

The Effects of Terrorist Attacks on Regional Economic Growth in Turkey

Türkiye’de Terörist Saldırıların Bölgesel İktisadi Büyüme Üzerindeki Etkileri

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Abstract

The process of balanced and comprehensive regional growth requires political as well as economic stability. Therefore, the effects of political dynamics such as terrorism on regional growth should be investigated for a more comprehensive analysis. This study investigates the effects of terrorist events, which have reached the dimensions of political instability in Turkey, over the growth performance of the regions. In this context, the model has been designed to cover the 2005-2014 period and Turkey’s NUTS-II regions (26 regions) and has been estimated based on the GMM estimator. The obtained findings show the terror events experienced in Turkey to have a statistically significant negative effect on regions’ growth performance. In other words, the problem of terrorism, which has been a frequent ongoing problem in southeast Turkey for nearly 40 years, has hindered economic growth. The other findings of the model indicate the accumulation of physical capital to have positive and statistically significant effects on regional growth rather than the accumulation of human capital.

Keywords: Regional economic growth, Terrorism, Turkey, Dynamic panel data analysis.

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Öz

Dengeli ve sürdürülebilir bir iktisadi büyüme süreci, iktisadi açıdan olduğu kadar politik açıdan da istikrarlı bir yapı gerektirmektedir. Bu sebeple, kapsamlı bir analiz yapılabilmesi için terörizm gibi politik dinamiklerin de bölgesel büyüme üzerindeki etkileri analiz edilmelidir. Çalışmada, Türkiye’de politik istikrarsızlık boyutlarına ulaşan terör olaylarının bölgelerin büyüme performansı üzerindeki etkileri incelenmiştir. Bu doğrultuda, 2005-2014 dönemi ve Türkiye’nin İBBS-II Bölgelerini (26 Bölge) kapsayacak şekilde tasarlanan model, sistem GMM tahmincisine dayalı olarak tahmin edilmiştir. Elde edilen bulgular, Türkiye’de yaşanan terör olaylarının bölgelerin büyüme performansı üzerinde negatif yönlü ve istatistiksel açıdan anlamlı etkilerinin olduğunu göstermektedir. Diğer bir ifadeyle, Türkiye’nin sıklıkla güneydoğu bölgesinde yaklaşık 40 yıldır süregelen terörizm sorunu iktisadi büyümeyi baskılamaktadır. Modelin diğer bulguları ise, beşer sermaye birikiminden ziyade fiziki sermaye birikiminin bölgesel büyüme üzerinde pozitif yönlü ve anlamlı etkilerinin olduğunu ortaya koymaktadır.

Anahtar Kelimeler: Bölgesel İktisadi Büyüme, Terörizm, Türkiye, Dinamik Panel Veri Analizi.

Introduction

The process of balanced and comprehensive regional growth not only depends on economic dynamics but also political dynamics. Terrorism, which has achieved a complex structure, is one of these¹ as the long-term decisions of economic agencies depend on a stable structure in terms of both political and economic dynamics, especially

¹ In the absence of a universally accepted definition of terrorism, this study accepts the definition from the National Consortium for the Study of Terrorism and Responses to Terrorism (START). Accordingly, terrorism is a threat or an actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation Retrieved September 16, 2018 from: <http://www.start.umd.edu/gtd/using-gtd/>

regarding capital investments. For instance, when terrorism becomes the dominant political factor in a region, it causes uncertainty and insecurity in that region's economic environment. In this process, market dynamics such as productivity, profitability, and costs become insignificant and economic decisions are based on concerns about the future and expectations, not market conditions. When perception of uncertainty and insecurity become more important than market dynamics, terrorism represses the growth process of that region. In other words, terrorism as a political factor has a damaging impact on key macro-economic variables such as investment, unemployment, and inflation.²

Indeed, the empirical literature offers strong proofs regarding this, where the processes of political uncertainty and instability are measured by constitutional or violent determinants. Most indicate the process of political instability to hinder economic growth. For instance, Asteriou and Price,³ Campos and Karanasos,⁴ Sanlisoy and Kok,⁵ and Demirgil⁶ focused on individual countries, respectively England, Argentina, and Turkey, while Barro;⁷ Levine and Renelt;⁸ Alesina et

² Chor Foon Tang and Salah Aboedra, "The Impacts of Tourism, Energy Consumption and Political Instability on Economic Growth in the MENA Countries", *EnergyPolicy*, 2014, Vol: 68, 458-464, p. 460.

³ Dimitrios Asteriou and Simon Price, "Political Instability and Economic Growth: UK Time Series Evidence", *Scottish Journal of Political Economy*, 2001, Vol: 48/4, 383-399, p. 383.

⁴ Nauro F. Campos and Menelaos G. Karanasos, "Growth, Volatility and Political Instability: Non-Linear Time-Series Evidence for Argentina, 1896-2000", *Economics Letters*, 2008, Vol: 100, 135-137, p. 135.

⁵ Selim Sanlisoy and Recep Kok, "Politik İstikrarsızlık – Ekonomik Büyüme İlişkisi: Türkiye Örneği (1987-2006)", *Dokuz Eylül Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 2010a, Vol: 25/1, 101-125, p. 101.

⁶ Hakan Demirgil, "Politik İstikrarsızlık, Belirsizlik ve Makroekonomi: Türkiye Örneği (1970-2006)", *Marmara Üniversitesi İ.B.B.F. Dergisi*, 2011, Vol: 31/2, 123-144, p. 123.

⁷ Robert J. Barro, "Economic Growth in a Cross Section of Countries", *The Quarterly Journal of Economics*, 1991, Vol: 106/2, 407-443, p. 407.

⁸ Ross Levine and David Renelt, "A Sensitivity Analysis of Cross-Country Growth

al.,⁹ and Chen and Feng¹⁰ focused on multiple countries. Sanlisoy and Kok¹¹ and Gurgul and Lach¹² also covered select country groups, respectively middle-income countries and Central/Eastern European (CEE) countries.¹³ All of them offered findings in support of the repressive effects of political instability on economic growth. However, Tavares and Wacziarg¹⁴ covered industrialized countries from 1970 to 1989, Campos and Nugent¹⁵ covered 98 countries from 1960 to 1995, and Arslan¹⁶ covered Turkey from 1987 to 2007;¹⁷ all indicated no systematic relationship to exist between economic growth and political instability. On the other hand, Alesina and Perotti,¹⁸ Svensson,¹⁹ and Aisen and Veiga,^{20,21} covered multiple countries while

Regressions”, *The American Economic Review*, 1992, Vol: 82/4, 942-963, p. 942.

⁹ Alberto Alesina, Sule Ozler Nouriel Roubini and Phillip Swagel, “Political Instability and Economic Growth”, *Journal of Economic Growth*, 1996, Vol.1/2, 189-211, p. 189.

¹⁰ Baizhu Chen and Yi Feng, “Some Political Determinants of Economic Growth: Theory and Empirical Implications”, *European Journal of Political Economy*, 1996, Vol: 12, 609-627, p. 609.

¹¹ Selim Sanlisoy and Recep Kok, “Politik İstikrarsızlık – Ekonomik Büyüme İlişkisi: Kuznets Eğrisi Yaklaşımı”, *Finans, Politik & Ekonomik Yorumlar Dergisi*, 2010b, Vol: 47/541, 9-22, p. 9

¹² Henryk Gurgul and Luksz Lach, “Political Instability and Economic Growth: Evidence from Two Decades of Transition in CEE”, *Communist and Post-Communist Studies*, 2013, Vol: 46, 189-202, p. 189.

¹³ Ibid, p. 189.

¹⁴ Jose Tavares and Romain Wacziarg, “How Democracy Affects Growth”, *European Economic Review*, 2001, Vol: 45, 1341-1378, p. 1341.

¹⁵ Nauro F. Campos, and Jeffrey Nugent, “Who is afraid of political instability?”, *Journal of Development Economics*, 2002, Vol: 67, 157-172, p. 157.

¹⁶ Unal Arslan, “Siyasi İstikrarsızlık ve Ekonomik Performans: Türkiye Örneği”, *Ege Akademik Bakış Dergisi*, 2011, Vol: 11/1, 73-80, p. 73.

¹⁷ Ibid, p. 73.

¹⁸ Alberto Alesina and Roberto Perotti, “The Political Economy of Growth: A Critical Survey of the Recent Literature”, *The World Bank Economic Review*, 1994, Vol. 8/3, 351-371, p. 351.

¹⁹ Jakob Svensson, “Investment, Property Rights and Political Instability: Theory and Evidence”, *European Economic Review*, 1998, Vol: 42, 1317-1341, p. 1317.

²⁰ Ari Aisen and Francisco Jose Veiga, “How Does Political Instability Affect

Gyimah-Brempong and Traynor,²² Fosu,²³ Darbyet al.,²⁴ and Campos and Karanasos²⁵ covered select countries, respectively all Sub-Saharan Africa (SSA) countries, 31 SSA countries, Organization for Economic Cooperation and Development (OECD) countries, and Argentina; all these offered empirical findings on the negative indirect effects of political instability.

Meanwhile, studies measuring the processes of political uncertainty and instability using terrorism as a violent determinant have indicated strong and homogeneous findings. For instance, Asteriou and Price,²⁶ Abadie and Gardeazabal,²⁷ Eckstein and Tsiddon,²⁸ Öcal and Yıldırım,²⁹ and Zakaria et al.³⁰ focused on select countries, respectively England, Spain, Israel, Turkey, and Pakistan,

Economic Growth?, *IMF Working Paper Middle East and Central Asia Department*, WP/11/12, 2011, 1-28, p. 1.

²¹ Ari Aisen and Francisco Jose Veiga, "How Does Political Instability Affect Economic Growth?", *European Journal of Political Economy*, 2013, Vol. 29, 151-167, p. 151.

²² Kwabena Gyimah - Brempong and Thomas L. Traynor, "Political Instability, Investment and Economic Growth in Sub-Saharan Africa", *Journal of African Economies*, 1999, Vol: 8/1, 52-86, p. 52.

²³ Augustin Kwasi Fosu, "Political Instability and Economic Growth in Developing Economies: Some Specification Empirics", *Economics Letters*, 2001, Vol: 70, 289-29, p. 289.

²⁴ Julia Darby, Chol - Won Li, and V. Anton Muscatelli, "Political Uncertainty, Public Expenditure and Growth", *European Journal of Political Economy*, 2004, Vol: 20, 153-179, p. 153.

²⁵ Ibid, p. 135.

²⁶ Ibid, p. 383.

²⁷ Alberto Abadie and Javier Gardeazabal, "The Economic Costs of Conflict: A Case Study of the Basque Country" *The American Economic Review*, 2003, Vol. 93/1, 113-132, p. 113.

²⁸ Zvi Eckstein and Daniel Tsiddon, "Macroeconomic Consequences of Terror: Theory and the Case of Israel", *Journal of Monetary Economics*, 2004, Vol: 51, 971-1002, p. 971.

²⁹ Nadir Öcal and Jülide Yıldırım, "Regional Effects of Terrorism on Economic Growth in Turkey: A Geographically Weighted Regression Approach", *Journal of Peace Research*, 2010, Vol: 47, 477-489, p. 477.

³⁰ Muhammad Zakaria, Wen Jun and Haseeb Ahmed, "Effects of Terrorism on Economic Growth in Pakistan: An Empirical Analysis", *Economic Research*, 2019, Vol. 23, 1794-1812, p. 1794.

while Jong-A-Pin³¹ and Tang and Abosedra³² focused on select country groups such as MENA countries. Haggard and Trede³³ also covered developing and transition economies. On the other hand, Gupta et al.,³⁴ et al.,³⁵ Tavares,³⁶ Giskemo,³⁷ Meierrieks and Gries,³⁸ Crain and Crain,³⁹ and Çınar⁴⁰ and Choi⁴¹ focused on multiple countries. All indicated terrorist attacks and other violent dynamics to hinder countries' economic growth performance.

In this direction, the empirical findings indicate terrorism to be a key political determinant of economic growth. Therefore, this study examines the impacts of terrorism on the growth performance of Turkey's NUTS-II regions⁴² over the period of 2005-2014.⁴³ This is

³¹ Richard Jong-A-Pin, "On the Measurement of Political Instability and Its Impact on Economic Growth", *European Journal of Political Economy*, 2009, Vol: 25, 15-29, p. 15.

³² Ibid, p. 458.

³³ Stephan Haggard and Lydia Tiede, "The Rule of Law and Economic Growth: Where are We?", *World Development*, 2011, Vol: 39/5, 673-685, p. 673.

³⁴ Dipak K. Gupta, M. C. Madhavan and Andrew Blee, "Democracy, Economic Growth and Political Instability: An Integrated Perspective", *Journal of Socio-Economics*, 1998, Vol: 27/5, 587-611, p. 587.

³⁵ S. Brock Blomberg, Gregory D. Hess, and Athanasios Orphanides, "The Macroeconomic Consequences of Terrorism", *Journal of Monetary Economics*, 2004, Vol: 51, 1007-1032, p. 1007.

³⁶ Jose Tavares, "The Open Society Assesses its Enemies: Shocks, Disasters and Terrorist Attacks." *Journal of Monetary Economics*, 2004, Vol: 51/5, 1039-1070, p. 1039.

³⁷ Gunhild Gram Giskemo, "Exploring the Relationship Between Socioeconomic Inequality, Political Instability and Economic Growth Why Do We Know so Little?", *CMI Working Paper*, 2012, 1-31, p. 4.

³⁸ Daniel Meierrieks and Thomas Gries, "Causality Between Terrorism and Economic Growth", *Journal of Peace Research*, 2013, Vol: 50/1, 91-104, p. 91.

³⁹ Nicole V. Crain and W. Mark Crain, "Terrorized Economies", *Public Choice*, 2006, Vol. 128, 317-349, p. 317.

⁴⁰ Mehmet Çınar, "The Effects of Terrorism on Economic Growth: Panel Data Approach", *University of Rijeka, Faculty of Economics*, 2017, Vol. 35, 97-121, p. 97.

⁴¹ Seung-Whan Choi, "Economic Growth and Terrorism: Domestic, Foreign, and Suicide", *Oxford Economic Papers*, Vol. 67, 157-181, p.157.

⁴² The NUTS Classification (Nomenclature of territorial units for statistics) is a hierarchical system which is established on the three different levels for dividing up the economic

because terrorism has been a crucial ongoing structural problem in Turkey for about 40 years and has dramatically increased in terms of both frequency and severity since 2012.⁴⁴ Indeed, according to Global Terrorism Database (GTD), while terrorist attacks averaged 15.7 per year for the period of 2002-2011, this figure increased six times to 93.6 per year for the period of 2012-2014. This represents that the impact of terrorism increased in Turkey more than the global average in terms of frequency of events. On the other hand, terrorism spread to Turkey's western regions too while being frequently observed in its southeastern region. Therefore, the potential costs of terrorism on economic growth became more pronounced. In this direction, this study recognizes terrorism as a political determinant of regional economic growth. Accordingly, the first part of the study examines terrorism in Turkey. Next information is given about the characteristic features of the data set and variables. The last section discusses the findings from the System GMM Panel Model.

1. Literature Review

Table 1 includes detail information from the selected empirical literature samples, especially about the relationship between terrorism and economic growth. Accordingly, the studies mainly indicate terrorism to hinder economic growth; however, its impacts can change in terms of a country's development level.

territory of the European Union for the purpose of the collection, development and harmonization of European regional statistics, socio-economic analyses of the regions and framing of European Union regional policies. It is also based on Regulation No 4720/2002 of the European Parliament on the establishment of a common classification of territorial units for statistics. NUTS 2 is generally preferred for the application of regional policies and the improvement of policy recommendations.

⁴³ Due to the lack of data about the several macroeconomic variables for NUTS-II Regions of Turkey, the study covers 2005-2014 period.

⁴⁴ The frequency degree refers to the frequency of occurrence of the terrorist attacks, while the severity degree refers to the number of dead and injured people caused by them.

Table 1. Selected Literature Examples

<i>Author(s)</i>	<i>Model</i>	<i>Indicators</i>	<i>Results</i>
Asteriou & Price (2001)	Period: 1961-1997 Section: England <i>Principle Component Analysis</i>	<i>Terrorist Attacks</i>	Terrorist attacks and other socio-political instability indicators have negative effects on economic growth.
Abadie & Gardeazabal (2003)	Period: 1998-1999 Section: Spain <i>Exposure-Response Functions</i>	Terrorist Attacks	Terrorist attacks have negative impacts on Spain's economic structure by suppressing private investments.
Eckstein & Tsiddon (2004)	Period: 1980:1-2003:3 Section: Israel VAR Model	Terrorism Index	Terrorism has negative impacts on economic growth during two periods.
Blomberg et al. (2004)	Period: 1968-2000 Section: 177 Countries Structural VAR Model	Terrorist Attacks	Domestic terrorist attacks have more negative and statistically significant effects on economic growth than international terrorist attacks.
Tavares (2004)	Period: 1987-2001 Countries: Selective <i>IV Estimator</i>	Terrorist Attacks per capita Casualties per capita	Terror has a negative impact on economic growth; but it is negligible size.
Haggard & Trede (2011)	Period: 1985-2004 Section: Developing and Transition Countries Panel Model Analysis	Civil War	Violence is the major restriction factor on economic growth process
Giskemo (2012)	Period: 1950-2004 Section: 188 Countries Simultaneous Equations Model	Conflict Index	Conflict has negative impacts on economic growth.
Meierrieks & Gries (2013)	Period: 1970-1991 1992-2007 Section: 160 Countries Dynamic Panel Model	Terrorist Attacks	Terrorism has crucial negative impacts, especially on African and Islamic countries. Yet, its main destructive effects are observed in anti-democratic countries.

Öcal & Yıldırım (2010)	Period: 1987-2001 Section: Turkey Geographically Weighted Regression (GWR)	Terrorist Incidents	The negative effects of terrorist incidents are more pronounced in Eastern and Southeastern provinces than Western.
Zakaria et al. (2019)	Period: 1972-2014 Section: Pakistan GMM	The Number of Deaths	The effects of terrorism on foreign direct investments, domestic investments and economic growth are negative and statistically significant.
Crain & Crain (2006)	Period: 1968-2002 Section: 147 Countries Panel Data Analysis	Terrorist Attacks	Terrorism has negative impacts on macroeconomic variables of countries such as GDP, investments and tourism.
Çınar (2017)	Period: 2000-2015 Section: 115 Countries Fixed and Random Effects Panel Models	Terrorist Incidents	Terrorist attacks have negative impacts on economic growth especially in low-income countries.
Choi (2015)	Period: 1970-2007 Section: 127 Countries Panel Data Analysis	Domestic and Foreign Terrorist Events	Industrialized countries are less likely to be affected by domestic or foreign terrorist events.

2. Terrorism in the World and Turkey

Neither the literature nor international relations have a consensus about the definition of terrorism due to both the different perspectives of governments and its complex structure. For instance, differences are found for the concept of terrorism among the United Nations, European Union, and other institutions' definitions. For instance, terrorism is defined as "criminal acts intended or calculated to provoke a state of terror in the general public, a group of persons or particular persons for political purposes are in any circumstance unjustifiable, whatever the considerations of a political, philosophical, ideological, racial, ethnic, religious or any other nature that may be

invoked to justify them” in United Nations General Assembly Resolution 49/60 from December 9, 1994 titled *Declarations on Measures to Eliminate International Terrorism*.⁴⁵

On the other hand, “criminal acts (murder, hostage taking, physical injuries etc.) aiming seriously intimidating a population, unduly compelling a government or an international organization to perform or abstain from performing any act and/or seriously destabilizing or destroying the fundamental political, constitutional, economic or social structures of a country or an international organization” are evaluated as terrorist attacks in Framework Decision 2002/475/JHA, EU’s response to counter terrorism.⁴⁶

Finally, terrorism is the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal by fear, coercion, or intimidation according to definition of National Consortium for the Study of Terrorism and Responses to Terrorism.⁴⁷ This study takes this last definition into consideration.

In this direction and with respect to statistics compiled from GTD in association with START, the number of terrorist attacks all over the world was 156,772 for the period of 1970-2015; 33% of these occurred just in the period of 2012-2015 period. On the other hand, while the number of terrorist attacks was 3,115 during 2002-2011, this figure increased more than four times to 13,024. In addition, the number of terrorist attacks that occurred in just 2014-2015 is the same as 40% of the attacks that occurred in the last 10 years. The dramatic rises in attacks can be seen in Figure 1.

⁴⁵ UNGA, Resolution Adopted by the General Assembly, 49/60 Measures to Eliminate International Terrorism, 1995, p. 4, <https://www.ilsa.org/Jessup/Jessup08/basicmats/ga4960.pdf>, Access Date: 27.09.2019

⁴⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:4322328>, Access Date: 27.09.2019.

⁴⁷ START, “Global Terrorism Database, Codebook: Inclusion Criteria and Variables”, 2018, p.10

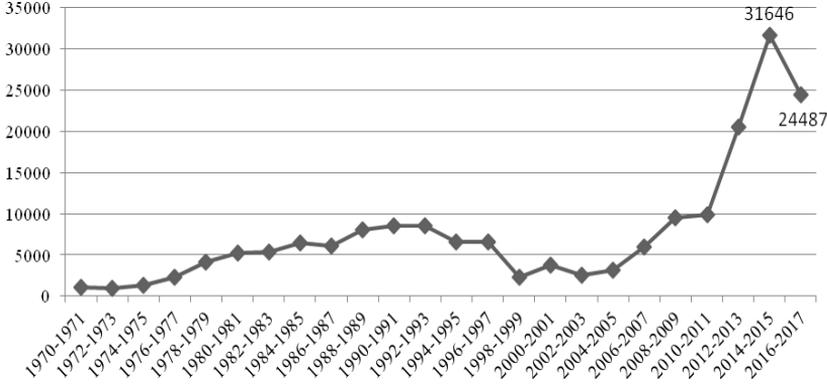


Figure 1. The number of terrorist attacks in the world⁴⁸

Both the percentage of terrorist attacks targeting civilians and the severity of terrorist attacks in terms of dead and injured have dramatically increased all over the world. For instance, the percentage of terrorist attacks resulting in death was 51% during 2001-2015 but had been 42% during the period of 1990-2000. In addition, the percentage of terrorist attacks targeting civilians directly or indirectly increased from 23% to 33% in this period.

Meanwhile, terrorist attacks have also been increasing dramatically in Turkey. Figure 2 indicates terrorist attacks to have decreased noticeably during 2009-2011;⁴⁹ however, since 2012 they have increased dramatically. In fact, while terrorist attacks averaged 15.7 annually in the period of 2002-2011, this figure grew to 93.6 for the period of 2012-2014 according to GTD, an approximately six-fold increase. Therefore, the impact of terrorism has increased in Turkey more than the global average in terms of frequency.

⁴⁸ Global Terrorism Database (GTD), START.

⁴⁹ According to GTD, there were only four terrorist attacks in 2009.

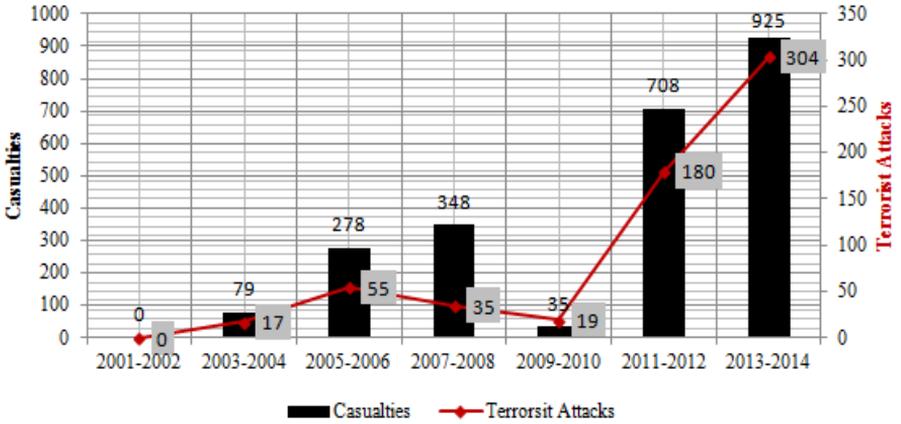


Figure 2. The number of terrorist attacks and casualties in Turkey⁵⁰

Similarly, the severity of terrorist attacks has increased prominently in Turkey. For instance, the share of terrorist attacks resulting in death increased to 38% in 2012-2015 from 32% in 2002-2011. In other words, the number of terrorist attacks increased from 82.7 to 308.3 per year. Therefore, the impact of terrorism increased in Turkey less than its global average in terms of severity. Indeed, Figure 3 indicates that 58% of terrorist attacks resulted in no deaths or injury in Turkey while this percentage was 46% for the rest of the world. In addition, the share of terrorist attacks resulting in 11-50 dead or injured people was only 7% in Turkey, while this was 13% for the rest of the world.

⁵⁰ Global Terrorism Database (GTD), START.

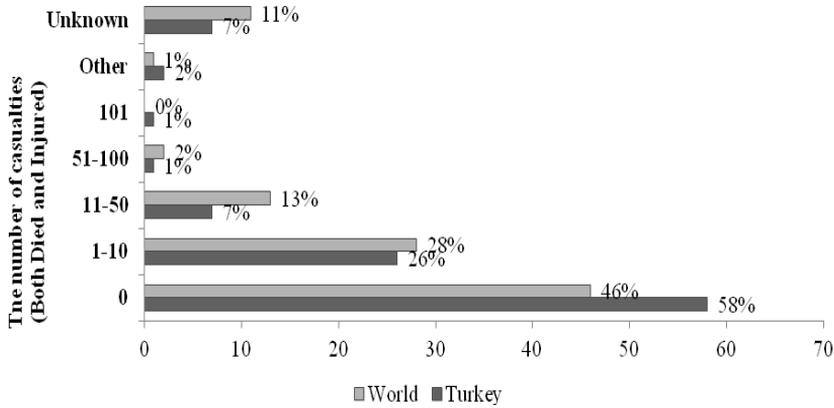


Figure 3. The distribution of terrorist attacks in Turkey and the world⁵¹

According to Figure 4, terrorist attacks targeting civilians in Turkey increased from 73 to 150 from the periods of 2002-2011 to 2012-2015. This corresponds to a 105% increase, approximately. This is one main reason for the increase in the severity of terrorism in Turkey.

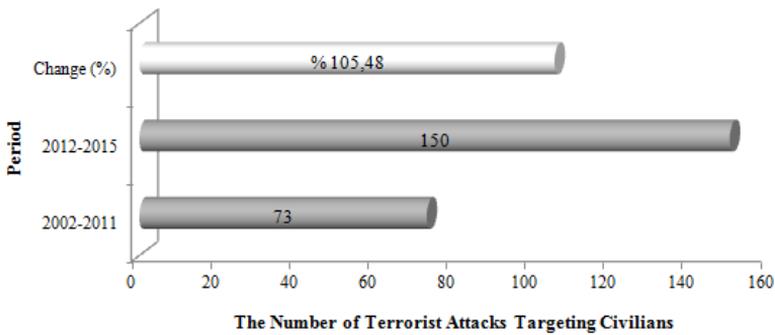


Figure 4. Changes in terrorist attacks targeting civilians in Turkey⁵²

⁵¹ Global Terrorism Database (GTD), START

In addition to these changes, the impact areas of terror spread over a wide eastern and southeastern geography after 2012. This can be seen in Figures 5 and 6. Before 2012, terrorist attacks had frequently been observed in eastern and southeastern Turkey; after 2012, these events had spread to all of Turkey's NUTS-2 regions.



Figure 5. The regional distribution of terrorist attacks (2002-2011)⁵³



Figure 6. The regional distribution of terrorist attacks (2012-2014)⁵⁴

⁵² Global Terrorism Database, START.

⁵³ It is compiled from Global Terrorism Database.

⁵⁴ It's compiled from Global Terrorism Database.

Consequently, when considering the increases in impact areas, frequency, and severity of terrorism, Turkey has become more vulnerable. In other words, terrorism can hinder the growth performance of the regions located particularly in eastern and southeastern Turkey. Therefore, terrorism should be investigated as a potential political determinant of balanced and comprehensive regional growth.

3. Data and Variables

This study investigates the effects of terrorist attacks on economic growth over the period of 2005-2014 in Turkey's NUTS-II regions. The econometric model's dependent variable is the growth rate of real GDP per capita, which reflects the economic growth that basically means increasing economic output. The independent variables are:

- The growth rate of terrorist attacks ($TERROR_{ATTACKS}$);
- The growth rate of human public capital investments in health and education per capita (PCI_{HUMAN}) as a regional physical capital;
- The growth rate of graduate students per capita ($EDUCATION_{HIGHER}$) as a regional human capital;
- Initial real GDP per capita ($y_{i,t-1}$) inconsideration of the convergence hypothesis.

The explanations and expectations regarding these variables are shown in Table 2. When taking the empirical literature into consideration, the negative relationship between terrorist attacks and economic growth performance can be predicted.

On the other hand, taking into consideration the variables of both higher education as human capital and human public capital investments as physical capital may result in a positive coefficient through their positive externalities. Finally, a negative lagged value for the dependent variable indicates divergence of the process within a region; otherwise, there is convergence.

Table 2. Characteristics of Variables

2005 – 2014 26 Regions	Symbol	Definition	Foreseen	Sources
Dependent Variable	$y_{i,t}/y_{i,t-1}$	The growth rate of real GDP per capita		TurkStat
Convergence	$y_{i,t-1}$	Initial real GDP per capita	+/-	TurkStat
	<i>POP</i>	The growth rate of population	-	TurkStat
Human Capital Stock	<i>EDUCATION</i> _{HIGHER}	The growth rate of graduate students per capita	+	TurkStat
Physical Capital Stock	<i>PCI</i> _{HUMAN}	The growth rate of human public capital investments (health and education) per capita	+	Ministry of Development
Terrorist Attacks	<i>TERROR</i> _{ATTACKS}	The growth rate of terrorist attacks	-	GTD START

TurkStat: Turkish Statistic Institute

START : National Consortium for the Study of Terrorism and Responses to Terrorism

GTD: Global Terrorism Database

4. Empirical Methodology and Model

Econometric model includes panel dataset covering 2005-2014 period and Turkey's NUTS-II regions.⁵⁵The functional form of it is:

⁵⁵ In panel data analysis, the three different model can be used as Pooled/Mixed, Fixed Effects, and Random Effects Panel Models. The main problem of Pooled Panel Model, in which a single constant term is determined for each cross-section and, depending on this, which is based on the homogeneity assumption between cross-sections, is that it does not discriminate between cross-sections and cannot say whether or not inter-variable

$$\ln\left(\frac{y_{i,t}}{y_{i,t-1}}\right) = \gamma \ln(y_{i,t-1}) + \beta \ln(X_{i,t}) + \varepsilon_{i,t} \quad (1)$$

$$\begin{aligned} \ln(y_{i,t}) - \ln(y_{i,t-1}) \\ = \gamma \ln(y_{i,t-1}) + \beta \ln(X_{i,t}) \\ + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $i = 1, \dots, 26$ (Cross-section), $t = 2005, \dots, 2014$ (period). With $\alpha = 1 + \gamma$, Eq. (1) becomes:

$$\ln(y_{i,t}) = \alpha \ln(y_{i,t-1}) + \beta \ln(X_{i,t}) + \varepsilon_{i,t} \quad (3)$$

$$\text{and } \varepsilon_{i,t} = \mu_i + v_{i,t} \quad (4)$$

where y_{it} stands for the real income per capita of region i at the end of period t ; $X_{i,t-1}$ is a vector of the economic determinants of growth such as physical and human capital stock and terrorist attacks; μ_i are region-specific effects and $\varepsilon_{i,t}$ is the error term.

The lagged value of the dependent variable is the independent variable in (3). It is known as a dynamic panel model. Because y_{it} is a function of μ_i , $y_{i,t-1}$ is also a function of μ_i . Therefore, $y_{i,t-1}$ is correlated with the error term and renders the OLS estimator biased and inconsistent even if $v_{i,t}$ is not serially correlated. It is similar to the *FE* estimator. This bias does not vanish as the number of individuals increases, so the *FE* estimator is inconsistent for large values of n and small values of T ⁵⁶. For large time periods, the bias becomes very small and the problem disappears⁵⁷. However, because only 10 periods exist

relationship is the same as all cross-sections in time (Gujarati and Porter, 2012, p.594).

⁵⁶ Badi H. Baltagi, *Econometric Analysis of Panel Data*. 5th Edition, Wiley Publication, United Kingdom, 2013, p. 155.

⁵⁷ Ari Aisen and Francisco Jose Veiga, *Ibid*, p. 154.

in the econometric model for 2005-2014, bias might become a significant problem.⁵⁸ Therefore, the econometric model has been estimated using the Roodman⁵⁹ System-GMM estimator.⁶⁰

5. Empirical Results

The findings from the dynamic panel model as based on the System-GMM estimator without spatial parameters are presented in Table 3. The findings indicate terrorist attack to hinder regional growth performance, which is consistent with Asteriou and Price⁶¹, Blomberg et al.,⁶² Eckstein and Tsiddon,⁶³ Giskemo,⁶⁴ Meierrieks and Gries,⁶⁵ Öcal and Yıldırım,⁶⁶ Zakaria et al.,⁶⁷ Crain and Crain,⁶⁸ Çınar,⁶⁹ and Choi.⁷⁰ A region's growth rate decreases by 0.5% for a

⁵⁸ According to the Monte Carlo Simulations is different cross and period examples estimated by Judson and Owen (1999), even if $t = 30$, this bias could correspond to 20% of actual value of coefficient.

⁵⁹ David Roodman, "How to Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata", *Stata Journal*, 2009, Vol: 9/1, 86-136.

⁶⁰ These estimators are designed for dynamic "small-T, large-N" panels that may contain fixed effects and separate from those fixed effects-idiosyncratic errors that are heteroskedastic and correlated within but not across individuals. On the other hand, before estimation, potential spatial dependency between variables investigated because of the regional patterns of GDP values reflecting spatial dependency as cluster. Because, in case that there is spatial effect (spatial dependency) between the variables to be analyzed but this effect cannot be considered, the Least Squares (LS) estimator will include several problems such as effectiveness or biased problem by types of spatial dependency (Anselin, 1998). However, according to findings of LM_{LAG} and LM_{ERR} Tests employing for this purpose, there isn't any spatial dependency between variables.

⁶¹ Dimitrios Asteriou and Simon Price, *Ibid*, p. 383.

⁶² S. Brock Blomberg, Gregory D. Hess, and Athanasios Orphanides, *Ibid*, p. 1007.

⁶³ Zvi Eckstein and Daniel Tsiddon, *Ibid*, p. 971.

⁶⁴ Gunhild Gram Giskemo, *Ibid*, p. 4

⁶⁵ Daniel Meierrieks and Thomas Gries, *Ibid*, p. 91.

⁶⁶ Nadir Öcal and Jülide Yıldırım, *Ibid*, p. 477.

⁶⁷ Muhammad Zakaria, *Ibid*, p. 1794.

⁶⁸ Nicole V. Crain and W. Mark Crain, *Ibid*, p. 317.

⁶⁹ Mehmet Çınar, *Ibid*, p. 97.

⁷⁰ Seung-Wan Choi, *Ibid*, p.157.

10% increase in terrorist attacks.

Meanwhile, investments in human public capital under health and education (PCI_{HUMAN}) have positive and statistically significant effects on a region's growth performance; this is consistent with Shioji,⁷¹ Baldacci et al.⁷² A 10% increase in health and education public capital investments increases the regions' growth rate by 0.2%.

In addition, no statistically significant relationship has been found between a higher educated population and growth. In other words, the positive externalities of human capital on growth do not occur in Turkey; this is consistent with Pereira and Aubyn⁷³ and Delgado et al.⁷⁴ An insufficient higher education system in terms of both qualitative and quantitative dynamics and economic production patterns may be the potential reason for this result as sectorial links from potential clusters have generally low or medium technological dynamics in Turkey.⁷⁵ Finally, Turkey's NUTS-II regions diverge from each other slowly in terms of GDP per capita; this is consistent with Berber et al.,⁷⁶ Gezici and Hewings,⁷⁷ Karaca,⁷⁸ Gezici and Hewings.⁷⁹

⁷¹ Etsuro Shioji, "Public Capital and Economic Growth: A Convergence Approach", *Journal of Economic Growth*, 2001, Vol: 6, 205-227, p. 205.

⁷² Emanuele Baldacci, Benedict Clements, Sanjeev Gupta and Qiang Cui, "Social Spending, Human Capital, and Growth in Developing Countries", *World Development*, 2008, Vol: 36/8, 1317-1341, p. 1317.

⁷³ Joao Pereira and Miguel St. Aubyn, "What Level of Education Matters Most for Growth? Evidence from Portugal," *Economics of Education Review*, 2009, Vol: 28/1, 67-73, p. 67.

⁷⁴ Michael Delgado, Daniel J. Henderson and Christopher F. Parmeter, "Does Education Matter for Economic Growth?", *IZA Discussion Paper 7089*, 2012, 1-27, p. 1.

⁷⁵ Sedef Akgungor, Nese Kumral and Necmettin Celik, "Türkiye'de Sektörel İleri – Geri Bağlantılar, Kümelenmeler ve Bölgesel Uzmanlaşma", *17. Ulusal Bölge Bilimi ve Bölge Planlama Kongresi (BBTMK2017) Bildiri Özetleri*, Burdur, 2017, 13-14, p. 13.

⁷⁶ Metin Berber, Rahmi Yamak and Seyfettin Artan, "Türkiye'de Yakınlaşma Hipotezinin Bolgeler Bazında Gecerliliği Uzerine Ampirik Bir Calisma: 1975-1997", *9. Ulusal Bolge Bilimi Kongresi*, Trabzon, 2000, 51-59, p. 51.

⁷⁷ Ferhan Gezici and Geoffrey J. D. Hewings, "Regional Convergence and the Economic Performance of Peripheral Areas in Turkey", *Review of Urban & Regional*

Table 3. System GMM Panel Model Results

<i>26 Regions 2005-2014</i>	Dependent Variable: $y_{i,t}/y_{i,t-1}$
$y_{i,t-1}$	-0.09*
<i>POP</i>	-0.07
<i>PCI</i> _{HUMAN}	0.02**
<i>EDUCATION</i> _{HIGHER}	-0.02
<i>TERROR</i> _{ATTACKS}	-0.05***
Constant	0.12***
AR (1) stat.	-4.53 [0.000]
AR (2) stat.	-0.29 [0.770]
Sargan Test stat.	113.57 [0.000]
Hansen Test stat.	22.36 [0.004]
Number of Instruments	14
Number of Groups	26
Number of Obs.	234

Note: *, **, *** symbols stand for a 10%, 5%, and 1% level of significance, respectively. Statistics in parentheses () stand for robust standard errors, statistics in brackets [] stand for *p*-values.

Development Studies, 2004, Vol: 16/2, 113-132, p. 113.

⁷⁸ Orhan Karaca, "Türkiye'de Bölgeler Arası Gelir Farklılıkları: Yakınsama Var Mı?", *TEK Tartışma Metni 2004/7*, 2004, 1-16, p. 1.

⁷⁹ Ferhan Gezici and Geoffrey J. D. Hewings, "Spatial Analysis of Regional Inequalities in Turkey", *European Planning Studies*, 2007, Vol: 15/3, 383-403, p. 383.

Conclusion

The frequency and severity of terrorist attacks have increased dramatically and begun to spill over to all NUTS-2 regions of Turkey, especially since 2012. Therefore, terrorism, which has been an ongoing problem in Turkey for approximately 40 years, has become a more sensitive factor on the economy since then. From this perspective, the problem must be taken into consideration in order to establish balanced and comprehensive regional economic growth and solve structural economic problems such as migration and regional inequalities. Therefore, the study investigated the effects of terrorist attacks on economic growth as a political determinant for the period of 2005-2014 in Turkey's NUTS-II regions in addition to several economic determinants.

The empirical findings indicate terrorism to directly hinder regional growth performance in Turkey. In addition, the repressive effects of terrorism on economy being higher since 2015 can be predicted due to the dramatic rise in attacks. In this respect, solving the terrorism problem is a crucial issue for establishing balanced and comprehensive regional development in Turkey. For this purpose, the concepts of terror and terrorism must first be separated from one another, and then the potential economic, political, social, psychological, and spatial dynamics of terrorism should be detected and proactive measures must be taken into account⁸⁰ as terrorism being

⁸⁰ Necmettin Celik, *Kırılgan-Başarısız Devlet Olgusu ve Terörizm Açmazı (Sosyo-İktisadi ve Politik Dinamikleri Dâhilinde)*, Yüksek Lisans Tezi, Ege Üniversitesi Sosyal Bilimler Enstitüsü, İzmir, 2014, 1-86, p. 85; Necmettin Celik, "Toplumsal Parçalanma, Sosyal Dışlanma ve Terörizm", *Uluslararası Hukuk ve Politika Dergisi*, 2015, Vol: 11/44, 157-280, p. 157; Necmettin Celik, "İktisadi, Politik ve Mekansal Dinamikleri Dâhilinde Küreselleşen Terörizm", *SAREN Güvenlik Stratejileri Dergisi*, 2016, Vol: 23/12, 163-204, p. 163; Mehmet Karacuka and Necmettin Celik, "Kırılgan-Başarısız Devlet Olgusu ve Terörizm İlişkisi", *Gazi İİBF Dergisi*, 2017a, Vol: 19/1, 20-41, p.20; Mehmet Karacuka and Necmettin Celik, "Globalizing Terrorism and It's Economic-Politic Dynamics", Halil İbrahim Aydın, Magdalena Ziolo and Aniela Balacescu (ed.), *Economic Development Global and Regional Studies*, IIOPEC Publication, London, 2017b, 301-315, p. 301.

a more complicated concept has several dynamics other than security patterns. Therefore government and policy makers must take into consideration and analyze in detail the conditions and dynamics of terrorist structures⁸¹.

When struggling with the economic dynamics of terrorism, investments in human and physical capital, especially in education towards regions located in eastern and southeastern Turkey, may be essential tools. In addition, leading employment incentives may be another policy tool for this purpose. This is because, as regional inequalities decrease in terms of development level, opportunity costs for terrorism increase and terrorist groups will lose their domination. However, these effects will essentially be limited. Therefore, regional structural problems urgently need to be solved.

Özet

Dengeli ve sürdürülebilir iktisadi büyüme süreçleri iktisadi istikrar kadar politik istikrar süreçlerine de dayalı olarak şekillenmektedir. Bu açıdan bakıldığında, politik istikrarsızlık boyutlarına ulaşan şiddetli terör olaylarının iktisadi dinamiklere etki etmesi ve işleyen piyasa mekanizmasına zarar vermesi kuvvetle muhtemeldir. Başka bir ifadeyle, politik istikrarsızlık süreçleri iktisadi büyüme performansını baskılayacak bir unsur haline dönüşebilmektedir. Bu sebeple, daha kapsamlı ve uygun iktisadi analizlerin yapılabilmesi terörizm gibi politik dinamiklerin de irdelenmesini gerektirmektedir.

Nitekim, Türkiye yaklaşık 40 yıldır terörizm sorunuyla karşı karşıya olan ve gerek insani; gerekse de maddi açıdan büyük kayıplar yaşayan bir ülke konumundadır. Türkiye’de 1980’lerden beri süregelen terörizm sorununun özellikle 2012 yılından itibaren daha belirgin bir şekilde hissedildiği görülmektedir. Buna ek olarak, genellikle, ülkenin doğu ve güneydoğu bölgelerinde yoğunlaşan terör olaylarının,

⁸¹ Necmettin Celik, 2014, Ibid, p. 68.

2012 yılından itibaren, neredeyse tüm ülke geneline yayılarak. iktisadi büyümeyi baskılayıcı bir unsura dönüştüğü söylenebilir. Bu sebeple, çalışmada, 2005-2014 dönemi ve Türkiye'nin 26 adet İBBS-2 Bölgesi kapsamında, terörizm sorunun dengeli ve sürdürülebilir bölgesel iktisadi büyüme üzerindeki potansiyel etkileri incelenmiştir. Bu doğrultuda tahmin edilen Sistem GMM Panel Model bulguları, terör olaylarının bölgelerin büyüme performansı üzerinde negatif ve istatistiksel açıdan anlamlı etkileri olduğunu göstermektedir. Bulgulara göre, yaklaşık 40 yıldır Türkiye'nin güneydoğu ve doğu bölgelerinde süregelen ve 2012 yılından itibaren sıklık, sertlik ve etki alanı gibi unsurlar ekseninde şiddetini arttıran terör olaylarının bölgesel iktisadi büyümeyi baskıladığı anlaşılmaktadır. Bu sebeple, dengeli ve sürdürülebilir bir bölgesel iktisadi büyümenin tesis edilebilmesinin temel noktalarından birinin de terörizmle mücadele olduğu unutulmamalıdır. Bu noktada, terörizmin muhtemel iktisadi, politik, toplumsal, psikolojik ve mekansal dinamiklerine yönelik çalışmaların genişletilmesi ve terörizm sorununa salt askerî açıdan değil, aynı zamanda proaktif güvenlik önlemleri ekseninde de bakılması faydalı olacaktır.

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