-1} \sum_{i=1}^N \frac{X_i' M_T y_i}{\hat{\sigma}_i^2} \tag{2}$$

The small sample properties of the  $\Delta$  test can be improved under the normally distributed errors by using the following mean and variance bias adjusted type of  $\Delta$ .

$$\bar{\Delta}_{adj} = \sqrt{N} \left( \frac{N^{-1} \bar{S} - E(\bar{z}_{iT})}{\sqrt{\text{Var}(\bar{z}_{iT})}} \right)$$

where

$$E(\bar{z}_{iT}) = k, \quad \text{Var}(\bar{z}_{iT}) = \frac{2k(T - k - 1)}{T + 1} \tag{3}$$

To test cross-sectional dependence, Breusch & Pagan (1980), Pesaran (2004) scaled LM and Pesaran et al. (2008) CD tests are used.

Breusch and Pagan (1980) test statistic is identified as (Pesaran et al., 2008):

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \bar{\rho}_{ij}^2, \chi^2 N(N-1)/2 \tag{4}$$

Under the null hypothesis, the LM test has asymptotic distribution  $N(N-1)/2$  in degrees of freedom. The LM test is valid when N is small and T is large enough. The test statistic developed by Pesaran (2004) is formulated as follows: (Pesaran et al. 2008):

$$CD = \sqrt{\frac{2T}{N(N-1)} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^N \bar{\rho}_{ij} \right)} \quad (5)$$

Under the null hypothesis, when T is large enough; the limit of N (0, 1) function is  $N \rightarrow \infty$ . Also, unlike the LM test, the mean values of the constant T and N are zero.

Pesaran et al. (2008) has developed  $CDLM_{adj}$  using the variance and mean of the LM statistic.

$$LM(\rho)_{adj} = \sqrt{\frac{2}{\rho(2N - \rho - 1)}} \sum_{s=1}^p \sum_{j=1}^{N-s} \frac{(T-k)\bar{\rho}_{i,i+s}^2 - \mu_{T,i+s}}{\sigma_{T,i+s}} N(0,1) \quad (6)$$

$M_{Tij}$  and  $V_{Tij}$  indicate the mean and variance respectively. It has asymptotically normal distribution under the null hypothesis.  $LM_{adj}$  asymptotically has normal distribution when  $T \rightarrow \infty$  is the first and then  $N \rightarrow \infty$  is converged, under the null hypothesis. The null hypothesis indicates there is no cross-sectional dependence.

If cross-sectional dependence is determined, the second generation panel unit root test should be employed. Thus, Pesaran (2007) panel unit root test (CIPS) considering cross-sectional dependence and heterogeneity, is employed to determine the integration order of the series and also to avoid possible spurious relationships. Also to run the Dumitrescu and Hurlin (2012), panel variables should be stationary. The CIPS test estimate gives unbiased results regardless of whether N or T is relatively small (Dogru & Bulut, 2018: 429).

The t statistic  $t_i$  of CIPS test developed by Pesaran (N, T) is shown in Equation (7) (Pesaran, 2007):

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + e_{it} \quad (7)$$

$$t_i(N, T) = \left( \frac{\Delta y'_i \bar{M}_w y_{i-1}}{\bar{\sigma}(y'_{i-1} \bar{M}_w y_{i-1})^{1/2}} \right) \quad (8)$$

Panel model statistics can be computed as follows:

$$CIPS(N, T) = t\text{-bar} = N^{-1} \sum_{i=1}^N t_i(N, T) \quad (9)$$

The CIPS statistics are calculated by the average of t statistics of each cross-section. Dumitrescu & Hurlin (2012) method is employed to examine the causal nexus between tourist arrivals and terrorism. The most important advantage of the method is the taking into account cross-sectional dependence and heterogeneity. The test also can be used when  $T > N$  or  $N > T$  and can estimate robust estimations in unbalanced panel data (Dumitrescu & Hurlin, 2012: 1457).

In the Dumitrescu & Hurlin panel causality test, considering two stationary series such as x and y, panel model can be written as follows;

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (10)$$

$$x_{i,t} = \delta_i + \sum_{k=1}^K \theta_i^{(k)} x_{i,t-k} + \sum_{k=1}^K \lambda_i^{(k)} y_{i,t-k} + \varepsilon_{i,t} \quad (11)$$

where  $y$  is tourist arrivals and  $x$  is terrorism index. The null hypothesis defined as there is no causality between any cross-section units,  $H_0: \beta_i=0, (i=1,.., N)$ .

## 2. EMPIRICAL RESULTS

Table 1 presents the results of cross-sectional dependence and homogeneity of the model. The findings show that the null hypothesis of no cross-sectional dependence and null hypothesis of homogeneity are rejected at %1 statistical significance level.

**Table 1.** Cross-sectional Dependency and Homogeneity Tests

| Cross-sectional dependency tests | Statistic | p-values |
|----------------------------------|-----------|----------|
| Breusch-Pagan LM                 | 454.6846  | 0.000    |
| Pesaran scaled LM                | 30.15891  | 0.000    |
| Pesaran CD                       | 16.44265  | 0.000    |
| Homogeneity tests                | Statistic |          |
| $\bar{\Delta}$                   | 2.332     | 0.001    |
| $\bar{\Delta}_{adj}$             | 2.693     | 0.000    |

Since the existence of cross-sectional dependence and heterogeneity is determined, the CIPS panel unit root test is applied to test the stationary levels of the series. The results of CIPS panel unit root test are presented in Table 2. Due to test statistics are upper than critical values, the null hypothesis indicates there is unit root is rejected at %5 statistical significance level.

**Table 2.** CADF Panel Unit Root Test

|            | t-bar  | Z[t-bar] | p-value |
|------------|--------|----------|---------|
| LTERRORISM | -2.928 | -2.302   | 0.028   |
| LARRIVALS  | -3.404 | -3.474   | 0.002   |

Notes: Pesaran (2007) critical values at 1%, 5%, and 10% significance levels are 2.97, 2.52, and 2.31, respectively.

Then Dumitrescu & Hurlin (2012) test is employed to test the causal nexus between tourist arrivals and terrorism. Dumitrescu & Hurlin panel causality test results are presented for  $k=2$  in Table 3. The findings denoted that the null hypothesis indicates no causality running from tourist arrivals to terrorism is accepted, while the null hypothesis indicates no causality from terrorism to tourist arrivals is rejected at 5% level of significance.

**Table 3.** Dumitruscu and Hurlin (2012) Panel Causality Test

| Null hypothesis                  | W-Stat  | Zbar-Stat | p-value |
|----------------------------------|---------|-----------|---------|
| LTERROR does not cause LARRIVALS | 3.35380 | 2.46510   | 0.0137  |
| LARRIVALS does not cause LTERROR | 1.92654 | 0.65721   | 0.5110  |

## CONCLUSION

The tourism sector takes an influential place in the economic performance of the emerging countries. Recent developments in the international tourism sector indicate that the sector is the fastest growing sector. On the other hand, the sector is sensitive to terrorist activities. In this study, the causal nexus between tourist arrivals and terrorism are examined by using panel data in the thirteen emerging countries during the period 2006-2016. Firstly, cross-sectional dependence and homogeneity are tested. Due to model contain cross-sectional dependence and heterogeneity, stationary levels of the series are analyzed by CIPS. Unit root test results denoted that both series are stationary at level. Then Dumitrescu & Hurlin (2012) panel causality test is employed to panel data. Thus, the estimation results of the causal relationship between tourist arrivals and terrorism are expected to robust and unbiased. Results showed that there is a causality relationship, running from terrorism to tourist arrivals.

These results are guidance for governments in order to improve the tourism sector in emerging countries. Thus, policymakers must find ways to prevent or reduce terrorist attacks for sustainable tourist arrivals, *ceteris paribus*. Also, governments should provide financial support for the tourist destination so that the tourism industry can be restructured after the terrorist activities. The government must support territories that have been attacked by terrorist with credit, tax discount, and various financial allowances. Countries should support activities against international terrorism. After the terrorist event, the boundaries for the publication of images and news that will harm the sector should be determined. If there is a negative image for the countries due to terrorist activities, activities should be carried out in order to remove this image by launching promotional campaigns at international level.



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