The effects of terrorism on tourism in Basque Country and Northern Ireland

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Abstract: The aim of this research is to investigate how terrorism incidents affect tourist arrivals. Using a Vector Autoregressive model, I calculated how a terrorist incident in Basque Country in Spain will affect its monthly tourist arrivals and how a terrorist incident in Northern Ireland in the United Kingdom will affect its annual tourist arrivals. Results show that terrorism has a negative effect on tourism by reducing the future arrivals of tourists in that region. Forecasting results show that a terrorist incident will keep reducing the number of tourist arrivals in the second and third year after the incident for both regions.

1. Introduction

After the 9/11 terrorist attack on the United States of America, the then President George W. Bush declared his "war on terror" addressing the State of the Union (Bush, 2001). That was not the first, and unfortunately was not the last, terrorist incident to happen. The recent attacks of 2016 in Europe, Asia, Africa and North America associated with ISIS, show that terrorism does not fall under any geographical borders.

According to Oxford Dictionary, terrorism is defined as "the unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims" (Oxford Dictionaries, 2016). What these political aims are cannot be generalized for all incidents since they differ for each occasion. It can be examined though what are the consequences of these attacks. With this paper, I will not touch upon the social and political consequences of these attacks but instead I will examine the economic consequences that they have on the respective countries or regions. More precisely, I will test for the economic effect by examining how the tourist arrivals were affected from the number of incidents in a given time in that region. The areas of interest are the Basque Country in Spain and the region of Northern Ireland in the United Kingdom. This formulates the following research question,

"How were tourist arrivals in the Basque Country in Spain during the period 1992-2010 and Northern Ireland in the United Kingdom during the period 1970-2002 affected by terrorist incidents in the respective regions?"

In a broader way, both regions faced terrorist incidents due to political reasons. For Basque Country it was the aim of the separatist group Euskadi ta Askatasuna (ETA) to create an independent Basque region that incorporated areas in both Spain and France (Whitfield, 2015). The group was active from 1959 until 2011 and counted more than 800 fatal victims on attacks not limited in the Basque Area but expanding also in the rest of Spain, targeting both civilians and politicians. ETA was listed as a terrorist group not only in Spain but also in the USA and the European Union. In Northern Ireland, the 'Troubles' were driven by intercommunal differences. While six of the 32 counties of Ireland remained in the United Kingdom, the rest 26 counties gained their Independence leaving the region of Northern Ireland with both Protestants and Catholics (Darby, 2003). The former were in favour of being part of the United Kingdom while the latter were divided into two groups, one that wanted to keep the historical integrity of the island and the other that felt that the successive Northern Ireland governments between 1920s and 1970s were corrupted and wanted them removed. The 'Troubles' gradually started in late 1960s and lasted until late 1990s costing the lives of more than 3500 people.

As mentioned before, the aim with this paper is to test how tourism is affected from terrorist incidents. To perform this analysis, I collected data regarding the number of tourist arrivals and the number of incidents for each region. For the Basque Country, monthly data for the number of tourist arrivals could be found for the years 1992 until 2010 while for Northern Ireland only annual data was available from 1970 until 2002. This data was retrieved from the official Statistical Agencies of each region. To count the number of terrorism incidents, I used the Global Terrorism Database (GTD) and collected data regarding the monthly (for the Basque Country) and annual (for Norther Ireland) number of incidents. Furthermore, to account for other factors that might affect the decision of tourists to visit either of the regions or a third destination, inflation and exchange rates were also considered as control variables.

To perform the analysis done in this research, a Vector Autoregressive (VAR) model has been used. I preferred the VAR model instead of the simpler AR since it could not be assumed that the relation is just one way, meaning that only terrorism affects tourism. To abstain from suppressing this possibility, a VAR model using OLS regression seemed more appropriate. For the Basque Country, 24 lags were used and two lags for Northern Ireland. It should be reminded that for the Basque Country I use monthly data while for Northern Ireland only annual. In addition, to account for the contemporaneous effects that the two variables have, I also calculated a Structural Vector Autoregressive (SVAR) model.

Results are fairly similar for both regions. Firstly, it should be noted that the R^2 of the equation explaining the number of tourists is high for both regions. For the Basque Country, we can observe a negative trend of incidents on tourist arrivals from the 7^{th} lagged period until the 18^{th} with the exception of periods t-12 and t-13. For the second equation, how the terrorist incidents are affected by the number of tourist arrivals, we observe that there are more positive significant coefficients than negative indicating that the number of tourists increases the likelihood of a terrorist incident in the Basque Country. These results are complemented by the fact that there is statistical evidence to assume that both the number of terrorist incidents granger cause the number of tourist arrivals and the number of tourist arrivals granger cause the number of terrorist incidents. Examining the contemporaneous effect of terrorism incidents on tourism, we observe a strongly significant and negative effect of 40 less tourists per attack in the same month. A 36-period forecast shows that there is a negative trend from a terrorist incident to future tourist arrivals. Results from Northern Ireland show a similar pattern. We observe a negative effect of a terrorist incident on tourism in the second lag which is also statistically significant. For the second equation, we find a statistically insignificant positive relation between tourist arrivals and terrorist incidents. However, there was no granger causality present for tourist arrivals affecting terrorist incidents but there was for the opposite relation. Regarding the contemporaneous effect, we observe a strongly statistically significant result of three less tourists per terrorist incident. Moreover, with a 10-period forecasting we observe that in year 2 there is a negative effect of a terrorist incident on tourist arrivals which starts fading off from period 5 onwards.

The paper is divided into 6 sections. Section 2 will be the Preliminaries where previous literature on the topic and a brief explanation of the incidents in the two regions will be explained. Section 3 discusses the Data and Section 4 the Methodology used. In Section 5 the results will be presented which they will then be further discussed in the last section followed by a conclusion.

2. Preliminaries

2.1. Previous Literature

Literature on this topic generally agrees with the findings of my paper that terrorism has a negative effect on tourism. Important research on this field has been done by Enders and Sandler (1991). In their paper, which constitutes a great example for this study, they researched the effect that transnational terrorism incidents have on tourist arrivals in Spain. They incorporated a model using VAR analysis, a similar approach as the one I used, with monthly data from 1970 until 1988. Results found that there is a negative effect of terrorism on tourism with their calculations showing that a single incident would scare away more than 140000 tourists if all the monthly effects are combined. It should be noted however that a significant difference of their research with this study is that they only found unidirectional causality with terrorism affecting tourism but not the other way around.

The previously mentioned authors co-authored a book called "The Political Economy of Terrorism" where they combine economic methodology and political analysis to further investigate terrorism (Enders & Sandler, 2006). In their book, they analyse terrorism based on historical events, current trends and political ideologies. They make use of economic-related models such as the rational-actor model and game theoretic analysis, to present and explain terrorism. In the scope of the book is to analyse counter terrorism and how liberal democracies react to terrorist attacks and threats. The book constitutes an extensive thesis on this field incorporating results from other papers to further strengthen their analysis.

In another paper, Enders, Sandler and Parise (1992) tested how tourist receipts changed relative to other countries considering the number of terrorist attacks in that country. They collected quarterly data for 12 countries and results showed a negative relation between tourism and terrorism. An interesting finding of their research is the evidence of a generalization effect meaning that an incidence in one country negatively affects the tourism industry in the neighbouring countries. However, another paper building its model on Enders et al (1992) work, found that the generalization effect works on certain intensity of terrorist attacks (Drakos & Kutan, 2003). On their paper they distinguished between low, medium and high intensity attacks according to the number of casualties and tested how this affects the market share of three Mediterranean countries (i.e. Greece, Israel and Turkey). Findings showed that low and medium intensity attacks lead tourists to choose one of the neighbouring countries. On the other hand, high intensity attacks lead tourists to choose a country away from that region in general.

Additionally, Araña and León (2008) conducted a research in Germany comparing how people feel about travelling in the Mediterranean and the Canary Islands before and after the 9/11 terrorist attacks in New York. They measured the value that people gave to certain characteristics for travelling to these destinations. Results indicated that after 9/11, people showed a decline in their willingness to travel and thus tended to value the packages offered less than before the attacks. Another noteworthy result of their research is that countries with higher shares of Islamic populations tented to have a more severe negative effect compared to the other alternatives.

Research has also been done in the USA with annual data from 1988 to 2001 using a time series analysis (Sloboda, 2003). The author tested how tourist receipts are affected by terrorist incidents. Results agree with the previous papers that terrorism negatively affects tourism, indicated by a negative correlation between tourist receipts and terrorist incidents. Another research conducted in the USA examined how people perceived international travelling and how they would compare it to domestic travelling (Sönmez & Graefe, 1998). Data were collected through surveys and they controlled for people’s experience with international travelling, education, income and risk perception level for both domestic and international travelling. Results show that people with more experience with international travelling, higher education and higher income tend to have reduced risk perception for international travelling compared to the rest and are more likely to travel abroad.

2.2. Brief explanation of Basque Conflict

The Basque Conflict was mainly an issue of separation and independence. Leading role in this process had Euskadi ta Askatasuna (Basque Homeland and Freedom, ETA). Their aim was to create an independent country for Euskal Herria, the "land of the Basque speakers", extending to both France and Spain around the Bay of Biscay, which is today divided in seven administrative units in both countries (Whitfield, 2015).

The root of the problem can be found in the different versions of the history of Basques. On the one hand, a part of the population sees themselves as a nation with their own identity, language and culture and thus they advocate that they should be a separate nation. On the other hand, another part of the population sees themselves as an important part of the greater nation-state of Spain. This division of the population into nationalists and non-nationalists (pro-Spain) has assisted to the complexity of the issue. The former want an independent Basque nation while the latter would support the idea of regional autonomy which was introduced during the transition of Spain from a dictatorship to democracy.

Under Franco's ruling, a part of Basques felt their identity being repressed and thus in the 1950s ETA was formed from a group of young Basques, dissatisfied with the lack of opposition to Franco. In their early stage, ETA was mainly focusing on lengthy ideological discussions and propaganda and it was not until 1968 that it claimed its first life. Spanish security forces were intolerant to their actions from the beginning but Franco's response to them of "action-repression-action" fuelled their continuation of attacks.

In 1975, after Franco's death, Spain was in its transition to democracy and ETA hoped it would achieve its goal. However, forming the constitution, the independence of Spain's "historic nationalities" (i.e. Catalonia, Euskadi and Galicia) was abandoned and in addition, the PNV (Basque Nationalist Party), the ruling party of Basque Country, did not strongly oppose the creation of a Basque autonomous community as one of the 17 autonomous communities within Spain. In the referendum, questioning the acceptance or not of the constitution, only 31% of the Basque population supported it but PNV's negotiations regarding the autonomy status implied a passive acceptance of it.

These led ETA to continue its terrorist attacks in pursue of their goal, the creation of a Basque nation. Between 1968 and 2011, there were 840 deaths, 80 kidnappings and 2500 people wounded as a result of the attacks. Important role played the capture of ETA's leadership in 1992 which made the possibility of a military defeat present for the first time. This led ETA to shift its attacks from only targeting people related with Spanish security forces to journalists, politicians and civilians in general.

Although no official peace agreement was signed, a series of events lead to the dissolution of ETA and to the end of the violence in 2011. These included strong counter-terrorism actions from Spain, talks between the government and ETA and the involvement of international actors. Regarding the talks, three attempts to reach a political solution took place and they all involved a cease-fire. All three, however, broke down since the two parties could not come to a mutual agreement with ETA's demands not being accepted by the government and vice versa, resulting in the continuation of the violence. To come to the final solution, international actors were also involved and played an important role in reaching this result.

2.3. Brief explanation of Northern Ireland Conflict

The conflict in Northern Ireland had its roots on political, religious and societal differences. Regarding the historical roots of the conflict, two general comments are worth making (Darby, 2003). Firstly, due to the close proximity of UK and Ireland, there was a long history of interaction between the two. Secondly, the Scottish and English populations that settled in the northern part of the island of Ireland around 1600s, affected the demographics of the area.

In 1921 the island was partitioned with the southern 26 counties gaining independence and forming the country of Ireland, while the northern 6 counties remained part of Great Britain. The new state of Northern Ireland had its own parliament and a certain level of autonomy in the United Kingdom. It should also be mentioned that there were both Protestants and Catholics, with the former having the majority. This cohabitation was not perfect since one community was more advantaged compared to the other, creating constant tensions to a certain extent.

More equality in access to political power and social provision was campaigned by a civil rights movement in the 1960s. However, it was not commonly accepted, resulting to violent protests in the streets of Northern Ireland. The London government, aiming to restore the order, deployed British troops on the island. A group of militant nationalists from the Catholic population saw the army as the symbol of oppression. This resulted in the creation of the Provisional Irish Republican Army (PIRA or IRA) which aimed at reunifying Ireland into one nation and removing the presence of United Kingdom from the island.

By 1970, IRA started fighting against the British army. Smaller organizations joined IRA's site and other loyalist paramilitaries supporting the safety of the Protestant community in the region also joined the conflict. The Troubles, as the conflict was called, costed the life of more than 3500 people by the mid-1990s which should not be taken lightly given the small population of 1,6 million people and the small area of the region (Darby, 2003).

Between 1974 and 1994, there were 7 London-led attempts to reach a solution. In August 1994, IRA declared ceasefire and started negotiating with the British and Irish government for a peaceful solution. The talks did not bring the wanted results, leading IRA to stop its ceasefire with bombing London's Canary Wharf in February 1996. In 1997 IRA declared a ceasefire again and talks continued.

In April 1998, they reached to the "Good Friday Agreement" which, among other constitutional provisions, included that people of Ireland (north and south) were free to vote for a united Ireland if they wanted to. The agreement was set to a referendum in May for both people of Northern Ireland and people of the Republic of Ireland. Both voted in favour of the agreement with 71% and 94% respectively. The ratification of the agreement marked the end of the Troubles.

3. <u>Data</u>

In order to perform the analysis of this research, I collected data regarding the number of tourist arrivals, the number of terrorist attacks, exchange rates and inflation from various sources as described below.

3.1. <u>Tourist Arrivals</u>

Data regarding tourist arrivals are collected from the Statistical Agencies of each region. For the Basque Country this was the Statistical office of the Basque Country. This data consists of the number of monthly arrivals on hotel establishment on the region from foreigners and is collected every month starting from January 1992 up until December 2010.

Information regarding Northern Ireland was collected from the Northern Ireland Statistics and Research Agency (NISRA) and the Northern Ireland Tourist Board (NITB). This data is collected by surveying people exiting Northern Ireland's ports and airports. Unfortunately, monthly data was not available and thus only annual observations can be used. These observations are available from 1959 until 2014 with some data missing between 1959 until

1967. Since the data regarding the terrorist attacks start from 1970, I will omit the data prior to that date. In addition, the methodology they used to collect this data changed in 2003, making the figures from that date onwards statistically incomparable with the ones prior to it. Therefore, in order to perform my analysis, I am using data from 1970 until 2002.

3.2. Terrorist Attacks

The data on the number of terrorist attacks for both regions are taken from the Global Terrorism Database (GTD). This database is maintained by the National Consortium for the Study of Terrorism And Responses to Terrorism (START).

The GTD is a database that contains a large amount of terrorist attacks throughout the globe with the earliest data dating back to incidents happened in 1970. The range of the database extents until the present day and is updated on an annual rate. GTD contains various information about the different attacks including, but not limited to, the exact date of the attack, the number of casualties, the place of the attack and the responsible organizations. The collection of this data is done, according to the methodology of GTD, from publicly available and open-source materials, as for example existing datasets and news archives. The events are then cross-referenced and added to the dataset (Global Terrorism Database, 2015).

For the Basque Country, I collected the monthly number of attacks from January 1992 until December 2010 while for Northern Ireland I retrieved the annual number of attacks from 1970 until 2002. I chose the number of attacks instead of their severity (i.e. number of casualties), because research shows that the former is a more important factor, when it comes to discouraging tourists visiting a country, than the latter (Pizam & Fleischer, 2002).

In order to count the number of attacks, I filtered the dataset in terms of location. For Northern Ireland, all the attacks that took place in that region were obtained and counted annually. Regarding the Basque Country, observations were not limited only to the region which belongs to Spain but they were counted also for the part which is in France, since all together constitutes the Basque region. I included the French region because, given the aim of the separists to create an autonomous Basque homeland in the areas of northern Spain and southwest France (Cronin, Aden, Frost, & Jones, 2004), I assume that an attack in the French part will still influence the arrivals of tourists to the Basque Country region in Spain. Moreover, while the ETA group was the prominent terrorist organisation that led the separists, their attacks were not limited only to the region of the Basque Country, although they were located there. However, since I want to test for the effect of terrorist attacks on tourist arrivals only on that region, the attacks of ETA outside the Basque Country will not be taken into account.

Furthermore, due to technical issues of GTD, there are no detailed data for 1993. They do, however, have the total annual number of terrorist attacks for each country. To minimise the effect of this issue in the analysis, I calculated the average number of attacks that take place in the two regions as a percentage of the total number of attacks for each country. This percentage will determine the number of attacks that will be allocated for 1993 to each region. For the United Kingdom there are 59 attacks taking place in 1993. Throughout the range of the dataset studied here (i.e. 1970-2002), attacks in Northern Ireland constitute 86,7% of the total terrorist attacks in the country, allocating 51 of the 59 attacks to the region for 1993. For the Basque region a similar methodology was used. The total number of attacks in the years studied (i.e. 1992-2010) was obtained for both Spain and France combined. Attacks in the Basque region constitute 19,6% of the total number of attacks of these two regions. In 1993 there were a total of 102 attacks allocating 20 to the region. Since the analysis constitutes of monthly data, the ratio of total attacks for each month to the total number of attacks was obtained in order to allocate these 20 attacks accordingly to each of the months in 1993. Tables 1 and 2 show how these calculations were made.

Table 1 1993 allocation of attacks to Northern Ireland

Northern Ireland	
Attacks in UK 1993	59
Total attacks in UK 1970-2002	4345
Total attacks in Northern Ireland 1970-2002	3769
Ratio	86,7%
Allocation of attacks to Northern Ireland for 1993	51

Table 2 1993 allocation of attacks to Basque Region

Basque Region			
Attacks in Spain and France 1993	102		
Total attacks in Spain and France 1992-2010	1773		
Total attacks in Basque Region 1992-2010	347		
Ratio	19,6%		
Allocation of attacks to Basque Region for 1993	20		
<u>Monthly allocation</u>			
Month	**Total number of attacks**	**Ratio**	**Attacks allocated**
January	35	10,1%	2

February	33	9,5%	2
March	36	10,4%	2
April	17	4,9%	1
May	29	8,4%	2
June	23	6,6%	1
July	27	7,8%	2
August	55	15,9%	3
September	26	7,5%	2
October	39	11,2%	2
November	19	5,5%	1
December	8	2,3%	0
Totals	**347**		**20**

3.3. Exchange Rates

In addition to the two main variables of interest (i.e. number of terrorist incidents and number of tourist arrivals), I have also included control variables in this analysis. The first control variable is the exchange rates of the countries with the most arrivals in each region. Given that the higher the exchange rate between foreign and local currency, the cheaper it is for the tourist to visit the country and vice versa, tourists' decision might be influenced from this when deciding where to spend their holidays. Since I am only interested on inbound tourism, I find exchange rates (and inflation, which I will discuss in the next subsection) to be sufficient control variables for tourist arrivals.

The collection of the exchange rates of different currencies was done mainly through the Bloomberg database. However, the earliest data point in Bloomberg regarding the exchange rate between the British and Irish pound was 1988. Since the analysis for Northern Ireland starts in 1970, the exchange rates of the years prior to 1988 were found in the dataset of the Central Bank of Ireland. Similarly with the previous discussion, monthly data was collected for the Basque Country and annual data for Northern Ireland.

The currencies that were taken into account were chosen according to the percentage of tourists that visited the regions. From the Statistical office of the Basque Country, a detailed view of the country of origin of tourist arrivals was available only for the years 2011-2016. For the previous year the distinction was done only as domestic or external. By looking at the data, one can observe that the ratio of tourists from each country to the total number of foreign tourists arriving in the Basque Country is fairly stable through these years with a fluctuation of one percentage point at some cases. Therefore, I assume that a similar pattern was observed in the previous years as well. Looking at these ratios, the biggest arrivals were from France (24%), Germany (9%), United Kingdom (9%) and United States (8%). For this reason, data regarding French Franc, German Mark, British Pound and United States Dollar was collected relative to Spanish Peseta. Although in January 2002, France, Germany and Spain started using the Euro, to avoid obscure coefficients for the exchange rates, the analysis will be made with the above currencies since Bloomberg continues to calculate their rates even after 2002. Since one of the requirements to join the common currency was to enter the Exchange Rate Mechanism and remain into certain "convergence criteria" (European Commission, 2014), there should not be an issue with using those currencies instead of converting into Euros. Monthly data was available for all the years examined.

The same approach was used for Northern Ireland. Data was collected from the CAIN Web Service of Ulster University which specialises on the conflict of Northern Ireland. Data regarding the country of origin of tourists is available from 1972 until 1997. From the total number of visitors, 58% comes from the other regions of Great Britain. Approximately 30% comes from the Republic of Ireland and around 6% from North America. More detailed data for 1997 break down North America into United Stated and Canada and they show that 78% of North America's visitors come from the United States. For these reasons, I collected exchange rates for Irish Pound and United States Dollar relative to British Pound. As previously mentioned, although Ireland adopted the Euro completely in 2002, the calculations will be done using the Irish Pound instead. Unfortunately, data was available for United States Dollar from 1971 and for Irish Pound from 1988. As I have previously discussed, data regarding the exchange rate of British to Irish pound were used from the Central Bank of Ireland to complement the dataset.

3.4. Consumer Price Index (CPI)

The second control variable of this analysis is the change of relative tourism prices (ex. accommodation, restaurant prices, etc). However, a Tourist Price Index (TPI) was not available and thus I will proxy it with controlling for inflation with the Consumer Price Index (CPI) as was also discussed in Lim's (1997) paper. CPI measures the change of the price of goods and services, making it a good indicator of the rate of inflation (IMF, 2016). It will be measured as the percentage change from the previous month (Basque Country) or year (Northern Ireland).

Data for the Basque Country was gathered from the National Statistics Institute of Spain. CPI monthly data was also available only for the region of the Basque Country, excluding the rest of Spain, and thus this is the data I will use for this research. The dataset is from January 1992 until December 2010.

Data regarding Northern Ireland was obtained from the Office for National Statistics of Great Britain. Unfortunately, I could not find inflation data only for the region of Northern Ireland and thus I will need to use the national index. Despite that, CPI data for United Kingdom was available only from 1989. Since this will pose a great limitation to the analysis by omitting 19 variables, I decided to use the Retail Price Index (RPI) instead to control for inflation for Northern Ireland. RPI differs with CPI in terms of items covered. The former covers some measures related to housing costs which the latter does not consider (Payne, 2016). Assuming that costs like mortgage interest payments which are covered at the RPI might affect hotel prices, I consider RPI to be a sufficient substitute to CPI for measuring inflation. The data ranges from 1970 until 2002.

4. Methodology

The methodology I use in my research follows the one that Enders and Sandler (1991) use in their paper. My aim is to test for the effect that terrorist incidents have on tourist arrivals. However, I cannot exclude that tourism, or at least its lagged values, might also influence terrorism which implies that terrorism cannot be treated as an exogenous variable. I will therefore treat both symmetrically which makes a Vector Autoregressive (VAR) model appropriate for my analysis (Enders, 1995).

4.1 Introducing the VAR

A VAR analysis with *k* time series variables has *k* equations, one equation for each variable, where the regressors are the lagged values of all the variables including the depended variable and other external variables (Stock & Watson, 2015). To estimate the coefficients of the VAR model, Ordinary Least Squares (OLS) regression seems appropriate.

Using a one-lag example for the Basque Country, the equations in the general form would look as (1) and (2) below,

$$N_t = a_{10} - \beta_{11} I_t + \gamma_{11} N_{t-1} + \beta_{12} I_{t-1} + \mu_{Nt} + u_{Nt} \qquad (1)$$

$$I_t = a_{20} - \beta_{21} N_t + \beta_{22} I_{t-1} + \gamma_{21} N_{t-1} + \mu_{It} + u_{It} \qquad (2),$$

where N_i is the number of monthly tourist arrivals in the region, I_i is the number of monthly terrorist attacks, α are the constant terms and β_{ij} and γ_{ij} are the unknown coefficients. The coefficients -β_{11} and -β_{21} show the contemporaneous effect that terrorist incidents have on the number of tourist arrivals and vice versa respectively. Moreover, μ_{it} are the control variables (i.e. the exchange rates of Spanish Peseta to United States Dollar, German Mark, French Frank and British Pound, monthly percentage change of Basque Country's CPI, seasonality considerations and a trend variable) and lastly u_{it} are the error terms which I assume to be uncorrelated with the depended variables.

Equations (1) and (2) are called the Structured Vector Autoregressive (SVAR) model and they represent the full model with the contemporaneous effect. However, in this model β_{11} and β_{21} simultaneously affect both N and I, making it hard to compute. With the help of matrix algebra, we can reduce the two equations in a more usable form (Enders, 1995). This will give,

$$\begin{bmatrix} 1 & \beta_{11} \\ \beta_{21} & 1 \end{bmatrix} \begin{bmatrix} N_t \\ I_t \end{bmatrix} = \begin{bmatrix} \alpha_{10} \\ \alpha_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \beta_{12} \\ \gamma_{21} & \beta_{22} \end{bmatrix} \begin{bmatrix} N_{t-1} \\ I_{t-1} \end{bmatrix} + \begin{bmatrix} \mu_{Nt} \\ \mu_{It} \end{bmatrix} + \begin{bmatrix} u_{Nt} \\ u_{It} \end{bmatrix} \quad (3)$$

or

$$Bx_t = \Gamma_0 + \Gamma_1 x_{t-1} + \mu_t + u_t \quad (4)$$

where

$$B = \begin{bmatrix} 1 & \beta_{11} \\ \beta_{21} & 1 \end{bmatrix} \qquad x_t = \begin{bmatrix} N_t \\ I_t \end{bmatrix} \qquad \Gamma_0 = \begin{bmatrix} \alpha_{10} \\ \alpha_{20} \end{bmatrix}$$

$$\Gamma_1 = \begin{bmatrix} \gamma_{11} & \beta_{12} \\ \gamma_{21} & \beta_{22} \end{bmatrix} \qquad \mu_t = \begin{bmatrix} \mu_{Nt} \\ \mu_{It} \end{bmatrix} \qquad u_t = \begin{bmatrix} u_{Nt} \\ u_{It} \end{bmatrix}$$

Following Enders' (1995) steps, by multiplying equation (4) by B^{-1}, I obtain the Vector Autoregressive (VAR) model in its standard form:

$$x_t = A_0 + A_1 x_{t-1} + m_t + e_t \quad (5)$$

where $A_0 = B^{-1}\Gamma_0$

$A_1 = B^{-1}\Gamma_1$

$m_t = B^{-1}\mu_t$

$e_t = B^{-1}u_t$.

To make it more comprehensible, let b_{i0} be element *i* of the vector A_0, let b_{ij} be the element in row *i* and column *j* of matrix A_1, m_{it} as the element *i* of the vector m_t and e_{it} be the element *i* of the vector e_t. Therefore, equation (5) becomes:

$$N_t = b_{10} + b_{11}N_{t-1} + b_{12}I_{t-1} + m_{1t} + e_{1t} \qquad (6)$$

$$I_t = b_{20} + b_{21}N_{t-1} + b_{22}I_{t-1} + m_{2t} + e_{2t} \qquad (7).$$

After computing the reduced-form VAR model as in equations (6) and (7), I need to impose certain restrictions to compute the contemporaneous effects -β_{11} and -β_{21} of equations (1) and (2). Restrictions are needed in order to avoid an infinite loop between the two equations. Following Enders (1995), we can assume that the error terms e_{1t} and e_{2t} have an expected value of 0 which will allow us to compute the coefficients -β_{11} and -β_{21}.

4.2 Formulating the model

The actual model I will use in my research has more than one lag as the example I illustrated above. In their general form, the two equations are presented below,

$$N_t = a_{10} - \beta_{11}I_t + \gamma_{11}N_{t-1} + \cdots + \gamma_{1p}N_{t-p} + \beta_{12}I_{t-1} + \cdots + \beta_{1p}I_{t-p} + \mu_{1t} + u_{1t} \qquad (8)$$

$$I_t = a_{20} - \beta_{21}N_t + \beta_{22}I_{t-1} + \cdots + \beta_{2p}I_{t-p} + \gamma_{21}N_{t-1} + \cdots + \gamma_{2p}N_{t-p} + \mu_{2t} + u_{2t} \qquad (9).$$

The variables in these equations change regarding the region that is being examined. For the case of the Basque Country, I have already discussed them above. Regarding Northern Ireland, N_i is the number of annual tourist arrivals in the region, I_i is the number of annual terrorist attacks, α are the constant terms and β_{ij} and γ_{ij} are the unknown coefficients. Moreover, μ_{ij} are the control variables (i.e. the exchange rates of British Pounds to United States Dollar and Irish Pound, annual percentage change of Northern Ireland's RPI and a trend variable) and lastly u_{it} are the error terms which I assume to be uncorrelated with the depended variables.

Regarding the amount of lagged values, for the Basque Country, since I am using monthly data, it seems appropriate to use either 3, 6, 12 or 24 lags as Enders and Sandler (1991) discussed in their paper. AIC, SBIC and HQIC criteria did not seem to agree to a certain lag order. However, 24 lags had the highest R^2 of all four models and it was also chosen based on the AIC criterion. In addition to R^2, I also performed the Lagrange Multiplier test to check for autocorrelation.

The null hypothesis of no autocorrelation could be rejected in the 99% Confidence Interval (CI) for all lags in the 3-lag model, could be rejected for four lags in the 6-lag model, could be rejected for eight lags in the 12-lag model and lastly it could be rejected only for four out of 24 lags in the 24-lag model. Therefore, I will use the 24-lag model for the analysis of the Basque Country. Furthermore, I also performed a Granger Causality test which shows that at a 95% CI we can assume that both the number of incidents granger causes the number of tourist arrivals and the number of tourist arrivals granger causes the number of incidents.

Regarding Northern Ireland, to match the 24 months used above, I should use a two-year lag order. While BIC criterion indicates that one lag is more appropriate, both AIC and HQIC criteria show preference towards a 2-lag model. Moreover, R^2 is higher for the 2-lag model. After performing a Lagrange Multiplier test, both models showed that there was no autocorrelation. Therefore, since the criteria indicate that and as it will also match, regarding the time span, the analysis of the Basque Country, I will use two lags for Northern Ireland. After performing a Granger Causality test, we have enough evidence to assume that the number of incidents granger causes the number of tourist arrivals but not the other way around.

5. <u>Results</u>

5.1. <u>Basque Country</u>

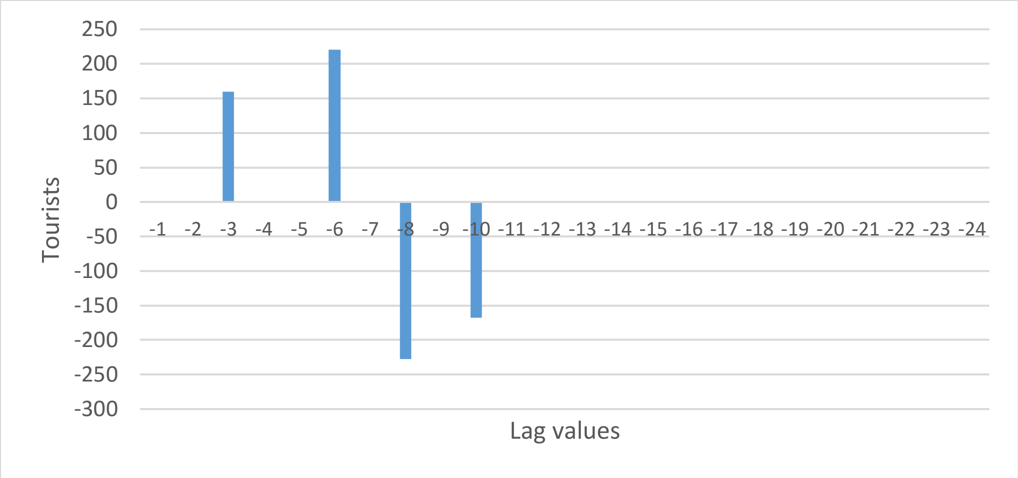
Table 3 presents the results for the Basque Country. As we can observe, there is a high R^2 value of 0,9829 regarding the equation for the number of tourists, indicating that the data fit the model almost perfectly. For the second equation, the one about the number of incidents, although the R^2 (0,5620) is not as high, it still indicates a good fit for the model. It should also be noted that the χ^2 value for both equations is significant at the 99% confidence interval.

For the first equation, there is a constant term of -13007 which, although is statistically insignificant, indicates that on average the number of tourists are negatively related with the number of incidents. Examining the lag values of the number of tourists, we can notice that the majority of them are positive showing an upward trend. Taken from the first three lags, all else equal, for every 100 tourists in periods t-1, t-2 and t-3 there will be 81 more tourists in period t, significant at the 95% confidence interval.

The most interesting part of this analysis is the effect of the lagged values of the monthly number of incidents on the monthly number of tourist arrivals. As we can observe from Table 3, 14 out of the 24 coefficients are negative. However, as we can see, only four coefficients, t-

3, t-6, t-8 and t-10, are significant. Figure 1 illustrates the significant values obtained. The biggest negative impact, as can be observed from the table, is the period between t-7 and t-11 which seems, based on the magnitude of the coefficient, to have the biggest effect on the current number of monthly visits. Looking at Table 3, it can also be noticed that the eighth lag has the largest negative effect (-228) and it also has the most significant coefficient (p-value = 0,009).

Figure 1 Effect of terrorist incidents on Tourists in the Basque Country (only significant results are projected)



For the second equation regarding the number of incidents, the positive constant of 26,13 shows that in general there is a positive effect of the lagged values of the number of incidents and the number of tourists on the current number of incidents. However, despite this effect, we should not ignore the fact that, as with the previous equation, the constant remains statistically insignificant.

From the 24 coefficients of the lagged values of the monthly number of tourists, 11 have a negative value and from those five are significant. Out of the 13 positive coefficients, seven of them are significant. When interpreting these values, we should not be confused by the close to zero coefficients in the table and assume that the effect is negligible. Instead, if we take the first lagged coefficient as an example, for every 100000 tourists at month t-1, all else equal, there will be 13 more incidents at month t.

Continuing, examining the effect of the lagged values of the monthly number of incidents on their current number, 12 out of the 24 coefficients are negative. In total, there are only five significant coefficients where three are negative and two are positive. It can be noticed that in general the lagged values of incidents do not affect much their current amount. The largest effect we can observe is at lag value t-9 where for every ten incidents there will be 2,3 more incidents in period t. Given that the average number of monthly incidents is just 1,6 the effect becomes smaller. Another remark is that the effect seems to change sign every period with some exceptions where we can see four consecutive periods with positive sign followed by four consecutive periods of negative sign. I do not have a specific explanation about it and I assume that it is just random. Furthermore, the R^2 of 0,56 shows that there are more variables we should take into account in order to be able to explain the pattern of the terrorist attacks.

Table 3 VAR results for Basque Country

Sample: 1994m1 - 2010m12			Number of obs = 204	
			AIC = 24.15651	
Log likelihood = -2331.964			HQIC = 25.02502	
			SBIC = 26.30353	
Equation	Parms	R2	chi2	P> chi2
Tourists' Equation	66	0.9829	11722.77	0.0000
Incidents' Equation	66	0.5620	261.799	0.0000

	Coefficient	Std. Err	z-statistic	P>|z|
Tourists' Equation				
Tourists				
Tourists (-1)	.4085756	.0687164	5.95	0.000
Tourists (-2)	.1474696	.0762756	1.93	0.053
Tourists (-3)	.1634426	.0766481	2.13	0.033
Tourists (-4)	.0516162	.0765225	0.67	0.500
Tourists (-5)	.2181403	.0804153	2.71	0.007
Tourists (-6)	-.1699023	.0809149	-2.10	0.036
Tourists (-7)	-.2462685	.0805825	-3.06	0.002
Tourists (-8)	-.0576256	.0849515	-0.68	0.498
Tourists (-9)	.1072153	.0849078	1.26	0.207
Tourists (-10)	-.1162866	.0826141	-1.41	0.159
Tourists (-11)	.4156713	.085928	4.84	0.000
Tourists (-12)	.2472302	.0866168	2.85	0.004
Tourists (-13)	-.1527683	.0867646	-1.76	0.078
Tourists (-14)	-.2287046	.0840115	-2.72	0.006
Tourists (-15)	-.2203247	.0835338	-2.64	0.008
Tourists (-16)	-.0954729	.0856186	-1.12	0.265
Tourists (-17)	.0179956	.0886765	0.20	0.839
Tourists (-18)	.0994881	.0847504	1.17	0.240
Tourists (-19)	-.0021467	.0833595	-0.03	0.979
Tourists (-20)	.0632681	.086298	0.73	0.463
Tourists (-21)	.08994	.0844716	1.06	0.287
Tourists (-22)	-.0890996	.0830245	-1.07	0.283
Tourists (-23)	-.081691	.0829956	-0.98	0.325
Tourists (-24)	.2597215	.0793774	3.27	0.001
Incidents				
Incidents (-1)	92.2993	86.42599	1.07	0.286
Incidents (-2)	-100.4796	87.01312	-1.15	0.248
Incidents (-3)	159.332	86.5301	1.84	0.066
Incidents (-4)	-26.67079	87.41907	-0.31	0.760
Incidents (-5)	79.36559	86.57121	0.92	0.359
Incidents (-6)	220.6465	86.21526	2.56	0.010
Incidents (-7)	-63.5394	87.22148	-0.73	0.466

Incidents (-8)	-227.615	87.18227	-2.61	0.009
Incidents (-9)	-17.82187	87.95603	-0.20	0.839
Incidents (-10)	-167.9328	89.58375	-1.87	0.061
Incidents (-11)	-93.58367	89.84431	-1.04	0.298
Incidents (-12)	17.56871	89.9175	0.20	0.845
Incidents (-13)	65.80926	89.37138	0.74	0.462
Incidents (-14)	-14.38131	88.46513	-0.16	0.871
Incidents (-15)	-102.212	87.9057	-1.16	0.245
Incidents (-16)	-24.61638	85.16303	-0.29	0.773
Incidents (-17)	-21.22885	84.85938	-0.25	0.802
Incidents (-18)	-71.62501	84.63735	-0.85	0.397
Incidents (-19)	83.42297	84.27122	0.99	0.322
Incidents (-20)	52.98593	80.42976	0.66	0.510
Incidents (-21)	47.84712	79.97334	0.60	0.550
Incidents (-22)	24.24858	79.26858	0.31	0.760
Incidents (-23)	-118.95	79.4269	-1.50	0.134
Incidents (-24)	-74.38366	77.43408	-0.96	0.337
CPI	873.0216	705.8074	1.24	0.216
ESPUSD	82760.25	513798.8	0.16	0.872
ESPGBP	-1334987	714047	-1.87	0.062
ESPFRF	739431.1	1203295	0.61	0.539
ESPDEM	-2124722	3240384	-0.66	0.512
time	38.35774	30.23351	1.27	0.205
m1	-2025.654	2047.369	-0.99	0.322
m2	2988.145	2203.247	1.36	0.175
m3	4986.449	2314.27	2.15	0.031
m4	1269.316	2639.384	0.48	0.631
m5	5658.665	2523.912	2.24	0.025
m6	670.11	2574.875	0.26	0.795
m7	4366.17	2426.39	1.80	0.072
m8	6288.12	2617.09	2.40	0.016
m9	-1361.355	2311.257	-0.59	0.556
m10	3498.914	2215.222	1.58	0.114
m11	1191.683	2115.74	0.56	0.573
cons	-13007.72	21894.12	-0.59	0.552
Incidents' Equation				
Tourists				
Tourists (-1)	.0001329	.0000561	2.37	0.018
Tourists (-2)	-.0000693	.0000623	-1.11	0.266
Tourists (-3)	-.0000417	.0000626	-0.67	0.505
Tourists (-4)	.0000301	.0000625	0.48	0.630
Tourists (-5)	-.000125	.0000657	-1.90	0.057
Tourists (-6)	-.0001169	.0000661	-1.77	0.077
Tourists (-7)	.0001455	.0000658	2.21	0.027
Tourists (-8)	.0001658	.0000694	2.39	0.017
Tourists (-9)	.0001497	.0000694	2.16	0.031
Tourists (-10)	-.0000222	.0000675	-0.33	0.742
Tourists (-11)	9.46e-06	.0000702	0.13	0.893
Tourists (-12)	-.0001318	.0000708	-1.86	0.063
Tourists (-13)	-.0000414	.0000709	-0.58	0.559
Tourists (-14)	.0001356	.0000686	1.98	0.048
Tourists (-15)	.0000447	.0000682	0.66	0.512
Tourists (-16)	.0000854	.0000699	1.22	0.222
Tourists (-17)	.0001847	.0000724	2.55	0.011
Tourists (-18)	.0000291	.0000692	0.42	0.674
Tourists (-19)	-.0001137	.0000681	-1.67	0.095
Tourists (-20)	-.0001699	.0000705	-2.41	0.016
Tourists (-21)	-.0000631	.000069	-0.91	0.360

Tourists (-22)	.0001383	.0000678	2.04	0.041
Tourists (-23)	.0000724	.0000678	1.07	0.285
Tourists (-24)	-.0000299	.0000648	-0.46	0.645
Incidents				
Incidents (-1)	.0454791	.0706056	0.64	0.519
Incidents (-2)	-.1202743	.0710852	-1.69	0.091
Incidents (-3)	.0873376	.0706906	1.24	0.217
Incidents (-4)	-.1439141	.0714169	-2.02	0.044
Incidents (-5)	.1631871	.0707242	2.31	0.021
Incidents (-6)	-.07161	.0704334	-1.02	0.309
Incidents (-7)	.0600312	.0712555	0.84	0.400
Incidents (-8)	-.0984081	.0712234	-1.38	0.167
Incidents (-9)	.2307662	.0718555	3.21	0.001
Incidents (-10)	.0793917	.0731853	1.08	0.278
Incidents (-11)	.0060977	.0733982	0.08	0.934
Incidents (-12)	.0340935	.073458	0.46	0.643
Incidents (-13)	-.0791283	.0730118	-1.08	0.278
Incidents (-14)	-.0525278	.0722715	-0.73	0.467
Incidents (-15)	-.1155732	.0718144	-1.61	0.108
Incidents (-16)	-.0338903	.0695738	-0.49	0.626
Incidents (-17)	.0490885	.0693257	0.71	0.479
Incidents (-18)	-.0321562	.0691444	-0.47	0.642
Incidents (-19)	.0857648	.0688452	1.25	0.213
Incidents (-20)	-.0827877	.065707	-1.26	0.208
Incidents (-21)	-.0426277	.0653341	-0.65	0.514
Incidents (-22)	.0407213	.0647583	0.63	0.529
Incidents (-23)	.0279984	.0648877	0.43	0.666
Incidents (-24)	-.1315122	.0632597	-2.08	0.038
CPI	-.1477313	.5766083	-0.26	0.798
ESPUSD	-980.5511	419.7472	-2.34	0.019
ESPGBP	-768.4198	583.3396	-1.32	0.188
ESPFRF	1109.569	983.0303	1.13	0.259
ESPDEM	-3435.652	2647.227	-1.30	0.194
time	-.0675779	.0246992	-2.74	0.006
m1	3.069137	1.672595	1.83	0.067
m2	3.668337	1.79994	2.04	0.042
m3	3.151505	1.890639	1.67	0.096
m4	2.423283	2.156241	1.12	0.261
m5	.9126802	2.061906	0.44	0.658
m6	-1.204257	2.10354	-0.57	0.567
m7	1.809214	1.982235	0.91	0.361
m8	4.579186	2.138028	2.14	0.032
m9	2.214869	1.888178	1.17	0.241
m10	4.792054	1.809722	2.65	0.008
m11	2.205775	1.728451	1.28	0.202
cons	26.12908	17.88637	1.46	0.144

5.1.1. Contemporaneous effect

After computing the VAR model above, I can impose the restrictions of null error terms and compute the contemporaneous effects as shown in Table 4. As the results indicate, an attack on the Basque Country on the current month results in 40 less tourists in that month. It is interesting to observe that this coefficient is significant at the 99% CI. With an average of

37254 tourists per month, the current effect seems negligible. However, it seems logical to assume that if tourists have already bought the tickets, they might be reluctant to cancel them. Moreover, it might be the case that the attack happened after tourists had already visited the country. Despite the relatively small figure, the results still show that at the time of the attack there is a strongly significant contemporaneous effect of less tourist arrivals. These results are in line with the existing literature which has found that terrorism negatively affects tourism.

Examining the second result of how an increase in tourists will contemporaneously affect the number of terrorist attacks, I find a statistically insignificant coefficient of 0,0017. This coefficient implies that for every 10000 tourists coming in the area, there will be 17 more attacks in the same period. Despite the large figure, the result is statistically insignificant and as the R^2 of the equation in Table 3 shows, there are more variables we need to consider to better explain this pattern.

Table 4 SVAR results with contemporaneous effect for Basque Country

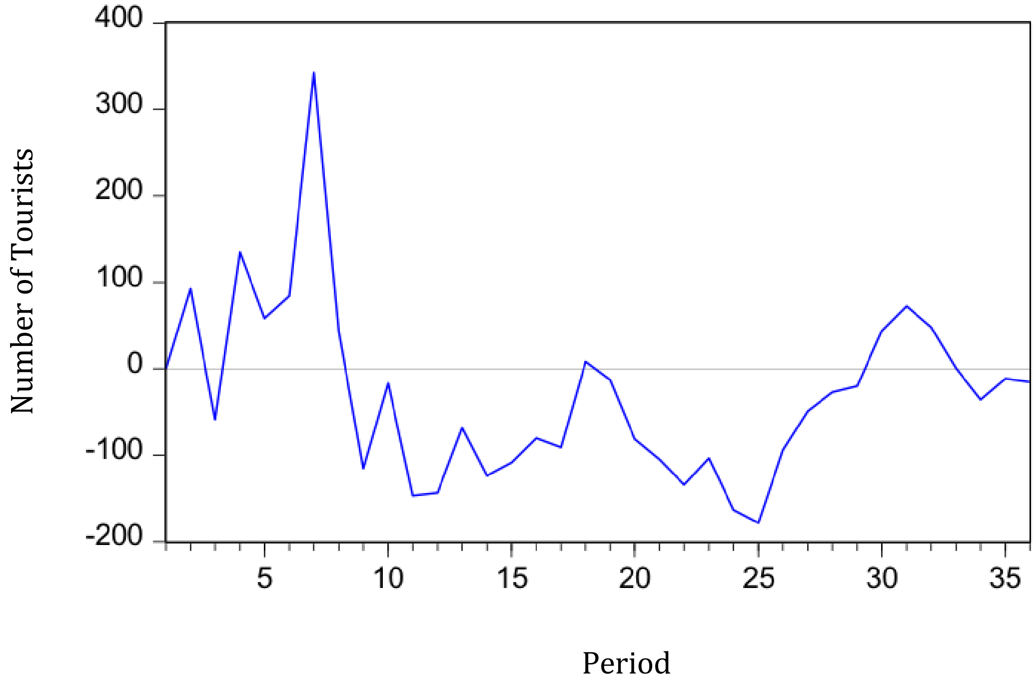
Structural VAR Estimates Sample (adjusted): 1994M01 2010M12 Included observations: 204 after adjustments				
	Coefficients	Std. Error	z-Statistic	Prob.
Tourists (N_t)	-39.2103	0.074733	524.6717	0.0000
Incidents (I_t)	0.0017	0.001347	-1.272432	0.2032

5.1.2. Forecasting

For forecasting purposes, I calculated an Impulse Response (IR) function. The IR function is calculated using the Vector Moving Average which allows for the forecasting of the trend of the VAR's time variables (Enders, 1995). The results of this function can either be presented in the form of a table or graph but for the better illustration, I will present them in a graph as can be seen in Figure 2.

The graph shows a 36-period forecasting of how the number of incidents affects the number of tourist arrivals. Overall, we can observe a negative trend, meaning that terrorism has a negative effect on tourism. From the first eight periods (one period after the peak in the graph), there is no negative effect with the exception of a small drop in period 3. After that, we can observe a negative slide in the graph until period 30. This shows that for approximately the next three years after a terrorist incident, tourism arrivals will decline. This effect, however, will faint off after a considerable period of time has passed.

Figure 2 36-period forecasting of the effect a terrorist incident has on monthly arrivals in the Basque Country



5.2. Northern Ireland

The results for Northern Ireland are approximately on the same line as the results for the Basque Country. As with the previous analysis, the model seems to fit the data as the high R^2 of 0,9783 indicates. On the other hand, the second equation has an R^2 of 0,4366 which shows that there are more variables we need to take into consideration when explaining the number of incidents. Moreover, as with the previous analysis, the χ^2 of both equations is significant at the 99% confidence interval.

Examining Table 5, we can notice that the first equation has a strongly significant constant of -74500000. This coefficient is extremely large and I am unable to justify this magnitude since even if I add all the numbers of tourist arrivals in that period I get a result less than this value. Despite this fact, the strong significance of the coefficient at the 99% CI and the negative sign, show that incidents have a strong negative effect on tourist arrivals. Furthermore, explaining the lagged values of tourist arrivals, we can observe that the first coefficient is positive and significant at the 95% CI and the second is negative and significant at the 90% CI. Adding those two together shows that for every 100 tourists in periods t-1 and t-2, for all else equal, there will be 13 more tourists in period t.

Regarding the second part of the first equation, we can observe that both coefficients are significant as with the first part. It is interesting to observe that the first lagged value is positive, meaning that an attack on t-1 would increase the amount of tourists in period t. I find this result to be odd, as I would not expect that a terrorist attack would help increase tourism, especially since we are dealing with annual data. However, an explanation for this could come from the previous analysis. If we take into consideration Figure 2, we can observe, as I have already discussed, that for the first eight periods after a terrorist incident, tourist arrivals continue to increase and it is from the eighth period onwards that we observe a decrease. Since we are now dealing with annual data, and if we assume that we would have observed a similar pattern with Northern Ireland in the case of monthly data, then if the positive effect of the first eight months outweighs the negative effect of the next four months, it is logical that we observe this positive coefficient. In addition, and in accordance to my previous results, the second coefficient is negative and larger in absolute value compared to the first.

For the second equation, as I have discussed in Section 4, there was no significant evidence to assume that the number of tourists granger causes the number of terrorist incidents but it would still be interesting to briefly discuss the results. Firstly, we observe a significant constant at the 90% CI of 15748,06. Similarly with the previous equation, the constant is very large given that the total number of terrorist incidents in the years examined is less than this amount. However, the significance and the positive sign indicates that on average, tourism has a positive effect on terrorist incidents.

Examining the coefficients, we can observe that both the lagged values of tourist arrivals and the lagged values of terrorist incidents are insignificant. For the first, they are both positive showing that an increase in tourists will increase the threat of a terrorist incident. To be more precise, all else equal, for every 10000 tourists in year t-1 and year t-2 there will be 7,7 more incidents in year t. An interesting observation is that the lagged values of the terrorist incidents negatively affect the threat of a current incident. In general, the results of this equation, even though they should be treated with caution given the absence of enough evidence to support granger causality, are similar with the results of the analysis for the Basque Country.

Table 5 VAR results with control variables for Northern Ireland

Sample: 1972 - 2002			Number of obs = 31 AIC = 36.51223	
Log likelihood = -547.9395			HQIC = 36.78364 SBIC = 37.34486	
Equation	Parms	R2	chi2	P> chi2
Tourists' Equation	9	0.9783	1398.203	0.0000
Incidents' Equation	9	0.4366	24.02414	0.0023

	Coefficient	Std. Err	z-statistic	P>|z|
Tourists' Equation				
Tourists				
Tourists (-1)	.3298941	.1453242	2.27	0.023
Tourists (-2)	-.1953309	.1083532	-1.80	0.071
Incidents				
Incidents (-1)	395.4654	206.3122	1.92	0.055
Incidents (-2)	-467.3071	214.9096	-2.17	0.030
GBPUSD	37235.21	52066.16	0.72	0.475
GBPIEP	-366532.3	135653.9	-2.70	0.007
RPI	-2840.264	3248.518	-0.87	0.382
Year	38093.35	5207.527	7.32	0.000
cons	-7.45e+07	1.02e+07	-7.28	0.000
Incidents' Equation				
Tourists				
Tourists (-1)	.0000342	.0001214	0.28	0.778
Tourists (-2)	.0000429	.0000905	0.47	0.636
Incidents				
Incidents (-1)	-.1580702	.1723568	-0.92	0.359
Incidents (-2)	-.075554	.1795392	-0.42	0.674
GBPUSD	-.7813522	43.49696	-0.02	0.986
GBPIEP	-88.52042	113.3276	-0.78	0.435
RPI	-.3374776	2.713868	-0.12	0.901
Year	-7.83665	4.350457	-1.80	0.072
cons	15748.06	8548.305	1.84	0.065

5.2.1. Contemporaneous effect

As with the previous analysis, after imposing the restrictions of null error terms, we can calculate the contemporaneous effects. Similarly with the Basque Country, I found strongly significant results regarding the contemporaneous effect of an incident on tourism and insignificant results on the contemporaneous effect of tourism on terrorist incidents.

Examining the first coefficient, we can see that a terrorist incident will result in three less tourists in the same year. Comparing with the monthly results above, the coefficient seems very small, especially if we consider the fact that it is annual data. However, taking into account that there are on average 113 attacks per annum in Northern Ireland, this would mean an average of 339 less tourists per year. However, this effect is still smaller than the Basque Country where there are 1,6 attacks on average per month resulting in (40*1,6*12=800) 800 less tourists per year. In addition, Northern Ireland has an average of 1 million tourists per year while the Basque Country has approximately 450 thousand. Despite the coefficient being smaller for Northern Ireland, results still show a strongly significant negative contemporaneous effect of a terrorist incident on tourism arrivals.

Regarding the second result, the contemporaneous effect of tourism on terrorism, the results are insignificant (p-value = 1.0000) and there was also, as mentioned before, no granger causality from tourism on terrorism.

Table 6 SVAR results with contemporaneous effect for Northern Ireland

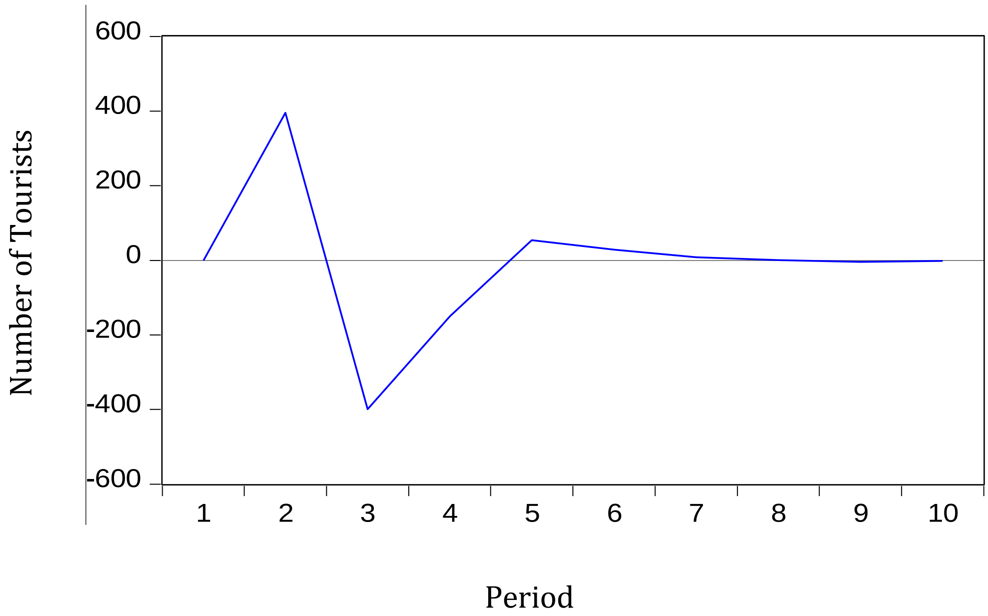
Structural VAR Estimates Sample (adjusted): 1972 2002 Included observations: 31 after adjustments				
	Coefficients	Std. Error	z-Statistic	Prob.
Tourists (N_t)	-2.577991	0.186238	13.84245	0.0000
Incidents (I_t)	1.80e-06	0.049263	3,65e-05	1.0000

5.2.2. Forecasting

Similarly with the Basque country, I calculated the IR function in order to better understand the implications of the equation. As with the previous analysis, I am interested in how the terrorist attacks will affect future tourist arrivals.

Figure 3 shows how the number of incidents affects the number of tourists in a 10-period (i.e. years) time. Overall the results of this forecast are similar with the results of Basque Country. We can observe an increase in tourists from period 1 to period 2, which can be explained with the results of the forecasting for the Basque Country. Due to the fact that I am using annual data in the second equation, if the positive effect of the first eight months outweighs the negative effect of the other four, then this might be the case for the positive effect that we see. Moreover, we observe a decrease in arrivals from period 2 to period 3 which continues, in a lesser effect, from period 3 to period 4. After period 4 (i.e. after four years from the terrorist incident), we can observe that the effect fades out.

Figure 3 10-period forecasting of the effect terrorist incidents have on annual arrivals in Northern Ireland



6. Discussion and Conclusions

During this research, I tried to investigate the research question ***"How were tourist arrivals in the Basque Country in Spain during the period 1992-2010 and Northern Ireland in the United Kingdom during the period 1970-2002 affected by terrorist incidents in the respective regions?"*** To do so, I collected monthly data for tourist arrivals in the Basque Country of Spain and annual data for tourist arrivals in Northern Ireland in the United Kingdom. Furthermore, to control for relative prices that might affect the decision of tourists to visit a country, I incorporated into the analysis the exchange rates from countries with the most visits in the respective regions and I also take into account inflation by including the percentage change of CPI for the Basque Country and the percentage change of RPI for Northern Ireland. The methodology I used was a Vector Autoregressive model to find the effect that lagged terrorist incidents have on tourist arrivals and how lagged values of tourist arrivals affect terrorist incidents. Moreover, I have also calculated a Structural Vector Autoregressive model to find the contemporaneous effect that a terrorist incident will have on current tourist arrivals and an Impulse Response Function for forecasting purposes.

Granger causality tests show that for the Basque Country the number of terrorist incidents granger cause the number of tourist arrivals and the number of tourist arrivals granger cause the number of terrorist incidents. However, for Northern Ireland, the granger causality is one-way with only the number of terrorist incidents granger causing the number of tourist arrivals.

Moreover, for both the Basque Country and Northern Ireland, the R^2 for the first equations, how the number of terrorist incidents affect tourist arrivals, were very high with 0,9829 and 0,9783 respectively. For the second equations, how tourist arrivals affect terrorist incidents, the coefficients were not high enough indicating that there are more variables which should be considered in order to explain this relation.

To answer the research question, results for both regions show similarities. For the Basque Country, we observe that the lagged values from t-7 onwards are mostly negative with some interruptions which are also small in magnitude. It should also be added that only four out of the 24 coefficients are significant with two positive and two negative. For the second equation, we observe in general that lagged tourist arrivals have a positive effect in terrorist incidents. The most interesting results are the contemporaneous effect, where we get a strongly significant negative coefficient of a terrorist incident causing 40 less tourists in the same month. For the opposite relation, the coefficient was insignificant. The Impulse Response Function shows that an incident now will have a negative impact on tourist arrivals eight months after the attack and this will continue for approximately two more years.

Results for Northern Ireland are similar with the ones from the Basque Country. Regarding the effect of terrorist incidents on tourist arrivals, we observe that the first lagged value has a positive effect while the second has a larger in magnitude negative effect. This can be explained with the results from the Basque Country where we found that it takes approximately eight months until we observe the negative effect and therefore if the positive values are larger than the negative, we see the positive coefficient due to annual data. For the second equation, there were not significant evidence to assume that tourism granger causes terrorist incidents. The contemporaneous effect shows a strongly significant negative effect of a terrorist incident causing three less tourists in the same year. The effect is small compared to the monthly results from the above equation. Nevertheless, given that there are on average 113 attacks each year, this would result in 339 less tourists. It is still relatively small but it does show a strongly significant negative relation. A forecast with the Impulse Response Function shows a negative effect from the second year and this effect will fade out after four years, a similar pattern as with the results from the Basque Country.

These results imply that in general a terrorist incident will have a negative effect on future tourist arrivals. These findings have significant policy implications given the fact that terrorist attacks happen in recent days even in big European capitals like Brussels and Paris. Before I continue with the discussion of these implications, it should be mentioned that it is in my understanding that my results are only for two specific regions and might not reflect situations, for example, outside Europe. However, given the similarities of the results for both regions and considering their distance, I believe that they could be extrapolated at least in the European region. The negative effect that terrorist incidents have on tourist arrivals shows that governments need to take action against it, especially for countries that their economy depends heavily in tourism receipts. It is straight forward that antiterrorism action needs to be taken first. However, in the case that the attack does happen, countries should launch a marketing campaign where they would show the perks of their destinations and the measures they took to prevent future attacks. Assuming that people are influenced by the media, then it follows that if enough positive advertisements cover the negative news of the attacks, the effect of the incident might be less severe regarding the reduction of tourist arrivals.

This paper does not come without limitations. The use of annual data for Northern Ireland imposes one of them. Monthly data, if could be found, would make the results of this research more robust and they could more easily be compared to the results of the Basque Country. Moreover, another limitation to this research is the use of RPI instead of CPI for Northern Ireland due to limitation of enough data for the CPI. The use of the latter would have made the results even more comparable to the analysis of the Basque Country.

Recommendations for further research would be to further analyse Norther Ireland with monthly data instead of annual. Furthermore, an interesting analysis would be to investigate how the rise of the Islamic State (ISIS) has affected tourism in South-East Europe and Middle East given the close proximity of the region. It would also be interesting for future researchers to examine if the attacks of 2015 and 2016 in central European cities has affected the general inclination of people to travel assuming that Europe is considered to be a safe region in general.

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