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Terror Incidents and Economic Growth: The Case of Turkey

Terör Olayları ve İktisadi Büyüme: Türkiye Örneği

Abstract

This study investigates the dynamic relationship between terror incidents and economic performance (growth) for Turkish economy, using annual data from 1984 to 2009. Empirical evidence from a dynamic bivariate model confirms the significance of the relationship between terror incidents/activities, and economic growth. Impulse-response functions for both variables indicate that the response of economic growth to terror incidents is positive and peaks in two years. On the other hand, the response of terror incidents to growth shock is significantly negative, and takes 3 to 6 years. Empirical findings indicate that better economic performance reduces terror activities with three year lags. Consequently, patiently implementing appropriate policies under political and economic stability is recommended.

Keywords: Terror incidents, Economic performance/growth, Turkish economy

JEL Codes: D74, O47

Özet

Bu çalışma, 1984-2009 dönemi yıllık verilerini kullanarak Türkiye ekonomisinde terör olayları ile iktisadi büyüme (performans) arasındaki dinamik ilişkiyi araştırmaktadır. İki değişkenli dinamik model, terör olayları ile büyüme arasında istatistiki manada ilişkinin varlığını teyit etmektedir. Her iki değişkenin etki fonksiyonu; büyümenin terör olaylarından pozitif etkilendiğini ve iki yıl içinde etkinin en yüksek düzeye ulaştığını göstermektedir. Diğer yandan, terör olayları iktisadi büyüme şoklarından negatif etkilenmekte ve etki 3-6 yıl sürmektedir. Analiz bulguları, daha iyi iktisadi performansın 3 yıllık gecikme ile terör olaylarını azalttığını ortaya koymakta; siyasal ve iktisadi istikrar koşullarında uygun politikaların, olumlu sonuçlara ulaşmak üzere sabırla sürdürülmesi önerilmeye değer görülmektedir.

Anahtar Kelimeler: Terör olayları, iktisadi performans/büyüme, Türkiye ekonomisi

JEL Kodları: D74, O47

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Introduction

Terrorism continues to be a major problem in many countries due to its devastating political, social and economic consequences. By resorting to acts of violence, terrorism destabilizes the economy, and force government to accept certain demands by attracting the media and putting the ruling party in difficulty. Terror and related events can affect economic activities in different ways; consumption, investment and government spending might be affected in different levels. Expenditures on security might increase at the expense of productive investments.

Since there is no universal goal of terrorist, governments need to analyze terrorism in various aspects to end or reduce terrorist activities and remedy devastating consequences. In general, the relationship between economic activities and terrorism are examined and assessed with different aspects. These are economic analysis of terrorism (economies of safety), economies of terror (the economic mechanisms of terrorism), financial sources of terrorism, macroeconomic cost of terrorism, and economic reasons of terrorism, etc. The reasons such as poverty, poor economic conditions, and income inequality, are alleged to be a ground for the commencement and continuation of terrorist activities.

In this study, we used available annual time series data from 1984 to 2009 to assess the causal link between terror activities and economic performance for Turkish economy. Standard Vector Autoregressive (VAR) model and impulse response functions are utilized to test this relationship.

This paper is organized as follows. Section I provides the general literature review on the relationship between terrorism and economy. Section II discusses economic perspective of terrorism and reviews the literature specifically on Turkish case. Section III presents data and the model. Section IV gives empirical results for standard VAR-based impulse-response functions. We complete with conclusion and policy recommendations.

1. Literature Review

In the related literature, the impacts of terrorism are discussed from different point of views. Especially after the terrorist attack on the Twin Towers on September 11, 2001 in the United States, the debate over negative economic effects of terrorism arises once more. Many analyses have been done on this issue. Studies analyzing economic costs of terrorism are called as "a burgeoning literature" (Gould, and Stecklov, 2009: 1175), or "the newly emerging field of security economics" (Brück, et al., 2008: vi).

Empirical data from the 9/11 attacks suggested that a single terrorist attack could negatively affect macroeconomy widely. Public spending could be remained limited, but private investment and consumption could be affected severely.

9/11 attack showed that in the US investment and consumption dropped significantly. Trade patterns were affected hardly (TTSRL, 2008: 73-74). Additional empirical evidence from both linear and non-linear models confirmed that terrorism had significant impacts on economic activity. The empirical results showed that the impact of terrorism on the aggregate economy is more severe during expansionary periods, and

that the impact of economic activity on terrorism is significant only in recessionary periods (Araz-Takay, et al., 2009: 1)

The first examples of linkage between terrorism and economic activity started with examination of the relationship between crime, criminal behavior and the general performance of the economy. Becker (1968) investigated the kinds and proportions of criminal regulations that prevent crimes, and he (1968:171) estimated the total cost of crime related to goods, services, humans' lives and the total cost of preventing them by security forces, courts, etc. Especially studies on the impact of political instability and war climate on the economy are quite old. The state of the economy during war and peace is examined by many economists like Keynes (1919), Pigou (1940), Robbins (1942) in different aspects (Blomberg, 2004a: 1).

Since terror activities create political instability and threaten internal peace, they have various economic and social costs. Thus, due to their economic consequences, terror activities become an important area of academic concern.

The impact of terrorism is analyzed in many ways, such as its impact on defense expenditure, countries' risk level, production level, transaction costs, life expectancy and property damages (TTSRL, 2008). Like destructive attack of terror on Bihopstage in 1993, September 11 become a milestone of terrorism (Frey, and Luechinger, 2005: 2; Llussá, and Tavares, 2007: 62). After terrorist attack of September 11, intensive studies have taken place on terrorism at local and universal level. Most of these researches are on theoretical and practical aspects of terrorism, and cover economic consequences of such incidents as September 11, 7/7 London strike, ETA terrorism, Palestinian-Israeli conflict, the Iraq War, terror in Turkey, etc.

Enders and Sandler (1991), Enders, Sandler and Parise (1992) are pioneers who investigated the relationship between terror and economic performance before September 11 attack. They utilized VAR model, and found the negative impact of terror on tourism sector. Another study by Enders, Sandler and Parise (1992: 548) using data of 1974-1988 period and ARIMA model found that terror-related incidents affect revenues in tourism sector. Estimated forgone income of the sector for Austria is 2.582 billion, Italy 615 million, Greece 472 million, and Europe 12.6 billion SDRs. According to Sandler and Enders (2008: 17), the higher the costs of terrorism the likelier the governments would accept the demands of the terrorists.

Findings of the studies on terror incidents and economic performance are controversial. Gries, et al. (2011) examined causality between economic growth and terrorism for Western European countries and found the impact of economic activity on terrorism for only three out of seven countries. Nasir, et al. (2008) did similar study and found causality running neither from economic growth to terrorism nor from terrorism to economic growth. Sandler and Enders (2008) stated that if the economy is well-diversified, terrorism may create substitutions away from more vulnerable sector to less ones.

Abadie (2006) pointed that economic variables are sensitive to terrorism. Blomberg, et al. (2004b) argued that the state of the economy is important for extensity of internal conflicts. They stated that economically disenfranchised groups are more likely to use violence to make their voice to be heard when economies grow slowly.

Gries and Meierrieks (2010) using panel data for 83 countries investigated the causal relationship between terrorism and economic development, and found no significant evidence of causal link between economic conditions and terrorism.

Hypothesis that terrorism is connected to economic variables is challenged by Krieger and Meierrieks (2010), Klitgaard, et al. (2006), Krueger and Maleckova (2003). They found the relationship of terrorism with political and institutional factors as well.

Although there are many studies on the relationship between terrorism and economic growth, the related literature does not provide a conclusive answer regarding bidirectional causal linkage of these variables. The negative relationship between terrorism on one hand, and economic growth and investment on the other, had been expressed by many authors (Shahbaz, et al, 2011: 3). Terrorism affects economic activity negatively by misallocating resources and government expenditures in unproductive sectors, and creates uncertainty for businesses and increase economic risks. Authors like Enders and Sandler (1996), Abadie and Gardeazabal (2003), Collier, et al. (2003), Tavares (2004), Chen and Siems (2004), Blomberg, et al. (2004), Gaibulloev and Sandler (2008), Mirza and Verdier (2008) found negative relationship between terrorism, and economic growth and per capita income.

Enders and Sandler (1996) used VAR model for Spain and Greece, and found that terrorism reduces net foreign direct investment by 13.5 and 11.9 percent, and causes capital outflow to less risky countries. Blomberg, et al. (2004) with a similar empirical study on 177 countries found that terrorism have significant negative impact on economic growth. Abadie and Gardeazabal (2003) studied Basque region for outbreak of terrorism in 1970s, and reported about 10 percent reduction in gross domestic product of the region.

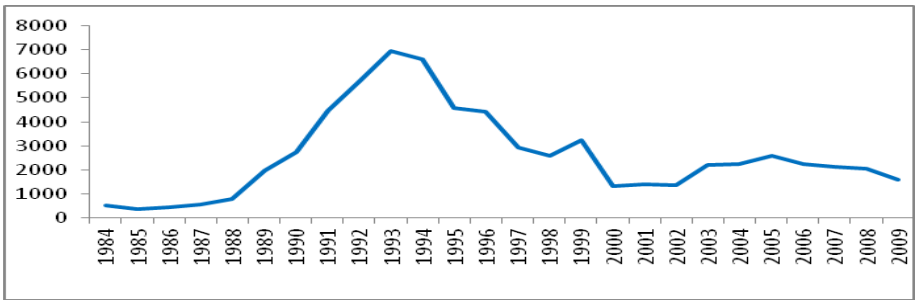
Gaibulloev and Sandler (2008) expressed the negative impact of terrorism by which resources are misallocated from investment to government spending mainly on unproductive defense expenditures. Some authors, like Sandler and Enders (2004), and Freytag, et al. (2010) pointed out that terrorists base their decisions on cost-benefit analysis. Shahbaz, et al. (2011) showed the long run relationship among growth, terrorism, capital flows, and trade openness for Pakistan. They found bidirectional causality between terrorism and capital flows, trade openness and capital, terrorism and trade openness, and unidirectional causality from economic growth to terrorism. Piazza (2006) found that poverty, backwardness, inequality and unemployment are the main causes of terrorism. Pınar (2011) did similar work for southeastern region of Turkey, but she did not find any direct relationship between terrorism and backwardness. The study by Nasir, et al. (2008) showed also no direct causality between economic growth and terrorism.

2. The Case of Turkey

Turkey has been facing ethnic oriented PKK (Partiya Karkeren Kurdistan- Kurdistan Labour Party) terrorism since 1984. According to the statistics, over a period of 25 years 67,907 terrorist attacks have taken place mostly by PKK and 21,532 terrorists were killed and 185,587 suspects were arrested. In this period, the security forces, civil servants and both Turkish and Kurdish innocent civilians suffered from the destructive consequences of terrorism. In total 12,892 people (6,448 citizens, 502 policemen, 4,500 soldiers and 1,442

village guards) were killed and 29,806 people (12,361 citizens, 4,153 police, 11,213 soldiers and 2,079 village guards) were injured (General Directorate of Turkey Security, 2010).

Figure-1: Terror incidents



Source: Caglar, 2009.

Starting from the beginning of 1986, annual terror incidents tended to increase; peaked in 1993, then started to decline, and from 2000 to 2009 were relatively low (Figure-1).Turkish literature includes many studies done to investigate the macroeconomic consequences of terrorism on Turkish economy. İrbeç (2002), Morgil (2002), Varol (2004), Mutlu (2008), Uysal, et al. (2009), Araz-Takay, et al. (2009) examined the macroeconomic impact of terrorism on the national economy, economic development, growth, and general economic performance. Among all sectors, tourism is the most negatively affected one. Drakos and Kutan (2001), Sezgin (2002), Sezgin (2003), Emsen and Değer (2004), Yeşiltaş, et al. (2008), and Yaya (2009) investigated the relationship between terrorism and tourism, and found negative impact of terrorism on the tourism sector. Aker, et al. (2005), Feridun and Sezgin (2008), Yalman, et al. (2009), and Yildirim, et al. (2009) assessed the economic impacts of terrorism both at regional and provincial levels.

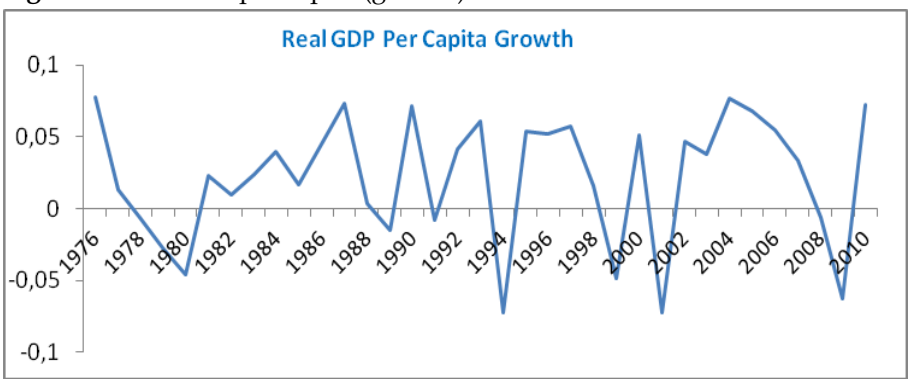
Table-1: Overall Cost of Terrorism in Turkey

Study	Methodology	Time period	Overall Cost
Irbeç (2002)	Not determined	1983-2002	> $100 billion; cost of counter-terror policy, $5 bln annually
Morgil (2002)	Not determined	1984-2002	Annual $6 bln
Mutlu (2008)	Data analysis method	1984-2005 1984-2008	$53.95 billion $ 75 billion
Yildirim, et al. (2009)	Geographically weighted regression	1990-2006	$100 billion
Bilgiç (2009)	Not determined	1984-2009	$300 billion
ISRO (2010)	Diyarbakır case/data analysis method	2006	$500 million

Source: Çimen, 2010.

In Turkey, there is no consensus among academics on the overall cost of terrorism. The total cost of terrorism varies from $53.95 billion to $300 billion. The figures from the most significant studies are given in Table-1, which indicates that the estimated numbers are very different in each study. For instance, while İbreç (2002) calculated the annual cost of terrorism as $5 billion, Morgil (2002) calculated $6 billion.

Figure-2: Real GDP per capita (growth)



Source: TURKSTAT, 2012.

Among these studies, Mutlu (2008) is the most comprehensive. He classifies the cost of terrorism under five headings: Cost due to security forces spending, losses on rural production from evacuation of villages, settlement cost of immigrants who move due to security concerns, cost of returning back to villages and rehabilitation, and the destruction of physical assets (damage to private and public vehicles, and heavy construction equipment, security stations, schools, hospitals, village surgeries, bridges, roads, and others).

Terror incidents and economic growth figures indicate that during the economic expansionary periods terror activities decline the most. As seen from the Figure-2, Turkish economy experienced a better economic growth during 2003 and 2009 periods in which terror incidents were at low level relatively.

3. Data and Model

In this study, we used available annual data for the period of 1984 to 2009. The series of terror incidents are taken from Caglar (2009). Real GDP data was obtained from the Ministry of Development. By using annual Turkish population series from 1984 to 2009, we calculated real GDP per capita series. Due to limited availability of data on terror incidents, we were only able to run our model for the period of 1984 to 2009. This period is also convenient, since PKK terror in Turkey started in 1984, and relatively decreased in 2009 due to democratic solution process.

Standard Vector Autoregressive Model is employed to establish bivariate causality. Since data on terror activities are I(0) and on real GDP per capita I(1), co-integration relationship between terror incidents and economic growth cannot be implemented. Instead, we started with short-run approach to estimate dynamic relationship between economic performance and terror incidents. The VAR model that is used is as following:

$$\Delta lnY_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\, \Delta lnY_{t-i} + \sum_{i=1}^{p} \beta_{1i}\, lnTA_{t-i} + \gamma_1 D_t + u_{1t}$$

$$lnTA_t = \beta_0 + \sum_{i=1}^{p} \beta_{2i}\, lnTA_{t-i} + \sum_{i=1}^{p} \alpha_{2i}\, \Delta lnY_{t-i} + \gamma_2 D_t + u_{2t}$$

In the model, Yt is real GDP per capita, TAt is terror incidents and Dt is dummy variable. D_t =1 is used for recessionary years (1994, 1999, 2001, 2009), and Dt =0 for other years. The data on both real GDP per capita and terror incidents were transformed into natural logarithms.

Before estimating the model, optimal lag length of the system needs to be specified. Since the results are very sensitive to lag length, putting too many lagged terms will consume a lot of degree of freedom which may likely cause multi-collinearity. In addition, including small number of lags may lead specification errors. Thus, in the following section, we apply various information criteria to select optimal lag length of the model variables.

4. Empirical Analysis and Findings

4.1. Testing for unit roots

Unit root test addresses the issue of stationary of a time series data. Therefore, Augmented Dickey Fuller (ADF) test was conducted on level and first differences of the variables. Using ADF stationary tests (Table-2), we observed presence of unit root in real GDP per capita, but not in terror incidents data. After taking first difference, real GDP per capita became stationary.

Table-2: ADF Stationary Test Results

	Levels		First Differences	
	t-statistics	P-values	t-statistics	P-values
ΔlnY	-0.2703	0.9269	-3.2528	0.0172**
lnTA	-3.4661	0.0089***	--	--

Note: ** (***) Indicate statistical significance at 5% (1%) level; critical values are obtained from the study of Mackinnon (1996).

4.2. Lag Order Selection Criteria for VAR

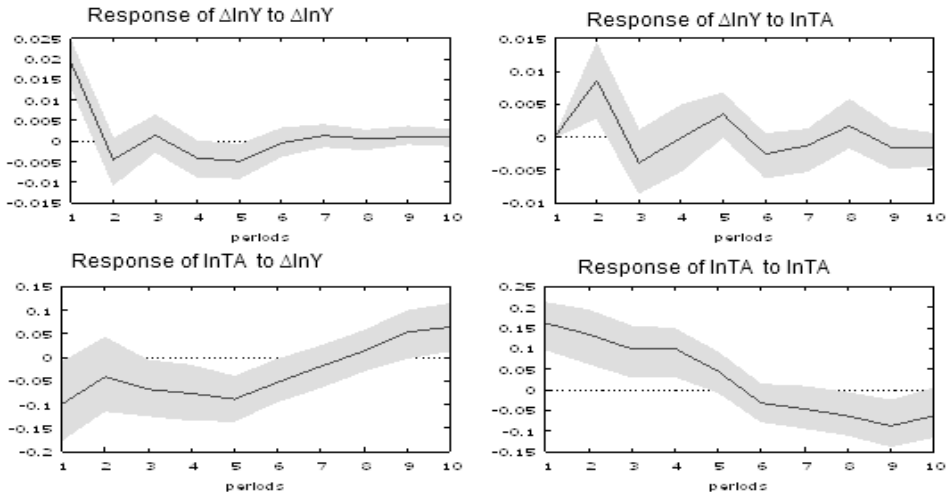
Various information criteria are used to determine the optimal lag length of the VAR model. Four lags were suggested by AIC and HQC.

4.2.1. Dynamic Model: Short-Run Relationship

Turkey has allocated a considerably high percentage of its GDP for combating terrorism. Thus, spending for terrorism and related areas are expected to have positive impact on GDP, but at the expense of productive investments. This reasoning is confirmed by the result of our model's impulse-response functions which indicate that terror activities (incidents) increase economic growth. On the other hand, a better economic performance (higher growth rate) decreases terror incidents with three year lags.

As shown in Figure-3, in order to see its impact, one standard deviation shock on terror (incidents) and economic performance (growth) over 10 steps (years) ahead is conducted. From first row and second column of Figure-3, impulse-response function of economic performance to terror activity is zero at the beginning, but in second year, it significantly reaches the highest level, thereafter decreases and insignificantly alternates around zero.

Figure-3: Impulse-Response Functions



Response to Cholesky One S. D. Innovations ± 2 S.E.

From first column and second row of Figure-3, we see that the response of the terror activities to one standard deviation shock of economic performance is close to zero until the first 3 years, and from 3 to 6 years it becomes negative. Thereafter, response of terror activities insignificantly alternate, and from 8 to 10 years becomes positive. Therefore as

indicated by impulse response functions of terror activities, economic performance reduces terror activities with about three year lags.

We also used dummy variable for recession years to see whether the impact of terror activities is more severe during economic crises. Empirical result showed that recession dummy variable in our model is insignificant, and its result is contrary to Sandler and Enders (2008: 17) findings. Dummy variable shows no severe impact of terror activities during recession years.

5. Conclusion and Policy Implication

This study examined the dynamic relationship between terror activities and economic performance using annual data from 1984 to 2009. In contrast to similar studies, this paper is the first that used actual annual data on terror incidents for Turkish economy to test the dynamic relationship in bivariate case. As expected, our analysis based on impulse-response functions showed a bidirectional relationship between terror incidents and economic performance.

Literature on terrorism and economic activities contains controversial outcomes. Some studies found significant causal relationship between both variables, and some did not find any connections. In this study, we tested dynamic relationship between economic performance and terror activities. Impulse-response functions in our model show that terror activities cause economic performance positively whereas economic performance affects terror activity negatively. For the former case, authorities try to minimize the impact of terrorism on economic activity by speeding economic development and defense related expenditures. One standard deviation (SD) shock to terror activities lead to better economic performance by forcing government to increase spending. On the other hand, one SD shock to economic performance leads to decline in terrorism, but with a three-year lags. Therefore, it could be suggested that better economic performance related policies would lower terror activities not immediately, but with lags. Political stability, being patient and insisting on the appropriate economic policies will contribute to reduction in terror-related incidents.

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