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# How Do Economic Growth and Terrorism Affect Tourism in the Council of Europe Countries?

## Abstract

The Council of Europe is one of the oldest European institutions in operation. This paper aims to examine the impact of economic growth and terrorism on international tourism for 33 Council of Europe countries. The period considered for analysis encompasses data from 1995 to 2018. The Panel Autoregressive Distributed Lag method was selected to gauge the short- and long-term impacts. The effects of globalization and the real effective exchange rate were also considered. The presence of sectional dependence heteroscedasticity and first-order autocorrelation in the models inferred the use of the Driscoll and Kraay (1998) estimator. The results of this study emphasize that decision-makers of the Council of Europe should develop public measures that promote tourism activities. At the same time, they can propose measures aimed at increasingly reducing terrorism and develop measures to encourage the attraction and capture of international tourism through the intrinsic advantages of the globalization phenomenon.

**Keywords:** economic growth, international tourism, terrorism, Council of Europe, panel analysis

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## 1. Introduction

The COVID-19 pandemic strongly impacted the global economy (Pham et al., 2021). The crisis triggered by the disease directly impacted global international tourism. The tourism sector was growing rapidly throughout the world and was responsible for the economic growth of several countries (e.g., Perles-Ribes et al., 2017; Shahzad et al., 2017; Tang & Abosedra, 2016; Pavlic et al., 2015).

The global outlook remains uncertain after more than a year of the onset of the COVID-19 pandemic (International Monetary Fund, 2021). Therefore, it is crucial to predict the behavior of international tourists after the pandemic is under control. However, this is a difficult task. Even more difficult with the containment measures

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in several countries around the world (e.g., Silva et al., 2021; Molina-Montes et al., 2021; Theodorou et al., 2021; Velasco, 2021). The tourism sector accounted for 10.4 percent of the global gross domestic product (GDP) in 2019. However, that number dropped to 5.5 percent in 2020, a 49.1 percent drop in global GDP from 2019 (World Travel & Tourism Council [WTTC], 2021).

Another problem affecting the tourism sector is terrorist attacks. Countries perceive tourism as an ally for economic growth and seek to pass on an image of security and reliability. However, in 2019, the global economic impact of terrorism was \$16.4 billion (Cision PR Newswire, 2020). In this sense, our research question is: what is the impact of economic growth and terrorism on tourism in Council of Europe countries?

The general objective of this research is to develop an econometric model that will allow us to verify the elasticity (i.e., the size of the impact) of economic growth and terrorism on international tourism in the Council of Europe countries. The research hypotheses are: (i) economic growth positively impacts international tourism in Council of Europe countries, and (ii) the impact of terrorism on international tourism in Council of Europe countries is negative. The studies of Machado et al. (2020) and Aslan (2014) support a positive relationship between economic growth and tourism.

After this introduction section, the research is organized as follows. Section 2 will present the theoretical background. Section 3 will show the statistical data and the databases where the information was collected; section 4 will describe the method used to analyze the statistical data. Section 5 will show the results and the discussion of the results. Finally, section 6 will present the conclusions.

## 2. Theoretical background

Recent studies show a positive relationship between tourism and economic growth in several cases in the world (e.g., Fuinhas et al., 2020; Perles-Ribes et al., 2017; Shahzad et al., 2017; Tang & Abosedra, 2016; Pavlic et al., 2015). Balaguer and Cantavella-Jorda (2002) confirmed the hypothesis of economic growth caused by tourism through long-term cointegration and causality tests in Spain. Therefore, it is possible to affirm that, directly or indirectly, the work mentioned above is one of the ones that most influences the contemporary literature on tourism economics, especially those that have focused on the tourism-growth nexus (Balsalobre-Lorente et al., 2020; Fuinhas et al., 2020; Perles-Ribes et al., 2017; Shahzad et al., 2017).

Tourism is one of the oldest activities in the world, and it is complex to define tourism activity. Simplicio and Camelo (2015) point out that there is no single, consensual definition of tourism, which varies according to the perspective from which it is formulated. Moreover, it is known that throughout the 20th century, international organizations have recognized the need to define the basic concepts of tourism to obtain comparable statistics (Cunha, 2010).

Since the 20th century, there has been a concern with creating statistics that make it possible to analyze the sector. However, with all the advantages that the globalization process has brought, a simple internet search can reveal surprising data: for example, in 2019, China became home to the largest number of international travelers in the world, with more than 154 million travelers visiting other countries (Lee et al., 2021).

Tourism and economy are connected in many subjects, for example, at the level of international trade, inflation, interest, savings, growth, and economic development (Santos & Kadota, 2012: 17). Although, currently, tourism is considered a vital economic activity at the global level, Belucio et al. (2019) argue that tourism is one of the most important activities worldwide. In addition, the sector (alone) was responsible for 5.5% of the world GDP in 2020 (WTTC, 2021).

Several factors can influence GDP growth and simultaneously impact the tourism sector, for example, pandemic crises such as Ebola (Novelli et al., 2018) on the African continent, Zika (Jamil et al., 2016) in Latin

America, MERS (Joo et al., 2019) in the Middle East, and more recently, with global effects, COVID-19 (Abbas et al., 2021).

Baker (2014), referring to tourist activity, indicates that one of the biggest threats is socio-economic problems, leading to increased crime rates. Since safety is an important factor for tourists (Liu & Pratt, 2017), the crime rate can risk the destination. However, Baker (2014) still points out that the threat of terrorism is more worrying than socioeconomic problems.

Tourism is more important for some countries than others, mainly because it contributes to economic growth (e.g., Perles-Ribes et al., 2017; Shahzad et al., 2017; Tang & Abosedra, 2016; Pavlic et al., 2015). However, as several countries have an important part of their economy generated by this economic sector, it is important to examine its behavior.

### **Tourism and terrorism**

Several externalities occur due to the general increase in tourism (Belucio et al., 2020) and may be positive and/or negative. Externalities and shocks with a negative causal relationship in international tourism demand directly compromise the revenues and economic growth generated by the sector. Data from World Development Indicators (World Bank, 2021) that even in 2019, tourism spending continued to grow. The top ten importers of tourism services in the world maintained their positions in the latest World Tourism Organization (UNWTO) report as the most "spending" countries (UNWTO, 2021). However, there has been a discussion of a global economic slowdown scenario (Gopinath, 2019).

It is well known that tourism involves several different business activities, namely, accommodation, catering, transport, equipment, services, and leisure industries, all of which generate employment and economic growth. Therefore, it is an extremely important sector in job creation, generating millions of direct and indirect jobs (UNWTO, 2021).

Data from the UNWTO in 2017 showed that the sector was responsible for one in ten jobs worldwide (UNWTO, 2018), thus contributing to global economic development and growth. However, by 2020, 62 million jobs were lost, representing an 18.5% drop across the sector globally (WTTC, 2021). In addition, the decline in domestic visitor spending fell by around 45%, and international visitor spending fell by around 69.4% (WTTC, 2021).

Europe accounts for almost one in two trips in the world (UNWTO, 2021), and four out of five tourists travel within their region (UNWTO, 2021). The effects of globalization are empowering international tourism. Access to the internet as a means of mass communication has led to a decline in the cost of acquiring and disseminating information (e.g., Denzer et al., 2020). This fact hampered several services but benefited tourism destinations by promoting themselves more efficiently. With this, countries focused on spreading a good image as tourist destinations, aiming to attract more visitors. Recent literature corroborates that globalization and tourism are related (e.g., Balsalobre-Lorente et al., 2020).

With the acceleration in the exchange of information, terrorist attacks have started to worry countries for several reasons, for example, the victims, the exposure of security flaws, and also for creating an unattractive image of the country as a tourist destination, among others. Countries that see tourism as an ally for economic growth seek to pass an image of security and reliability. However, in 2019 alone, the global economic impact of terrorism was US\$16.4 billion (Cision PR Newswire, 2020).

There are several motivations for these attacks by radical groups. Commonly the targets are tourist spots in large cities, i.e., places with a large influx of people. In macroeconomic analysis, it can be stated that Central America and the Caribbean recorded the lowest impact of terrorism, and on the other hand, South Asia is the region with the highest impact (Cision PR Newswire, 2020). Terrorism deaths worldwide fell in 2019, but 13826 victims were still recorded (Cision PR Newswire, 2020).

Increasingly, international initiatives are seeking peace and conflict resolution through dialogue. For example, the member states of the Council of Europe have signed the European Convention on Human Rights. This treaty is designed to protect human rights, democracy, and the rule of law (Council of Europe, 2021a). Around the world, several countries have also recently signed agreements aimed at ending conflicts, for example, Israel and the United Arab Emirates (ONU News, 2020), Ethiopia and Eritrea (ONU News, 2019), and Morocco and Israel (Atlantic Council, 2020). Nevertheless, even though the Council of Europe is the largest human rights organization on the European continent (besides countries with geographical proximity) and counts among its members the twenty-seven countries of the European Union (Council of Europe, 2021a), the Council's member countries have several times been victims of terrorist attacks, e.g., Madrid-Spain (Notícias ONU, 2004) Paris-France (ONU News, 2015), Berlin-Germany (ONU News, 2016), London-United Kingdom (ONU News, 2017).

### 3. Data

The criteria for the selection of statistical data were threefold, namely: (i) the countries were officially member states of the Council of Europe (CoE); (ii) they were not on the list of the Observer States, namely Canada, the United States of America, Israel, Japan, Mexico, and the Holy See; (iii) the statistical information was available in public databases, and (iv) the data series had no breaks in consecutive years of the structure.

Among the 47 member countries of the CoE (Council of Europe, 2021b), it was possible to select 33 countries, these being: Albania, Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Croatia, Cyprus, Finland, Georgia, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Northern Macedonia, Malta, Moldova, Norway, Poland, Portugal, Romania, Russia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and the United Kingdom.

Fourteen countries were removed from this analysis for one or more criteria. The countries removed were Andorra, Bosnia and Herzegovina, Denmark, Estonia, Slovakia, France, Greece, Liechtenstein, Lithuania, Monaco, Montenegro, the Czech Republic, San Marino, and Serbia.

Four databases revealed the characteristics necessary to provide the statistical information for the econometric analysis of this research. However, due to the limited data availability of international tourism, the number of arrivals, and KOF Globalization Index variables, the initial time horizon of this research was 1995, and the final one was 2018. Table 1 shows the selected variables and their respective databases.

**Table 1**  
*Variables and databases*

Variables	Acronyms	Databases	Units
<i>Gross domestic product</i>	GDP	World Development Indicators	Constant local currency unit (LCU)
<i>International tourism, number of arrivals</i>	ARRI	World Development Indicators	Total number
<i>KOF globalization index</i>	KOF	KOF Swiss Economic Institute	Index
<i>Number of terrorist incidents</i>	TERROR	Global Terrorism Database	Total number
<i>Real effective exchange rate</i>	EXC	BRUEGEL Datasets	Rate (Base: 2007)

Next, Table 2 presents the values of the descriptive statistics of the variables at the level. The acronym "L" in front of the variables means that the natural logarithm of the respective variables was calculated. Reduction of the observations is mandatory after the first differences. The result should be the difference between the number of observations at the level (792) minus the number of countries (in this case 33); a result of 759 for all variables indicates that the calculation is correct.

**Table 2**  
*Descriptive statistics at the level and after the first differences*

At level					
Variables	Obs.	Average	Standard deviation	Minimum	Maximum
LGDP	792	26.715	2.139	22.272	32.124
LARRI	792	15.472	1.853	9.393	18.639
LKOF	792	4.296	0.182	3.481	4.511
EXC	792	93.315	12.534	45.107	140.533
TERROR	792	12.551	52.674	0	895.000
First differences					
DLGDP	759	0.030	0.040	-0.160	0.296
DLARRI	759	0.056	0.144	-0.880	1.190
DLKOF	759	0.011	0.020	-0.075	0.110
DEXC	759	0.645	5.801	-33.993	29.376
DTERROR	759	-0.182	46.590	-577	890

Note: "Obs." means the number of observations.

The frequency of the statistical information is annual, so it is possible to obtain 24 observations per country. Still, on the data, there was a missing value in the statistical information of the ARRI variable for Switzerland in 2004. Therefore, it was decided to average the data for 2003 and 2005 to overcome this limitation, thus making the country eligible for analysis.

The data for the TERROR variable was initially treated by adding up the various types of terrorist attacks (for example, facility/infrastructure attack, hostage-taking (kidnapping), bombing/explosion, armed assault, assassination, hijacking, and others) that occurred in the same year to get the total number of terrorist incidents. In addition, years in which no type of attack occurred were assigned the value "0" to represent years with no terrorist events. For example, in Ukraine, in 2014, the highest number of attacks in the same year, 895 was recorded.

Table 3 presents the Pesaran (2004) cross-sectional dependence test for the variables. The test's null hypothesis reveals that the residuals across individuals (in this case, the analyzed countries) are not correlated. On the other hand, the alternative hypothesis indicates a correlation of residues, that is, cross-sectional dependence.

**Table 3**  
*Cross-sectional dependence test*

At level				
Variable	CD-test	p value	corr	abs(corr)
LGDP	103.49	0.000	0.919	0.919
LARRI	79.77	0.000	0.709	0.728
LKOF	104.79	0.000	0.931	0.931
EXC	46.59	0.000	0.414	0.533
TERROR	n.a.	n.a.	n.a.	n.a.
First differences				
DLGDP	47.02	0.000	0.427	0.440
DLARRI	11.27	0.000	0.102	0.210
DLKOF	41.45	0.000	0.376	0.389
DEXC	26.40	0.000	0.240	0.319
DTERROR	n.a.	n.a.	n.a.	n.a.

Note: The test has N(0,1) distribution under H0. "n.a." means "not applicable". CD means cross-sectional dependence.

After performing an analysis of the results of the sectional dependence test, it is possible to conclude that they indeed support the presence of sectional dependence for all variables. Except for the variable TERROR,

which cannot be computed, the "missing values" problem is caused by the presence of "0" values. This situation indicates no type of terrorist attack in that country/year, which is different from the unbalanced panel problem due to omission or non-computation of values.

Furthermore, since the test results show a correlation, the series are interdependent and possibly connected to the existence of common shocks that the series share. This result is corroborated by Santiago et al. (2020), who performed the same test in their study and made important observations about the problem of sectional dependence. However, in the first differences, the results did not change dramatically. Instead, they reinforced the presence of sectional dependence.

The correlation matrix is an important pre-test before the estimations. This importance is because correlations can be positive, negative, or zero. For example, Belucio et al. (2021) indicate that positive values mean that the variables have symmetric behavior, while negative values mean that the variables have asymmetric behavior. Still, about the correlation matrices, it is essential to point out that omitting the statistical significance of the matrix does not provide the reader with important information. Instead, this parameter contributes to a better understanding of the results and directly impacts how the matrix is interpreted. Table 4 shows the correlation matrices at the level and after the first differences.

**Table 4**  
*Correlation matrix*

At level					
	LGDP	LARRI	LKOF	EXC	TERROR
LGDP	1				
LARRI	0.438***	1			
LKOF	0.248***	0.568***	1		
EXC	-0.127***	0.056	0.342***	1	
TERROR	0.224***	0.171***	-0.003	-0.130***	1
First differences					
	DLGDP	DLARRI	DLKOF	DEXC	DTERROR
DLGDP	1				
DLARRI	0.333***	1			
DLKOF	0.159***	0.171***	1		
DEXC	0.192***	0.195***	0.0717**	1	
DTERROR	-0.041	-0.186***	-0.021	-0.054	1

\*\*\*, \*\* denote statistical significance at the 1% and 5% levels, respectively.

After the correlation matrix analysis, it is concluded that there is no strong correlation between the variables. No absolute value exceeds 0.6 for the variables at the level or after the first difference. This result can be considered far from indicating a strong association between variables. However, the results of the correlation matrices are also a first indicator for the possibility of the existence of multicollinearity, especially when the values are close to 1 (Fuinhas et al., 2019), which does not meet the results presented.

The VIF (Variance Inflation Factor) statistic should be run to check for the existence of the multicollinearity problem. If the VIF value is greater than 10, there is a multicollinearity problem (Fuinhas et al., 2019) between the study variables. This statistic also allows the user to identify possible formats for the regressions to be estimated, i.e., it uses one variable as a dependent and the other parameters as an independent. It is recommended that if one or more parameters present the multicollinearity problem, they should be removed from the analysis to avoid distortions in the estimation results.

Next, in Table 5, we present the results for the VIF statistic. The statistic was calculated by highlighting two different parameters: (i) LARRI as the dependent variable; and (ii) DLARRI as the dependent variable.

**Table 5**  
**VIF test**

(i) Dependent variable LARRI (at level)		
Independent variables	VIF	1/VIF
LKOF	1.26	0.796
LARRI	1.21	0.826
EXC	1.18	0.849
TERROR	1.07	0.939
Average VIF		1.18
(ii) Dependent variable DLARRI (after first differences)		
Independent variables	VIF	1/VIF
DLARRI	1.06	0.941
DEXC	1.04	0.959
DTERROR	1.03	0.978
DLKOF	1.00	0.996
Average VIF		1.03

The results reveal that there is no multicollinearity problem. The average values vary between 1.03 and 1.18. In specification I, the highest parameter was found for the independent variable LKOF. At the same time, the lowest parameter was found in specification II, independent variable DTERROR.

The first or second-generation unit-roots allow identifying the order of integration of the variables, that is,  $I(0)$ ,  $I(1)$ , or  $I(2)$ . This test is important because the results of the unit-roots can suggest which is the best econometric model that should be used to analyze the constructed panel of data. The test can be run with several different settings. For example, the number of lags can vary. In addition, the test can be run in the presence of a trend or without the presence of the trend. Finally, the variables can be at the level or after the first differences.

Table 6 shows the results of the first-generation test of Maddala and Wu (1999) and the results of the second-generation test of Pesaran (2007) for unit roots in panels. Fuinhas et al. (2019) show that the second-generation unit root test was developed to deal with the sectional dependence in panels. After analyzing the results, it is possible to ascertain that the LGDP variable at the level has a unit root. That is, it cannot be considered stationary at the level. On the other hand, the variable TERROR is stationary at the level, in the options "with" and "without" a trend. The analysis of the other variables is inconclusive, thus suggesting that they may be  $I(0)$  or  $I(1)$ , depending on the parameter settings. In turn, all variables, after the first differences, are integrated into order one, with a statistical significance of 1%.

**Table 6**  
**Panel unit roots**

		Pesaran (2007)				Maddala & Wu (1999)		
		At level						
	Specification without TREND	Variable	lags	Zt-bar	p-value	t-bar	chi_sq	p-value
		LGDP	0	-1.172	0.121	.	70.156	0.340
		LGDP	1	-4.102	0.000	.	47.793	0.955
		LARRI	0	-1.290	0.099	.	100.351	0.004
		LARRI	1	-2.638	0.004	.	56.844	0.782
		LKOF	0	-4.057	0.000	.	301.819	0.000
		LKOF	1	-2.455	0.007	.	211.027	0.000
		EXC	0	-5.27	0.000	.	88.458	0.034
		EXC	1	-8.692	0.000	.	129.454	0.000
		TERROR	0	-13.479	0.000	.	470.184	0.000
		TERROR	1	-9.354	0.000	.	355.806	0.000

Table 6 (continued)

	Variable	lags	Zt-bar	p-value	t-bar	chi_sq	p-value
Specification with TREND	LGDP	0	0.312	0.622	.	37.997	0.998
	LGDP	1	-4.548	0.000	.	74.621	0.218
	LARRI	0	1.883	0.970	.	90.743	0.023
	LARRI	1	0.110	0.544	.	104.685	0.002
	LKOF	0	-2.183	0.015	.	76.865	0.170
	LKOF	1	0.303	0.619	.	79.281	0.126
	EXC	0	-2.711	0.003	.	53.237	0.871
	EXC	1	-6.899	0.000	.	100.925	0.004
	TERROR	0	-12.577	0.000	.	398.507	0.000
	TERROR	1	-7.192	0.000	.	273.875	0.000
<b>First differences</b>							
Specification without TREND	DLGDP	0	-8.371	0.000	.	307.311	0.000
	DLGDP	1	-6.217	0.000	.	239.524	0.000
	DLARRI	0	-11.968	0.000	.	490.95	0.000
	DLARRI	1	-8.118	0.000	.	429.637	0.000
	DLKOF	0	-17.676	0.000	.	531.091	0.000
	DLKOF	1	-8.374	0.000	.	315.226	0.000
	DEXC	0	-14.852	0.000	.	453.444	0.000
	DEXC	1	-12.641	0.000	.	370.791	0.000
	DTERROR	0	-22.662	0.000	.	1411.191	0.000
	DTERROR	1	-15.805	0.000	.	794.853	0.000
Specification with TREND	DLGDP	0	-5.933	0.000	.	227.180	0.000
	DLGDP	1	-2.943	0.002	.	214.775	0.000
	DLARRI	0	-10.599	0.000	.	422.770	0.000
	DLARRI	1	-6.59	0.000	.	355.577	0.000
	DLKOF	0	-16.017	0.000	.	589.158	0.000
	DLKOF	1	-6.228	0.000	.	362.573	0.000
	DEXC	0	-12.994	0.000	.	369.623	0.000
	DEXC	1	-9.751	0.000	.	277.339	0.000
	DTERROR	0	-21.049	0.000	.	1198.994	0.000
	DTERROR	1	-13.224	0.000	.	710.626	0.000

## 4. Method

Considering the nature of the variables that were identified through the pre-tests and statistics performed, it was possible to select the Panel Autoregressive Distributed Lag model, widely known by its acronym PARDL. The Autoregressive Distributed Lag model (developed by Pesaran et al. (2001)) for time series analysis or the Panel Autoregressive Distributed Lag model for panel data analysis is frequently used in economic studies (Göktuğ Kaya et al., 2022; Machado et al., 2020; Fuinhas et al., 2020; Castilho, 2020; Perles-Ribes et al., 2017; Liu & Pratt, 2017).

The PARDL model presents some advantages compared to other models: it allows identifying short and long-term impacts; it deals well with variables with two types of integration order  $I(0)$  and  $I(1)$ , working with both types simultaneously. In addition, the method allows dummies variables to control for shocks (e.g., Fuinhas et al., 2020; Machado et al., 2020; Belucio et al., 2020; Marques et al., 2019). As these phenomena happen with some frequency in economies, this capability of the model is important. However, it is essential to note that the method also has some disadvantages, not being possible to apply it in the presence of variable integrated of order two.



A PARDL model can follow the specification of Equation 1 (below), where the prefix "L" denotes the transformation of variables into natural logarithms.

$$LW_{it} = \alpha_i + \beta_{11}LW_{it-1} + \beta_{12}LT_{it} + \beta_{13}LT_{it-1} + \dots + \beta_{1n}LZ_{it} + \beta_{1n+1}LZ_{it-1} + \varepsilon_{it} \quad (1)$$

where,  $W_{it}$  is the dependent variable,  $\alpha$  is the model constant,  $\beta$  represents the short-term parameters and finally,  $\varepsilon_{it}$  is the error term, i.e., the residuals.

To obtain the dynamic relationships between the variables, the general dynamic form of the Error Correction Mechanism (ECM) in a PARDL model (Equation 1) can be parameterized according to Equation 2, below:

$$\Delta LW_{it} = \alpha_{2i} + \beta_{22}DLW_{it-1} + \beta_{23}DLT_{it} + \dots + \beta_{2n}DLZ_{it} + \gamma_{21}LW_{it-1} + \gamma_{22}LT_{it-1} + \dots + \gamma_{2n}LZ_{it-1} + \mu_{it} \quad (2)$$

where,  $DLW_{it}$  is the dependent variable after first differences, represented by  $\Delta$  or  $D$ . Similarly,  $\beta$  represents the short-term parameters,  $\gamma$ , in turn, represents the long-term parameters;  $\mu_{it}$  represents the estimation residuals, and finally,  $LW_{it-1}$  represents the ECM, i.e., the long-term coefficient of the lagged dependent variable.

Regarding ECM values, results between zero and any positive value invalidate the long-term model, indicating that possibly there are only short-term effects on the variables analyzed. When the ECM results exceed the -1 mark, presenting lower values, these results tend to be considered unsatisfactory. However, this phenomenon does not always mean a problem, since it may arise in scenarios where there is much volatility, for instance, in the analysis of stock markets, exchange rate, number of tourists at the destination, among others, and the existence of error correction in a period smaller than one period of the series under analysis. The method also tends to deal better with monthly, quarterly, four-monthly, and annual data, being more sensitive in bi-weekly, weekly, daily, or hourly time series.

Finally, to obtain long-term elasticities, it is necessary to calculate the ratio between the coefficient of the independent variables and the coefficient of the dependent variable, all lagged once, and subsequently, multiply this ratio by -1.

## 5. Results and discussion

Specification tests allow for gauging if the PARDL model has the essential statistical characteristics to consider the results of the robust model. Table 7 presents specification tests. To verify whether the panel has fixed or random effects, the Hausman test was run with the *hausman fixed random function* of the Stata software. The result indicates that the individual effects of the countries are significant and should be considered, being the fixed effects model the most adequate to analyze the impacts of the variables. The test's null hypothesis is that the difference in the coefficients is not systematic. The Modified Wald test is used to verify the existence of heteroscedasticity. The null hypothesis is the presence of homoscedasticity. Based on the results, the presence of heteroscedasticity was confirmed. This fact infers in the use of a robust model to the problem. The Stata function *xttest3* was used for this test.

The null hypothesis of the Pesaran test (Stata function *xtcsd, pesaran abs*) indicates that the residuals are uncorrelated and follow a normal distribution. However, the result indicates the presence of the contemporaneous correlation phenomenon. The Frees and Friedman tests (functions *xtcsd, frees* and *xtcsd, friedman* of Stata, respectively) confirm the results of the Pesaran test, note that both tests have as a null hypothesis the cross-sectional independence. The Breusch Pagan LM test also analyses the cross-sectional correlation, the null hypothesis being cross-sectional independence. The result of the Breusch Pagan LM test supports the results of the tests mentioned above; however, this test is not suitable for cases in which the number of countries (N) is greater than the number of years (T) of the panel, which is verified in this research, being 33 countries and 24 years (N>T), and therefore, may not be considered. In this test, Stata's *xttest2* function was used. Finally, the Wooldridge test was run to test for first-order serial autocorrelation in panels. The null hypothesis that there is no first-order serial autocorrelation was rejected. In this test, the Stata function *xtserial* was used.

**Table 7**  
**Specification tests**

Tests	Statistic	Probability (Prob>chi <sup>2</sup> )	Critical values of the Q distribution
Hausman	50.56	(0.000)	n.a.
Modified Wald	13296.13	(0.000)	n.a.
Pesaran's	7.326	0.000	n.a.
Frees	0.645	n.a.	alpha = 0.01 : 0.213 alpha = 0.05 : 0.147 alpha = 0.10 : 0.112
Friedman	83.930	0.000	n.a.
Breusch-Pagan LM	779.664	0.000	n.a.
Wooldridge	117.753	0.000	n.a.

Note: H0 of Modified Wald test:  $\sigma(i)^2 = \sigma^2$  for all i. H0 of Pesaran's test: residual are not correlated. H0 of Wooldridge test: no first-order autocorrelation. "n.a." means "not applicable".

Considering the phenomena of sectional dependence, heteroscedasticity, and first-order autocorrelation in the model, the estimator of Driscoll and Kraay (1998) is the most appropriate estimator according to the literature (Fuinhas et al. 2020; Castilho, 2020), being this model able to produce robust standard errors to the disturbances. In Equation 3, it is possible to observe the arrangement of all model parameters.

$$DLARRI_{it} = \alpha_{3i} + \delta_{3i} + \beta_{31}DLGDP_{it} + \beta_{32}DLKOF_{it} + \beta_{33}DEXC_{it} + \beta_{34}DTERROR_{it} + \gamma_{31}LARRI_{it-1} + \gamma_{32}LGDP_{it-1} + \gamma_{33}LKOF_{it-1} + \gamma_{34}EXC_{it-1} + \gamma_{35}TERROR_{it-1} + \epsilon_{it} \quad (3)$$

The model results and its diagnostic statistics are presented in Table 8. The estimation was carried out with a constant and a trend. The short-term impacts on international tourism were verified. The GDP impact is positive and statistically significant at the 1% level. The speed of adjustment, i.e., the time after a shock necessary for variables to return to equilibrium, presents the value of -0.103. This value reflects a low speed of adjustment from the short-term imbalance to the long-term equilibrium state (e.g., Fuinhas & Marques, 2012). Moreover, this fact (negative value between 0 and -1) indicates that long-term elasticities can be calculated, as the model has long-term effects.

**Table 8**  
**Driscoll-Kraay results**

Dependent variable: DLARRI	Coefficient	Standard error	t	P>t	[95% Conf. interval]	
Trend	0.005	0.001	6.69	0.000	0.003	0.006
Constant	1.600	1.445	1.11	0.280	-1.398	4.597
DLGDP	0.840	0.233	3.61	0.002	0.358	1.323
DLKOF	0.496	0.275	1.81	0.085	-0.074	1.066
DEXC	0.003	0.002	1.79	0.088	-0.001	0.007
DTERROR	-0.001	0.000	-8.14	0.000	-0.001	0.000
LARRI(-1)	-0.103	0.020	-5.12	0.000	-0.145	-0.061
LGDP(-1)	-0.039	0.056	-0.7	0.491	-0.156	0.077
LKOF(-1)	0.216	0.090	2.4	0.025	0.030	0.403
EXC(-1)	0.001	0.001	0.95	0.350	-0.001	0.003
TERROR(-1)	0.000	0.000	-4.46	0.000	-0.001	0.000
Diagnostic statistics						
N	759					
R <sup>2</sup>	0.219					
F	F (10, 22) = 42.98***					

\*\*\* denotes statistical significance at the 1% level.

Next, the model's residuals were checked, and shocks (or outliers) were identified and corrected with dummies. Appendix presents the impulse dummies introduced in the model and the theoretical justification for the shocks identified and corrected. Negative or positive shocks may, in some cases, contaminate other economies. Whether domestic crises, wars, or even terrorist attacks, the effects felt by one country may impact its neighbors. Therefore, in some cases, a neighboring economy may feel the effects of one country's instability in the same or the following period. In addition, other diverse phenomena can have a direct or indirect bearing on countries' income. For example, the financial crisis that started in the US impacted European economies most severely in 2009, months after its onset.

Table 9 presents the results of the short-term impacts, the elasticities that were calculated (representing the long-term impacts), the dummies that control the shocks, and the adjustment time after correction of the model shocks. An increase in GDP will positively impact international arrivals only in the short term. Terrorism has negative impacts on international arrivals in the short and long term. Globalization has positive impacts on international arrivals in the short and long term. The exchange rate positively impacts international arrivals only in the short term. The adjustment time after shock correction showed a negative and low value (-0.06), confirming the persistence of the phenomenon of very low adjustment speed, from the short-term disequilibrium to the long-term equilibrium state.

**Table 9**  
*Short term impacts, elasticities, and speed of adjustment based on the results of the Driscoll-Kraay model aftershock correction*

Short term impacts						
Dependent variable: $\Delta LARRI$	Coefficient	Standard error	t	P>t	[95% Conf. interval]	
Constant	1.120	1.051	1.07	0.298	-1.059	3.299
Trend	0.004	0.001	4.80	0.000	0.002	0.006
$\Delta LGDP$	0.681	0.153	4.45	0.000	0.364	0.999
$\Delta LKOF$	0.534	0.163	3.27	0.003	0.195	0.872
$\Delta EXC$	0.001	0.001	1.78	0.089	0.000	0.003
$\Delta TERROR$	-0.001	0.000	-11.52	0.000	-0.001	0.000
Long term (calculated) elasticities						
	Coefficient	Standard error	z	P>z	[95% Conf. interval]	
LGDP(-1)	-0.576	0.790	-0.73	0.466	-2.123	0.972
LKOF(-1)	2.411	1.113	2.17	0.030	0.229	4.593
EXC(-1)	0.006	0.006	0.94	0.349	-0.007	0.019
TERROR(-1)	-0.005	0.002	-3.27	0.001	-0.008	-0.002
Adjustment time after correction of shocks						
	Coefficient	Standard error	t	P>t	[95% Conf. interval]	
ECM	-0.05728	0.010625	-5.39	0.0000	-0.07931	-0.03524
Dummies						
	Coefficient	Standard error	t	P>t	[95% Conf. interval]	
aze1996	0.627	0.062	10.19	0.000	0.500	0.755
arm2001	0.730	0.029	25.25	0.000	0.670	0.790
ukr1997	0.750	0.035	21.31	0.000	0.677	0.823
alb1997	-0.909	0.039	-23.05	0.000	-0.990	-0.827
alb1999	0.450	0.037	12.15	0.000	0.374	0.527
fin2013	-0.425	0.012	-34.1	0.000	-0.451	-0.399
fin1998	0.322	0.013	25.19	0.000	0.295	0.348
geo1997	0.704	0.043	16.34	0.000	0.615	0.793
geo2001	-0.440	0.038	-11.46	0.000	-0.519	-0.360

**Table 9 (continued)**

mac2001	-0.811	0.017	-47.99	0.000	-0.846	-0.776
mol2004	1.099	0.029	37.67	0.000	1.039	1.160
por2007	-0.565	0.014	-39.78	0.000	-0.595	-0.536
swe2011	0.741	0.018	41.91	0.000	0.704	0.778
swe2015	-0.499	0.026	-18.84	0.000	-0.553	-0.444
rus1996	0.466	0.034	13.72	0.000	0.395	0.536
<b>Diagnostic statistics</b>						
N	759					
R <sup>2</sup>	0.662					
F	F (25, 22) = 1.08e+07***					

\*\*\* denotes statistical significance at the 1% level.

The short-term result where economic growth positively impacts international arrivals in Council of Europe countries validates Hypothesis 1. This result contributes to the tourism economics literature as it validates the Tourism-Led Growth (TLG) conservation hypothesis. Indeed, the conservation relationship is common and can be seen in contemporary literature (e.g., Wu et al., 2018). This finding corroborates that more measures that promote economic development should be motivated and that such development is an important ally of the tourism destination to attract visitors.

The effects of terrorism on international tourism are negative. Thus Hypothesis 2 of this research is validated. This result meets the literature (e.g., Mohamed et al., 2019). Terrorist attacks generate such insecurity that public measures need to be taken as a matter of urgency. Thus, public security actors quickly attempt to provide a rigorous response to those responsible for attacks. It is common to see armies supporting the police in cities and countries that suffer attacks soon after the event.

Among tourists, the security factor is important. Therefore, measures that make the tourist destination safer are key to developing the tourism sector. Belucio et al. (2019) argue that public-private partnerships between security agencies, international organizations, and tourism sector businesses can make a destination safer for tourists.

A consideration relevant to the case is that countries' economic growth may indirectly decline via the tourism sector. Those scheduled to travel to a tourist destination that has been the target of a terrorist attack may be infected with the "feeling" of insecurity and give up their trip. This is why quick actions by the state are critical so that the negative effects that media cause do not occur. Brown (2015) describes these "storm" effects as devastating for economies that rely on tourism as an economic driver.

Globalization's positive impacts on international arrivals have been detected in the short and long term. Since the 1990s, globalization has been developing in an accelerated way in the world, and the Council of Europe countries are no exception. Data confirming this fact can be seen in ETH Zürich KOF (2021). Furthermore, it is well known that tourist destinations exploit globalization through promotions in digital format, ease of access to air tickets and accommodation, speed of payment, among others. Therefore, the countries' tourism sector should rely on existing tools such as the internet to further develop their marketing actions.

These results shed light on the issue proposed by Song et al. (2018)<sup>1</sup>. Therefore, international openness policies can benefit the tourism destination, which can also benefit economic growth. State support to attract foreign capital investment to rehabilitate the tourism sector would be another measure that would benefit the economy in a post-pandemic scenario. With foreign investment, jobs can be created in the tourism sector, and economic indicators can be improved. One counterpart that states could offer would be tax exemptions.

<sup>1</sup> How does a destination increase its competitiveness by reacting to the influential forces behind globalisation?

Ivanov and Webster (2013) contribute to the debate by showing a negative impact for less open economies, where inbound tourism may be limited and subject to government control, and a positive impact, where most tourism revenues can remain within the country.

The effects of the exchange rate on international tourism in Council of Europe countries occur only in the short term. As it is a very volatile variable, its effect in the long term is difficult to predict. Of course, stronger currencies such as those of developed countries tend to remain appreciated against currencies of poor or developing countries. For the development of international tourism, the exchange rate can be a partner or an antagonist, so monetary policies must be assertive, and countries must pay the utmost attention because, unintentionally, they can damage an important economic sector and drive away tourism.

The effects of internal or regional crises affect the economies of the Council of Europe. These, in turn, have absorbed many of the shocks that have occurred since the 1990s. In future studies, the pandemic crisis caused by COVID-19 cannot be ignored. Possibly researchers will find this shock starting in 2020 and may extend into 2021. This information is useful as it can save time for researchers in economics and tourism.

A barrier that has not been overcome in this one is the issues inherent to the environment. For example, Leal and Marques (2020) state that in an era of globalization, climate change is considered a major threat to humanity and consequently to tourism and other activities. Furthermore, with increasing environmental awareness around the world, the trade-off between the economic benefit of tourism and its adverse implications on the environment has gained relevance (Castilho, 2020). Therefore, further research should also consider the effects of environment/climate on tourism growth, terrorism, and globalization relationship in the future.

The findings of this research are important for the literature because, as far as is known, this is the first time that the Council of Europe countries is considered. Oh (2005) says that scientifically proven information is crucial for the private, public, and government sectors to manage tourism operations and plan to maximize tourism gains. One suggestion for the Council of Europe could be, for example, to implement short-term public measures to try to minimize the negative effects of the COVID-19 pandemic, which for some time forced the closure of several borders of largely tourist countries. In addition, the rapid and assertive streamlining of health security certificates for companies in the airline, hotel, and restaurant sectors can increase tourist flows. The flow of tourists, in turn, benefits countries' trade balances by accumulating funds through the export of tourism services.

## 6. Conclusion

This paper examines the impact of terrorism and economic growth on international arrivals in the Council of Europe countries. A panel data set was constructed with 33 countries of the 47 members. The time horizon was as broad as possible and without breaks in structure, with data from 1995 to 2018. The PARDL method was selected to analyze the short- and long-term impacts. Considering the phenomena of fixed effects, sectional dependence, heteroscedasticity, and first-order autocorrelation in the model, the estimator of Driscoll and Kraay (1998) was the most robust option for analysis.

The impact of economic growth on international tourism in the Council of Europe countries was verified. The impact was positive and statistically significant in the short term. Terrorism, in turn, was found to have a negative impact in the short term and the long term. However, in the long term, the impact of terrorism is higher, suggesting a memory effect on countries that suffer from attacks.

As far as we know, there is no econometric study on the relationship between international tourism, economic growth, and terrorism for the Council of Europe countries. Therefore, the results presented here shed light on the contemporary literature on economic growth and tourism economics. Hence, the development of studies, with the variables presented here, and the replication of the model for other groups of countries, to verify the prevalence of the results found here.

The results support that Council of Europe decision-makers advocate public measures that promote their countries' tourism to attract foreigners. Indeed, the shocks caused by terrorist events suggest that measures to inhibit terrorism should be discouraged as these are beneficial to the tourism sector. Furthermore, these measures can indirectly benefit the economic growth of the Council of Europe countries and bring more welfare to the population and their visitors. Finally, decision-makers can also seize the opportunities intrinsic to globalization to develop partnerships for attracting and capturing international tourism.

This research, like all studies, presents some limitations. The first is regarding the data, where the number of Council of Europe countries could not be the total due to the lack of statistical information. In addition, the series was limited between 1995 and 2018 due to the current availability of statistical information for some variables. As a result, the tourism-led growth and feedback hypotheses have not been tested. Consequently, they are leaving a gap that other investors can expose in the future. In addition, it will be important to revisit the theme, expand the time horizon, and verify, for example, if the effects found here are persistent over time.

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## Appendix

### Dummies in model

Dummies	Theoretical justification
Albania 1997 (alb1997)	In 1996 the country registered economic growth, however 4.2% lower than the previous year, showing signs of a strong recession. In 1997 the fall in GDP was drastic, around 10.92% (World Bank, 2021); the country was experiencing an internal crisis in this period (Migration grew in a disorderly way, the capital was destroyed by violence (Sikor et al., 2009). The United Nations (UN), through Resolution 1101 (1997), determined that the crisis in Albania constituted a threat to international peace and security; the Security Council welcomed the offer of some Member States to establish a "temporary and limited multinational protection force" to facilitate the rapid and secure delivery of humanitarian aid and to help create a safe environment for international organizations (UN, 1997). The following years were also marked by instability; the Kosovo war and the entry of refugees in 1999 after NATO airstrikes (Barutciski & Suhrke, 2002) reflect part of the economic insecurity in the country and region. Another economic factor that haunted the country in 1999 was the high unemployment rate.
Albania 1999 (alb1999)	
Armenia 2001 (arm2001)	The constant crisis caused by the economic collapse after independence, by war, by the energy crisis has not benefited at all from the lack of experience of an independent government. An emerging wave of emigration that ended in 2001 resulted in a total net emigration of around 30% of the country's population (Makaryan & Galstyan, 2013). In addition, the country received approval from the Executive Board of the International Monetary Fund in 2001 for a new three-year loan under the Poverty Reduction and Growth Facility (International Monetary Fund, 2001).
Azerbaijan 1996 (aze1996)	The instability resulting from the two coup attempts that shook Azerbaijan in 1995 (Freedom House, 2006) is a possible justification for the 1996 shock. It is recalled that the country only regained its independence after the collapse of the Soviet Union in 1991.
Finland 1998 (fin1998)	Recession indicators for Finland show several periods of recession for the country, with November 1997 to September 1999 and September 2011 to February 2015 being the main ones to stand out (Federal Reserve Economic Data [FRED], 2021a). These crises justify that the shocks detected in this dissertation result from economic instability, not only in the period detected but, to a lesser extent, in earlier or later periods.
Finland 2013 (fin2013)	
Georgia 1997 (geo1997)	Georgia, from 1995 to 1996, experienced high economic growth, over 11%. However, the country's economy was stagnant from then onwards, and growth was increasingly smaller, just over 1% in the 2000s (World Bank, 2021). Georgia, like its neighbours Armenia and Azerbaijan, experienced several internal problems. In 1999 the national budget failed. The government collected only about 70% of the projected national budget (Papava, 2006), which also happened in the following years. Papava (2006) also shows that since 1999, the country was unable to obtain loans and donations from international financial institutions and donor countries, as it could not meet the International Monetary Fund requirements. In addition, in 2002, the International Monetary Fund suspended its own financing (Papava, 2006).
Georgia 2001 (geo2001)	
Macedonia 2001 (mac2001)	The insurrection in Macedonia, which took place in 2001, was an armed conflict that started after the National Liberation Army (of Albanian origin) attacked the country's security forces. The 2001 recession (World Bank, 2021) is the main indicator of this shock. Furthermore, it is historically the year with the most terrorist attacks (67) since 1995 (CHC Global, 2021) when the data began to be calculated by CHC Global; these attacks were possibly motivated by the conflict between nations.

*(continued)*

<b>Moldavia 2004</b> (mol2004)	This was a particularly complex year for the country: several economic problems such as inflation (Dabrowski, 2003). In addition, Moldova at this time had half the average GDP per capita of the countries of the former Soviet Union and was the poorest country in Central and Eastern Europe (Libman, 2007). However, even with so many economic problems, the country had a growth in international arrivals of 328.6% (World Bank, 2021).
<b>Portugal 2007</b> (por2007)	This year, the country experienced the so-called "general strike" (Dias & Fernandes, 2016), greatly motivated by revisions to the Labor Code, suggesting signs of internal instability to the world. In addition, the Subprime financial crisis began in the United States of America (e.g., Fuinhas et al., 2021), and Portugal was no exception, and therefore suffered the contagion effects of the crisis, which would become global. Nunes & Serrasqueiro (2017), who studied hotel companies in the country, used a dummy variable representing the financial crisis; this fact confirms the existence of a major shock in the economy that started in 2007.
<b>Russia (1996)</b> (rus1996)	This year's presidential election was the first fully competitive presidential contest in Russia and the first opportunity for Russians to vote at the presidential level since the collapse of the Soviet system (Miller et al., 1998). However, the year was also marked by a decline in GDP, around 3.76% (World Bank, 2021), and 66 terrorist attacks were counted (CHC Global, 2021). The effects of the recession experienced by the country contribute to the detection of this shock (FRED, 2021b).
<b>Sweden 2011</b> (swe2011)	It can be said that the last decade has been tragic for Sweden. In July 2011 officially began one of the country's recessions periods (FRED, 2021c) which ended in August 2013. Nevertheless, a new period of recession started in 2015 and became the longest period of recession in history (FRED, 2021c), lasting until May 2020.
<b>Sweden 2015</b> (swe2015)	
<b>Ukraine 1997</b> (ukr1997)	During this period, several incidents of corruption occurred in the country, so much so that former Prime Minister Pavlo Lazarenko (1995-1996) was convicted of money laundering, electronic fraud, and extortion during his tenure (Transparency International, 2004). In addition, in this period, the country experienced consecutive falls in GDP (World Bank, 2021), a phenomenon that contributed to the unstable situation in the country and in the region in the 1990s.

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