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Research Report

Counterterrorism Effectiveness: The Impact on Life and Property Losses

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- **How efficient is antiterrorism policy?**
- **Has authorities' counterterrorism effectiveness increased overtime?**
- **How is the probability of losses (life & property) affected, when authorities prevent terrorist incidents?**

Summary:

In this Policy Briefing we look at authorities' relative counterterrorism effectiveness focusing on its behavior over time, its impact on preventing casualties and property losses. The study underlying this Policy Briefing used data on transnational terrorism from the ITERATE database (1973–2003) and discrete choice models, to evaluate relative counterterrorism effectiveness while controlling for a variety of terrorists' and authorities' effort attributes. It was found out that the probability of a terrorist incident being stopped by the authorities has increased in the period examined. Furthermore, a negative relationship between authorities' ability to stop an incident and the probabilities of casualties and damages is identified. However, the "ability to stop" exerts higher impact on the probability of property losses compared to casualties.

POLICY BRIEFING

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Counterterrorism Effectiveness: The Impact on Life and Property Losses

Introduction

Sovereign states and international organizations have dedicated vast resources on designing and implementing a multitude of counterterrorism policies. Moreover, the amount of counterterrorism spending has increased substantially over time, especially after 9/11. Clearly the evaluation of counterterrorism policies and measures deserves further investigation in order to explore whether the allocated resources on antiterrorism are productive. However, despite the importance of this issue, empirical work remains weak, for two main reasons. First, due to the lack of data, as counterterrorism expenditures are classified, and second because counterterrorism productivity is an elusive concept. (for a review see Landes 1978; Atkinson et.al. 1987; Enders et.al. 1990; Barros 2003 etc). This Policy Briefing is based on the paper: An econometric analysis of counterterrorism effectiveness: the impact on life and property losses.

In this study, the probability that a terrorist incident is stopped by authorities is used as a measure of counterterrorism effectiveness. Then, the time trend (stable, increasing or decreasing) of this probability is examined. Furthermore, the impact of authorities on two important observed outcomes of terrorist incidents is measured. The first refers to human losses (casualties) and the second to property losses. Thus, the question is whether the probabilities of casualties and property losses, when terrorist incidents were

stopped by authorities, could have been lower. This is the major issue in this study. At first glance, this objective might seem to have an obvious answer since it is expected that the incident stopping probability and the probability of casualties and property losses, are negatively correlated. However, until this correlation is established in the context of a formal statistical framework it remains a simple supposition. More importantly though, even if one was certain that authorities' stopping capabilities and casualties/damages are moving in opposite directions, important information can be obtained regarding the relative strength of these forces and the potential asymmetries across regions and various incident-specific attributes.

The empirical models used by the authors incorporates a number of potential correlates to account for the fact that the logistical outcome of a terrorist incident depends on the relative effort levels of both, the terrorists and the authorities. The authors expect that the probability of effective counterterrorism tends to increase (decrease) when authorities' effort level surpasses (falls short of) the effort exercised by terrorists. The effort level of terrorists is approximated by the number of terrorist groups directly involved, and also by the choice of attack type. Accordingly, authorities' effort level is proxied by the percentage of military expenditures over GDP, as an attempt (although imperfect) to measure authorities' counterterrorism spending. In addition, we further control for country-specific characteristics such as regime type (Abrahams 2007) and income class (Enders and Sandler 2006).

The empirical analysis has two primary objectives. Firstly, to provide a microeconomic analysis of relative counterterrorism effectiveness over time. Secondly, to explore the significance and magnitude of its impact on the probability of casualties and property losses. However, it should be noted that the analysis has two disadvantages. Firstly, it does not test structural hypotheses, i.e., hypotheses derived from a specific theoretical model. Rather, it presents a pure econometric analysis of terrorist acts' observed outcomes. Secondly, it does not capture any dissuasion effects of counterterrorism policy, that is, the number

of incidents or terrorists that have been averted overtime. However, the required data are not available since we do not observe dissuaded cases. Hence any evaluation of counterterrorism effectiveness must be based on cases where terrorists have passed the threshold point, i.e., once they have decided to engage in terrorist activities. Thus, whatever level of counterterrorism is found, it will be an underestimate of its true level, to the extent that we fail to incorporate dissuasion effects.

The research underlying the answers to these questions was conducted as part of the EUSECON project and is published as Drakos and Giannakopoulos (2009).

Authorities' effectiveness for the period under examination

The authors utilize the information provided by the ITERATE database (International Terrorism: Attributes of Terrorist Events), which classifies the logistical outcome of each terrorist incident in several categories. In the period 1968–2003 out of 12569 recorded incidents, 1755 were stopped by the authorities (14 percent of total incidents). Of those 23.3 percent were stopped at the planning stage, 36.7 percent stopped at the scene or on the way to the scene before initiation and 40 percent stopped at the scene after initiation (see table 1). A cursory look at the relevant data reveals that the percentage of stopped incidents exhibits an upward trend. The authorities' overall ability to stop terrorist incidents in the period 1968-1973 was on average 12.6 percent, decreased to 8.1 percent in the period 1974-1979 and increased markedly in the remaining period.

Table 1 Average authorities' effectiveness by time period and stages of terrorist incident

Time period	Percentage of terrorist incidents stopped by authorities	Distribution of stopped terrorist incidents by stage		
		Stopped at planning stage	Stopped at scene or on the way to scene before initiation	Stopped at the scene after initiation
1968–1973	0.126	0.170	0.830	0.000
1974–1979	0.081	0.243	0.435	0.322
1980–1985	0.163	0.212	0.331	0.457
1986–1991	0.166	0.206	0.300	0.494
1992–1997	0.127	0.234	0.207	0.558
1998–2003	0.174	0.424	0.215	0.362

These terrorist incidents cover 25 different attack types ranging from hoaxes and threats to unconventional attacks. In order to reduce the noise in the data various types of attacks were combined and the analysis focused on a sub-sample of 7264 incidents that corresponds to the following major attack types: bombings, armed attacks, assassinations and hostage taking. Table 2 summarizes variable regroupings, definitions and descriptive statistics.

Table 2 Definition of type of attack variables

Variable	Definition Type of incident	Mean	S.D.
Hostage	1 if type of incident was kidnapping or barricade and hostage seizure or occupation of facilities without hostage seizure, 0 otherwise	0.029	0.168
Bombing	1 if type of incident was incendiary bombing, arson, molotov cocktail, or letter or parcel bombing, or explosive bombing, or car bombing, or suicide car bombing, or suicide bombing, 0 otherwise	0.682	0.465
Armed	1 if type of incident was armed attack employing missiles or armed attack—other, including mortars, bazookas, or sniping at buildings, other facilities, or shoot-out with police, 0 otherwise	0.163	0.370
Assassinations	1 if type of incident was assassination, murder, 0 otherwise	0.124	0.329

A unique feature of ITERATE is that it classifies each terrorist incident's logistical outcome (*lo*) in one of the seven categories presented in Table 3. An apparent difficulty is that the terrorists' and authorities' effort levels are inherently latent. However, since the logistical outcome for each incident is observed, one may still draw some conclusions.

Table 3 Logistical outcome

(<i>lo</i>) as in ITERATE	Definition	Sample frequency	Percentage of sample
0	Aborted by terrorists before initiation	7	0.001
1	Incident stopped by authorities at planning stage	99	0.013
2	Incident stopped by authorities at scene or on the way to scene, before initiation	387	0.053
3	Aborted by terrorists during event	250	0.034
4	Unsuccessful owing to faults or errors by terrorists	170	0.023
5	Stopped by authorities at the scene after initiation	396	0.054
6	Apparently completed as planned	5955	0.819

Counterterrorism effectiveness: results

Microeconomic results indicate that the probability that authorities stop a given terrorist incident has been increasing over time at an annual rate of 0.40

percentage points. The breakdown by stage reveals that the probability of stopping incidents at the planning stage has increased by 0.1 percentage points. The same increase in probability is encountered for authorities' ability to stop events after the planning stage, but before initiation. The highest improvement is documented in the authorities' ability to stop terrorist events in the post initiation stage, which has been increasing by an average of 0.2 percentage points per year. Overall, the ability of the authorities to stop terrorist incidents with higher probability over time is found to be robust when a series of sensitivity analyses were taken place.

On top of that, the estimation results for casualties and property losses show that incidents stopped by authorities after initiation reduce the probability of casualties by 13 percentage points. Also, note that the probability of casualties is emphatically increased when incidents are in the form of armed attacks (by 25%) or in the form of assassinations (65%). Regarding property losses the results show that incidents stopped by authorities have about 60% lower probability of resulting in damages.

It is apparent how crucial the effectiveness of authorities is for human life. Indeed, according to estimation results if all incidents were stopped then the mean probabilities of casualties and property losses would be 28% and 7%, respectively. In contrast, if none of the incidents were stopped then the mean probabilities of casualties and property damage would be 41% and 71%, respectively. Therefore, changes in aggregate counterterrorism performance exert a large impact on the outcomes of incidents under study.

Sensitivity Analysis

During the long period covered by our sample, major changes have taken place and a natural question that arises is whether these changes are reflected on the linear time-trend.

Two obvious developments that should be taken into account, are the end of the Cold-War and the rise of radical Islam. With regards to the end of Cold-War we define a dummy variable taking the values of 1 after

1989 and 0 before. In addition the effect of radical Islam is captured by the variable which measures the share of terrorist incidents executed by Islamic groups in a given year

The coefficient of the post Cold-War dummy is significantly negative implying that the share of stopped incidents, *ceteris paribus*, has decreased in the post Cold-War era. Similarly, the effectiveness of counterterrorism is lower as the share of terrorist incidents executed by Islamic groups increases. As it regards to the parameter of main interest we find that the linear time trend retains its positive and significant effect.

Policy recommendations

The most important thing that has become clear is the crucial role of the authorities to stop terrorist incidents. In this study the relative counterterrorism effectiveness was investigated. Employing data on transnational terrorism from the ITERATE database for the period 1968–2003 and utilized discrete choice models, the results indicate that the probability a terrorist incident is stopped by the authorities has increased over time. Therefore, for the period under examination aggregate relative counterterrorism effectiveness has increased. In line with conventional wisdom, the econometric analysis verifies that when authorities are able to stop terrorist incidents, the probabilities of casualties and property losses are significantly reduced.

Credits

This EUSECON Policy Briefing was authored by Christos Kallandranis (B.C.A./Business College of Athens), Konstantinos Drakos (Athens University of Economics & Business, and Nicholas Giannakopoulos (University of Patras). The views expressed in this briefing are the authors' alone.

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