



CAUSAL INTERACTION BETWEEN CORRUPTION AND TERRORISM: EVIDENCE FROM MIDDLE EAST AND NORTH AFRICAN COUNTRIES

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ABSTRACT

Corruption and terrorism are two prevalent characteristics of some developing and underdeveloped countries in the world. This article investigates the bilateral relationship between corruption and terrorism in 12 Middle East and North African countries over the 2007-2019 period by means of causality analysis. The findings of causality analysis revealed a bidirectional causality between corruption and terrorism in Jordan, a unidirectional causality from corruption to terrorism in Saudi Arabia and Tunisia, and a unidirectional causality from terrorism to corruption in Morocco and Yemen.

Keywords: Corruption, Terrorism, Middle East and North Africa, Panel Causality Analysis

JEL Classification: C23, D73, D74

YOLSUZLUK VE TERÖRİZM ARASINDAKİ NEDENSELLİK İLİŞKİSİ: ORTA DOĞU VE KUZEY AFRİKA ÜLKELERİ

ÖZET

Yolsuzluk ve terörizm, dünyada bazı gelişmekte olan ve az gelişmiş ülkelerin iki yaygın özelliğidir. Bu çalışma, nedensellik analizini kullanarak 2007-2019 döneminde 12 Orta Doğu ve Kuzey Afrika ülkesinde yolsuzluk ve terörizm arasındaki iki yönlü ilişkiyi incelemektedir. Nedensellik analizi bulguları, Ürdün'de yolsuzluk ve terörizm arasında çift yönlü bir nedensellik, Suudi Arabistan ve Tunus'ta yolsuzluktan terörizme doğru tek yönlü bir nedensellik ve Fas ile Yemen'de terörizmden yolsuzluğa doğru tek yönlü bir nedensellik ortaya koymuştur.

Anahtar Kelimeler: Yolsuzluk, Terörizm, Orta Doğu ve Kuzey Afrika Ülkeleri, Panel Nedensellik Analizi

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1. Introduction

Corruption can be defined in many various ways, but it is briefly abuse of public power for private benefits and it can also exist in private sector or private sector activities regulated by public sector (Tanzi, 1998). The regulations and authorizations, tax system, some public spending decisions, and supply of goods and services under market prices are the main factors affecting the corruption demand, public sector wages, penalty system, bureaucratic tradition, institutional controls, and public sector transparency level are the main factors affecting the corruption supply (Tanzi, 1998). Corruption has many negative economic, social, psychological, cultural and political implications for the societies. In this context, corruption can negatively affect the economic growth and employment through decreasing investments, poverty, income inequality, decrease the access to public services such as education, health, and justice (World Bank, 2021).

Terrorism is another phenomenon deeply affecting the societies through channels of health, economic, social, and cultural ways and its definition is varied among the countries. Therefore, no universally accepted terrorism definitions have existed yet. However, primary effects of terrorism are deaths, injuries, cause the people to lose their lives or disabled and disability injuries and the secondary effects of terrorism are decreases in economic growth and development, tourism revenues, and foreign direct investments., fluctuations in financial markets and security risks (Tahir, 2018).

Both corruption and terrorism have significant social, economic, and political costs for the countries and the scholars have generally focused on economic, social, institutional, and political effects and determinants of corruption and terrorism in the related literature. In this study, we focus on the mutual interaction between corruption and terrorism considering the gap in the literature.

In this context, corruption can facilitate the crime and terrorism through weak institutions and supervision (Efe, 2021; Boussiga and Ghdamsi, 2016). Terrorists can benefit from corruption to finance the terrorist incidences and corruption can facilitate the international terror attacks (OECD, 2017). On the other hand, terrorism encourages corruption through creating a corruptive environment (OECD, 2017). In other words, corruption increases the conflict risk and conflict increases the corruption risk. The peace and stability in the countries with high level of corruption and terrorism are at high risk (Pyman at al., 2014). As a consequence, terrorism and corruption are expected to feed each other at theoretical terms. Shelley (2014) suggests that terrorism is a result of economic and demographic inequalities as well as ethnic and



denominational tensions. Therefore, this phenomenon is generally more prevalent in developing economies and terrorism is generally exported from the developing countries because of notably corruption and misallocation of the resources (Shelley, 2014). Furthermore, corruption is increasingly recognized as a major threat to stability and peace in the globalized world. Therefore, cooperation of governments, international organizations and non-governmental organizations to combat with with corruption is very important (Pyman at al., 2014).

Corruption and terrorism have become a common phenomenon especially in underdeveloped and developing countries and have a great negative impact on the political and socio-economic structure of the countries. Therefore, a global collective effort is necessary to combat with social problems through the implementation of anti-bribery laws, anti-corruption policies and various counter-terrorism strategies around the world (Olaniyi, 2019).

The study investigated the causality between corruption and terrorism in sample of Middle East and North African economies, one of the regions with notably corruption and terrorism in the world. The economic impact of terrorism considerably differs among the regions. The regions of Sub-Saharan Africa, South Asia and MENA respectively experienced the largest negative economic impact of terrorism and 86% of economic impact of terrorism was seen in these regions and the economic impact of terrorism was 4,736.38 (Constant 2019 \$US, millions) in MENA in 2019 and 17.9% of global terrorisms impact happened in MENA region in 2019 (Institute for Economics & Peace (IEP), 2020). However, MENA region had the largest improvement in terrorism during the last successive two years and deaths caused by terrorist incidents decreased 87% as of 2016 and reached the lowest level since 2003 mainly resulted from decreases in conflicts in the Middle East and decline of ISIL (Islamic State of Iraq and the Levant) in Iraq and Syria (IEP, 2020). On the other side, MENA region average CPI (corruption perception index) score was 39 out of 100 in 2020 (Transparency International, 2020). So, the region was highly corrupt region. Syria, Yemen, and Libya were the most corrupt countries with respectively GTI scores of 14, 15, 17 (Transparency International, 2020). On the other hand, global terrorism index and control of corruption index of the countries from MENA region was indicated in Table 1. The data indicated that the corruption level was about constant in Algeria, Egypt, Iraq, Israel, Jordan, and Morocco, but Iran, Kuwait, Lebanon, Tunisia, and Yemen experienced considerable deteriorations in corruption during the study period. Only Saudi Arabia had a significant improvement in corruption. Iraq, Yemen, and Egypt were the countries with highest negative impact of terrorism 2019.

**Table 1:** Terrorism and corruption level in MENA countries

Country	Year	Global Terrorism Index	Control of Corruption Index
Algeria	2005	6.223	-0.48
	2019	2.696	-0.62
Egypt	2005	5.17	-0.62
	2019	6.4	-0.67
Iran	2005	4.122	-0.48
	2019	4.157	-1.05
Iraq	2005	8.618	-1.37
	2019	8.682	-1.34
Israel	2005	5.947	0.83
	2019	4.522	0.81
Jordan	2005	4.586	0.26
	2019	3.149	0.11
Kuwait	2005	1.736	0.51
	2019	1.795	-0.13
Lebanon	2005	4.168	-0.53
	2019	3.661	-1.14
Morocco	2005	3.05	-0.31
	2019	0.565	-0.29
Saudi Arabia	2005	4.596	-0.10
	2019	5	0.28
Tunisia	2005	1.586	-0.26
	2019	3.858	-0.09
Yemen	2005	3.27	-0.89
	2019	7.581	-1.68

Source: IEP (2022) & World Bank (2022a)

As a consequence, we analyze the mutual interaction between corruption and terrorism in a region with high corruption and terrorism by means of causality analysis under cross-sectional dependence and in turn makes a contribution to the empirical literature considering the limited number of studies on our research topic. In this context, Section 2 summarizes the literature about corruption and terrorism, and data and method are briefly explained in Section 3. Section 4 makes the causality analysis and the paper is finished with the Conclusions.

2. Literature Review

Terrorism and corruption negatively affect the countries through various channels. Terrorism can negatively influence the economic growth and development by means of direct and indirect channels such as damaging the physical and human capital, infrastructure, entrepreneurship, and political stability, decreasing the domestic and foreign direct investments, trade, and tourism revenues because of uncertainty, insecurity, and psychological side effects (Bayar and



Gavriletea, 2018). On the other side, the impact of corruption on economic growth varies depending on country specific characteristics. The corruption may positively affect the economic growth if the regulations are tight (grease the wheels hypothesis), but corruption may negatively influence the economic growth through inefficient production and innovation (sand the wheels hypothesis) (Gründler and Potrafke, 2019). However, the empirical literature has mainly revealed a negative growth effect of terrorism and corruption (e.g. see Gründler and Potrafke, 2019; Iheonu and Ichoku, 2021; Malanski and Santos Póvoa, 2021). However, the interaction between corruption and terrorism has been investigated by few scholars, although corruption and terrorism can affect each other at theoretical terms. Corruption can foster terrorism through decreasing the efficiency of the institutions and rule of law, counterterrorism measures, easing the recruitment and radicalization, funding, border insecurity, and trafficking of arms (OECD, 2017; Gilchrist and Eisen, 2019). On the other side, terrorism can reduce the efficiently functioning of the governmental organizations and public oversight and in turn cause the increases in corruption activities. The scholars investigating the interaction between corruption and terrorism have generally reached mixed findings as seen in the following literature summary.

Al-Badayneh (2009) analyzed the interaction between corruption indicators and terrorism incidents in 22 Arab countries over the 1970-2007 period and revealed a negative correlation between terrorism and corruption indicators. On the other side, Kalbasi Anaraki (2012) explored the interaction between corruption and terrorism in 13 Arab countries through Johansen cointegration test and revealed a significant cointegration between corruption and terrorism and also reached that the countries with higher corruption were also the countries with more terrorist incidents. Simpson (2014) also investigated the relationship between corruption and terrorism in 106 countries during the 1990-2010 period through binomial regression analysis and disclosed a negative relationship between corruption and terrorism.

Institute for Economics and Peace (2015) explored the interaction between peace and corruption and reached a significant relationship between corruption and peace. The corruption had a little effect on peace level until a certain threshold, but corruption had a considerable negative effect on peace after the threshold. On the other side, Boussiga and Ghamsi (2016) explored the cointegration relationship between corruption and terrorism in 123 developed and developing economies for the 2003-2014 period through cointegration relationship and discovered significant cointegration between corruption indicators and terrorism.



Břeň et al. (2019) explored the relationship between economic, social, security, political factors and terrorism in 162 countries in 2017 by means of Spearman's correlation coefficient and reached that corruption raised the terrorism threat in the world. Olaniyi (2019) also investigated the interaction between terrorism and corruption in Nigeria, Niger Republic, Cameroon, and Chad from Africa over the 2010-2017 period through Spearman rank correlation and discovered a weak negative causality between corruption and terrorism in Nigeria and Chad and strong positive causality between corruption and terrorism in Niger and very weak positive causality between the corruption and terrorism in Cameroon. Hassan (2020) researched the influence of corruption on human security in Iraq through case study methodology and reached a strong negative influence of corruption on human security in Iraq.

3. Data and Method

The article investigated the reciprocal interplay between corruption and terrorism in MENA countries. In the causality analysis, terrorism was proxied by global terrorism index (GTI) of IEP (2022) and corruption was represented by control of corruption index from worldwide governance indicators of World Bank (2022a). The GTI indicates the impact of terrorism and is calculated based on terrorist incidents, fatalities, injuries, and property damage caused by terrorism and takes values between 0 (no impact of terrorism) and 10 (highest impact of terrorism) (IEP, 2022). On the other hand, the control of corruption index states to what extent public power is employed for private gains and takes value between -2.5 (weak) and +2.5 (strong) (see Kaufmann et al. (2010) for detailed information about corruption measurement methodology).

Table 1: Dataset definition

Variables	Description	Source
GTI	Global terrorism index	IEP (2022)
CORRUPTION	Control of corruption index	World Bank (2022a)

The sample of the econometric analysis consisted of Algeria, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Morocco, Saudi Arabia, Tunisia, and Yemen considering World Bank (2022b), but Bahrain, Djibouti, Libya, Malta, Oman, Qatar, United Arab Emirates and West Bank and Gaza were not included in the study due to data non-availability. The empirical analyses were carried out by statistical packages of Stata 14.0 and Gauss 10.0.

The key characteristics of global terrorism index and control of corruption were denoted in Table 2. The average of global terrorism index was 4.4172 in the sample, but the index was



significantly changed among the countries. On the other hand, the average of corruption index was -0.3982 and exhibited relatively less changes among the countries.

Table 2: Summary statistics of the dataset

Variables	Mean	Std. Deviation	Minimum	Maximum
GTI	4.4172	2.3667	0	10
CORRUPTION	-0.3982	0.6387	-1.681	1.1868

The causal interaction between economic growth and terrorism was analyzed by bootstrap causality test of Kónya (2006) taking heterogeneity and cross-sectional dependence into consideration. Konya bootstrap causality test rests upon seemingly unrelated regression and critical values of the test are generated for each country through bootstrapping process.

4. Empirical Analysis

In the empirical analysis part of the article, the cross-sectional dependence was respectively investigated by means of LM test of Breusch and Pagan (1980), LM CD test of Pesaran (2004), and LM adj. test of Pesaran et al. (2008) and the test findings in Table 3 uncovered the entity of cross-sectional dependence, because the null hypothesis (there is cross-sectional independence). was declined.

Table 3: Cross-sectional dependence tests

Test	Test statistic	P value
LM	151.6	0.000
LM CD	15.511	0.030
LM adj.	14.73	0.000

*two-sided test

The entity of homogeneity was investigated by means of delta tilde tests of Pesaran and Yamagata (2008) and test findings in Table 4 pointed out the existence of heterogeneity, because the null hypothesis (there exists homogeneity) was declined.

Table 4: Homogeneity tests

Tests	Test statistic	P value
$\tilde{\Delta}$	8.448	0.000
$\tilde{\Delta}_{adj.}$	9.446	0.000

The stationarity of GTI and CORRUPTION variables analyzed by means of Pesaran (2007) CIPS unit root test due to the cross-sectional dependence among the series and test consequences in Table 5 pointed out that GTI and CORRUPTION were I(1).

**Table 5:** Results of CIPS panel unit root test

Variables	Constant	Constant + Trend
GTI	-2.135	-2.305
D(GTI)	-3.170***	-3.654***
CORRUPTION	-2.095	-2.600
D(CORRUPTION)	-3.725***	-3.606***

*** it was significant at 1%.

The causality from corruption to terrorism was explored by means of Kónya (2006) bootstrap causality test and the test consequences were reported in Table 6. The causality analysis pointed out a unidirectional causality from corruption to terrorism in Jordan, Saudi Arabia, Tunisia. In other words, corruption had a significant effect on terrorism in these countries.

Table 6: Causality analysis between corruption and terrorism

Countries	H ₀ : CORRUPTION \nrightarrow GTI			
	Wald St.	Bootstrap Critic Value		
		1%	5%	10%
Algeria	0.96120960E	270.49313	94.82940	54.61840
Egypt	3.6693134	307.08817	109.91841	64.22024
Iran	2.6215188	321.29840	130.75285	82.60963
Iraq	5.0152153	206.24956	90.36341	56.33431
Israel	1.2148047	327.97250	113.04431	62.90115
Jordan	69.758177*	268.37250	103.96708	61.53134
Kuwait	3.2886899	199.46173	79.63577	50.85352
Lebanon	0.11380203	262.84375	102.38632	57.88245
Morocco	1.0946887	240.48857	95.58047	60.13940
Saudi Arabia	80.543014*	275.08688	122.22160	77.05169
Tunisia	65.427895*	218.24202	96.58118	62.87276
Yemen	3.9970722	193.62509	83.10300	53.94667

* indicates that it is respectively significant at 10%

The causality from terrorism to corruption was explored via Kónya (2006) bootstrap causality test and the test consequences were reported in Table 7. The causality analysis pointed out a unidirectional causality from terrorism to corruption in Jordan, Morocco, and Yemen. So, the findings revealed bidirectional causality between corruption and terrorism in Jordan and terrorism had a significant impact on corruption in Morocco and Yemen.


Table 7: Causality analysis between terrorism and corruption

Countries	H₀: GTI \leftrightarrow CORRUPTION			
	Wald St.	Bootstrap Critic Value		
		1%	5%	10%
Algeria	6.9158956	159.23428	68.29960	42.10747
Egypt	7.4562172	143.40276	55.95374	34.13581
Iran	5.5458237	193.92937	81.46946	51.28722
Iraq	0.62180631	271.37576	115.39463	71.19403
Israel	6.6877727	209.00366	76.35901	43.62685
Jordan	57.643172*	196.52679	85.14796	55.22782
Kuwait	0.45229446	308.78421	110.54053	63.04983
Lebanon	0.10499590	214.87891	85.50131	52.54652
Morocco	63.980058*	302.70612	110.55439	63.54427
Saudi Arabia	7.3847811	166.17293	76.32958	47.68857
Tunisia	0.85198289	244.82201	103.15317	65.59259
Yemen	119.19483**	295.30194	117.44291	74.08580

** , * indicates that it is respectively significant at 5% and 10%

A significant mutual interaction between corruption and terrorism is expected theoretically. However, the related empirical literature has reached the mixed findings. Similarly, we reached a significant mutual interaction between corruption and terrorism only in Jordan. But corruption had significant impact on terrorism in Saudi Arabia and Tunisia and terrorism had significant effect on corruption in Morocco and Yemen in compatible with empirical expectations (e.g. see Al-Badayneh, 2009; Olaniyi, 2019).

5. Conclusion

Corruption and terrorism have significant negative institutional, social, economic, and political implication for the countries and the researchers have generally investigated the economic effects of both corruption and terrorism. The mutual interplay between corruption and terrorism have relatively less explored. Therefore, we researched the mutual interplay between corruption and terrorism in sample of MENA countries with already high level of corruption and terrorism through causality analysis. The causality discovered a bidirectional causality between corruption and terrorism in Jordan. On the other hand, a significant unidirectional causality from corruption to terrorism in Saudi Arabia and Tunisia and a significant unidirectional causality from terrorism to corruption Morocco and Yemen.



The corruption can affect the terrorism through weak institutions, supervision, and legal structure and in turn terrorist incidences can be easily financed and implemented. On the other hand, terrorism weakens the public institutions and legal structure and creates an environment conducive to corruption. Therefore, a significant interaction between terrorism and corruption is expected at theoretical terms. However, the related limited literature on the nexus of corruption-terrorism has stayed inconclusive. Our study also disclosed a significant interaction between corruption and terrorism only in Jordan. In this context, combat with corruption may not be a good instrument to decrease the terrorism in a country. The country specific characteristics exhibit importance for the relationship between corruption and terrorism. The future studies can focus on the interaction between institutional development and terrorism.

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