Assessing the costs of instability for tourist-based economies: the case of the Mediterranean countries

Mariam T. Karam

A thesis submitted in conformity with the requirements
for the MSc in Economics, Finance and Computer Science

University of Huelva & International University of Andalusia

November 2017

Assessing the costs of instability for tourist-based economies

Mariam T. Karam

Master in Economics, Finance and Computer Science

Emilio Congregado

Universidad de Huelva y Universidad Internacional de Andalucía

2017

Abstract

This paper deals with the evaluation of the influence of an extreme form of instability –terrorism attacks– on the tourist demand. To this end this study investigates the relationship between terrorism, as extreme way of instability and tourism demand, in 21 Mediterranean countries. This region is a suitable case of study since it combines countries in different stages of development but with high interdependences which turn them in competitors. The hypotheses of this study are derived running regressions by using a panel data set of these countries during the period 2000-2015, gently provided by the UNWTO for this study. To assess the contribution instability and other factors make to the tourism industries in these countries we report estimates on the responsiveness of the tourism development to different indicators by using linear and non-linear panel data models.

The results conclude terrorist events, damages the country's tourist sectors, specially to the subset of low-income countries in the region. On the other hand, results seem to point out that the magnitude of the mass murder doesn't matter. Then conflicts, instability and terrorism are clearly associated to a deterioration of the tourism in countries like the Mediterranean ones in which this sector is a key for their national strategies of development.

JEL classification: L83, C23

Key words: tourism economics, panel data, instability, tourist arrivals, tourism industry, terrorism, public intervention, Mediterranean countries.

Resume

This work deals with the evaluation of the impact on tourism demand of an extreme form of instability: terrorist attacks. For this, the relationship between terrorism and tourism demand in 21 Mediterranean countries is analysed. This region is a desirable case study since it combines countries of different stages of development that compete in the tourism sector and which in turn are subject to different types of instability, so that there are many interdependencies among them. In order to contrast the hypotheses presented, the results obtained from the regressions of different linear and non-linear models are used based on a data panel from these countries in the period 2000-2015, provided by the UNWTO for this study.

The results suggest that terrorist attacks damage national tourism sectors, although with greater incidence in low income countries in the region. On the other hand, the data seem to indicate that the magnitude of the assassination does not matter. Therefore, conflicts, instability and terrorism cause deteriorations in the tourism sector that are especially relevant in developing economies where the development of this sector is one of the key leaders of their development strategies.

Acknowledgments

I would like to thank Professor Congregado to help me with this project, for letting me make wrong to learn and guide me when I could not find the way. I also wanted to thank him for his availability, always looking for a few minutes for me. In addition to the time he has used in revising me numerous times the project. He has been a source of learning at all levels and that is why I admire and respect him infinitely. Finally, my thanks go to my family and friends, for their great support and especially my mother for her patience to support being far away from me one year of our life time, love you so much mom.

Table of Contents

List of Tables

1. Introduction

Political stability and safety are necessary conditions for tourism. Negative perceptions of a tourist destination can persist for decades and affect a whole country, and in certain conditions, instability in one country or group of countries can have positive effects on the tourism sector of competitors, in some cases neighbouring countries.

In the Mediterranean area some emerging countries – especially north African and in the Middle East have based their national strategies of economic development in the international tourism and in tourism receipts, competing with some consolidated European tourist destinations in the Mediterranean and South Atlantic coast.

Political instability, the civil unrest, kidnappings, terrorist attacks and violence in some countries have led to opposite effects for these two groups of Mediterranean countries. On the one hand, the impact of insecurity will cause a decline in the number of international tourists and in tourism receipts with a potential negative externality on destinations with complementarities –e.g. countries belonging or being part of a common itinerary–. By contrast, some regions in neighboring countries –competitors the same area– experience a boom, a positive externality, since are considered safer, by international tourists. Then, the impact of these events on the tourisms sector's evolution is twofold: first, a damage on the less safety countries in terms of receipts, foreign trade, foreign investments, that is a negative shock on the whole of the economy, and at the same time this loss of arrivals goes to other countries competitors.[1]

To deal with such situations, after the negative impact the recovery is slow and maybe requires an action plan for combating the loss of image and international reputation. The discussion above raises a number of questions about the causes and consequences of the deep of economic downturn

[1] It is also very likely that domestic tourism declines. However, these effects are out of the aim and scope of our analysis.

created by these events and the positive externalities on the competitor destinations and on the persistence of these negative shocks on the figures in the tourist sector.

The cost of instability for emerging countries, especially for countries in which the tourist industry is a key pillar of the national strategy of economic development, is a hot policy issue. That is the case of the North African Mediterranean countries for which the damage of instability has become in a major issue. This paper aims to show that the damage done by one of the extreme forms of instability (violence and terrorism) can be empirically measured in order to capture not only negative effects but also positive externalities for some competitors.

To this end, we briefly review previous essays on how the impact of instability and terrorism on tourist industry has been measured and treated by previous literature. After that, we provide a framework for analyzing the impact of terrorism on tourism, expenditures and foreign arrivals to a specific country, by using different indicators of terrorism events.

The rest of the paper is structured as follows. Section 2, provides a selective overview on the relationship between terrorism and tourism. Section 3 presents the econometric framework and data. Section 4 discusses the results while section 5 concludes and presents some avenues for further research.

2. Literature review[2]

Some studies (Neves and Macas, 2008) emphasise the relation existent between tourism and economic growth, reflecting that, by general rule, tourism has a positive effect in both, developed and underdeveloped countries. In some countries, the development of this sector has become a leader key of the national strategy of economic development. However, some essentials for tourism are not compatible with some characteristics of these countries. Political instability and violence are incompatible with the development of the tourism sector and benefiting directly to other (competitors) destinations which are more stable. In general, previous literature agrees in that tourism promotes economic growth and a positive correlation between economic growth and specialized tourism (see e.g. Antonakakis, Dragouni & Filis, 2015; Dritsakis 2004; Tugcu 2014, Aslan, 2014, Chou, 2013, Oh 2005)[3].

Tourists have become a frequent target of terrorist activities in recent years. Examples are the Luxor massacre in 1997, in which members of an Egyptian Islamic group shot dead 58 foreign tourists visiting the temple of Queen Hatshepsut in the Valley of the Queens. As consequence of these attacks, the individuals planning their holidays are less probable to choose a destination with a higher risk of terrorist attacks. Host countries providing tourism services, which can be easily substituted are, therefore, negatively affected by terrorist attacks with an extensive range. The bombing, shooting and kidnapping of tourists becomes attractive strategies for terrorists who want to cause economic loss, when pursuing their political goals. There is a fast growing literature evaluating the effects of terrorism on tourism, focusing on the number of tourists and lost revenues in the industry.

---

[2] The terrorism's impact on various aspects of the economy includes at least arrivals, GDP and investment. The effect of terrorism on collective consumption and savings is important as it influences the investment level and, hence, economic growth. In that sense one could argue that political violence not only affects the level of investments but also the composition of investments. There is also a body of literature devoted to the evaluation of the macroeconomic impacts of the terrorism (See e.g. Abadie and Gardeazabal 2003, Blomberg et al. 2004a; Blomberg et al. 2004b and Eckstein and Tsiddon 2004). However, these relationships are out of the aim and scope of this paper.

[3] See Pablo-Romero & Molina (2013) for a survey.

A primary, important paper, of Enders and Sandler (1991) study the relationship between international terrorism and tourism in Spain. They use monthly data on terrorist occurrences and linked it with the number of foreign visitors in Spain between 1970 and 1988, applying VAR methodology. It is estimated that a typical terrorist act in Spain scares over 140,000 tourists.

In 1988, 5.392 million foreigners visited Spain and 18 international terrorist incidents took place. Hence without these incidents, 1.5 times as many tourists would have visited Spain in the same year.

Fleischer and Buccola (2002) have made a study of the impact of terrorism in the touristic sector in Israel, shows that foreign demand and equilibrium prices are allowed to be influenced by a monthly index, capturing the severity of the terrorist movement in Israel. The annual revenue losses between 1992 and 1998 in the market with foreign visitors sum up to approximately $50 million (1998 present value discounted at 5%) or 1.27% of total revenues in this period. Though these revenue losses are relatively modest, they increase with a deterioration of the situation. In 1996, a year of Middle East unrest, the revenue shortfall amounted to 2.55%. Estimated impacts of terrorism on tourism vary considerably, because the structure of the tourism industry and terrorism campaigns differ, not only across countries, but also over time.

This fact highlights the importance of differentiating between different types of attacks, the locations and the number of casualties (see e.g. Drakos and Kutan 2003).

A note of caution is in order with regard to the temporal patterns of the impact of terrorism on tourism. The temporal pattern depends on the type of attacks in a particular country, and the market structure as well as the type of time-series used by researchers. Time-series on the number of actual visits are likely to respond more quickly to a terrorist incident than time-series on tourism revenues.

To summarize, terrorism systematically influences tourist's choice of destination and can, substantially negatively affect a host country. Furthermore, the effect is long-lasting and has an influence on the demand for tourism in neighboring countries.

On the basis of the discussion above, one could hypothesise that international arrivals will be negatively affected by terrorist attacks causing important economic losses and leading a

reallocation of this tourism services in safer areas. On the other hand, one could argue that the frequency of these events may have more negative effects that the size of the attack. To test these two hypotheses, we suggest the strategy presented in the next section.

3. Data, methodology and variables

Data and variables

The data we use for this study consist of a balanced panel of 336 observations from 21 Mediterranean countries and a set of economic and non-economic indicators from 2000 to 2015. The available information includes tourism and macroeconomic indicators, and statistics on terrorist attacks and injured and killed persons. Data for the study were extracted from the World Tourism Organization, Yearbook of Tourism Statistics and Compendium of Tourism Statistics and from the Global Terrorism Database.

Initially, the dataset includes a set of 21 countries European, Asian and African countries that border the Mediterranean Sea (Albania, Algeria, Bosnia & Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey). However, and due to the lack of data, Syria, Monaco, Libya, Montenegro and Lebanon are excluded in some regressions.

International tourism expenditures (current US$): International tourism expenditures are expenditures of international outbound visitors in other countries. Data are in current U.S. dollars.

International tourism, number of arrivals: International inbound tourists (overnight visitors) are the number of tourists who travel to a country other than that in which they have their usual residence, but outside their usual environment, for a period not exceeding 12 months and whose main purpose in visiting is other than an activity remunerated from within the country visited.

For the type of extreme instability and violence considered in our study and as it is usual, we use the *number of terrorist incidents*. Thus, measuring the number of incidents makes sense if the percentage of hostage, killed or injured, and the number of major attacks remains approximately constant. An important problem is that only those terrorist events reflected in official statistics and reported in the media are counted. The media only pick up on some terrorist events, mostly those occurring in the larger cities or the capital of the country. The problems associated with the limits of comparing different types of attacks and of unfair or partial reporting of attacks have been

addressed in various ways in the literature. The analysis is usually limited to developed countries where the reporting bias is less of a problem. As well as, the consequences are often estimated for a small number of countries, or even a single country, where modes of attack are comparable across countries and over time. In the case of international terrorism, where foreign interests are involved, the reporting bias is likely to be less severe. Employing the GLOBAL Terrorist Database START National Consortium for The Study of Terrorism and Responses to Terrorism covering the annual number of incidents of international terrorism and the number of fatalities for the countries covered in our study.

The Global Terrorism Database (GTD), maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START), University of Maryland.[4] From this database we draw information about the following indicators:

Number of injuries

Number of total attacks

Number of victims killed in an attack

Methodology

The empirical strategy adopted combines two complementary approaches for panel data. First, we report estimates of different estimators for linear panel data models.

The baseline model is:

$$y_{it} = \mu_i + \beta' x_{it} + e_{it} \quad (3.1)$$

with the well-known properties.

In this model, the indicator of the demand is determined by a set of factors including the number of attacks and the damages caused by them. In a certain extent, we consider that each country is

[4] An exhaustive codebook can be download at: https://www.start.umd.edu/gtd/downloads/Codebook.pdf

different, since the estimated relationships may vary across individuals. However, the fixed effect or random effect reflects only the 'heterogeneity in intercepts'. However, we also consider a 'varying slope' models. In particular, we run the Hansen's (1999) panel threshold model in order to check whether we can find a different effect of our main explanatory variable depending on the regime. These regimes are defined by a threshold variable, the GDP per capita, in our case.

The model is now:

$$y_{it} = \mu_i + \beta_1' x_{it}(q_{it} < th) + \beta_2' x_{it}(q_{it} \geq th) + e_{it} \quad (3.2)$$

where q_{it} is the threshold variable and *th* the threshold parameter that divides the equation into two regimes with coefficients b_1', b_2'. The parameter μ_i is the individual (fixed) effect, while $e_{it} \sim (0, \sigma^2)$ is the disturbance.

Variables

The dependent variable is the international tourism expenditures that is the expenditures of international visitors the *i-th* country. Each of these indicators treat to capture a different aspect or dimension –frequency, quantitative or qualitative magnitude– of these events.

Finally, in the analysis we include a control variable, region dummies in order to control the unobservable heterogeneity.

4. Results

The main aim of this work is to investigate whether the national demand in the tourism sector depends not only on the arrivals or business cycle phase, but also on the existence of adverse shocks caused by terrorism attacks. Model 3.1., presented in the previous section is the baseline model of our estimations.

Tables 1, 2 –in the appendix– reports the estimates of our balanced panel. Table 1 reports the fixed effects estimator or within while table 2 reports the results of the random effects model. Table 3, report the well-known Hausman's test (Hausman, 1978) is the standard test for discriminating between fixed versus random effects in panel data models.

Our results suggest that the number of attacks is negatively related to the expenditures. We also expected a positive relationship between our explanatory variable and the level *per capita income and the number of arrivals*. The coefficients associated to these two variables are statistically significant and with the expected sign.

Contrary to our expectations, the number of killed is not statistically significant. The number of injured is not significant either. The reason for this result may be related with the fact that the perception of instability depends on the frequency of the terrorist attacks instead of the type and magnitude of them.

On the other hand, note that values of the estimated coefficients are very similar among different models.

Finally, we provide evidence in favour of the existence of idiosyncratic factors in each country.

Table 4 presents the results for the non-linear specification (3.2), that is with regime intercepts. In the selected specification, the GDP per capita is used as threshold while the non-linearity is introduced for our key variable: the number of registered attacks The null hypothesis of no threshold can be rejected at the 5% significance level, while the presence of one threshold cannot be rejected. Results are very similar to the results of the linear case. We find strong statistical

evidence on the positive effect of arrivals, GDP and the number of attacks on the demand indicator. However, now, the model defines two regimes. On the one hand, when the GDP per capita is below the threshold –low income countries in the sample– the number of attacks have a significant negative effect on expenditures, while a positive impact is found when the GDP is above the threshold.

This last result, apparently contradictory, could be interpreted in terms of that even when the attack is located at one of the high-income countries, the instability is interpreted by tourist for the area as a whole, but even at this case, they consider that high income countries are safer than the low income countries. The results from the specification with a regime intercept are in line with those by previous literature.

From a policy perspective, choosing the correct specification and controlling the existence of different regimes has important implications in order to understand the interdependence. Keeping political stability seems to be then a prerequisite for an adequate development of the tourism sector.

5. Conclusions and avenues for future research

This article evaluated the frequency and magnitude of terrorism attacks on the tourist demand for a set of Mediterranean countries with two characteristics: they are competitors and they are in different stages of development. By using linear and non-linear models for panel data, our results confirm that terrorist events, damages the country's tourist sectors, especially in the subset of low-income countries in the region. On the other hand, results seem to point out that the magnitude of the mass murder doesn't matter. Then conflicts, instability and terrorism are clearly associated to a deterioration of the tourism in countries like the Mediterranean ones in which this sector is a key for their national strategies of development. Our results suggest that the number of terrorist attacks is a good predictor of the international tourism demand.

An important and pending research question concerns the durability of these negative shocks that is whether the demand is trend (-or broken trend-) stationary in which case terroristic attacks will have only temporary effects. To explore whether terroristic events have different and potentially durable long-run effects is a key question for devising strategies for recovering the reputation of the damaged destinations.

6. 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.

Antonakakis, N., Dragouni, M., & Filis, G. (2015). How strong is the linkage between tourism and economic growth in Europe?. *Economic Modelling*, *44*, 142-155.

Aslan, A. (2014). Tourism development and economic growth in the Mediterranean countries: evidence from panel Granger causality tests. *Current Issues in Tourism*, *17*(4), 363-372.

Blomberg, S.B. Hess, G.D., Orphanides, A (2004). The macroeconomic consequences of terrorism. *Journal of Monetary Economics,* 51(5): 1007-1032.

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.

Eckstein, Z. & Daniel Tsiddon, D. (2004). Macroeconomic Consequences of Terror: Theory and the Case of Israel. Journal of Monetary Economics, 51(5): 971-1002

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference, Journal of Econometrics 93: 345–368.

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference, Journal of Econometrics 93: 345–368.

Hsiao, C. (2003), *Analysis of Panel Data*, second edition, Econometric Society. Monographs, Cambridge University Press.

Oh, C. O. (2005). The contribution of tourism development to economic growth in the Korean economy. Tourism management, 26(1), 39-44.

Pablo-Romero, M.D.P., & Molina, J. A. (2013). Tourism and economic growth: A review of empirical literature. *Tourism Management Perspectives*, *8*, 28-41.

Sequeira, T. N., & Maçãs Nunes, P. (2008). Does tourism influence economic growth? A dynamic panel data approach. *Applied Economics*, *40*(18), 2431-2441.

Tugcu, C. T. (2014). Tourism and economic growth nexus revisited: A panel causality analysis for the case of the Mediterranean Region. *Tourism Management*, *42*, 207-212.

Appendix

Table 1. **Fixed effects**

```
      Source |       SS       df       MS              Number of obs =     256
-------------+------------------------------           F( 20,   235) =  327.80
       Model |  3.4168e+22    20  1.7084e+21           Prob > F      =  0.0000
    Residual |  1.2248e+21   235  5.2118e+18           R-squared     =  0.9654
-------------+------------------------------           Adj R-squared =  0.9624
       Total |  3.5393e+22   255  1.3880e+20           Root MSE      =  2.3e+09

------------------------------------------------------------------------------
 expenditure |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    arrivals |   168.1028   44.58816     3.77   0.000     80.25918    255.9463
       gdppc |     378375   34277.79    11.04   0.000       310844      445906
     nattack |  -1.18e+07    4946746    -2.38   0.018    -2.15e+07    -2041386
       nkill |    5160270    3191293     1.62   0.107     -1126928    1.14e+07
      nwound |    1054934    1053908     1.00   0.318     -1021380     3131249
       _Iid_2 |  -8.24e+08   8.10e+08    -1.02   0.310    -2.42e+09    7.73e+08
       _Iid_3 |  -8.45e+09   1.11e+09    -7.61   0.000    -1.06e+10   -6.26e+09
       _Iid_4 |  -1.28e+09   9.26e+08    -1.39   0.166    -3.11e+09    5.39e+08
       _Iid_5 |   7.08e+08   8.89e+08     0.80   0.426    -1.04e+09    2.46e+09
       _Iid_6 |  -3.78e+09   2.39e+09    -1.58   0.115    -8.49e+09    9.22e+08
       _Iid_7 |   1.62e+10   3.30e+09     4.91   0.000     9.69e+09    2.27e+10
       _Iid_8 |  -6.87e+09   1.08e+09    -6.36   0.000    -9.00e+09   -4.74e+09
       _Iid_9 |  -4.42e+09   8.73e+08    -5.06   0.000    -6.14e+09   -2.70e+09
      _Iid_10 |  -5.64e+09   1.18e+09    -4.79   0.000    -7.96e+09   -3.32e+09
      _Iid_11 |   6.79e+09   1.92e+09     3.53   0.000     3.01e+09    1.06e+10
      _Iid_12 |  -2.94e+08   8.48e+08    -0.35   0.729    -1.97e+09    1.38e+09
      _Iid_13 |  -6.53e+09   9.67e+08    -6.75   0.000    -8.43e+09   -4.62e+09
      _Iid_15 |  -6.33e+09   9.87e+08    -6.41   0.000    -8.28e+09   -4.39e+09
      _Iid_16 |  -1.49e+09   8.32e+08    -1.79   0.074    -3.13e+09    1.47e+08
      _Iid_17 |  -3.04e+09   1.29e+09    -2.35   0.019    -5.59e+09   -4.97e+08
        _cons |  -4.15e+08   5.81e+08    -0.71   0.476    -1.56e+09    7.30e+08
------------------------------------------------------------------------------
```

```
. xtreg expenditure arrival gdppc nattack nkill nwound, fe

Fixed-effects (within) regression               Number of obs      =       256
Group variable: id                              Number of groups   =        16

R-sq:  within  = 0.4481                         Obs per group: min =        16
       between = 0.7999                                        avg =      16.0
       overall = 0.7737                                        max =        16

                                                F(5,235)           =     38.17
corr(u_i, Xb)  = 0.4776                         Prob > F           =    0.0000

------------------------------------------------------------------------------
 expenditure |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    arrivals |   168.1028   44.58816     3.77   0.000     80.25918    255.9463
       gdppc |     378375   34277.79    11.04   0.000       310844      445906
     nattack |  -1.18e+07    4946746    -2.38   0.018    -2.15e+07    -2041386
       nkill |    5160270    3191293     1.62   0.107     -1126928    1.14e+07
      nwound |    1054934    1053908     1.00   0.318     -1021380     3131249
       _cons |  -1.99e+09   7.42e+08    -2.69   0.008    -3.46e+09   -5.33e+08
-------------+----------------------------------------------------------------
                             sigma_u |  6.052e+09
                             sigma_e |  2.283e+09
                 rho |  .87544508   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(15, 235) =    47.85             Prob > F = 0.0000
```

Table 2. **Random effects**

```
. xtreg expenditure arrival gdppc nattack nkill nwound, re

Random-effects GLS regression                   Number of obs      =       256
Group variable: id                              Number of groups   =        16
R-sq:  within  = 0.4411                         Obs per group: min =        16
       between = 0.8498                                        avg =      16.0
       overall = 0.8224                                        max =        16
                                                Wald chi2(5)       =    268.90
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
------------------------------------------------------------------------------
 expenditure |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    arrivals |   253.9752   34.87566     7.28   0.000     185.6201    322.3302
       gdppc |   357758.8   33411.52    10.71   0.000     292273.4    423244.2
     nattack |  -1.28e+07    4999118    -2.56   0.011    -2.26e+07    -2989042
       nkill |    5176341    3222932     1.61   0.108     -1140490    1.15e+07
      nwound |    1068623    1064791     1.00   0.316     -1018329     3155574
       _cons |  -3.06e+09   1.26e+09    -2.42   0.015    -5.54e+09   -5.87e+08
-------------+----------------------------------------------------------------
                             sigma_u |  4.340e+09
                             sigma_e |  2.283e+09
                 rho |  .78328154   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Table 3. **Hausman test**

```
                                  ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed        random       Difference          S.E.
-------------+------------------------------------------------------------
    arrivals |    168.1028     253.9752       -85.87242        27.78114
       gdppc |      378375     357758.8         20616.2        7657.486
     nattack |   -1.18e+07    -1.28e+07         1000113               .
       nkill |     5160270      5176341       -16070.91               .
      nwound |     1054934      1068623       -13688.25               .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

              Test:  Ho:  difference in coefficients not systematic

                          chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                                  =    -0.17
```

Table 4. **Panel Threshold Model (Hansen)**

```
. xthreg expenditure arrivals nkill nwound gdppc, rx(nattack) qx (gdppc)
Estimating the threshold parameters:   1st ......  Done

                        Threshold estimator (level = 95):
                    ------------------------------------------------
                      model |    Threshold         Lower         Upper
                    --------+---------------------------------------
                       Th-1 |   40838.0234             .             .
                    ------------------------------------------------

Fixed-effects (within) regression               Number of obs      =       256
Group variable: id                              Number of groups   =        16

R-sq:  within  = 0.6071                         Obs per group: min =        16
    between = 0.8553                                           avg =      16.0
    overall = 0.8296                                           max =        16

                            F(6,234)            =     60.27
corr(u_i, Xb)  = 0.6161                         Prob > F           =    0.0000

------------------------------------------------------------------------------
 expenditure |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  arrivals |     150.9036   37.74269     4.00   0.000     76.54465    225.2625
   nkill |       4219463    2700113     1.56   0.119     -1100174     9539100
  nwound |       909706.9   891251.5     1.02   0.308    -846195.6     2665609
  gdppc |        311163.1   29795.01    10.44   0.000     252462.4    369863.9
cat#c.nattack |
   0  |          -8706637    4194657    -2.08   0.039    -1.70e+07   -442518.4
   1  |          9.39e+08   9.78e+07     9.60   0.000     7.47e+08    1.13e+09

  _cons |         -9.24e+08   6.37e+08    -1.45   0.148    -2.18e+09    3.30e+08
-------------+----------------------------------------------------------------
                             sigma_u |  5.886e+09
                             sigma_e |  1.930e+09
                 rho |  .90289423   (fraction of variance due to u_i)
------------------------------------------------------------------------------
 F test that all u_i=0:     F(15, 234) =    52.73             Prob > F = 0.0000
```

Table A1. Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
i	overall	11	6.064332	1	21	N =	336
	between		6.204837	1	21	n =	21
	within		0	11	11	T =	16
year	overall	2007.5	4.616647	2000	2015	N =	336
	between		0	2007.5	2007.5	n =	21
	within		4.616647	2000	2015	T =	16
attack	overall	26.50595	75.57078	0	675	N =	336
	between		32.73078	0	93.4375	n =	21
	within		68.46611	-66.93155	608.0685	T =	16
killed	overall	60.60417	310.1563	0	3925	N =	336
	between		139.0895	0	615.9375	n =	21
	within		278.7781	-555.3333	3369.667	T =	16
injured	overall	96.19345	319.5265	0	2978	N =	336
	between		146.1149	0	584.5625	n =	21
	within		285.8383	-488.369	2489.631	T =	16
arrivals	overall	1.28e+07	2.09e+07	25700	8.45e+07	N =	336
	between		2.11e+07	36905.26	7.87e+07	n =	21
	within		3069262	-3094840	2.71e+07	T =	16
expend~s	overall	1.15e+09	2.28e+09	2000000	1.10e+10	N =	264
	between		2.14e+09	4.68e+07	8.46e+09	n =	20
	within		7.69e+08	-2.12e+09	5.52e+09	T-bar =	13.2
gdp	overall	3.40e+11	6.60e+11	9.84e+08	2.92e+12	N =	336
	between		6.53e+11	3.15e+09	2.33e+12	n =	21
	within		1.71e+11	-6.24e+11	9.31e+11	T =	16

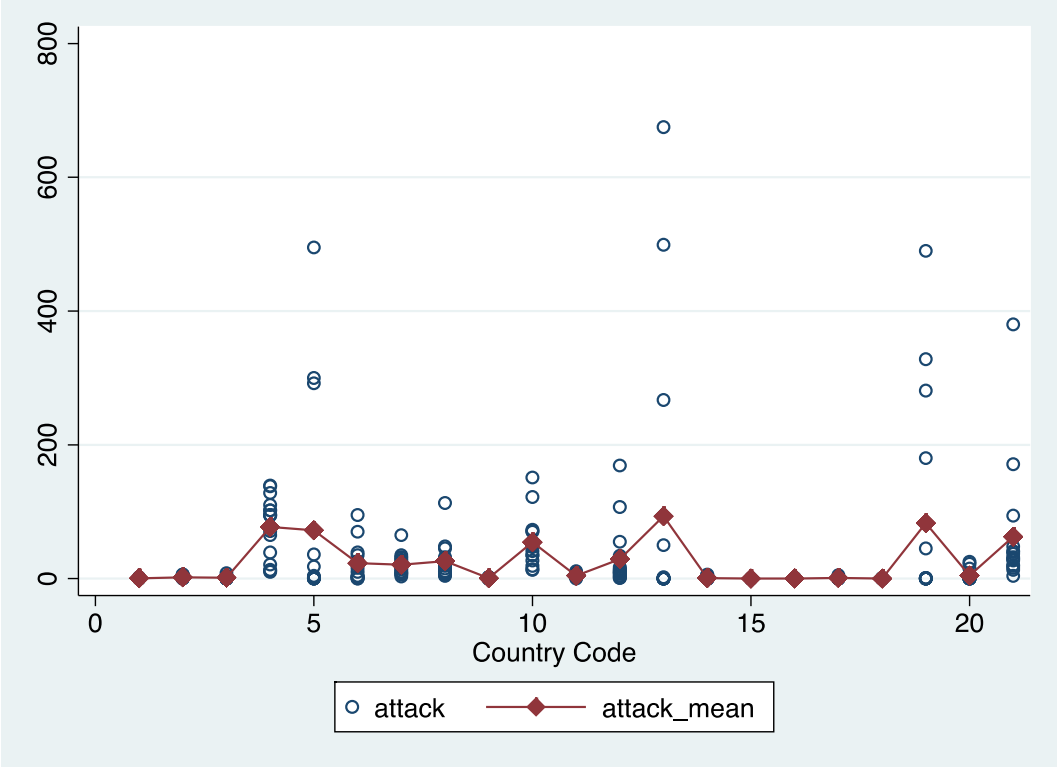

Figure A1. Number of attacks by country

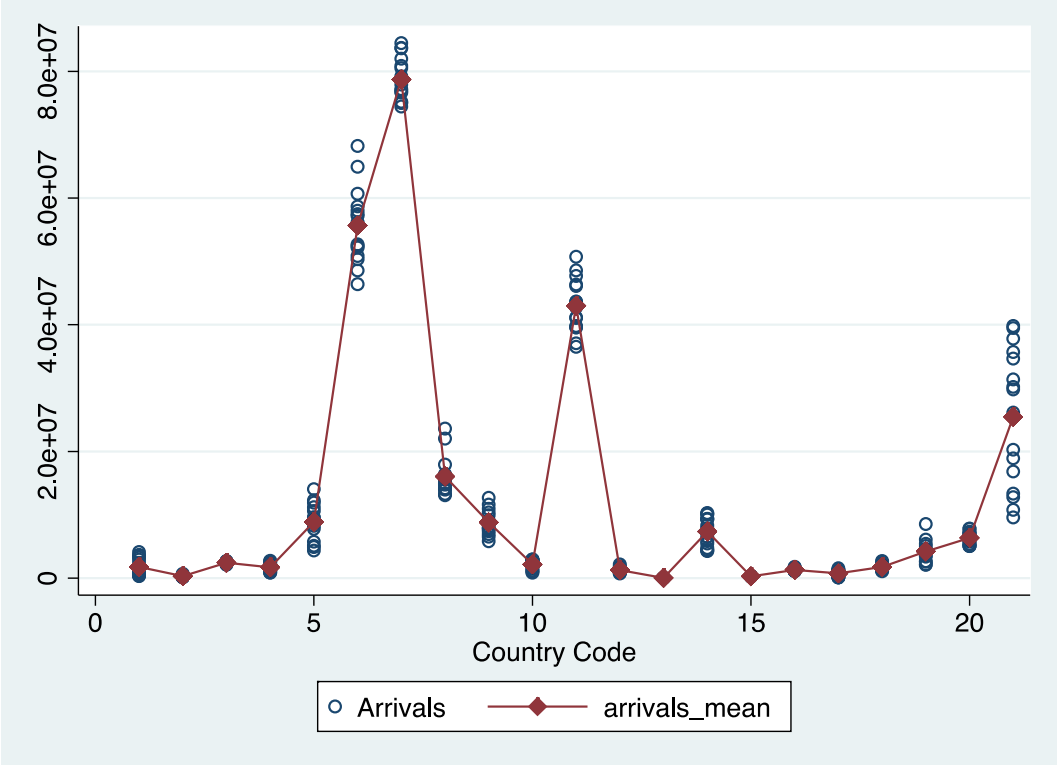

Figure A2. Arrivals by country

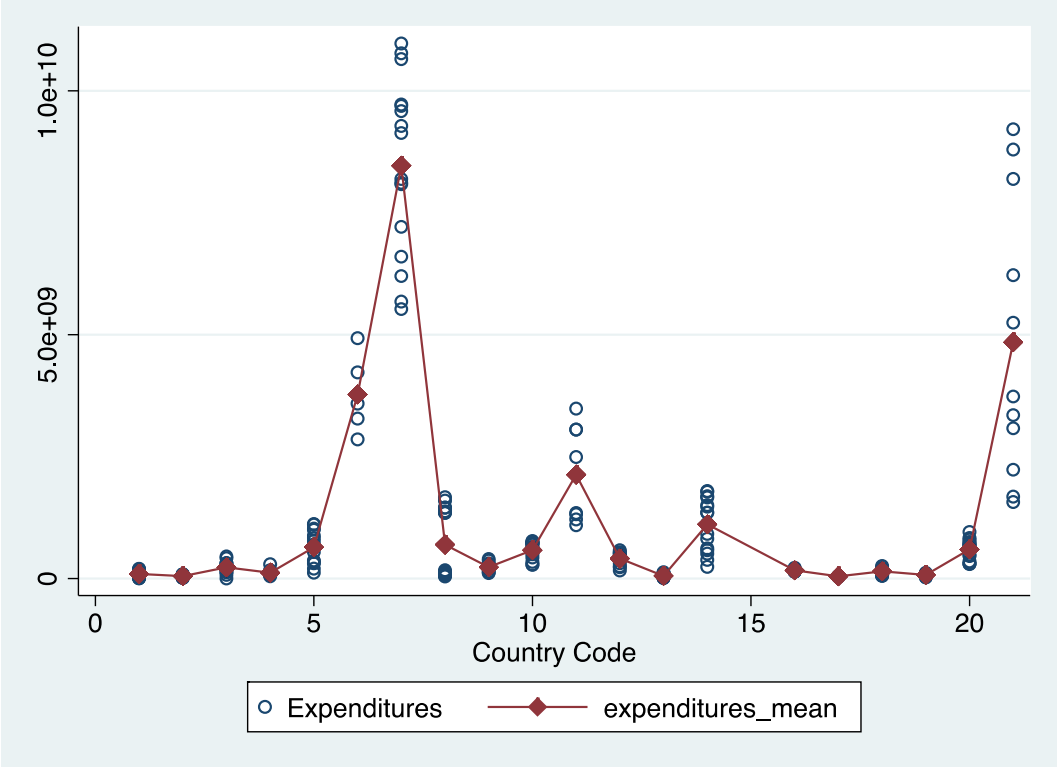

Figure A3. Expenditures by country