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Tourism Demand in Central Africa: The Counter Effect of Terrorism

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Abstract: *The present study aims to assess the effects of internal and cross-border terrorism on international tourism demand in Central Africa over the period 1995 to 2018. The Panel Vector Auto regression model is used to assess the overall effects of this type of conflict on tourist arrivals. The results show that terrorism has a significant but minimal effect on international tourism demand – acts as an impediment to tourism demand in the study context. The number of victims of terrorist attacks has a greater effect on the number of current and future foreign tourists the number of terrorist attacks. One direct victim of terrorism results in a 0.045% drop in tourist arrivals, and persists for up to a year. Tourism development strategies in this sub-region must be complemented by continued coordination of anti-terrorism policies.*

Keywords: *Central Africa, Vector Autoregressive Panel, Terrorism, International Tourism*

1. INTRODUCTION

The tourism industry has the strongest global growth since the post-war periods and generates over 10% of global wealth [1]. Tourism contributes to and offers multiple development opportunities, particularly for developing countries, and is emerging as an attractive complementary sector for diversifying economies [1, 2]. This is the case for Africa in general, and the countries of Central Africa in particular, which are characterized by significant natural, environmental and cultural wealth [3, 4]. These touristic resources constitute the foundation of tourism demand [5, 6] in Africa. Due to the characteristics of these resources in Africa, they are solicited by tourists to be moved by a spatial setting that differs from their usual living environment [4, 7]. The natural landscape of Africa is an incubator for tourism demand, particularly eco-tourism. However, international tourism demand in Africa contrasts with its potential as it accounted for 4.93% of global tourist arrivals compared with 50.91% (Europe), 23.95% (Asia and the Pacific), 15.5% (America), 4.7% (Middle East) [1, 4].

Overall, tourism development and demand in particular, depends on a number of factors that influences tourism activities [4, 5]. These factors from extant works are group into economic, psychosocial, environmental, exogenous, and the cultural values of Africa per se[4, 8]. Wherein, endogenous and exogenous shocks fall into the category of environmental determinants of both internal and international tourism [8]. Certain macro-environment factors as well constitute an important class of determinants on tourism activity in the short, medium and even long term depending on their unpredictable nature [5, 9, 10]. The socio-political climate can favor or disfavor the tourism demand of a destination, neighboring destinations or a region of the world [7, 9-16].

Socio-political instability takes the form of various forms of conflict, including internal conflicts, external conflicts and terrorism [12].

Terrorism is an act of conflict which uses violence as a means of action, targeting all or certain people, with the purpose of promoting a cause, aimed at influencing a public particularly the government [17, 18][1]. Terrorism's field of action is localized in a country's internal, cross-border and international space. First appearing in the 18^{e} century, terrorism experienced a revival in the 1968s, and has taken on a geopolitical, strategic and ideological scope since the September 2001 attacks in the USA in several forms and actions [12]. According to political theory, the main factors in international terrorism are modernization, social ease or habit and the spread of revolutionary ideology [19]. These factors justify the concentration of this phenomenon in certain regions and countries of the world, notably the developed countries and the MENA countries[2] , where a large proportion of terrorist acts and incidents have been recorded [12, 19]. Thus, such acts impairs the movement of tourist from one destination to the other and even distort the course of tourism stays in some countries. This phenomenon as well makes the selection of a tourist destination by those involve challenging; and equally reduces on the sustainability of the tourism sector in some countries especially the economies of developing nations.

Since the 2000s, domestic and cross-border terrorism have gradually taken hold in Africa south of the Sahara, and particularly in the Sahel zone, following the creation of local networks and the birth and multiplication of nebulous groups such as the Al quaida, Eil, Al shebab and Boko-haram. [7]. The recent summit of African Union heads of state and government on terrorism in Africa[3] bears witness to the resurgence and scale of this phenomenon and Central Africa is not exempt from terrorism that has weaken the strength (sustainability) of the tourism sector of these economies. According to the Global Terrorism Index, in 2019 three countries in this sub-region were ranked among the countries with the highest impact of terrorism in the world: DRC (9th), Cameroon (13th) and CAR (17th) with scores of 7.17, 6.26 and 6.24 respectively on a scale of 10 [20].

Terrorism generally encroaches on the tourism sector, and mainly on tourism demand, and is manifested mainly in reduced tourist flows [12, 21]. By world region, the greatest number of studies has been devoted to tourism demand in Europe and Central Asia, followed by the MENA region, while sub-Saharan Africa, South Asia, North America, Latin America and the Caribbean have been rarely studied [22]. In Central Africa, given the importance, that the tourism sector can generate on the one hand enamors employment opportunities and boost the GDP, the other axes shows the growing emergence of terrorism. The present study examines the consequences engendered by terrorism primarily on international tourism demand in Central Africa. Moreover, we extend the tourism literature into an understudy African context – giving the novelty of the study. The paper is divided into; introduction in section 1, review of theoretical literature in section 2, data and variables are explained in section 3, while our empirical strategy is presented in section 4, results and discussion in section 5, while terminating with a summary findings in section6.

2. THEORETICAL EFFECTS OF TERRORISM ON TOURISM DEMAND

The relationship and impact of terrorism on tourism demand converge mainly on three dimensions, namely their characteristics, motivations and implications [9]. As far as characteristics are concerned, terrorism and international tourism share the same field of action; such is the case of international space, and the same communications, and travel instruments [9]. These two characteristics converge the opposing interests of the two players. Onone hand, air transport is the means most frequently used by tourists to reach their destinations; on the other, space and air transport are a field of expression for terrorist acts. [9]. Thus, the convergence of the spatial framework and communication routes brings international tourists into the prism of terrorists, for whom they become an integral and major part of their attack.

In terms of motivation, tourists are a prime target for terrorists for a number of reasons. Firstly, attacks on visitors have a strong international resonance in terms of communications and publicity. As a result, the message conveyed and the object of the terrorist's claim are more widely disseminated on a global scale through the international media [9, 15, 23]. Secondly, tourists have a symbolic value, as

they are seen and apprehended as ambassadors for their country. They are then soft targets as indirect representatives of hostile governments, which implies that failing to reach the political representatives who are the primary target, tourists are the second-rate choices [9, 15, 23]. What's more, terrorist attacks on tourists, foreign companies, tourist facilities and local elites are a form of ideological prohibition against tourism, because tourism is a vector for the promotion of capitalism and openness to social, cultural and economic exchange, which is the antithesis of the ideologies developed by terrorists, who often go against the grain of globalization. [9, 15, 23]. Lastly, these attacks are also intended to cause economic disruption, demotivating foreign investors and business tourists with their various projects in the tourism sector, and reducing economic benefits. [12, 24].

When it comes to the implications of terrorist acts on tourism, there are generally direct and indirect effects [25]. Indirect effects relate to the deterioration of the economy as whole, consequences, which are also felt by the tourism sector. Firstly, are the economic costs in the transport and hotel sectors inherent in a reduction in the frequency of international air travel and local land travel to tourist destinations at risk [25]. Secondly, terrorist acts cause infrastructural costs through the destruction and degradation of social capital, particularly in transport, communication, energy and even tourist sites [25]. In addition, this environment increases uncertainty, leading to a reduction in international financial flows and capital flight, as investors prefer a peaceful environment. [21, 26]. The tourism sector also suffers because, on the one hand, it concentrates a significant mass of international financial flows, and on the other, countries benefiting from large foreign direct investments are more likely to attract hotel companies [27]. Similarly, there is also a reduction in business travel, which is often a particularly lucrative form of tourism [28]. Subsequently, terrorist acts cause negative externalities by redirecting public spending and creating crowding-out effects [21]. Indeed, after the terrorist acts, there is an increase in public spending on security, a reduction in the investment budget for tourism infrastructure, leading to the crowding out of private and public productive investment in the tourism sector [21]. The same applies to public spending on counter-terrorism, with advertising campaigns to boost the country's image internationally and in the eyes of tourists [13]. Finally, terrorism leads to substitution effects from riskier and more costly tourist activities to activities perceived as relatively less risky, and an income effect when the variation in real income is redistributed between products [13].

The direct effects of terrorism concerns the consequences of terrorist acts on tourists' choice of destination. They mainly affect the psychology and behavior of the tourist, and the image of the destination. [4, 10, 29]. Risk is an important factor in tourists' travel decisions. This importance is based on the concepts of perceived risk and actual risk [10]. Perceived risk represents the situation of insecurity in a destination as perceived by the tourist through the information in their possession. Real risk, on the other hand, is the exact situation of instability in tourist destinations. The psychological perception of perceived risk and actual risk, and the psychological influence of one on the other, considerably affect the decision to travel and the choice of a destination or region of the world. [10, 29-31]. The risk-averse tourist will have a high propensity to forego a destination with high perceived risk, and vice versa [25]. Another aspect of the impact of direct effects is the negative externalities associated with destinations, where tourists forgo certain countries because of their proximity to high-risk destinations [13, 32]. In an unstable region, the resilience of tourism and its ability to attract new tourists depend, on one hand, on the maturity of the tourism sector, campaigns to improve the destination's image and the level of economic diversification, and on the other hand, the scale of conflict, the frequency and likely perceived and actual recurrence of conflicts [32-35].

In the case of Central Africa, over the period 1995 to 2018, the annual frequency of recorded attacks is around ten. The highest number of terrorist attacks was observed in 2015, when 67 acts were recorded in the sub-region as observed on Figure. The increase in the number of victims has gone through three cycles, with peaks in 1999, 2004 and 2015 corresponding to 122, 325 and 765 direct

victims respectively. Meanwhile, tourist arrivals in the sub-region have continued to grow, reaching over six million in 2018.

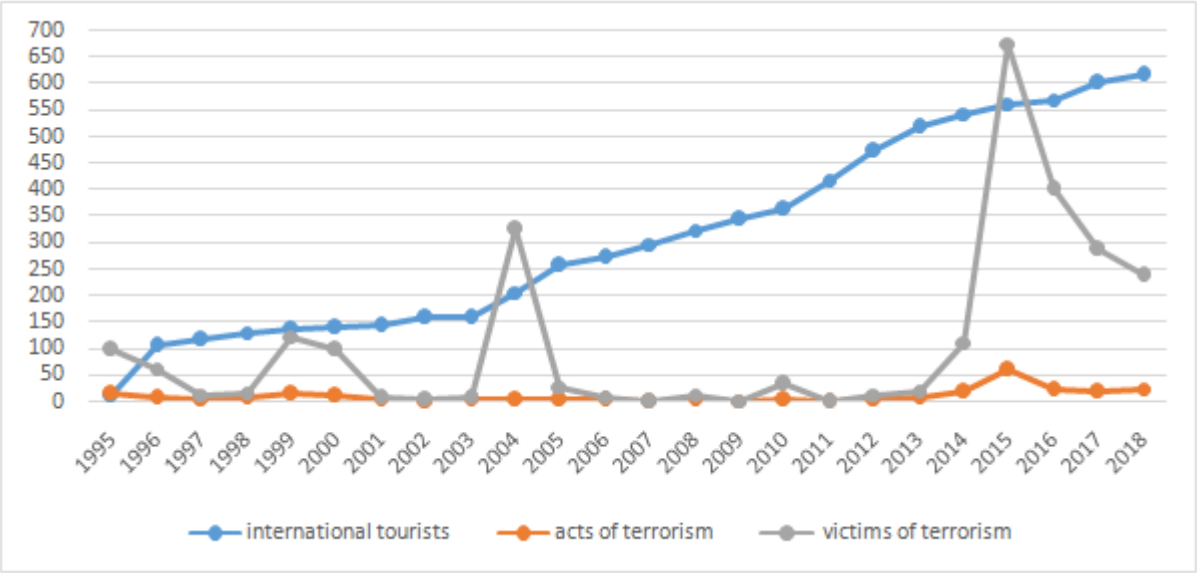

Figure1.*Trends in international tourists (in tens of thousands), terrorist acts and victims of terrorism in Central Africa from 1995 to 2018*

Source: *Authors' computation*

3. DATA SOURCE AND VARIABLES

They are three sources of data used; the World Tourism Organization (UNWTO), the International Terrorism Attributes of Terrorist Events (ITERATE) produced by Mickolus, et al. [18] and the Word Development Indicators (WDI). The time of the study extends from 1995 to 2018 and covers 10 countries[4] , i.e., 240 observations. For data processing, partial missing data are replaced by the historical imputation method using the three-step moving average technique and total missing data by nearest neighbor imputation. The logarithm function was applied to the data for linearization purposes and were interpreted in terms of elasticity.

The dependent variable is the number of international tourist arrivals (TOUR). The independent variable of interest is terrorist acts and the intensity of terrorist attacks. Terrorist acts (TERR_act) reflect the recurrence of attacks in a country and are measured by the number of annual terrorist acts recorded and reported by the press in each country [18]. In contrast, the intensity of terrorist attacks (TERR_int) describes the scale and effects of terrorism in a country. It is assessed by the number of incidents or victims of terrorism, i.e. the number of people directly and physically affected by the attack through loss of property, life or freedom [18].

The control variables are Gross Domestic Product (GDP) and oil revenues (PET). The choice and theoretical justification of these variables stems from their more or less direct implication and relationship with tourism and terrorism activities. GDP is an indicator of economic development, and the economic situation can give rise to terrorism. Indeed, terrorism is a means of expression and grievance in the face of a deteriorating economic situation and a poor distribution of wealth between sections of the population [11, 12]. Furthermore, the level of development has a monotonic and decreasing effect on the occurrence and resurgence of warfare [36]. On the other hand, oil revenue is used as a proxy for natural resources. Indeed, in developing countries, natural resources are often the main source of natural wealth; and the monopolization and management control of these natural resources are a bone of contention between governments and dissident groups [37]. Mining and oil resources are more frequent sources of conflict than agricultural resources [36].

4. THE ECONOMETRIC STRATEGY OF TOURISM DEMAND AND TERRORISM

The econometric specification is a dynamic vector autoregressive panel model (PVAR) with the Generalized Method of Moment (GMM) estimator as the equation system. The main advantage of the GMM estimator is that it solves the problem of variable endogeneity. Variable endogeneity arises

from the presence of lagged variables of the dependent variable among the explanatory variables, or from the presence of endogenous explanatory variables. More specifically, this estimator takes greater account of simultaneity, reverse causality and omitted variable biases, unlike OLS [38].

Furthermore, in the estimation process, GMM estimation with a system of equations produces efficiency gains by increasing the sample size[5] and makes inter-equation hypothesis testing straightforward relative to other methods [39]. In the implementation process, the various variables are instrumented with a time lag of four periods. PVAR models were introduced and generalized by Holtz-Eakin, et al. [39]. They are a generalization of time series models, specifically the standard VAR model with several individuals. The following system of linear equations represents the global model for a VAR panel of order p with k components, l independent variables, and panel-specific fixed effects: $TOUR_{it} = \sum_{m=1}^{p+1} tour_{it-m} A_m + X_{it} B + \mu_{it} + \varepsilon_{it}$

i is the country index, i= 1 to 10; t is the time index, t= 1995 to 2018; m=1,..., p-1

Where $TOUR_{it}$ is the vector of dependent variables of formats $(1\times k)$; X_{it} is the vector of independent variables of formats $(1\times l)$ consisting of TERR_act, TERR_int, GDP, PET; μ_{it} represents the vector of fixed effects specific to the dependent variables of formats ; $(1\times k)$ ε_{it} the idiosyncratic error term of formats $(1\times k)$ which represents the innovation term. It has the following properties: $E(\varepsilon_{it}) = 0$, ; $E(\varepsilon'_{it}, \varepsilon_{it}) = \sum$ $E(\varepsilon'_{it}, \varepsilon_{is}) = 0$ for all t > s. $A_1,...A_{p-1}, A_p$ of format $(k\times k)$ and the matrix B of format $(l\times k)$ are the parameters to be estimated.

The following diagnostic, stability and validity tests of the model are verified; the stationarity properties of the different variables, the stability condition of the VAR panel estimates by calculating the modulus of each eigen value of the estimated model. Equally, in this paper, we discuss a number of issues related to estimation and forecasting, such as; how to select an optimum number of lags in a specification, and how to select an optimum number of moments in a specification. These are all necessary conditions from the over identifying restrictions J statistic of Hansen (1982) [40]. The following specific analyses will then be carried out: Granger causality to describe the links between variables. Finally, the analysis of impulse response functions based on the Cholesky decomposition and the variance decomposition of forecast errors over a five-year horizon. The aim of the previous two analyses is to observe, respectively, the behavior of each variable in the face of innovation shocks and the contribution of forecast errors. Confidence intervals for the various analyses are derived by integrating resampling techniques from Monte Carlo simulations, where 500 draws are implemented.

Table1. *Descriptive statistics for variables by year and counties*

Variable	Sum	Average	SD	Min	Max
Tourims arrivals	75.5	0.31	0.33	0.0029	1.71
Terrorism acts	232	0,97	3,18	0	39
Terrorism victims	2576	10.73	42.56	0	360
GDP	3509	14.62	23.74	0.14	145.7
Oil revenue	1334.3	5.56	11.45	0.0002	70.47

Source: *Author's Computation. SD - standard deviation*

In the table above, data on tourism demand are in millions of tourists. Data on GDP and oil revenues are in billions of US dollars. Over the period 1995-2018, more than 75.5 million foreign tourists visited Central Africa, i.e. an average of 3.14 million tourists per year and around 3,144,455 tourists per country each year. These statistics confirm the sub-region's last position among Africa's tourist hubs, despite its strong tourist assets. In 2018, the highest annual inflow of visitors to Rwanda were recorded(1.7 million). In terms of terrorism, the country has had more than 232 officially recorded attacks and reports. These resulted in more than 2,576 direct official victims. These figures exclude perpetrated attacks for which no information is available, casualties that occurred without an official

source and attacks and casualties of which we have no knowledge. In terms of production, some countries are categorized as low-income and lower middle income. The wealth created in the various countries varies widely. The economies of this sub-region are largely dependent on oil resources, which account on average for 38% of wealth creation and 60% of exports.

5. RESULTS AND DISCUSSION

The various tests presented in the appendix show, in the case of the IPS unit root test, that the variables are stationary in first difference. The J statistic, which maximizes the order of selection, and the MBIC, MAIC and MQIC statistics, which minimize the order of selection, show that the optimal lag is one period. With regard to the model validation tests, the stability test of the estimated model shows that the model is stable. Indeed, all eigen values (modulus of the companion matrix) are below unity or inside the circle. Granger causality tests reveal bidirectional causality between terrorism and tourism. This result is similar to those found in the UK, Turkey and Germany [41].

The results of general model (1) indicate that the number of terrorist acts and the number of victims of terrorism are significant at the 1% level.

Table2. *Results of the impact of terrorism on international tourism demand*

Variables	**Dependent variable: tourism arrivals**		
	(1)	**(2)**	**(3)**
Tourism arrivals (t-1)	0.183***	0.134*	0.185**
	(0.068)	(0.075)	(0.077)
Terrorism acts	0.123***	0.017	××××
	(0.031)	(0.031)	××××
Victims of terrorism	-0.045***	××××	-0.015*
	(0.009)	××××	(0.011)
GDP	0.259***	0.223***	0.296***
	(0.070)	(0.080)	(0.086)
Oil revenue	-0.017*	-0.020*	-0.023**
	(0.010)	(0.011)	(0.011)
Number of observation	210	210	210
Number. of panels	10	10	10
GMM criterion Q(b)	0.413	0.293	0.313

Source: *Author's Computation.*

Note: - ×××× *means variable was not included at this level of analyses,*

** p<0.1; ** p<0.05; *** p<0.01 are the significant levels at 10, 5, and 1% respectively*

This illustrates the effect of terrorism on foreign demand for the sub-region. However, the elasticity of terrorist acts is positive, which seems to be contrary to theory. However, it is explain by tourists' low perceived risk of terrorist acts. In this context, the number of terrorist attacks has little influence and does not reconsider the choice of destinations. This is corroborated in model 2, where terrorism is unimportant when this variable alone measures terrorism.

The elasticity of terrorism intensity is negative, in line with theory. This negative effect is explain by a high-perceived risk. The size of the effect is small and is less than one unit in proportional terms. In model 1, an increase of one direct victim of terrorism in the sub-region leads to an average decrease in tourist arrivals of 0.045 units, while in model 3 the decrease is 0.015 units. Tourists are relatively sensitive to the victims of terrorist attacks, and associate a high perceived and actual risk with them, compared with the number of terrorist acts. The number of victims of terrorism may lead tourists to reconsider their choice of sub-region.

The impulse-response analysis and error-variance decomposition presented in the appendix show different responses to the impact of shocks and the future forecast of international tourism demand in Central Africa. The shock of a terrorist act has no short-term effect. In fact, tourist arrivals increase in the first two years, decline in the third and return to normal in the fourth. The contribution of terrorist acts to the variance of tourism demand forecast errors over a five-year horizon is 0.0041309. In other words, 99.58% of the variance in the forecast error of tourism demand in Central Africa is due to its own innovations, and 0.413% to that of terrorist acts.

An increase in the number of victims of terrorism has a significant impact on international tourism demand. In the first year, tourist arrivals drop by an average of 0.4 points. In the second year, there is strong negative growth in arrivals. From the third year onwards, demand stabilizes at the initial trajectory, i.e. the number of visitors prior to the period of terrorist attacks, until the fifth year. The contribution of terrorism intensities to the variance of tourism demand forecast errors is 0.0194712. In other words, 98.06% of the variance in the forecast error of international tourism demand in Central Africa is due to its own innovations and 1.94% to that of terrorism intensity.

These findings are align with empirical studies. A review of the study results shows that there appears to be an overall effect of terrorism on tourism demand 82% of the studies find that terrorism has a significant and negative impact on tourism demand [22]. However, the effect varies from country to country and region to region. In the MENA, Europe and Asia regions, the loss of market share of tourist arrivals to Greece, Turkey and Israel is estimated at 9.02%, 5.21% and 0.67% respectively [32]Between 1984 and 1995, the decline in tourist arrivals in the year of the terrorist attacks was estimated at 8.8%, and 14.8% in subsequent years [42]. Other studies conclude that the effects are limited and short-lived. An increase in the number of victims and the number of deaths resulted in a 0.1% and 0.7% reduction in arrivals respectively, over the period 2010-2014 [43]

In Africa, Egypt saw a 22%, 30% and 43% drop in international visitors, overnight stays and tourism revenues respectively between 1992 and 1995 [44]. In Nigeria, terrorism caused a negative reaction in tourism revenues and key macroeconomic indicators, notably oil revenues and GDP over the long term following terrorist acts over the period 1995 to 2015 [37]. The post-terrorism elasticity of tourist arrivals to Kenya from 124 host countries is estimated at minus 0.13% over the period 2010-2013.This corresponds to a loss of 2,500 arrivals and US$1.82 million in tourism revenue per year [45]. In general, the consequences of terrorist acts are less severe than other forms of conflict, such as coups d'état and internal political conflicts, and depend on the scale, frequency and government response to the attacks [25, 33, 35].

As for the other economic aggregates, GDP elasticity is 0.259 and significant at the 1% threshold. The level of development of the domestic region favors foreign tourist arrivals. The elasticity of oil revenues is minus 0.017 and significant at the 10% threshold. A poor distribution of natural endowments generates terrorist movements, which in turn can inhibit international arrivals [36]. The lagged value of tourism is significant at the 1% threshold. It confirms the validity of the phenomenon of repeat visits in the behavior of foreign tourists.

As far as shocks to other aggregates on tourism demand are concerned, a shock to GDP leads to very significant positive waves in tourist numbers, the effect of which stabilizes at the start of the third year. This is the antithesis of oil revenues, where there is a significant negative reaction in demand in the first year, followed by stable demand at the start of the second year. In terms of forecasting, 3.5% of the variance in the forecast error for tourism demand over the five years is explain by the GDP and 0.55% by oil revenues. Some studies conclude that cross-border terrorism has a significant effect on per capita income, unlike domestic terrorism in African countries [21].Similarly, terrorism has adverse effects in countries specializing in primary fuel exports [46].

6. CONCLUSION

The tourism sector offers itself as a diversification sector for the economies of the Central African sub-region by taking into account the enormous potential of natural and cultural attractions. The objective of this paper was to examine the effect of terrorism on tourism activities (arrivals) in Africa; particularly by paying attention to the Central Africa where scanty works exist on the subject matter of tourism development, study, and/or sustainability.

Tourism activities in Central Africa are indeed confronted with a rising climate of insecurity, which tends to inhibit the development of the economy in general and specific sectors such as tourism and travel, illustrated by a lackluster tourism demand dynamic. This article assesses the effect of terrorism on tourism demand over the period 1995-2018. Using a PVAR model and impulse response functions as econometric strategies and in line with tourism demand theoretical underpinnings, results indeed shows a negative effect of terrorism on tourism demand in Central Africa. However, unlike certain regions of Africa or the world, the effect of terrorism is marginal and weak, generally not exceeding one year. The number of victims of terrorism has a greater effect on demand than the number of

terrorist acts. Terrorism also affects production and income from the natural resources on which most of these countries depend on. In view of these results, we recommend that the governments of this sub-region, on one hand, continue to take action to thwart the multiplication of terrorist groups andterrorist acts by initiating policies that adequately coordinate and moderate between countries. Second, tostepup pacifist communications through the international media, diplomatic representations and tourist information offices, in order to restore the image of this destination and curb the perceived risk of this sub-region of the world.

CONFLICT OF INTEREST

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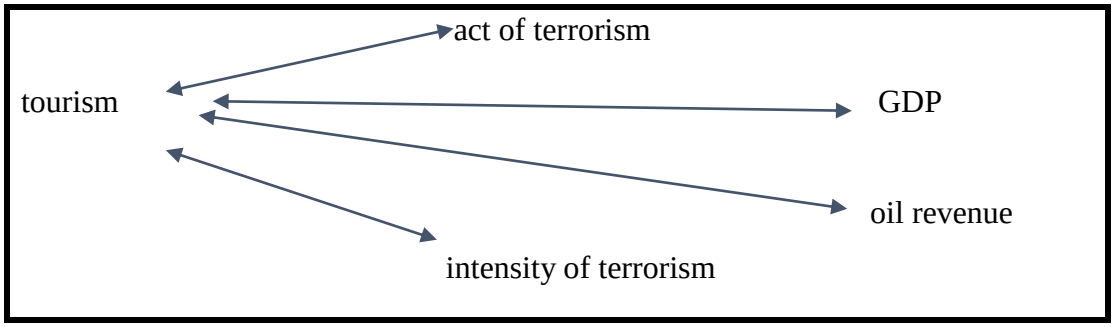
APPENDIX

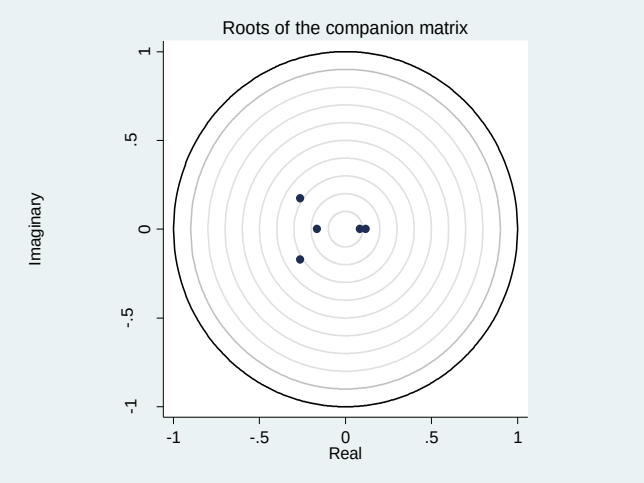


FigureA.1. *Granger causality of other variables with tourism flows*

Source: *Author's Computation*

Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
-.2634514	-.1721158	.3146911
-.2634514	.1721158	.3146911
-.1642866	0	.1642866
.1191824	0	.1191824
.0839066	0	.0839066



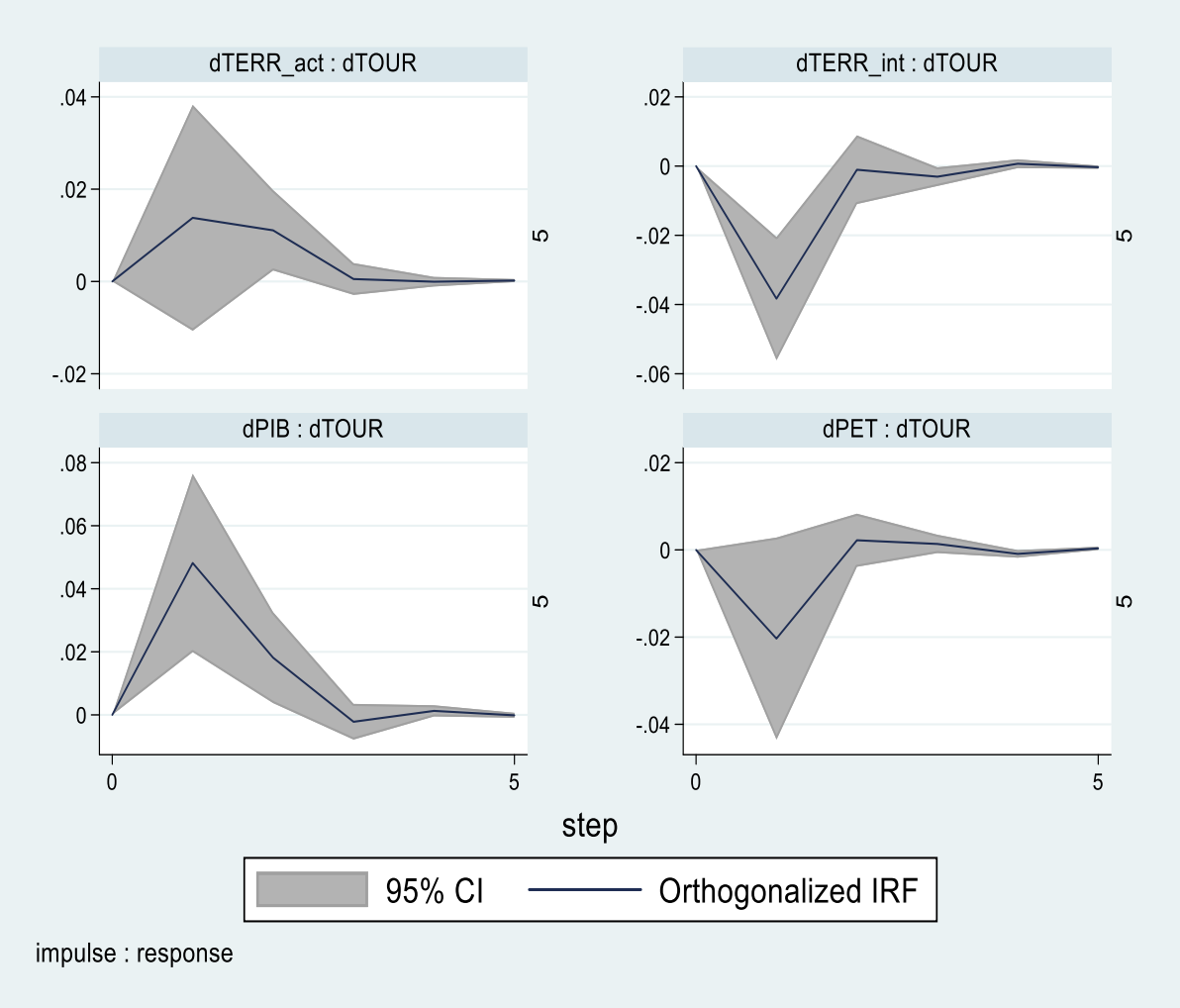
FigureA.2. *Stability of the estimated PVAR model*

Source: *Author's Computation*

TableA.1. *Variance decomposition of forecast errors over a five-year horizon*

Reponse variable and forecast horizon	**Variable impulse**			
Tourism arrivals	TERR_act	TERR_int	GDP	PET
0	0	0	0	0
1	0	0	0	0
2	0.0025253	0.0194656	0.0308239	0.0054888
3	0.0041282	0.0193485	0.0349601	0.0055162
4	0.004131	0.0194658	0.0350134	0.0055396
5	0.0041309	0.0194712	0.0350333	0.0055504

Source: *Author's Computation*



FigureA.3. *Impulse response functions (IRF)*

Source: *Authors computation*

[1] GTD: Global Terrorism Data.
[2] MENA: Middle East and North Africa ord. According to the World Bank, this region comprises 21 countries.
[3] The counter-terrorism summit was held on May 28, 2022 in Malabo (Equatorial Guinea).
[4] Sao-Tomé et Principe is excluded from the analysis due to data unavailability.
[5] Instrument offsets with missing values are replaced by zeros.

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