Direct Effect of Terrorism on Economic Growth

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Abstract

The objective of this article is to study the effect of terrorism on economic growth and the transmission mechanisms of this effect. To do this, a simultaneous equation model was applied to panel data for a sample of 31 countries (18 developing and 13 developed). The results of this study show the following: Terrorism has a significant negative impact on economic growth in the case of the entire sample; Unemployment also has a significant negative effect on economic growth in the case of the entire sample; Investment and FDI have positive and significant effects on economic growth in the case of the entire sample; For developed countries, we see that terrorism has no significant effect on economic growth; FDI had a positive and significant impact on economic growth in the case of developed countries; Unlike the case of developing countries, we note that terrorism has a positive and significant impact on economic growth; Unemployment, investment and FDI have a positive and significant impact on economic growth in the case of developing countries. It can be said that terrorism threatens fragile economies more and poses no problem in advanced economies.

Keywords: *Terrorism, economic growth, simultaneous equations.*

Introduction

Terrorism is a complex, man-made phenomenon that impacts all aspects of society. Over time, it has become a threat that knows no geographic or geopolitical boundaries. Although efforts to establish an internationally binding definition of terrorism have been unsuccessful, it can be agreed that terrorism seeks to cause human suffering and widespread fear. Recent attacks, in particular, have demonstrated the disruptive potential of terrorism on social life and business.

Althougt terrorism is not a recent phenomenon; it gained importance in the studies after the September 11, 2001 attacks on the USA. Though it is a global phenomenon, the Middle East and South Asia are specifically affected due to piracy launched after the September 11 attacks,and the Taliban government in Afghanistan has been seen as providing the basis for al-Qaeda terrorist activities by the United States (US) and its allies. After the September 11 incident, Afghanistan was attacked by US and NATO forces in 2001.

Terrorism is one of the greatest, if not the greatest, humanitarian evil of the last twenty years. Since the beginning of the wave of attacks around the world, in Europe and the United States in particular, several thinkers have directed their explanations to the " extremist character " of the religion of Islam.

GDP per capita deserves special attention because it is the most commonly used instrument to measure the level of economic development of countries, their poverty and wealth, as well as their place in common classifications used in international statistics and comparative studies. A number of studies have shown the existence of a curvilinear relationship between this indicator and the intensity of terrorism.

Terrorism can cause substantial loss to the country's economy. These losses are mainly due to the uncertainties caused by the trust lost with terrorism and the transfer of a significant part of the country's resources to military spending (Karagöz, 2016; Chile et la., 2023; Cuong et la., 2024). On the other hand, terrorists can also directly attack key sectors of the economy. These results suggest that the aim of terrorism, to meet the political and economic demands of illegitimacy, is a clear indication that the government must intimidate and create fear and horror in society. In other words, the objectives of terrorism achieve a political goal by creating pressure on political authority and digesting public interest through violence.

The link between peace and economic growth is indispensable, because economic development cannot be achieved without peace, and peace and security without growth cannot be sustainable. Terrorism has a direct and indirect impact on economic growth. The accumulation of physical and human capital is the

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main determinant of economic growth. Terrorism, conflict and violence destroy physical and human capital and undermine socio-political institutions that positively impact economic growth.

Likewise, conflicts, such as terrorism, increase uncertainty, which reduces investments. Additionally, internal conflicts account for nearly doubling the share of gross domestic product (GDP) spent on defense, and limiting spending on social capital and health.

The authors studied the short-term impact on economic growth using an event study. But the longer-term impact of terrorism on economic development is distant and less pronounced. Therefore, we came up with the idea and decided to study the longer-term impact of terrorism on macroeconomic variables. Hence the central problem of our work is articulated around the existence of a long-term effect of terrorism on economic growth. And we address the following question: To what extent and by what mechanisms can terrorist attacks affect the economic growth of countries?

Terrorism and Economic Growth: Stylized Facts

Direct Effect of Terrorism on Global Economic Growth

Economic growth suffered a decline between 2007 and 2010 because of the subprime financial crisis and then between 2011 and 2012 because of political instability in some countries, notably the Arab Spring countries. The remarkable decline in economic growth was followed by an increase in terrorism between 2011 and 2017 for political, economic and social reasons. (**See figure 1**)
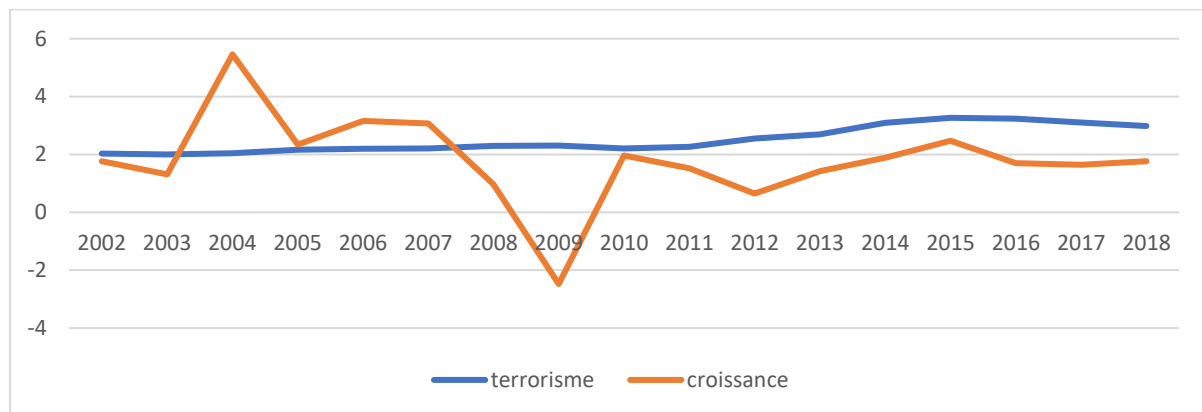
Figure 1. Evolution of terrorism and economic growth

Source: Representation of the author.

Through the second figure, we see that the economic cost of terrorism was equivalent to 16.7% of Afghanistan's GDP mentien the year. That's according to the Institute of Economics and Peace's new Global Terrorism Index. Relatively speaking, no other country is more affected, with Syria being the second most affected country at 3.4% of GDP. The situation in Iraq has improved significantly in recent years, with the so-called Islamic State crushed and ultimately driven out from the country. In 2016, for example, terrorism accounted for almost a quarter of Iraq's GDP, but this has declined significantly to just 1.1%. (See figure 2)
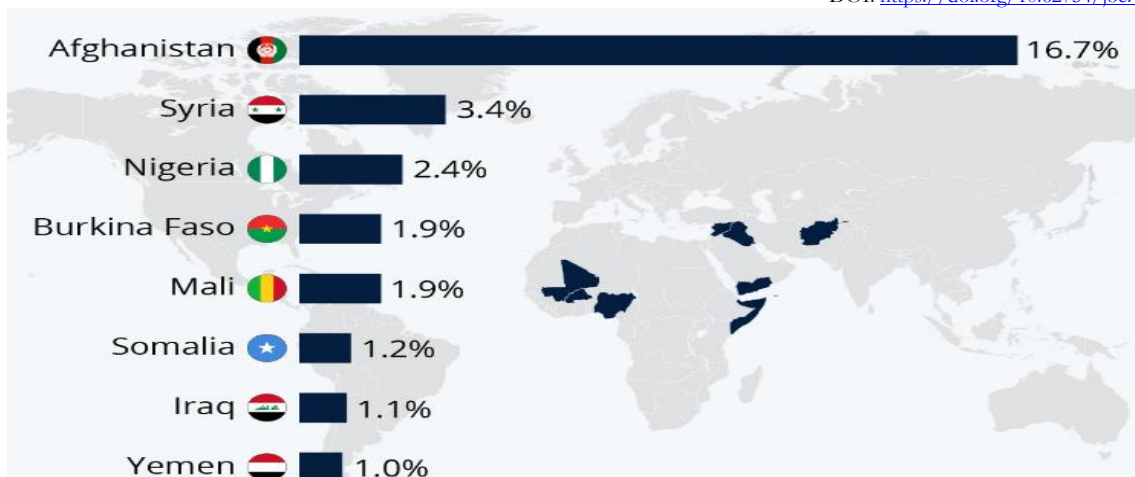
Figure 2. Impact of terrorism as a percentage of GDP in 2019.

Source: Institute for Economics and Peace Report 2019.

Experience From Some Countries

Figure 3 clearly indicates an inverse relationship between economic growth and terrorist attacks in Pakistan, i.e. when terrorism is low, economic growth is high and when terrorism is high, economic growth is low . To defeat terrorism, a significant portion of human and financial resources have been allocated for security purposes. (See figure 3).
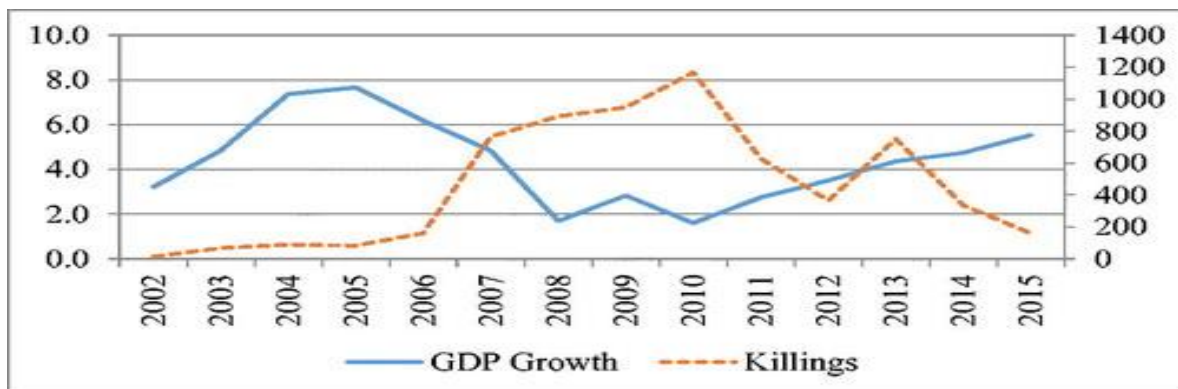

Figure 3. GDP growth and suicide bombing deaths in Pakistan (2002-2015).

Source: Semantic Scholar

Indirect Effect of Terrorism on Economic Growth

Tourism Are the Transmission Channels

Figure 4 illustrates that tourism contributes the highest amount in terms of both GDP and employment to the economies of the at-risk group of countries, and spillover countries have suffered the greatest reductions in tourism's contribution to GDP.

The costs of terrorism to the tourism industry include direct costs such as reduced tourist numbers leading to reduced spending and therefore GDP, and indirect costs such as reduced employment in the tourism sector. Between 2014 and 2015, revenues from tourism sectors declined by US$40 billion globally due to the increased impact of terrorism. In 2015, one million fewer tourists visited Tunisia compared to the same period the previous year. Morocco, where no terrorism-related deaths occurred in 2015, lost only $5 billion in tourism revenue.

For 2008 and 2014, tourism's contribution to GDP growth was 1.9 percent for countries where terrorist attacks deliberately targeted tourists, but almost double at 3.6 percent for countries without targeted attacks. (See figure 4)
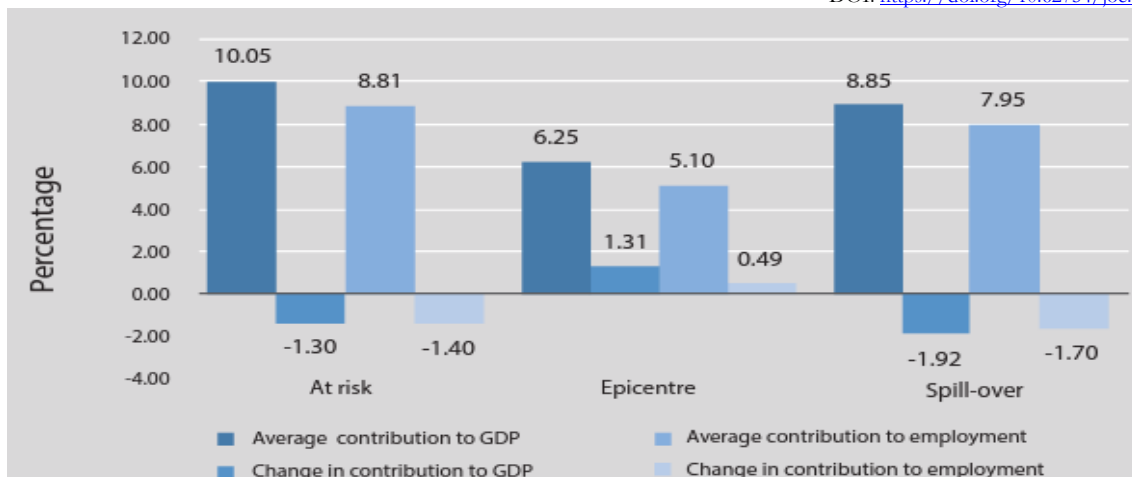
Figure 4. Contribution of tourism to the economy by group between 2007 and 2016.

Source: WTTC, IEP Report 2019.

Literature Review

The relationship between economic growth and terrorism has received multiple attention over the past two decades due to the increase in terrorist activities after the September 11 incident. Many countries have been under the curse of terrorism and have lost hundreds of people, their capital, and have suffered serious losses in their economic growth due to the destruction of infrastructure and disruption of the economic growth process.

Gaibulloev and Sandler (2009) divide their model into developed and developing economies in Asia, they find that terrorism does not have a significant impact on the growth of the developed economies in the sample. However, among the 35 developing countries examined, for each additional transnational terrorist incident per million people, the growth rate of GDP per capita decreased by 1.4 percent and government spending as a percentage of GDP increased by 1. 6%.

Araz-Takay and al. (2009) studied the macroeconomic effects of terrorism by controlling the possible non-linear and endogenous relationship between political conflict and economic activity. They confirmed that terrorism had a significant negative effect on economic activity and that its effect was more severe during periods of expansion, and that the impact of economic activity on terrorism was only significant during periods of expansion. periods of recession.

Meierrieks and Gries (2012) examined the relationship between economic growth and terrorism in 18 Latin American countries between 1970 and 2007. They found that the link between terrorism and economic growth differed depending on the development of the countries. Terrorism reduces growth in less developed countries, but this link cannot be observed in the developed economies of Latin America.

Malik and Zaman (2013) explored the effect of terrorism on macroeconomic factors, namely political instability, poverty, population and price level, and economic growth. They covered 1975-2011 data from different sources, applied Granger causality test and concluded that there was a negative impact of terrorism on macroeconomic factors.

Choi (2015) studied the impact of economic growth on terrorism using data for 127 countries from 1970 to 2007. It was found that countries with high industrial growth are less likely to experience internal and external terrorism.

Syed and al. (2015) explain the causes and incentives of terrorism in the case of Pakistan using panel data from five regions of Pakistan from 1980 to 2010. The results finalize this irrelevant increase in expenditure and poor law and order conditions result in an increase in terrorist activity in Pakistan.

Siddique and al. (2017) attempted to examine the effect of terrorism on domestic investment and FDI with evidence from Pakistan. They detected a long-term association between terrorism and investment flows.

The empirical result revealed that domestic investment and FDI have a negative effect on terrorism. In addition, trade and human capital are a cause of increased investment.

As for the African context, Chuku and al. (2017) studied the growth and fiscal consequences of terrorism in Nigeria. They found that terrorism is negatively and significantly associated with growth. The authors estimated the annual cost of terrorism to GDP at approximately 0.82%. The results also indicate that terrorism disrupts the reallocation of economic activity from private investment spending to government spending.

Lassoued and al. (2018) examined the effect of terrorism on economic growth. They applied the simultaneous equation model to panel data from eleven countries (six developing and five developed) over the period 2008-2015. The results of this study show: a positive effect of terrorism on economic growth for the entire sample as well as for the case of developing countries; a negative effect of economic growth on terrorism for the case of the total sample and the case of developing countries; and a negative effect of unemployment on terrorism for all countries samples. Furthermore, the study finds that people living in rural areas tend to engage in terrorism more than those in urban areas.

Asongu and al. (2019) found a positive relationship between inclusive development and terrorism. This finding supports our conclusion that inequality reduces terrorism because inclusive development is necessary for terrorism to persist. We also find that unemployment has a positive impact on the level of terrorist incidents and deaths due to terrorism in Africa. However, the impact of unemployment on terrorism is more pronounced in countries where the current level of terrorism is low.

Alade and al. (2021) examined the effect of terrorism on economic growth and human capital development in Nigeria from 1981 to 2019. The generalized method of moments (GMM) estimator was used to analyze the data. A negative and insignificant impact of terrorism on economic growth and human capital development was noted. Internal and external conflicts have also had a negative and insignificant effect on economic growth. Domestic investment had a positive and significant effect on economic growth, while its impact on human capital development was positive but insignificant. We therefore recommend the creation of a security bank to directly finance security in Nigeria.

The Sample and Data

As part of this research, we are interested in the study of a scourge that strikes the world, namely terrorism. Thus, this research focuses on the following question: To what extent and by what mechanisms can terrorist attacks affect the economic growth of countries? To answer this question, we chose a simultaneous equation model applied to panel data for a sample of 31 countries (18 developing and 13 developed).

Our total sample includes 31 countries divided into two categories (developed and developing). 18 developing countries (Tunisia, Algeria, Brazil, Egypt, Hungary, Jamaica, Bulgaria, Morocco, Kenya, Pakistan, Namibia, Djibouti, Jordan, United Arab Emirates, Iraq, Iran, Malaysia, and Nigeria), and 13 developed countries (Australia, United States, France, Canada, Czech Republic, Iceland, Italy, Denmark, Ireland, Portugal, Sweden, Slovakia, and Japan…) during the period 2002 -2018.

Research Methodology

Data Description

In this part, we will estimate the model by introducing control variables each time to improve our estimation. The first model contains GDP as a dependent variable. In this step, we test the direct impact of terrorism on economic growth.

In other words, we will estimate the model taking into account the ranking of countries according to the development criterion and then estimate the overall model.

This study examines the direct effects of terrorism on economic growth. To observe the direct effect of the growth of terrorism, we estimate the following reduced form:

$$GDP_{yit} = \beta_{1it} GTI + \beta_{2it} Inflation + \beta_{3it} Unemployment + \beta_{4it} Investment + \beta_{5it} FDI + \varepsilon_{it}$$

- Economic growth: Measured by the growth rate of real GDP per capita (dependent variable).

- Unemployment rate.
- Inflation: Measured by the consumer price index.
- FDI.
- Terrorism: Measured by the global terrorism index(GTI).
- Investment: Measured by gross fixed capital formation in relation to GDP.

The hypotheses are as follows:

- H1: Terrorism does not affect economic growth
- H2: Terrorism affects economic growth

Results and Discussion

Descriptive Statistics

Descriptive analysis is the type of data analysis that helps describe, show, or summarize data points constructively so that patterns can emerge to meet all the conditions of the data.

Table 1. Descriptive statistics by development criterion.

Variable	Developed countries	Developing countries	Complete panel
Terrorism	1.616797	3.1503	2.507218
GDP	1.566711	1.976995	1.800932
Inflation	1.942899	6.743852	4.730549
Unemployment	7.355928	9.396993	8.541063
Population	5.09e+07	5.06e+07	5.08e+07
FDI	4.312887	3.856254	4.047745
GINI index	31.82561	39.06611	36.02977
Poverty rate	0.3920662	9.828518	5.871297
Rural population	23.20453	38.05966	31.83009
Urban population.	76.79547	61.90793	68.15109
Human capital	109.8584	73.13573	88.53558
Commercial openness	83.81894	97.3754	91.69043
Investment	23.30124	24.71504	24.12216
Public expenditures	20.35116	15.62576	17.60738

Source: Author's calculation.

In Table 1 we described the model variables by ranking the countries and using the average criterion. Terrorism calculated by the Global Terrorism Index averages 2.51; it is much higher in developing countries (3.15) than in developed countries (1.62).

The high value of this index in developed countries is due to some socio-economic factors such as poverty, unemployment and social inequality (Gini index). For this reason, we find that the poverty rate in developing countries is almost 30 times the poverty rate in developed countries as well as the social inequality (Gini index) which is at the level of 39 for developing countries while in developed countries it is at the level of 31.8. The unemployment factor is also important for the increase in the terrorism index; it is higher in developing countries (9.39%) than in developed countries (7.35%).

Economic growth is on average 1.8% shared between 1.98% for developing countries and 1.57% for developed countries; This result shows the speed of economic growth is higher in developing countries.

Correlation Matrix

The correlation analysis is based on the Pearson correlation coefficient (Rho) defined by:

$$\rho = \frac{cov(x_1; \ x_2)}{\sigma(x_1). \sigma(x_1)}$$

Table 2. Correlation matrix for developed countries.

	Terr	GDP	Inf	Unemployment	Pop	FDI	GINI index	Poverty rate	Rpopulation	Urpopulation	Hcapital	Copenness	Investment	PuExp
Errrtte TERR	1.0000													
GDP	0.0101	1.0000												
Inf	0.3232	-0.0488	1.0000											
Unemployment	-0.0458	0.0117	0.0260	1.0000										
Pop	0.4497	-0.0283	0.1248	-0.2596	1.0000									
FDI	-0.1655	0.1795	-0.0464	0.0886	-0.1831	1.0000								
GINI index	-0.0526	0.0390	0.1704	0.2869	0.2404	-0.0165	1.0000							
Poverty rate	0.3349	0.0815	0.3009	-0.0927	0.2142	-0.0741	0.4609	1.0000						
Rpopulation	0.3703	0.1174	0.3336	0.1373	0.0499	0.0105	0.3354	0.6323	1.0000					
Urpopulation	-0.3697	-0.1179	-0.3345	-0.1371	-0.0523	-0.0106	-0.3382	-0.6331	-0.9997	1.0000				
Human capital	-0.5468	-0.0867	-0.3834	-0.0770	-0.2263	0.1205	-0.2970	-0.5706	-0.6636	0.6643	1.0000			
Copenness	-0.4097	0.1031	-0.1781	0.1136	-0.5963	0.3464	-0.1596	-0.2062	-0.0833	0.0848	0.0733	1.0000		
Investment	-0.1143	0.0489	0.0945	0.1034	-0.1977	0.0996	-0.0764	-0.2147	-0.1231	0.1236	0.1338	0.0341	1.0000	
Public expenditures	-0.4285	0.0074	-0.4007	0.2424	-0.3642	0.0299	-0.1344	-0.3689	-0.4602	0.4606	0.4736	0.1275	-0.0165	1.0000

Source: Author's calculation.

Table 3. Correlation matrix for developing countries.

	Terr	Inf	Unemployment	Pop	FDI	GINI index	Poverty rate	Rpopulation	Urpopulation	Human capital	Copenness	Investment	Pu exp
Terr	1.0000												
Inf	0.2873	1.0000											
Unemployment	-0.1679	-0.0763	1.0000										
Pop	0.4392	0.2470	-0.3666	1.0000									
FDI	-0.2741	-0.0510	0.0862	-0.1965	1.0000								
GINI index	-0.3761	-0.0061	0.2791	0.0886	0.0309	1.0000							
Poverty rate	0.2578	0.1736	-0.1926	0.2998	-0.0643	0.4015	1.0000						
Rpopulation	0.3899	0.2275	-0.1358	0.2359	-0.1302	0.1829	0.6168	1.0000					
Urpopulation	-0.3891	-0.2281	0.1371	-0.2408	0.1306	-0.1862	-0.6180	-0.9995	1.0000				
Human capital	-0.5024	-0.1431	0.1541	-0.2294	0.0971	-0.0741	-0.5946	-0.5121	0.5118	1.0000			
Copenness	-0.4644	-0.2717	0.0611	-0.5822	0.2752	-0.0005	-0.1258	-0.4212	0.4244	-0.0679	1.0000		
Investment	-0.1852	0.0324	0.1991	-0.2846	0.1049	-0.0552	-0.1995	-0.2613	0.2627	0.1133	0.2341	1.0000	
Public expenditures	-0.3809	-0.3127	0.5609	-0.4270	0.2059	0.2729	-0.2523	-0.2837	0.2834	0.1901	0.3146	0.1253	1.0000

Source: Author's calculation

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This coefficient is between -1 and 1; the more this coefficient is close to 1 in absolute value the more the correlation is strong and the more it is close to 0 in absolute value the more the correlation is weak. The correlation results are reported in Tables 2 and 3.

According to the results of Table 2, we note that terrorism, social inequality, the poverty rate as well as the rurality rate of the population have blocks of negative correlation with the urbanization rate, human capital, trade opening, investment and public spending. According to these results, we can generally affirm that social variables are negatively correlated with economic and demographic variables. In this framework, poverty and social inequality are the variables which present the strongest correlation values, particularly with terrorism and human capital which amounts to literacy or perhaps intellectuality.

Table 3 shows that terrorism, social inequality, the poverty rate as well as the rurality rate of the population have blocks of negative correlation with the urbanization rate, human capital, commercial openness, investment and public spending.

The highest correlation values are presented by the urbanization rate with human capital (0.51) and with public expenditure (0.28) as well as human capital and public expenditure (0.19) which shows that developing countries devotes an average share to expenditure on education, training and scientific research to improve the quality of human capital.

Model Estimation

Impact of Terrorism on Economic Growth (Free Model)

Table 4. Estimate of the full panel.

Independent variables	Dependent variable: GDP		
GDP_{t-1}	-0.158***	-0.152***	-0.172***
	(0.00416)	(0.00753)	(0.00395)
Terrorism	-0.314***	-0.420***	-0.201***
	(0.0273)	(0.0551)	(0.0486)
Inflation	0.0829***	0.0859***	0.0713***
	(0.00414)	(0.00259)	(0.00518)
Unemployment	-0.322***		-0.345***
	(0.0232)		(0.0382)
Investment	0.193***	0.0655***	0.176***
	(0.0125)	(0.00520)	(0.0174)
FDI		0.138***	0.106***
		(0.0176)	(0.00876)
Observations	484	484	484
Number of id	31	31	31

Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

Source: Author's calculation.

The estimate shows that terrorism has a significant negative impact on economic growth. This result is consistent with Çinar (2017) used a sample of 115 countries over the period 2000-2015. The results indicate that terrorism exerts a negative and significant effect on economic growth in low-income countries. Bloomberg and al. (2004) illustrated the same link and empirically studied the impact of terrorism on 177 countries between 1968 and 2000. The results indicate that terrorism exerts a negative and significant impact on economic growth. We can accept hypothesis 2 (H2) that terrorism affects economic growth.

Furthermore, this result is consistent with several authors such as; Korotayev et al. (2021), Fared et al. (2018), Zakaria and al. (2019), Asongu and Nwachukwu (2017), Ak and al. (2015), Akıncı and al. (2014), Fatima, Latif and Chugtai (2014), Uysal and al. (2009), Araz-Takay and al. (2009).

Concerning the other variables, we note that unemployment also has a significant negative effect on economic growth while investment and FDI have positive and significant effects on growth. This result is consistent with James and al. (2006).

Table 5. Estimated panel of cases from developed countries.

Independent variables	Dependent variable: GDP		
GDP_{t-1}	0.133***	0.0374	-0.0684
	(0.0506)	(0.0787)	(0.101)
Terrorism	0.623	-0.0675	0.0827
	(0.422)	(0.201)	(0.159)
Inflation	-0.101	0.151	0.0532
	(0.0644)	(0.161)	(0.152)
Unemployment	-0.216**		-0.316***
	(0.0948)		(0.0647)
Investment	0.0951*	-0.00767	0.103***
	(0.0568)	(0.0295)	(0.0249)
FDI		0.183***	0.193***
		(0.0221)	(0.0296)
Observations	208	208	208
Number of id	13	13	13

Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

Source: Author's calculation.

For developed countries, we see that terrorism has no significant effect on economic growth. This result is consistent with Lutz and al. (2014) which indicate that terrorism does not have the expected effects on economic activities. Gaibulloev and Sandler (2009) used the same approach and found that terrorism does not have a significant impact on the growth of the developed economies in the sample. We can accept hypothesis 1 (H1) that terrorism does not affect economic growth.

While unemployment and FDI have significant effects; unemployment has a negative impact but FDI has a positive effect on economic growth. This result is consistent with Alade and al. (2021) who found that FDI had a positive and significant impact on economic growth.

Table 6. Estimation of the panel of cases from developing countrie.

Independent variables	Dependent variable: GDP		
GDP_{t-1}	-0.202***	-0.221***	-0.206***
	(0.0182)	(0.0104)	(0.0151)
Terrorism	-0.488***	-0.408***	-0.272*
	(0.150)	(0.122)	(0.147)
Inflation	0.0789***	0.0731***	0.0345
	(0.0195)	(0.0170)	(0.0294)
Unemployment	0.0198		-0.0254
	(0.0859)		(0.102)
Investment	0.0953***	0.0775***	0.112***
	(0.0298)	(0.0158)	(0.0405)
FDI		0.0673*	0.0618*
		(0.0366)	(0.0331)
Observations	276	276	276
Number of id	18	18	18

Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

Source: Author's calculation.

For developing countries, we note that terrorism has a positive and significant effect on economic growth. Some studies have proven that the impact of terrorism on economic growth can be positive and this result is confirmed by Lassoued and al. (2018).

Indeed, unemployment, investment and FDI have a positive and significant impact on the EC. According to these results, we can affirm that terrorism threatens fragile economies more and poses no problem in advanced and developed economies. In the case of developing countries, we can accept hypothesis 2 (H2) that terrorism affects economic growth.

Summary and Conclusions

In summary, the divergent results of this study regarding the relationship between terrorism and economic growth highlight the need to take into account the specificities of each situation. It is essential to recognize that terrorism can have varied impacts on different economies, and policy responses must be tailored accordingly. In all cases, citizen security and social stability remain priorities, whether the economic impact of terrorism is significant or not.

The results of simultaneous equation modeling applied to panel data can be summarized as follows:

- Terrorism has a significant negative impact on economic growth in the case of the entire sample. This result is consistent with Çinar (2017).
- Unemployment also has a significant negative effect on economic growth in the case of the entire sample.
- investment and FDI have positive and significant effects on economic growth in the case of the entire sample.   This result is consistent with James and al. (2006).
- For developed countries, we see that terrorism has no significant effect on economic growth. This result is consistent with Lutz and Lutz (2014), Gaibulloev and Sandler (2009).
- Unemployment has a negative and significant impact on economic growth in the case of developed countries.
- FDI had a positive and significant impact on economic growth in the case of developed countries. This result is consistent with Alade and al. (2021).
- Unlike the case of developing countries, we note that terrorism has a positive and significant impact on economic growth. This result is consistent with Lassoued and al. (2018).
- Unemployment, investment and FDI have a positive and significant impact on economic growth in the case of developing countries. According to these results, we can affirm that terrorism threatens fragile economies more and poses no problem in advanced economies.

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