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The Economics of Terrorism and Counter-Terrorism: A Survey

by

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The economics of security is one of the most important issues in our discipline, yet, the one least researched (Martin Feldstein (5. 1. 2007), Former President of the American Economics Association

“Economic theory in particular can offer key insights, enabling governments to optimise their efforts to enhance security and growth” (ESRAB, 2006)

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1 INTRODUCTION

In particular after the devastating attacks on New York and Washington on September 11, 2001 (henceforth *9/11*), the (economic) analysis of terrorism has gained in importance in (economic) research. Some contributions have focused on the causes of terrorism, asking, e.g., whether terrorism is rooted in poor political and economic conditions (i.e., in repression and poverty). Others have centered on the consequences of terrorism. For instance, (global) terrorism may damage economic growth and globalization, e.g., by reducing trade flows and investment flows. The interaction of terrorism and counter-terrorism has also been the center of some academic interest, given that the fight against terrorism also has noticeable economic consequences of its own accord, e.g., by affecting the ease of travel and trade and by diverting public investment to internal security.

This survey provides an in-depth analysis of existing research on the economic analysis of terrorism and counter-terrorist measures.¹ We first take a look on existing evidence on the *causes of terrorism*. That is, we assemble the evidence on the drivers and determinants of various forms of terrorism taking place in various parts of the world. Knowing the ‘roots’ of terrorism is helpful to assess the benefits of security policies and their interactions with the economy. Then, we consider the evidence on the *consequences of terrorism*, where we focus on its economic impacts, while also alluding to its political or social effects. By describing the academic research on the various negative effects of terrorism, we show why it is important to regarding the issue of counter-terrorism policies. Moreover, our survey also presents the existing knowledge on the interrelation between the economy and the issue of security (with a particular focus on terrorism) in a comprehensive manner. It incorporates an analysis of the level of knowledge about the causal chains between security and the economy to show in

¹ However, one should note that most countries are yet not sufficiently prepared to intellectually meet this new type of research, as their capacity for economic analysis and policy making in this field is still weak, especially in comparison with the United States. This is a result from several factors: first, the large geographical dispersion of economic research capacity on terrorism and anti-terror policy; second, the spread of experts across many different sub-disciplines in economics, which often do not communicate with each other; third, the fact that many authors publishing books and articles in the field of economics of security usually work on other themes and simply lend their expertise to the analysis of terror-related economic phenomena on a temporary basis, thus making experts on economics of security a very transient phenomenon. Still, the economic literature on terrorism has made remarkable inroads (e.g., Landes 1978; Frey 2004; Brück 2006; Enders and Sandler 2006; Krueger 2007; Keefer and Loayza 2008; Bird et al. 2008) building on already available research, which had previously not received much attention. Nevertheless, despite of remarkable progress, different areas of research remain insufficiently integrated and various aspects still need to be studied in depth (cf. Llussa and Tavares 2008).

which way interactions manifest. Relevant knowledge on the interaction between the costs of both terrorism and anti-terrorism measures is identified as well.

This survey focuses on perspectives and methodologies from the discipline of economics but also refers to research from related disciplines (sociology, political science). The related non-economic literature is not only extensive but also complements the economics literature, e.g., as it covers some issues and aspects which have so far been overlooked by many economists. Arguably, economics contributes to the study of terrorism with important tools, yet it is not sufficient to provide an understanding of *all* the complexities of the security-insecurity nexus.

Our survey assesses the degree of available information on the causes of terrorism, as they follow from an economic analysis of the issue. It also assembles the knowledge on the impact of terrorism on the economy as reflected in macro-economic variables, and its impact on specific sectors. Furthermore, it assesses how potential and actual terrorist events determine consumer and producer behavior, public policy as well as terrorist responses to these policies. Apart from the impacts on the respective economic levels, distributional effects are analyzed including the distribution of impacts between segments within an economy and between economies within the international economic system. In Section 2 we discuss some *definitions and concepts* which should be reflected before starting an in-depth discussion. The main part of our survey (Sections 3 to 7) is divided into several sections:

1. *The causes of terrorism* (Section 3) are discussed in order to understand which factors (determinants) motivate the production of terrorism and terrorist attacks. After presenting several global hypotheses that link certain country-specific factors to the risk of a country producing terrorism or being attacked by it, we review the existing evidence, distinguishing between several analytical perspectives. If it is possible to identify the “true” determinants of terrorism, then it is also possible to “drain the swamp” by applying respective policy actions. Such actions should help to reduce terrorism, thus also reducing the first-order (direct) and second-order (indirect) effects of terrorism on affected economies.
2. *The impacts of terrorism* (Section 4) account for the direct (first-order) economic repercussions to the economy from a risky event (Enders and Sandler 2006; Brück 2006) both at macro- and micro-economic level. These impacts correspond to the aftermath of an event and deal with the immediate reaction of victims to a terrorist attack. Many studies exist which provide overviews and summarize the impacts of terrorism, yet, these studies do not differentiate between various (temporal) stages of terrorist events and their repercussions.

One may distinguish between (i) the direct short-run response triggered by the event itself, (ii) the medium- to long-term responses induced by fear and resulting security responses of agents, which (iii) will in turn trigger reactions by terrorists. Most existing studies attribute the dynamic repercussions of terrorism to the terrorist event itself, even though the extent of indirect effects is largely determined by the reactions of targets rather than terrorist actions. This distinction is critical as it provides a perspective on relative dimensions of the economic repercussions of the actual attacks versus the economic repercussion of responsive actions, which at least in theory could be reduced through adequate management of a post- and pre-terror situation.

3. *The dynamic analysis of both terrorism attacks and security measures* (Sections 5) recognizes that terrorists' behavior will respond to both previous terrorist events and to security measures of public and private agents. These adjustments in behavior (e.g., in the nature of attacks and in the type of target) will in turn result in a changed aggregate impact of terrorist attacks. In other words, security responses do not only contribute to the total costs of a past terrorist event but also partly determine the economic repercussions of terrorism in the future.
4. *The economic impacts of security measures* (Section 6) or indirect (second-order) costs of terrorism result from the responses of agents to re-establish an environment of security. Brück (2006) further differentiates between impacts on private security spending and on public policy. These adjustment activities occur between terrorist events, i.e., they are activities which attempt to prevent an attack altogether, or target to minimize the impacts and thus costs from an actual attack. They do not only arise from public security policies but are also a result of changes in behavior at individual level which lead to a changed allocation of resources to consumption and production. Consequently, the ultimate impact of terrorism is not only determined by the nature of the terrorist attack but also by the reactions of the respective agents, leading to the hypothesis that indirect impacts, i.e., impacts resulting from security reactions could outweigh the direct impacts of terrorist attacks themselves (Chen and Siems 2004; Brück 2006).
5. *The European perspective on the terrorism-security nexus* (Section 7) is finally discussed in order to apply the discussion to the European theatre. Here, we want to discuss the causes of terrorism in Europe and the first- and second-order effects of terrorism on the economy and society as a whole. Also, we want to have a look at counter-terrorism policies and

their interaction with terrorism and the economy. We in particular focus at policy actions undertaken by the European Union (EU).

2 DEFINITIONS AND CONCEPTS

The 9/11 terror attacks that destroyed the World Trade Center in New York and subsequent attacks in Europe have introduced a new dimension of terrorism. 9/11 and other terror attacks have challenged existing notions on the “ethics” or behavior of terrorist organizations and created a new atmosphere of uncertainty. As the unimaginable happened, large scale terrorist events since 2001 have turned a low probability event into an event with a higher likelihood, but also into an event whose likelihood cannot be estimated. In other words, what was previously rejected as significantly unlikely has now become not only possible but also probable. Yet, given lack of data it is difficult to predict the actual level of probability. Consequently, although previous historic incidences (e.g., nuclear accidents) had enhanced the awareness of living in a “risk society”, 9/11 has further influenced conceptions of risk, insecurity and security. In this section we want to give a brief overview of basic concepts and their implications, before offering an in-depth view on the issue of terrorism and its (economic) analysis.

2.1 Risk and insecurity

Brück (2006) defines *insecurity* as an “aggregate, unquantifiable form of risk”, *risk* as the probability of a harmful event to happen (where the level of risks rises with an indicator being close to its threshold) and consequently, *security* as the absence of this risk, i.e., a zero probability of a harmful event to happen. A similar concept has been provided early on by Knight (1921) who differentiates between risk and uncertainty. Risk is a known entity to the extent that its probability can be estimated, e.g., based on certain variables which have been derived historically or through research; yet, uncertainty implies the impossibility to quantify the probability of an event to happen. In sharp contrast to, e.g., natural disasters which are predictable to some extent, terrorists deliberately seek to evade attempts for prediction, thus reproducing uncertainty or creating an environment of “dynamic insecurity”.

Terrorism is not the only source of insecurity but one among many others, such as organized crime, political instability or economic shocks, natural disasters or industrial accidents. Consequently, the risk of terrorism is defined not only by its own absolute probability but also by the likelihood of other events to happen. Given that the “portfolio of risks” and their likeli-

hoods vary across time, across countries and across stakeholders, the importance that is assigned to a particular element of insecurity (e.g., terrorism) and its salience on the policy agenda will vary as well. Moreover, the notion of risk is not objectively defined but strongly influenced by individual's perceptions and risk aversion which is often based on cognitive experiences of the past rather than estimations of probability of future events.

2.2 Security

The phenomenon of “dynamic insecurity” has important repercussions on notions of “security” and security provision. As Auerswald et al. (2005) suggests, the goals of security provision need to be redefined, shifting away from the objective to protect potential targets against all possible risk factors towards enhancing systemic resilience through capability building in order to minimize negative impacts in case of attack. It may be more sustainable to decrease vulnerabilities and increase the resilience of (economic) systems in general, rather than trying to fight a particular cause of insecurity in isolated fashion.

This concept of security provision is based on the understanding that insecurity and vulnerability are two sides of one coin. In other words, the level of both risk and uncertainty is determined not just by the threat per se but also by the degree of systemic vulnerability. Kunreuther (2006) builds, e.g., on Beck's Risk Society (1992) and identifies the current state of interdependencies in the economic context as a critical factor of vulnerability. These interdependencies imply that a local event can have global repercussions and as a result, a system of interdependent elements and actors is only as secure as its weakest link (cf. Enders and Sandler 2006: 104-106). Every actor will decide independently whether to invest in security or not; nevertheless, these individual decisions can have severe repercussions on overall security. As the effectiveness of individual security investments is partly dependent on security investments of other agents, the decision to invest in security will depend on the expected actions of other agents. Consequently, without appropriate mechanisms to overcome possible coordination failures, this situation can lead to sub-optimal levels of security when actors (uncertain about the investment behavior of others) decide not to invest in security (Kunreuther and Heal 2003).

A second disincentive to security provision is the partly public good nature of security. Some investments into certain types of security will provide benefits to society at large, not just to the entity investing in these actions. In contrast, other measures of security retain a private

good element, which allow the investor to reap all returns from the investment. In the case of transnational terrorism, the public-private good dichotomy is most significant at the international level. Protective policies aimed at securing a particular country, e.g., against al-Qaeda attacks, will benefit only this respective country and the people within its territory. In contrast, proactive policies that target the actual terror threat incorporate positive externalities to other potential target countries which benefit from the reduced capacity of the terror organization without taking action by themselves. This free rider problem is a likely explanation why international actors are more inclined to rely on defensive rather than proactive policies when addressing transnational terrorism, even though game theoretic models show that coordinated action could theoretically bestow higher benefits to all countries (Enders and Sandler 2006).

2.3 Terrorism

In this survey, terrorism is defined as “the premeditated use or threat of use of extra-normal violence or brutality by sub-national groups to obtain a political, religious, or ideological objective through intimidation of a huge audience, usually not directly involved with the policymaking that the terrorists seek to influence” (Enders and Sandler 2002:145). This definition has also been used by security economists in Europe such as Tavares (2004) and Brück (2006). Nevertheless, this definition has its shortcomings.

First, it does not reflect the varieties of terrorism that have occurred in history and across countries (Hoffman 1998). Thus, such an aggregate definition runs the danger of masking the heterogeneity of terrorism and terrorists, their behavior and consequently the impact. It may necessary to differentiate between, e.g., large versus small scale attacks; continued versus protracted incidences; domestic versus transnational terrorism.² Such a differentiation between different types of terrorism is critical as economic impacts of terrorism and the complexity of countermeasures vary, depending on the nature of the terror attack. For instance, the issue of transnational terrorism involves the cooperation between at least two countries to tackle the causes and consequences of terrorism, and requires taking into account host and target country factors and their interactions that may drive terrorist activity.

Second, the above definition does not account for the political characteristics of the term terrorism: ultimately “every sovereign state reserves to itself the political and legal authority

to define terrorism in the context of domestic and foreign affairs” (Alexander and Alexander 2002: 1). As history shows, terrorists have become “freedom fighters” when power shifted hands. For the purpose of security economics this can have important repercussions for the reliability of data. Especially when data collection is based on government statistics, acts may be defined as terrorist, depending on political suitability rather than “objective” criteria, as we shall discuss below.

2.4 Security economics

Security economics is understood as those activities affected by, preventing, dealing with and mitigating insecurity (including terrorism) in the economy. Such a broad definition includes private and public activities in both legal and illegal areas of the economy. Narrower versions of this definition (such as a focus on state spending for homeland security or private spending for anti-crime devices) may be adopted by other authors for different purposes (Brück 2004: 376). Security economics further refers to the application of economic tools to analyze the origins and dynamics of (in-) security.

2.5 Methodological considerations

There are at least four methodological problems associated with the evaluation of costs and benefits of terrorist events and anti-terrorist measures: (i) the problem of double counting; (ii) the problem to value non-monetary parameters; (iii) the insufficiency of (potentially biased) data; and (iv) general limitations of economics as discipline.

(i) Double Counting

Double counting refers to the problem of accounting for the same costs or benefits twice, thus arriving at an inflated figure of economic impacts. For instance, when considering the number of victims from different forms of terrorism (e.g., bombings, kidnappings, hijackings) there may be incidences of double counting when an attack incorporates two or more of these different forms of terrorism (e.g., hijacking of a plane and its subsequent bombing), and the victims of this single event are counted for each type of activity separately (i.e., multiple times).

² Transnational terrorism denotes an act of terrorism which involves actors and targets from at least two different

(ii) Non-Monetary Parameters

Non-monetary parameters refer to a value that has no market price equivalent. For instance, a human life or life satisfaction have a value which is not readily quantifiable. Non-monetary parameters may also include more tangible economic parameters which are simply not traded in the market and therefore do not have a monetary value. Consequently, accounting for their value is often difficult. Approaches to quantifying non-monetary parameters (e.g., the value of human life) are summed up, e.g., by Viscusi and Aldy (2003).

The analysis of the effect of terrorism on non-monetary parameters has also been recognized and addressed in the field of security economics, e.g., in Frey et al. (2009). They argue that the economic impacts of terrorism are likely to be underestimated as non-monetary losses do not appear in statistical databases and are therefore not accounted for. Besides the life satisfaction approach (e.g., Frey et al. 2009), other methodologies such as contingent valuation³, hedonic market pricing⁴ and conjoint analysis (e.g., Smith et al. 2009) exist which have also been applied to the issue of terrorism.

(iii) Insufficiency of Data

As the understanding of terrorism and an empirical analysis of its causes and impacts is based on reports of actual terror events in the media and by public statistics, the quality of the data may negatively impact these analyses.

First, the problem of an “under-reporting bias” (the tendency not to report a specific event and therefore underestimating the frequency of terror) can significantly influence the accuracy of security economics. Evidently, democratic countries with a free press tend to report more terrorism than countries where the media is controlled, producing an under-reporting bias. For instance, not taking into account this bias properly may lead to the conclusion that democratic countries are likelier producers of terrorism. However, such an inference may simply be a result of the bias that is systematically related to the variables of interest (e.g., Miller 1994; Drakos and Gofas 2006a). Leading economists conclude that extant research has fallen short from addressing this issue in a systematic fashion, yet underreporting is indeed present, im-

nationalities. Actors could refer to either the terrorists themselves as well as to their wider support structure.

³ Contingent valuation has been applied by, e.g., Viscusi and Zeckhauser (2003).

⁴ The hedonic market approach is based on the idea that agents reveal their preferences regarding terrorism through, e.g., wage and salary demands and real estate prices.

plying that the used databases for terrorism represent an understatement of the true number of terrorist incidents (cf. Drakos and Gofas 2006a).

Second, more generally, given that terrorist organizations work clandestinely, a reporting bias may also be a consequence of the very nature of terrorist activity and may not only be rooted in certain country-specific characteristics (e.g., freedom of the press). Researchers should be aware that existing data sources may suffer from reporting biases and that extracted data may be a rather poor proxy for terrorist activity.

Third, datasets used by empirical researchers may contain specific biases of their accord. Certain datasets (e.g., the US State Department reports on terrorism) have been found to include significant reporting errors (cf. Krueger 2007; Krueger and Laitin 2008). Also, most datasets focus on specific kinds of terrorism only (i.e., on transnational terrorism), where such a focus may lead to a truncation of the data and to the drawing of wrongful inferences by making generalizations when looking at specific forms of terrorism only (cf. Sanchez-Cuenca and Calle 2009). Drakos (2008) provides an overview of available data sources suitable for an economic analysis of terrorist actions, also pointing at existing shortcomings of these sources which, e.g., manifest in a focus on specific kinds of terrorism only or general insufficiencies of the data collection process, leading to “truncated” information on terrorist activity that is not of limited value for the economic analysis of terrorism.

(iv) General limitations

Even if economics can provide an additional dimension to evaluate policy choices, in many respects it cannot give clear cut answers to certain policy problems. Coughlin et al. (2002:9) for example recognize that “economic theory does not provide a clear answer to what is likely to be a continuing source of controversy - the appropriate scope of governmental involvement in security”.

3 ECONOMICS OF INSECURITY – CAUSES OF TERRORISM

In this section we want to discuss one central question of the economic analysis of terrorism: what are the causes of terrorism? To answer this question, we first introduce a basic theoretical framework which underlies any economic analysis of terrorism roots. Then, we consider which kind of terrorism is analyzed on which level. This implies that different kinds of terrorism may have different roots, and that individual and aggregate analytical perspectives may deliver different results. For our survey, we distinguish between (i) analytical levels (micro vs. macro perspective), (ii) geographical levels (case study vs. regional vs. global perspective) and (iii) the various kinds of terrorism (transnational vs. domestic; suicide vs. non-suicide terrorism).⁵

3.1 Explaining the Causes of Terrorism

Before we discuss the empirical evidence along the aforementioned categories, we first have to present a basic theoretical framework for an economic analysis of terrorism causes, focusing on several key assumptions. As stated above, terrorism is commonly defined as the deliberate use of violence and intimidation directed at a large audience in order to coerce a community or its government into conceding politically or ideologically motivated demands. The main tactical (short-run) goals of terrorism are (i) gaining publicity and media attention, (ii) destabilizing existing polity and (iii) damaging national economies (e.g., Schelling 1991). Among the long-run goals of terrorism are a redistribution of power, influence and wealth (e.g., Frey and Luechinger 2004). Tactical terrorist behavior (e.g., assassinations, hostage-takings) serves the purpose of achieving such strategic goals. Terrorist organizations must have goals that are not enforceable in the ordinary political process. Violence is thus a means to meet more abstract (strategic) objectives.⁶

⁵ Note that in order to avoid repetitions we discuss some empirical evidence that focuses on (Western) Europe in Section 7 of this contribution, where we offer a European view on the issue of terrorism.

⁶ On an individual level, terrorists must exhibit certain character traits (e.g. low cognitive capabilities or the ability to overcome moral constraints related to the hurting and killing of others) that enable them to conduct terrorist actions; on an organizational level, the dominance of group leaders, group dynamics and other (psychological) factors also influence terrorist behavior. See Victoroff (2005) for a review of psychological approaches to terrorism.

An economic view on terrorism assumes that terrorists are rational actors. The average terrorist behaves more or less as a *homo economicus*, considering their response to incentives, their narrow self-interest and the rationality of their expectations (Caplan 2006). As rational actors they commit terrorist actions in order to maximize their utility, given certain benefits, costs and constraints linked to these actions (e.g., Sandler and Enders 2004). The calculus of terrorists includes their marginal benefits and costs. The utility-maximizing level of terrorism is the level where the marginal costs equal the marginal benefits of terrorism. Benefits from terrorism arise from obtaining the tactical and strategic goals of terrorism. The costs of terrorism are linked to e.g. the use of resources and to the opportunity costs of violent behavior (e.g., Frey and Luechinger 2004). `Aggregate' factors that are country-specific impact the terrorists' cost-benefit matrices and thus their behavior. Such determinants may either raise the price of terrorism or the opportunity costs of terrorism, causing a decline in terrorist activity. Alternatively, the price of terrorism, and thus the opportunity costs of terrorism, may be decreased, resulting in an increase in violent behavior. The empirical literature on terrorism roots surveyed in the following picks up this idea.

In general, this literature aims at finding the “roots of terrorism”. Basically, the idea is that certain poor or unfavorable conditions morph into violence (terrorism) via the aforementioned cost-benefit effects. Here, a central question is whether economic (e.g., poverty) or political (e.g., repression) factors are root causes of terrorism. Of course, eventually finding the root causes of terrorism should be particularly interesting for counter-terrorism, e.g., when deciding whether to focus on economic or political development. However, while some researchers (e.g., Krueger 2007; Krueger and Laitin 2008) argue that political conditions matter clearly more to terrorism than economic ones, other studies (as we shall see later) come to less conclusive (or contradicting) conclusions. Also, non-economic and non-political factors (e.g., ethnic conflict and geography) have also been found to matter to terrorism. That is, the empirical evidence (as we shall discuss later) offers ample support for a number of distinct schools of thought emphasizing the relative importance of certain terrorism determinants on theoretical grounds. We discuss these schools of thought below.⁷

(1) Some scholars suggest that terrorism is rooted in ‘relative’ *economic deprivation* (which manifests itself, e.g., in poverty, within-country inequality and a lack of economic opportuni-

⁷ The discussion here partly draws on Krieger and Meierrieks (2008).

ties), where violence is generated when there is a discrepancy between what individuals think they deserve and what they actually receive in the course of an economic (distributive) process (Gurr 1970). Poor structural economic conditions create frustration, which in turn makes violence more likely. In environments where (relative) economic deprivation prevails, terrorist organizations should find it easier (less costly) to recruit frustrated followers or to receive funding from supporters. The lack of non-violent economic activities may also fill the ranks of terrorist organizations by lowering the opportunity costs of violence.

(2) Others emphasize the role of socio-economic change over long-run socio-economic conditions. They argue that terrorism is fostered by the process of *modernization* which creates different types of strain, e.g., from economic changes, new ideas (e.g., Western ideologies) and new forms of living (shift from agricultural to urban societies). All of these factors may create grievances associated with economic, demographic or social strain (Robison et al. 2006). For instance, medical progress changes the patterns of population development, resulting in populations with high youth burdens (Ehrlich and Liu 2002). In general, modernization is associated with economic, demographic and social changes. Terrorist organizations are able to capitalize on the grievances of 'modernization losers', thus making recruitment, financing or other forms of support more likely. Also, terrorist organizations may use modern means of communication to disseminate their opinions more effectively (Ross 1993). Modernization is likely to lower the costs of terrorist activity by creating grievances e.g. linked to economic dissatisfaction, new forms of alienated living or other challenges to traditional societal patterns.

(3) The *political and institutional order* is also argued to be connected to terrorism. There is an ongoing academic debate on whether a certain political system (a democratic or autocratic regime) is more prepared to deal with terrorism. While the former can offer non-violent means of voicing dissent, it is also constrained in its efforts to realize 'hard' counter-terrorism (e.g., because civil liberties are protected). The latter can capitalize on its capability of 'hard' repression but may at the same time also generate grievances linked to political disenfranchisement. Some authors suggest that semi-open societies (partial democracies) are most prone to terrorism because they cannot capitalize on the advantages of either 'pure' political regime. Regardless of the exact regime type, government strength (e.g., military power), government policies or ideological affiliation may also influence a terrorist's calculus. For instance, a large-scale government may make it more difficult for societal groups to pursue rent-

seeking, making it more attractive to gain rents through terrorist violence (Kirk 1983). Also, if the institutional order impedes economic participation (e.g., by means of corruption) it may also be more attractive for an individual terrorist to engage in violence. The opportunity costs of violence are expected to increase with institutional quality (Kurrild-Klitgaard et al. 2006). That is, terrorist activity should decrease with higher levels of institutional quality.

(4) *Political transformation* and *political instability* are also sometimes regarded as causes of terrorism, in particular in popular discourse. This view argues that political change also matters to terrorism, regardless of the (long-run) political conditions. Changes in a political system create political vacuums which terrorist groups can use to push their agendas. First, these groups are less likely to be challenged by an instable government which is usually weak, making terrorism a less costly venture. Second, an individual may find it more attractive to support a radical organization because there are few non-violent alternatives (meaning low opportunity costs of violence) but high payoffs from terrorist success (meaning increased violence benefits). Third, instable countries may serve as schools of terrorism (Campos and Gassebner 2008). In times of domestic instability individuals gain an 'education' in violence they can also use for internationalized terrorist campaigns. State failure is commonly seen as one root cause of terrorism, as it is expected to maximize the promoting effects of instability on terrorism. Failed states are seen as safe havens for terrorist organizations (Rotberg 2002).

(5) Huntington (1996) states that violence is also a consequence of *civilizational clash*. The main idea is that when groups exhibit different identities (e.g., in the sense of different religions or ethnicity), this leads to more conflict either between different groups within a country or between different country groups organized along civilizational lines (e.g., Islamic countries versus the West). For terrorist groups it should be less costly to muster support against antagonistic groups, in particular when terrorist groups build on identity-related ideologies that stress the supremacy of their identity (e.g., representing a 'chosen people'). Such a world view eliminates moral constraints and strengthens an organization's cohesion, thus making terrorism less costly and more effective (Bernholz 2006). The abstract conflict between world views also becomes manifest in realpolitik, where population groups with different identities pursue different (often diametrical) policies. Such behavior may, e.g., be represented in rent-seeking or other forms of social interaction between groups with different identities (Arce and Sandler 2003). Terrorism is used by the inferior group not only as a means to voice their

world view but also to shift (material) outcomes in their favor. Identity (and opposition to other identities) works as a bond facilitating, e.g., terrorist recruitment and financial support.

(6) *Economic and political integration* is also sometimes linked to terrorism. On the one hand, this view transfers the idea that terrorism is rooted in socio-economic change and conditions to the global arena. That is, if individuals are incited by an existing global order (e.g., the existing global distribution of wealth) that is perceived as 'unfair', it should be easier for terrorist organizations to find support by building on related grievances. Then, terrorism is used as a political tool by the poor and disenfranchised, being a cost-efficient means to voice discontent.

On the other hand, economic globalization may also have specific effects on terrorism. For instance, increased trade openness may lower the costs of transportation and cross-border activities for terrorists, thus contributing to increased terrorist activity (e.g., Mirza and Verdier 2008).

Furthermore, international politics (political integration) may also enter the terrorists' calculus. Here, foreign policy, alliance structures and foreign dominance (Western or US supremacy), may incite terrorist activity (cf. Lizardo and Bergesen 2004). For instance, a conflict between a government and an opposing group may be exported to a foreign ally of the government; the Israeli-Palestine conflict which has e.g. triggered Palestine terrorist activity in Europe may serve as an example (Addison and Murshed 2005). In times of global changes (e.g., hegemonic decline) terrorism is also anticipated to become more likely (Bergesen and Lizardo 2004). Here, e.g., punishment for terrorist activity becomes less probable (i.e. costs of terrorism decrease) and radical views can be more easily voiced and enforced in times of global instability and insecurity (i.e., the potential payoffs increase, while the costs of terrorism decrease).

However, international economic and political factors do not need to automatically generate violence. For instance, if political integration ameliorates the international distribution of wealth and power, it may reduce terrorist support as globalization grievances are reduced. Similarly, if economic integration benefits the poor by stimulating economic development (e.g., through gains from trade), it may reduce terrorist support as non-violence becomes more attractive (Li and Schaub 2004). So while a globalization-terrorism nexus may very well exist, the exact mechanics of this nexus remain somewhat disputed.

(7) Lastly, *contagion* may be another factor explaining terrorism. Terrorism exhibits a strong self-energizing nature with respect to both time and space (Midlarsky et al. 1980).⁸ First, past terrorism bears new terrorism within one country (temporal contagion). For a terrorist organization it is more beneficial to run a terrorist campaign because this increases the benefits from terrorist activity (e.g., by making oneself heard through increased media attention). Second, if one country suffers from terrorism, it may infect other countries in its neighborhood (spatial contagion). For instance, emerging terrorist groups may capitalize on the experience of older groups in adjacent countries. Additionally, when terrorist organizations cooperate they may also reduce their costs (e.g., by sharing know-how) or increase their payoffs (e.g., by joint terrorist actions). Spatial and temporal proximity to terrorism thus already influences the cost-benefit considerations of terrorists in ways that may promote the generation of violence.

3.2 Micro-economic analyses

Some studies try to gain information about the causes of terrorism by analyzing individual behavior, e.g. by means of interviews of potential or captured terrorists. Several studies explicitly investigate the roots of Palestinian terrorism. While such a micro approach is surely helpful to understand individual behavior (answering the question why an individual becomes a terrorist), a generalization of related results and their transfer to the macro level of analysis is difficult (bearing in mind the relationship of micro and macro levels of analysis and the risk of ecological fallacies). Nevertheless, such micro approach may be helpful to provide ‘micro foundations’ associated to macroeconomic explanations of terrorist activity (which are far more common and will be discussed later).

Krueger and Maleckova (2003) provide an analysis which focuses on the connections between poverty, education and terrorist activity in the Israeli-Palestine and Arab-Israeli conflict (e.g., lone-wolf terrorism by Israelis and participation in Hezbollah). In general, their findings suggest that on an individual level violent activity is not correlated with poor economic conditions or low levels of education. By contrast, higher income and better education seem to promote participation in terrorist activity (as does a young age). Krueger and Maleckova (2003) argue that this is a consequence of an increased interest in politics that is associated with better education and a privileged background. Also, a better education of potential terror-

⁸ We may also think of contagion that is a consequence of terrorist success. For instance, a successful attack using a certain method (e.g., skyjackings) may induce copycat behaviour.

ists makes it more likely for them to be successful, making them more attractive recruits for terrorist activity. This argumentation can also be found in Bueno de Mesquita (2005).

Focusing on a similar field of analysis (i.e., Palestine terrorist activity), Berrebi (2007) also finds that higher education and standard of living make it more likely for an individual to join a Palestine terrorist organization. By contrast, being married reduces this likelihood. Berrebi (2007) argues that the positive link between education and terrorism on a micro level may have to do more with the content of education (which is shown to often resemble indoctrination) than with the amount of education (e.g., years of schooling).

Krueger (2008) who analyzes the background of homegrown Islamic terrorist in the US finds that these alleged terrorists are well-educated compared to their non-violent counterparts: He also stresses the role of education (i.e., years of schooling) and young age in predicting terrorist activity, while a specific cultural background (e.g., an Arabic one) does not seem to matter strongly.

In general, being of young age and not being married makes it more likely to become a terrorist. More interestingly, existing micro evidence indicates that education matters to terrorism in ways that are in contrast to popular wisdom. The same holds for the (negligible) impact of poverty on terrorist activity. As existing micro evidence is sparse and focuses strongly on the Israeli-Palestine (Arab-Israeli) conflict, it is difficult to come to a general conclusion. It seems that on organizational levels it is more beneficial to recruit educated (or at least strongly indoctrinated) individuals, as they are more likely to be politically motivated and successful in executing terrorist actions (e.g., Bueno de Mesquita 2005). A positive correlation between high education and high income may explain why poverty does not matter to terrorist recruitment on individual levels (given that individual abilities may lead to higher education, thus higher income and also a higher attractiveness for terrorist organizations). As we shall see later, the 'micro' findings are supported by some scholars with a 'macro view' of the issue of terrorism roots, where related studies also finds no strong links between education, poverty and terrorism. Considering the aforementioned schools of thought on terrorism roots (which are more strongly related to a 'macro view' of the issue) it is difficult to connect to the 'micro view' and its results. At best, it seems as if modernization which manifests itself in education (and in particular in educational content which conveys resentments against modernization) is connected to terrorist participation on individual levels.

3.3 Macro-economic view: Case study and region-specific evidence

3.3.1 Case studies

The first studies taking an aggregate (macro) view on the determinants of terrorism reviewed here are case studies. These studies focus on one country only. On the one hand, such analyses are helpful in assessing the roots of conflict in this very country, also allowing for comparisons with the general results from global studies on terrorism determinants. On the other hand, they are not very helpful in creating such generalized results. Naturally, case studies focus on countries strongly affected by terrorist violence (i.e., by long-run terrorist campaigns).

Algeria has suffered from terrorism by Islamic groups (e.g., by the Armed Islamic Group) in particular since the 1990s. Testas (2001) argues that economic decline has initiated this conflict. Although Testas (2001) does not deny the impact of religious (Islamic influence) and political (lack of democracy) factors in swaying civil conflict, he argues that not until the beginning of the economic decline in the 1980s Islamic movements were able to gain substantial popular support. Thus, Testas (2001) gives support to the economic deprivation hypothesis, arguing that economic factors have been central for explaining terrorist violence in Algeria.

Sri Lanka has suffered from terrorist violence conducted by insurgent groups such as the Liberation Tigers of Tamil Eelam since its independence in 1948. Samaranayake (1999) also links the violence in Sri Lanka to economic factors, arguing that slow growth, youth unemployment and inflation have laid the ground for civil unrest. Modernization has also played a role: Population growth, urbanization and the emergence of modern forms of education and mass media have led to societal changes that have not been absorbed by the existing political and economic system. Furthermore, ethnic conflict (between the Sinhalese majority and the Tamil minority) has contributed to the generation of violence. Thus, for Samaranayake (1999) in general a variety of economic and non-economic factors has contributed to the ongoing civil conflict in Sri Lanka.

In Turkey, terrorist violence has been conducted by leftist and certain ethnic groups (e.g., by the PKK). Feridun and Sezgin (2008) argue that terrorist violence has at least to some part been motivated by economic causes. In their analysis regional economic underdevelopment is

one factor that contributes to the genesis of terrorism in Turkey, again giving support for hypotheses that link terrorism to economic factors.

Lastly, Israel has had a history of political violence since its independence, where violence has originated from extremist Israeli and Palestine groups (e.g. the early PLO or Hamas). Berrebi and Lakdawalla (2007) focus on the spatial and temporal determinants of terrorism in Israel, looking for support of the contagion hypothesis of terrorism. In their analysis, they find that space and time are indeed important for explaining the patterns of terrorism in Israel. Locations that are accessible for terrorists (e.g. as they are near to their home bases) are more frequently attacked because the (travelling) costs of such attacks are comparatively low. Time also matters, as the frequency of attacks may serve as a risk signal for potential terrorists.

In general, existing case study evidence focuses on countries that suffer heavily from terrorist violence. In many cases, economic and political underdevelopment coupled with ethnic conflict seems to matter to explaining the emergence of violence. However, these results are not suitable for generalization. This may be regarded as a major shortcoming of case study evidence. Still, the results of such studies allow for the derivation of adequate policy solutions for the countries analyzed.

3.3.2 Region-specific evidence

A few other studies investigate the determinants of terrorism in certain world regions, again using macro variables. While these studies are able to provide a general picture for the respective region on which they focus, they are (like case studies) unable to provide a global perspective on terrorism roots.

For Latin America the study by Feldmann and Perälä (2004) suggests that non-economic factors are more important than economic ones. In their analysis economic variables (economic growth, income inequality etc.) do not share a significant association with terrorism. However, terrorist attacks are more likely in regions with poor institutions and relative political underdevelopment, where attacked countries are characterized by, e.g., human right violations or a weak rule of law. Feldmann and Perälä (2004) thus provide support for hypotheses that link the likelihood of terrorism more closely to the political and institutional than to the (domestic) economic order.

For the Middle East as another region plagued by terrorism, Piazza (2007) provides an empirical analysis. He finds that political stability and other political factors matter strongly to terrorism production and attack patterns. For this world region more liberal (i.e., less autocratic) countries are more likely to be attacked by terrorist groups. What is more, countries experiencing episodes of state failure (i.e., of major political instability) are significantly more likely to be attacked by or to host terrorism. At least for this part of the world the results by Piazza (2007) imply that hypotheses emphasizing the role of the political order and of political stability trump others which focus on the economy or international factors. However, political instability may be closely related to economic failure and to ethnically or religiously motivated conflict; thus, the results of Piazza (2007) may be, at least partially, driven by such correlations.

The study by Testas (2004) focuses on another country club, namely Muslim countries.⁹ His results indicate that economic factors (i.e., per capita income) are not strongly connected with terrorism, whereas political factors are. More precisely, there is a non-linear relationship between a country's level of political repression and the likelihood of terrorist activity, suggesting a non-trivial connection between the political order and terrorism for this country club. As in Piazza (2007), the existence of civil wars (i.e. of extreme political instability and state failure) is positively connected with terrorism, again relating terrorism closely to political instability. Also, the results of Testas (2004) suggest that education is a positive determinant of terrorism. This may give support to hypotheses that link demographic features (e.g., education) to terrorism because they influence a terrorist organization's calculus. For instance, better education means a higher rate of success of terrorism, so education may be positively connected to terrorism. However, connecting education to terrorism in this way may go along with potential ecological fallacies.

As with the case study evidence, empirical studies on terrorism roots for certain world regions are rare. Also, they are not able to provide complete (global) pictures of terrorism determinants. For Latin America, the Middle East and the club of Muslim countries, non-economic (political and institutional) factors appear to matter more strongly to terrorism than economic ones. Also, political instability seems to fuel the emergence of terrorism and terrorist attacks.

⁹ Testas (2004) includes all the countries of Piazza (2007) in his sample, with the exceptions being Israel, Libya and Lebanon. Testas (2004) furthermore includes Muslim countries outside the Middle East in his sample (e.g., Chad, Pakistan, and Indonesia).

This evidence supports views arguing that political and institutional factors enter a terrorist's calculus, e.g., by providing a cost-efficient means of voicing dissent in the face of political repression.

3.4 Macro-economic view: cross-country evidence

The majority of empirical studies have tried to establish global results for terrorism determinants by using large country samples which are not restricted to one world region or country club. These studies may focus on specific kinds of terrorism (transnational vs. domestic; suicide vs. non-suicide terrorism). They may also (in the case of transnational terrorism) focus either on the country of origin of the perpetrators of transnational terrorism or on its targets. Given that most datasets available only provide information on transnational terrorism, this kind of terrorism has been in the center of interest.¹⁰

3.4.1 Origins of Transnational Terrorism

As discussed earlier, transnational terrorism is a form of terrorism that involves more than one country through a variety of possible connections (e.g., as terrorist groups consist of members from different countries or because a domestic terrorist group purposefully targets foreigners). Empirical studies which investigate the origins of transnational terrorism center on the conditions in the countries from which terrorists originate, regardless of the eventual targets of these terrorists. We review the existing evidence on the origins of transnational terrorism with regard to the aforementioned global hypotheses on terrorism roots that connect terrorism to economic factors (e.g., poverty or socio-economic modernization), politics and institutions (e.g., regime type or political instability), demography (e.g., education or ethnic conflict), political and economic globalization (e.g., trade or foreign aid) and spatial and temporal contagion.

The study by Blomberg and Hess (2008a) provides evidence that high income reduces the likelihood of a country to generate terrorism. This result and similar ones in Azam and Delacroix (2006) and Lai (2007) seem to suggest that economic factors matter to the global production of transnational terrorism. However, there are a number of other studies (e.g. Krueger and Maleckova 2003; Kurrild-Klitgaard et al. 2006; Basuchoudhary and Shughart 2007;

Krueger and Laitin 2008) that do not find a significant relationship between short-run (e.g., growth) and structural economic conditions and the genesis of transnational terrorism. That is, there is no clear evidence linking economic deprivation (low income) and economic change to the production of terrorism.

Evidently, political and institutional conditions may also matter to terrorism. A study by Piazza (2008b) finds that political instability and state failure make it more likely for a country to host transnational terrorist groups. Burgoon (2006) shows that welfare policies are associated with a reduction in terrorism production, presumably by leveling economic disparities which may otherwise lead to discontent and violence. Political repression may also be associated with terrorism production (e.g., Krueger and Maleckova 2003; Krueger and Laitin 2008). In repressive political systems terrorism may be seen as a cost-effective way of voicing dissent and achieving political changes. However, it is by now unclear whether this relationship is strictly linear (so that repressive countries produce terrorism while liberal ones do not). As found by Kurrild-Klitgaard et al. (2006), the relationship between political openness and terrorism may also be non-linear (so that semi-open countries produce most terrorism).

In either case, it is clear that when studies control carefully for non-economic (political and institutional) factors the impact of economic factors on terrorism production becomes less pronounced. This may be a consequence of the close connection between economic and non-economic factors (the effect of political instability on the economy may serve as an example).

Besides the aforementioned ongoing discussion whether terrorism production can be described as a process driven by economic or political factors, a variety of other potential determinants has also been investigated. Basuchoudhary and Shughart (2007) provide evidence that terrorism is rooted in ethnic conflict. Such conflict may be about the distribution of power, wealth and other resources along ethnic lines, making violence (terrorism) along these very lines likely. This study can be regarded as a support for the civilizational clash theory of terrorism. Furthermore, conflicting evidence argues that education is (Azam and Thelen 2008) or is not (Krueger and Maleckova 2003) associated with terrorism. From these studies it remains unclear whether education is a determinant of terrorism (e.g., through the so-called

¹⁰ For a more detailed review of the causes of terrorism, see the review by Krieger and Meierrieks (2008) on which the discussion here partly draws.

socio-economic modernization channel) on a global scale and what the direction of influence of related variables is.

Further evidence empirically demonstrates links between economic globalization, international political factors and terrorism production. Here, Kurrild-Klitgaard et al. (2006) find that increased economic integration (increased trade openness) may scale down the risk of terrorism production, arguing that economic integration may create economic gains that make violence less attractive. Evidently, the global economic order may also influence the calculus of potential terrorists and their supporters. Focussing on the international political order, the results of Azam and Delacroix (2006) and Azam and Thelen (2008) suggest that foreign aid may reduce the likelihood of a country to produce terrorism. These studies argue that foreign aid may reduce terrorism by promoting education and economic development, thus increasing the opportunity costs of violence. Thus, these studies suggest that the international political order may not only be considered as threatening and thus terror-enhancing. However, as Neumayer and Plümper (2009) argue, dependence on foreign aid may create terrorism against donor countries when foreign aid is used to stabilize otherwise weak regimes. Here, the strategic logic of terrorists is to weaken domestic regimes by attacking the donor country in the hope of cutting support for the domestic regime. The latter finding may indicate that the use of foreign aid matters to the mechanics through which aid (as an international political factor) and terrorism interact.

In general, evidence on the origins of transnational terrorism is substantial but no conclusive. While some (e.g., Krueger and Laitin, 2008) strongly argue that political factors trump over economic ones, the related discussion has not been settled by the existing evidence. Currently, the production of terrorism appears to be a complex phenomenon potentially driven by a variety of factors. Thus, existing evidence provides support for several hypotheses which link terrorism production to economic deprivation, political underdevelopment and instability, demographic struggles and the global (economic and political) order. Because several factors may not only determine terrorist activity but may also be dependent upon other potential terrorism determinants, future research is necessary to reveal, if possible, the “true” or “deep” determinants of the genesis of transnational terrorism.¹¹

¹¹ As mentioned before, political instability and economic decline may not only determine terrorism but instability may also affect decline and vice versa. Similarly, ethnic conflict may cause slow growth and vice versa. Again, both factors are also argued to cause terrorism. Other inter-relations between possible terrorism determinants and political violence exists but have not been extensively discussed by previous research.

3.4.2 Targets of Transnational Terrorism

A number of further studies do not center on the origins of transnational terrorism but on its targets. That is, these analyses try to answer the question why certain countries are more likely to become terrorism victims than others.¹²

Similar to the origin of transnational terrorism, the evidence tells no convincing story as to whether economic or non-economic (political) factors are more important to the attack patterns of transnational terrorism. On the one hand, there are studies which suggest that economic success (e.g., high income or growth rates) make a country a likelier target of terrorism (e.g., Tavares 2004; Blomberg et al. 2004b; Blomberg and Hess 2008a, 2008b; Krueger and Laitin 2008). Such evidence seems to suggest that the global economic order (global income disparities) fuel the discontent of the perceived losers of this order which direct their anger at the globalization winners, using terrorism as a cost-efficient means of expressing their anger. On the other hand, there are empirical analyses which find no substantial connection between terrorism and economic conditions (e.g., Li und Schaub 2004; Li 2005; Piazza 2006; Dreher und Gassebner 2008).

Again it can be argued that once empirical studies do not only control for the influence of economic factors on terrorist attack patterns but also for non-economic ones, the effect of economic conditions on terrorism becomes less pronounced. For instance, the studies by Campos and Gassebner (2008) and Piazza (2008a, 2008b) suggest that political instability is an important factor that makes a country a more attractive target for terrorism, e.g. as the costs of terrorist attacks (in the form of potential governmental punishment) decrease in the absence of a strong state. Further analyses suggest that institutional factors such as government ideology (Koch and Cranmer, 2007) or social spending (Burgoon, 2006) are systematically related to the attack patterns of terrorism. Also there are studies such as Eyerman (1998), Eubank and Weinberg (2001), Li (2005), Piazza (2006), Kurrild-Klitgaard et al. (2006) and Krueger and Laitin (2008) which find a significant relationship between the political and institutional order of a country and the likelihood of it being attacked. Still, there is no clear evidence whether more repressive or more liberal countries are more prone to attacks, or whether the relationship between political factors and terrorist attacks is non-linear. That is, we cannot assess (as with the origins of transnational terrorism) in which way the political order effects the terror-

ist's calculus. On the one hand, liberalism may make it easier (less costly) for terrorist groups to operate as a government is restricted in its counter-terrorism actions by various laws. On the other hand, attacks may become less likely as dissent may be voiced more easily by means of democratic participation (changing the opportunity costs of violence).¹³

Furthermore, there are studies which suggest that demographic and international political factors also matter. For instance, in Drakos and Gofas (2006b) demographic stress in the form of a high population density increases the likelihood of an attack. Also, ethnic conflict is again found to be a determinant of terrorist attacks (e.g., Piazza 2006). An interesting analysis by Dreher and Gassebner (2008) suggests that political proximity to the US leads to more terrorist strikes, suggesting that the global political order matters to attack decisions by terrorist groups. Finally, the evidence provided by Braithwaite and Li (2007) shows that spatial proximity to terrorism hot spots makes it more likely for a country to be attacked by terrorism. This supports the contagion hypothesis of terrorism which postulates that spatial or temporal proximity to terrorism makes terrorism more likely as its costs decrease (e.g., through network and learning effects) while its benefits simultaneously increase (e.g., as extended terrorist campaigns guarantee media attention). Drakos and Gofas (2006b) report a similar connection, also suggesting that temporal contagion exists as well.

To sum up, existing evidence is not uniform with respect to the determinants of transnational terrorist attacks. Similar to the origin of transnational terrorism, it is unclear whether economic factors are strong determinants or whether they are only closely related to the "true" determinants of such attacks (e.g., political instability, state failure, political proximity to the US) and therefore become insignificant once empirical studies also control for such "true" factors. Currently, evidence on the attack venues seems to indicate that they are influenced by a number of economic and non-economic factors, suggesting that terrorist attacks are not driven by a few root causes only. An interesting avenue of future research may be to isolate the "true" determinants of terrorist attacks more rigorously. Currently, several hypotheses on terrorism are supported by the empirical evidence, suggesting that a variety of factors may potentially enter the terrorists' calculus.

¹² In this subsection we discuss evidence on the targets of transnational terrorism, where studies either focus on the location of the event or on the nationality of the terrorism victims when taking the target perspective.

¹³ Similarly, repressive regimes may find it easier to oppress any opposition (making terrorism a more costly venture). Still, repression may breed violence by restricting non-violent channels of political change (making terrorism more attractive).

3.4.3 Domestic Terrorism

Domestic terrorism is a more common phenomenon than transnational terrorism. Enders and Sandler (2008) note that there are eight times more domestic than there are transnational terrorist acts. Nevertheless, there have been only few studies on the roots of domestic terrorism. On the one hand, this is a consequence of the nature of this kind of terrorism. It usually gets less (international) media attention than transnational terrorism as it is mainly used to express domestic dissent, e.g., related to ethno-religious tensions. On the other hand, only recently databases have become available which explicitly include acts of domestic terrorism, mainly the *Global Terrorism Database* (LaFree and Dugan 2006) and the *Terrorism in Western Europe: Events Data* set by Engene (2007). Other datasets focus solemnly on transnational terrorism, for instance the *International Terrorism: Attributes of Terrorist Events* or *ITERATE* set (e.g., Mickolus et al. 2004) and others (cf. Enders and Sandler 2008).

Because of the scarcity of the evidence we cannot make any clear conclusions about the roots of domestic terrorism yet. The results of Sambanis (2008) suggest that per capita income insignificantly discourages domestic terrorism, while there is a weakly significant and negative link between religious fractionalization and the occurrence of this kind of terrorism. Also, it is found that population size is positively connected with terrorism. The results of Blomberg and Hess (2008b) suggest that higher incomes impede domestic terrorism substantially in low- and high-income economies. However, both studies only analyze very narrow time periods and report their results on domestic terrorism rather in the form of robustness results.

Krieger and Meierrieks (2009) and Gries et al. (2009) make use of the GTD and TWEED dataset to analyze the determinants of domestic terrorism specifically for Western Europe. The findings of Krieger and Meierrieks (2009) suggest that social welfare policies help to discourage domestic terrorism as in Burgoon (2006) and that higher income is also negatively related to less domestic terrorism as in Blomberg and Hess (2008b). The results of Gries et al. (2009) show that economic performance (economic growth) is a significant determinant of domestic terrorism in several Western European countries but is not associated with terrorism for other countries of the sample.

While informative, existing evidence on the genesis of domestic terrorism is very rare and at times region-specific. By now, some evidence indicates that economic success reduces the likelihood of domestic terrorism, so economic factors seem to matter. Higher income (or the

leveling of economic disparities by welfare policies) may make non-violent activities more attractive and may reduce grievances associated with relative economic deprivation. Consequently, domestic terrorism becomes less likely. However, evidence for non-economic determinants of domestic terrorism is rare and inconclusive, so future research may help to validate the early evidence. This research may build on recently available (open-source) datasets of domestic terrorism. One interesting avenue of this research may be the (non-)detection of differences between the roots of domestic and transnational terrorism.

3.4.4 Suicide Terrorism

Lastly, we want to review some studies which explicitly look at the determinants of suicide terrorism. As suggested by Harrison (2006a), suicide terrorism, while looking irrational at first sight, may still be considered as the outcome of individual rational choice. While an economic analysis of suicide terrorism may thus be justified, there is still an ongoing discussion whether suicide terrorism has specific roots or whether it has not. It may be the case that a suicide terrorism campaign is a form of terrorism in particular used against democratic regimes because there are more likely to give in to terrorist demands, facing such a drastic form of terrorism (Pape 2003). However, the findings of Wade and Reiter (2007) do not suggest that democratic regimes are more likely to face suicide terrorism. Rather, their findings show that past experience with suicide terrorism on national and global scales (i.e., in the form of suicide terrorism campaigns) more strongly helps to explain the occurrence of suicide terrorism, offering support for the idea of suicide terrorism contagion. The results of Wade and Reiter (2007) are also supported by Moghadam (2006) who gives a detailed critique of Pape's (2003) ideas that regime type and factors like foreign occupation are strong determinants of suicide attacks. Similarly, Piazza (2008c) shows that a groups ideological affiliation is a stronger determinant of using suicide terrorism than political surroundings, finding that groups with abstract (e.g., religious) goals are more likely to use this kind of terrorism than groups with domestic (concrete) aims. However, the study by Piazza (2008c) also finds that suicide terrorists are more likely to come from non-democracies and are also more likely to utilize suicide terrorism in the face of foreign occupation. This suggests that political (institutional) matter more strongly to the production of suicide terrorism than to its target decisions. Finally, Benmelech and Berrebi (2007) find that education is positively associated with suicide terrorism, meaning that better educated individuals are more likely to be recruited from

terrorist groups because they are anticipated to be more successful in carrying out their attacks.

As with the study of domestic terrorism, suicide terrorism has not been investigated exhaustively. While the phenomenon may be analyzed on economic grounds, it is unclear whether it is used in specific environments (meaning that it has different determinants than other forms of terrorism). Currently, little evidence indicates that certain political regimes are more prone to suicide attacks. However, other institutional and political factors as well as contagion may matter to the production of suicide terrorism and the choice of its targets. Here, we can find little difference to the genesis of other forms of terrorism and its targets. While the existing evidence does not indicate that suicide terrorism is rooted in other socio-economic or political environments than domestic or transnational terrorism, the study by Piazza (2008c) indicates that group ideology matters to the decision to use suicide terrorism. This may add to the observation by Robison et al. (2006) that groups with certain ideologies are motivated by distinct determinants. Potentially, group ideology not only predicts which factors offer significant incentives to produce terrorism or to attack; it may also predict the mode of the attack.

3.5 Summary

In this section, we reviewed the theoretical and empirical (economic) literature on the determinants of terrorism. An economic analysis of terrorism always implies that terrorists are rational actors who are influenced in their decisions to commit terrorist acts by a certain set of factors (determinants) impacting on their cost-benefit matrices. This basic idea allows for the formulation of several global hypotheses emphasizing the relative importance of certain of these factors. We presented these hypotheses and their underlying (economic) mechanisms. Then we reviewed the empirical evidence in order to assess which hypotheses match the reality best.

We explicitly distinguished between results taking different analytical perspectives. That is, we looked at micro and macro evidence, and at studies which focus on different forms of terrorism (origins and targets of transnational terrorism, domestic terrorism, suicide terrorism). In short, even after this (necessary) differentiation our extensive review showed that there is no “one size fits all” result when it comes to the identification of terrorism causes. One may conclude that the evidence on transnational terrorism tends to suggest that transnational terrorism originates in politically underdeveloped countries and is directed at advanced

and successful economies, as Krueger and Laitin (2008) argue. However, there is conflicting evidence on this issue (i.e., the relative importance of economic and non-economic factors in terrorism) and no study has ever attempted to control for all factors potentially influencing terrorism at once. Furthermore, different possible determinants of terrorism do not only interact with terrorism but also interact with each other. Related issues with causality and interactions may plague the robustness of empirical analyses, and future research should take such issues into account.

This also leads to a more general notion about the causal relationship between terrorism and several of its supposed determinants. For instance, while it seems intuitive that poor economic conditions (partially) cause terrorism, there may also be a negative effect of terrorism on economic development (as we shall see in the next section). This means that the problem of reverse causation should be accounted for properly. Here, some studies use instrumental variable approaches (e.g., Abadie 2006) to avoid this problem. Others (e.g., Gries et al. 2009) directly test for causation between terrorism and its determinants. However, most studies simply assume a fixed causal relationship and only superficially control for causation (i.e., by lagging independent variables one period behind the dependent one). Future research should take the issue of causality more into account.

Future research should also more extensively try to cover the rarely investigated forms of domestic and suicide terrorism. Currently, the evidence allows for no concrete statement on the causes of domestic and suicide terrorism. Also, we cannot assess whether the causes of transnational terrorism differ from the ones of domestic and suicide terrorism. Another avenue of future research may be the study of the micro foundations of terrorism and their connection with the macro view. By now, some evidence suggests that income and education are positively related to individual participation in terrorist groups. However, this evidence is strongly related to certain kinds of conflict (e.g., the Arab-Israeli conflict) and kinds of terrorism (e.g., Islamic terrorism). This leaves a number of interesting research questions unanswered.

Existing evidence seems to tell the story that terrorism is driven by numerous factors and is thus a complex phenomenon which cannot be sensibly explained by one root cause only. These differences in results may be explained on empirical grounds. That is, empirical analyses use different methodologies and different datasets. Empirical results also differ with different levels of analysis, different geographical focuses and different perspectives as regards

to content (i.e., different dependent variables). Future research may try to use new analytical perspectives to broaden the evidence.¹⁴

The use of different (and large) datasets that cover large time horizons also produces a problem that is connected to the so-called wave theory of terrorism (e.g., Rapoport 2004). This theory argues that the world has been hit by four distinct waves of terrorism in the past, where each wave has been associated with a distinct era and ideology.¹⁵ While the studies assessing the roots of terrorism implicitly assume that the effect of terrorism determinants (e.g., poverty) is constant over time, it may very well be the case that the effect of the determinants changes with one wave of terrorism being replaced by another. Future research may take this into account by more properly accounting for specific waves of terrorism and associated ideological backgrounds (cf. Robison et al. 2006).

Given that we by now cannot assess which “root causes” of terrorism are dominant, our review of the evidence currently does not allow us to reject any of the global hypotheses on terrorism causes. This finding has some (obvious) implications for sound counter-terrorism advice, as we will discuss later.

¹⁴ For instance, Abadie (2006) uses a terrorism risk variable instead of distinguishing between domestic and transnational terrorism as his dependent variable. His results suggest that political transition matters more strongly to terrorism than economic underdevelopment. A different approach by Robison et al. (2006) distinguishes between different terrorist group ideologies when assembling a dependent variable in order to analyze whether certain groups with distinct ideologies are motivated by distinct determinants. Their results indeed suggest that leftist groups are incited by other determinants than Islamic groups. A further categorization of terrorist groups along ideological lines may help to further unveil which ‘macro’ determinants matter to which kind of terrorism.

¹⁵ Rapoport (2004) identifies an anarchist wave in the late 19th century, an anti-colonial wave beginning in the 1920s, a leftist wave lasting till the late 1970s and a religious wave starting in 1979. Shughart (2006) argues similarly.

4 ECONOMICS OF INSECURITY – ECONOMIC EFFECTS OF TERRORISM

Direct economic impacts of terrorism refer to the effects arising from the immediate aftermath of a terrorist event. Estimating these impacts requires accounting for the physical destruction of buildings and infrastructure and losses of human life or capabilities (through injury) but also for the economic impacts resulting from actions to mitigate damages. Furthermore, in an interdependent economic system, terrorist strikes causes the disruption of economic activities which may feed through even to economic entities which have not been direct targets of the attack; that is, terrorism may also produce considerable but indirect effects.

4.1 Micro-economic impacts

Before assessing the aggregate impacts at the macro-economic level, micro-economic processes which determine the overall macro-economic effects need to be considered. At the most basic, it is possible to differentiate between three main types of economic actors, namely households (or consumers), the private sector (or producers), and the public sector (or the government). As discussed before, depending on their involvement in a terrorist attack, economic agents may suffer from (i) *direct* impacts through losses in physical and human capital, and (ii) *indirect* impacts that emerge as consequence of the distortion of the economy. At the same time, they themselves may influence the economy through their immediate responses to the violent shock that occurred. Thus, apart from the actual costs, it is necessary to understand the underlying processes and behavior which lead to these impacts, all based on the notion that appropriate management of a post-attack situation could potentially mitigate negative impacts.

Direct economic losses of terrorism have reached new dimensions considering the unprecedented magnitude of 9/11. Therefore, it is not surprising that the core of the literature focuses on this event as a special case. The destruction that took place includes physical and human losses which by far exceed the average scale of terrorist attacks: Human losses amounted to over 3,000 lives lost (including office workers, aircraft passengers and hundreds of rescue personnel), excluding the unaccounted number of people who suffered temporary and perma-

nent injury, who experienced health problems caused by air pollution from the collapse of the buildings, not to mention the severe trauma and psychological impacts on these victims and their families.

Various studies have attempted to compute the actual costs resulting from these losses. In general, the estimations of human and capital costs of 9/11 range between US\$ 25 and 60 billion. Navarro and Spence (2001) estimate that human capital losses alone account for US\$ 40 billion while property losses ranged “only” between US\$ 10 and 13 billion. This estimate is similar to Baily’s estimate (Baily 2001), yet is somewhat lower than the cost calculations of the OECD (Lenain et al. 2002). Furthermore, rescue and clean-up operations have been estimated at US\$ 11 billion. Of these aggregate costs, it has been estimated that 14 billion US accrued to the private sector, 1.5 billion US for state and local government enterprises, 0.7 billion US for the US federal government. Estimated figures differ depending on whether human losses have been incorporated into the calculation and due to various accounting problems, such as differences in definitions of damage, measurement of losses used, aggregation issues, but especially the difficulty to value a human life (Brück and Wickström 2004).

Yet, 9/11 is certainly an outlier with regard to the physical damage and human fatalities it caused, compared, e.g., to the majority of predominately separatist terrorist attacks that have been experienced in Europe. Apart from its scale, two other key differences between 9/11 and “conventional” terror attacks prevail: firstly, recent transnational terror attacks can be characterized as large scale but single events, whereas, e.g., terrorist attacks in Europe can mostly be characterized as small scale but more frequent; second, 9/11 hit targets which stand not only symbolically but factually at the centre of global economic activity (not only the New York’s business and financial centre but also the aviation industry), thus subsequently causing major economic disruptions, which are not likely to ensue from the destruction of a target chosen only due to its political or symbolic value.

4.1.1 Impacts at household level

To our knowledge, no literature exists analyzing the direct costs that households experience due to terrorism itself, or due to subsequent disruptions of the economy (e.g., loss of employment). Nevertheless, some innovative approaches attempt to value the loss in life satisfaction and welfare that households experience due to the fear induced by acts of terrorism. As fear is highly subjective, it cannot be measured easily. Still, economic methods such as contingent

valuation or the hedonic market approach can be employed to estimate the “price” of fear. Frey and Luechinger (2005) and Frey et al. (2009) combine indicators of welfare (from the Euro Barometer) with three terror indicators to analyze the impacts of terrorism on micro-economic happiness in France, the Republic of Ireland and the UK. In all three countries, the estimations show that terrorist attacks have a statistically significant negative effect on reported life satisfaction. This decrease in life satisfaction is amongst other things reflected in the hypothetical willingness of people to pay for a reduction of terrorism in the three countries. For instance, a resident of Northern Ireland (with an average household income) would be willing to pay 26% of his income for a reduction in terrorist activity (measured by the number of fatalities) or 37% of his income if terrorism is measured by the number of incidents. By contrast, a resident of Paris would be willing to pay between 4% (number of fatalities) and 8% (number of attacks) of their income, depending on how terrorism is measured (Frey et al. 2009).¹⁶

Ultimately, psychological factors (such as fear as well as changes in life satisfaction and happiness) can impact on economic behavior. That is, non-monetary effects of terrorist attacks may translate into significant monetary ones at household as well as on macroeconomic levels when the psychological impacts of fear change consumption behavior (Nair 2006), negatively affect labor productivity or require medical treatment. While impacts of the latter two are not discussed in the academic literature, consumption effects due to changes in life satisfaction and utility have received some attention. Here, Eckstein and Tsiddon (2004) show a marked decrease in consumption of non-durables that is related to changes in utility due to terrorism in Israel. Interestingly, the immediate response to the attacks of 9/11 showed an increase in consumer confidence particularly reflected in the consumer demand for durables, which for example Enders and Sandler (2005) explain as being driven by “patriotism” that spurred consumption in an act of defiance against the attacks. Shieh et al. (2005) provide an alternative explanation for this increase, pointing out that when a terrorist attack is anticipated and the public is fully informed, short-term consumption may deviate from its long-term level. Households may be motivated to increase the consumption of certain goods before an an-

¹⁶ Beyond the impacts on “quality of life”, acts of terrorism can have severe psychological effects that become apparent in stress and trauma. Studies from Israel demonstrate these traumatic effects of terrorist attacks: children who have experienced a terrorist attack in their community show markedly higher levels of stress than children who “merely” live under the same threat of terrorism (Mansdorf and Weinberg 2003). Stecklov and Goldstein (2006) discover signs for a traumatic impact of terrorist attacks, detecting a 35% increase of fatal accidents after a terrorist attack in Israel. For Columbia, Camacho (2008) finds that an increased exposition to random terrorist attacks is associated with increased stress which translates into lower child birth weights.

nounced terrorist attack as a temporary response to a shortened lifespan. Thus, rather than relating the increase in consumption to the initial attacks on the World Trade Centre, the authors relate the increase in consumption to the expectation of future attacks which were announced by al-Qaeda and believed to be credible by the US Administration. However, in the long run Keyfitz (2004) shows that through their depressing effects on consumer confidence, "war jitters" and fears about weapons of mass destruction are estimated to have lowered (U.S.) consumption spending by 0.3 percent (equivalent to a cumulative US\$ 40 billion) over the past two years. This matches some previously reported empirical studies which similarly suggest that terrorism may reduce consumption.

Given the potentially significant economic impacts that the psychological effects of fear may cause, approaches to contain fear and thus mitigate the impact of a terrorist attack need to be identified.¹⁷ Although the causes of fear are a psychological rather than an economic problem¹⁸, a small body of economic literature exists that attempts to shed light on some determinants of the fear caused by terrorism. One factor discussed in the literature is the phenomenon of "probability-neglect". Research has produced evidence that people base their risk analysis on cognitive experiences of past events rather than actual probabilities of future events. That is, they employ the "availability heuristic" (Kunreuther 2002), which in the case of terrorism can lead to an overestimation of a terrorist attack which is usually characterized as a low probability event causing a high impact; in contrast, certain events which are more likely but cause a lower impact (e.g. car accidents) may be systematically underestimated.¹⁹ In other words, terrorism although less likely to implicate the ordinary citizen, will produce more fear than more probable risks (Downes-Le Guin and Hoffman 1993; Sunstein 2003; Viscusi and Zeckhauser 2003; Becker and Rubinstein 2004).²⁰ The effects of terrorist attacks on risk perception may also be dependent on certain individual factors such as sex or political affiliation (Fischhoff et al. 2003). Moreover, if terrorism not only produces fear but also other feelings (e.g., anger), the actual effect of terrorism on risk perception is contingent upon the interplay of various emotions (Lerner et al. 2003). In general, a variety of factors influence the factual

¹⁷ In fact, as one of the objectives of terrorists is to cause fear, minimizing fear after a terror attack also implies minimizing the actual benefits received by terrorists from their violent action.

¹⁸ The psychological impacts of terrorism have been discussed by, e.g., Katiuscia et al. (2003).

¹⁹ This notion is supported by the finding of Gigerenzer (2006) who finds that American reduced air travel after 9/11 to avoid being killed in the course of a (low probability) attack. As a consequence, more Americans were killed in car accidents (an underestimated event).

changes in risk perception caused by a terrorist strike. Nevertheless, such changes in risk perception then may translate into changes in individual or public behavior.

4.1.2 Impacts on private sector

Businesses and firms have been direct and indirect victims to both domestic and transnational terrorism for a long time. According to the US Department of State, US businesses were the targets of over 80% of terrorist attacks in 2000 and nearly 90% in 2001 (Michel-Kerjan and Pedell 2006). One of the reasons for this increase is that companies source from, operate in and supply to insecure countries, thus exposing themselves to greater threats of terrorism; another important reason are substitution effects of terrorists who shift their attention from better protected public buildings towards relatively easier targets.

The actual direct losses of terrorist attacks depend on the characteristics of the attacked company but also on the nature of the attack and its impacts which may include, e.g., property damage or ransom payments for hostages. Overall, Enders and Sandler (2008) conclude that even if some sectors may face significant losses from terrorism, they are likely to recover quickly, given that the economy does not face sustained terrorist attacks.

While direct physical losses without doubt hurt companies, 9/11 has shown that it is disruptions in the interconnected economy which impact on businesses more severely. Even if businesses are not directly exposed to the physical destruction of an attack, terrorism can impact companies by increasing their overall level of market risk, credit risk, operational risk and business volume risk. Furthermore, stock market reactions to a terrorist attack, partly induced by the fear to lose capital, partly based on speculative behavior on future gains (or losses) of a company, can be detrimental to a company.

In this context, the danger of supply chain interruptions has received much attention in the literature. It has been estimated that business interruptions accounted for one third of the entire losses from 9/11 (Kleindorfer and Saad 2005). In general, companies experiencing supply chain disruptions underperform their peers significantly in stock performance as well as in operating performance as reflected in costs, sales and profits.

²⁰ These kinds of anomalies do not only occur with terrorism but also in other contexts of risk perception (Viscusi and Zeckhauser 2003).

This illustrates that it is not shocks on their own which create cataclysmic events but vulnerabilities of the economic system which determine the impacts of an exogenous shock such as a terrorist attack. These vulnerabilities may arise from technical factors (e.g., the physical interdependence through communication and transportation) but also more elusive factors such as expectations on the functioning of the economic system: “longer paths and shorter clock speeds provide more opportunities for disruption and a smaller margin for error” (Kleindorfer and Saad: 53). Recent terror attacks such as 9/11 seem to have deliberately taken advantage of these vulnerabilities, striking targets of economic significance which led to a breakdown of economic activity even beyond the immediate target area. In contrast, attacks on targets of “mere” symbolic or political value are less likely to cause disruptions beyond the geographical locality of the attack. This is insofar important as reducing the economic impacts of terrorism should then not only focus on the actual threat but also on the extent to which the economic system on the whole has become more resilient or more vulnerable (Kunreuther 2006). Evidently, the threat of terrorism may make a country more vulnerable and increase public demand for security. Such vulnerabilities and increases in security may negatively affect economic efficiency (e.g., by producing overhead investment in public security and emergency response).

Apart from the direct and indirect disruptions, the private sector has to carry the burden of psychological impacts of terrorism; on the one hand, in their function as employers, on the other in their function as management decision makers being influenced by their own psychological reactions. As mentioned above, no rigorous analysis beyond anecdotal evidence exists that elicits the impact of fear of employees on the private sector. The case of the bombings of the London public transport system on July 7th, 2005 shows that it may be significant. Some firms reported that they had to find alternative means of transport for employees unwilling to use public transport into central London. For smaller firms this even constituted the principal cost of the attack (London Chamber of Commerce 2005). But it remains unknown how significant these impacts are for the cost structure of companies or for labor productivity.²¹

²¹ The available literature how terrorism impacts on management decisions will be reviewed in the section below.

4.1.3 Impacts on public policy / public sector

Apart from households or consumers and the private sector, the public sector is the third economic agent who is directly and indirectly affected by terrorism. There exists rarely any literature on the direct economic impact that terror inflicts on governments. While an estimate of the costs to the US government arising from 9/11 has been given above, the costs arising from physical destruction from small-scale terror attacks in general are not estimated, although they are likely to be relatively small.²²

Yet, potentially more significant, public sector policies before and after a terror attack are critical to contain and mitigate the economic impacts of a terrorist attack, and to restore order and confidence in the economy. Necessary policies can be differentiated according to their timing: on the one hand, governments have to build their emergency response preparedness before an attack; on the other hand, they have to institute appropriate short-run policies in response to an actual terror event.

With regards to the first, health sector policies are particularly important to mitigate the impacts of terrorism. Any large-scale terror attacks will put the public health infrastructure to the test, having to deal not only with mass casualties resulting from the event, but also the longer term impacts of physically and psychologically incapacitated victims. Organizing an effective response challenges government institutions because the issues involved (e.g., eligibility for health care, the effects of low-level exposure to toxic agents, stress-related illnesses, unlicensed therapeutics, financial compensation) are complex and controversial (Hyams et al. 2002). Although the use of chemical, biological and nuclear (CBN) weapons as agents of terrorism has so far only occurred sporadically recent events demonstrate the increasing risk and possibility that terrorist groups may employ them against civilian targets, as demonstrated by the release of anthrax in the United States.²³ It is expected that agents such as *Bacillus anthracis* and *Yersinia pestis* could leave hundreds of thousands dead or incapacitated (Evans et al. 2002).²⁴ The impact of the attack will depend on a number of variables, including the agent used, the method of dispersal, but especially on the preparedness of the public health

²² These costs arise whenever public infrastructure or buildings are destroyed in a terrorist attack, which can vary from government buildings, publicly organised transport and services infrastructure but also military structures and equipment.

²³ One widely known incidence of a chemical terrorist attack was the dispersion of Sarin gas in the subway of Tokyo in 1995.

system to respond appropriately. Contingency planning so far almost exclusively involved detection, containment, and emergency health care for mass casualties. However, it is clear that even small-scale CBN incidents (the spread of anthrax spores through the mail) can cause widespread confusion, fear, and psychological stress that have lasting effects on the health of affected communities and on a nation's sense of well-being.

Even though the preparedness and structure of the public health sector appears to play a significant role in mitigating the short- and long-term economic effects of a terror attack, so far it has received little attention in the security economics literature. Neither the costs resulting from specific attacks nor the costs of different policy responses have been accounted for.

Preparedness to tackle the impacts of a terror attack is only one side of the coin. The right response especially through economic policy is critical to restore confidence into the economy, thus minimizing a potential negative economic impact of a terror attack.²⁵ Still, there is little rigorous analysis of appropriate monetary and fiscal responses to mitigate the economic impacts of terrorism. Baily (2001) in a policy report, outlines and comments briefly on US fiscal policies responding to the impacts of 9/11. These policy measures included the enactment of tax cuts, distribution of rebates, the discussion of a tax stimulus package and the approval of US\$ 40 billion by Congress for emergency spending measures that included military and security spending as well as reconstruction. Furthermore, the aviation industry was granted support to the amount of US\$ 15 billion. He also provides an overview of US monetary policies which followed the 9/11 attacks. Central to containing the shocks of the attack was the liquidity that the Federal Reserve Bank²⁶, and the European Central Bank added to the system, thus allowing cash-strapped banks to borrow money more easily. Moreover, a 0.5% point cut in interest rates stimulated spending. Lacker (2004) confirms these findings, reviewing the monetary and payment system consequences, highlighting that the relatively benign banking conditions helped to make the Fed's credit policy manageable. Based on Lacker's report and a general overview of the existing literature, it can be concluded that the

²⁴ However, Ackerman and Moran (2006) note that terrorists are generally not very likely to use CBN devices as their weapon of choice due to the technological complexity of such devices.

²⁵ The London Chamber of Commerce in its report on the economic effects of terrorism on London points out that even though the attacks on the London public transport system on July 7th, 2005 caused relatively little destruction, it significantly decreased the confidence of the business community in the economy (London Chamber of Commerce 2005)

²⁶ After 9/11, the Federal Reserve injected more than \$ 100 billion in additional liquidity.

US's fiscal and monetary policy responses were critical in attenuating potentially even worse economic effects of the terrorist attack (cf. Llussa and Tavares 2008).

4.2 Impacts across sectors

Terrorism impacts differently across various economic sectors. Impacts differ depending on the nature of the attack and its target, whether a sector is directly hit or whether its activities are “merely” interrupted by the disruptions that a terrorist attack may cause. With respect to the first, the tourism sector has been a frequent target of terrorism. No analysis exists on the economic impacts that direct effects of terrorism have on the tourism industry. Rather, the literature concentrates on the analysis of changes in demand structures as the predominant economic impact of terrorism on the tourism industry which will be discussed later in the report.

The transport sector (aviation, maritime transport, road and railways) has been another direct target of terrorist attacks, reflected for example in the attacks of 9/11, and the subsequent acts in Europe.²⁷ The aviation industry has been particularly conducive to terrorists. In the specific case of 9/11, the aviation industry is said to have “lost more in one year than it had made in its entire history” (IATA Director General and CEO Pierre J. Jeannot)²⁸, firstly, due to the incurred physical losses of four airplanes, secondly, due to subsequent airport closures and disruptions in services, thirdly, due to the negative impacts on the value of airline stocks, and fourthly, due to changes in passenger and cargo demand patterns for air transport (Drakos 2004), which will be discussed in the section below.

Even sectors who are not directly implicated in a terrorist attack can suffer from the consequences of economic disruption. Especially attacks on the transport sector can lead to severe delays in the movement of goods and services which have been discussed as “supply chain disruptions” above. The scale of the impact and which sectors will be affected is determined by the nature of the attack and the target. Once again 9/11 represents an unprecedented outlier that caused severe disruptions across a wide range of sectors, hitting a globally significant economic hub. In contrast, even though severe, the subsequent bombings in London and

²⁷ These attacks include the Madrid train bombings, the attacks on the London public transport system and the unsuccessful attempts to bomb commuter trains in Germany.

²⁸ This statement was made during the opening day of the Airline Financial Summit, New York City, 8 April, 2002 (in Drakos (2004)).

Madrid did hardly cause any disruptions even in the local economy (London Chamber of Commerce 2005).

Until today, especially the direct impacts of terrorism have been confined to a relatively small set of sectors. This, however, does not mean that there are no other sectors which could potentially become targets of terrorism in the future. For example, the agricultural sector has been identified by some as potentially attractive to terrorists, with possibly detrimental effects not only on the sector itself but also society at large (Chalk 2001; Singh 2009). Yet the actual degree of risk is contested (Blandford 2002). Even if these policy reports constitute the informed opinion of policy advocacy coalitions rather than scientific papers, the lesson that should be drawn is that terrorism could provide surprises by aiming at previously unthinkable targets.

Within the sectors affected by terrorism, the insurance sector plays a somewhat special role as it neither experiences destruction directly nor is negatively affected by disruptions of the economy, but suffers under the consequences of terrorism through ensuing payment claims. While insurance companies are able to cover small terror attacks such as sporadic bombings with localized impacts, 9/11 dealt a particular blow to the insurance and re-insurance industry, firstly, due to claims at the scale of billions of dollars and, secondly, due to negative impacts on stock markets which affected the capital base of insurance companies. Consequently, 9/11 triggered important changes in the insurance market. The main problem that 9/11 posed was the number and the volume of simultaneous claims, exceeding the capital insurance companies held (Alexander and Alexander 2002). Claims to insurance companies related to 9/11 totaled US\$ 50 to 80 billion which was partly paid by primary insurers and partly by re-insurances. Importantly, while the tragedy of 9/11 unfolded in the United States, much of the costs (in total an estimated US\$ 1.3 billion) were carried by European insurance companies (*ibid*). With 9/11, the insurance industry realized that terrorism had reached a new scale that does not comply with conventional insurability criteria: since 9/11, it is difficult to measure the risks associated with terrorism which renders it next to impossible to calculate insurance premiums accurately (Cummins 2002; Hogarth 2002; Wolgast 2002; Caplan 2003; Cummins 2003; Ericson and Doyle 2004; Dixon and Reville 2005). In practice, the insurance sector reacted with raising premiums drastically (between 50-100%) which hit particularly shipping

and transport companies (airlines)²⁹ (Walkenhorst and Dihel 2002) and owners of large commercial property. As the “unimaginable” had happened and led to an unquantifiable risk, insurance companies also announced the exclusion of terrorism coverage unless government support was granted. Intervention of the government in the insurance market, which under normal conditions counters liberal market philosophies, has therefore received much academic attention: the literature analyzing different government interventions in the insurance market across countries concludes that the case of terrorism may represent an instance where public intervention and even subsidies are necessary for maintaining some market forces, rather than using regulation (or the lack thereof common in most OECD economies before 9/11) to stifle the market for terror insurance (Brown 2002; Russell 2002; Brown et al. 2004; Chalk 2005).

While in general terrorist attacks are associated to incur costs and losses across sectors, a few sectors may in fact benefit from attacks. Berrebi and Klor (2005) assess impacts of terrorist attacks during the second Intifada on the stock value of Israeli companies differentiating between security and non-security industries.³⁰ They find that terror attacks had a significant negative impact of 5% on non-defence related companies, in contrast to a significantly positive effect of 7% on defence and security related companies. These coefficients translate into an average loss of US\$ 65 million in the market capitalization of non defence-related companies, and an average increase of US\$ 53 million in the market capitalization of defence related companies, induced by expected increased demand of stock traders.

4.3 Impacts on Financial Markets

The large scale impacts of various financial crises in the last century have highlighted the significance of financial markets in the economy. Exogenous shocks such as terrorist events are generally expected to impact negatively on financial market values. Once again, 9/11 takes a special place within the literature, yet it is necessary to differentiate the impacts of this singular large scale event from impacts of protracted terrorism such as in Israel and Spain (Basque country).

²⁹ Airlines faced an increase of insurance premiums by up to 400%, yet, this was buffered thanks to the airline stabilisation legislation which allows for the federal government to pay any rise in commercial insurance (Alexander and Alexander, 2002).

Chen and Siems (2004) who study the impacts of terrorist events on the US capital market in comparison to other military attacks³¹, show that the latter led to substantial negative cumulative returns. In contrast, the event of terrorist bombing attacks³² produced no abnormal returns on the day of the attack. The only terrorist attack with a significant impact was 9/11: even after six trading days markets showed negative cumulative abnormal returns. Nonetheless, they conclude that the magnitude of the shocks were even if significant, still not without precedent in history, i.e., the reaction to the attack was less severe than reactions to previous shocks. In accordance with others (e.g., Enders and Sandler 2005; Enders and Sandler 2008; Brück 2006), they conclude that the contained shock of the financial and stock markets are largely due to increased resilience of US capital markets to exogenous shocks.

The idea that more developed markets react less to terrorist attacks is confirmed by Arin et al. (2008). They show that while terrorism influences stock market volatility across a sample of six countries, the magnitude of the volatility effect depends on the level of development of the attacked markets; for emerging markets, the effect of terrorism on stock markets is more pronounced.

In comparison, protracted events in smaller markets can have significant impacts as illustrated by Eldor and Melnick's (2004) study of the impacts of the Israeli capital markets. Analyzing the impacts of terrorist attacks on stock and foreign exchange markets in Israel (1990-2003), they find that suicide attacks have permanent impacts on both markets, while other type of attacks do not; overall, the Israeli-Palestinian conflict reduced the stock market capitalization substantially. Interestingly, they find that even after continued experiences with the Palestinian-Israeli conflict the stock market still reacts to suicide bombings, which may be explained by the fact that stock purchases are not just based on the expectation of the future value of the firm but also on the expected behavior of others.

Zussman and Zussman (2006) also find that Israeli stock markets react to news linked to terrorism and counter-terrorism. In their study counter-terrorism efforts by the Israeli government (i.e., the assassination of members of Palestinian terrorist organizations) may translate

³⁰ Stock market values are a good indicator for the actual economic damage of a terrorist attack, as they provide information on the expected impacts on future returns and risk perception, given that the speculative element on the behaviour of others is kept in mind (Frey et al, 2004).

³¹ These military attacks include the invasion of France (1940) or North Korea (1950).

³² The terrorist attacks incorporate are the bombing of Pan Am (December 21, 1988), the World Trade Center (February 26, 1993), Oklahoma City (April 19, 1995) or the US Embassy in Kenya (August 7, 1998).

into stock market gains or losses, depending on the rank of the assassinated member (where only assassinations of high-ranked members yield positive effects).

In Zussman et al. (2008), periods of violence are associated with a decrease in asset prices, while periods of peace (and the success of politicians favoring peace) results in an increase in asset prices. Overall, this finding is in line with the previously reported ones and indicates that markets react to terrorist violence (i.e., individual attacks, prolonged periods of violence, and prolonged periods of peace) in anticipated ways.

Abadie and Gardeazabal (2003) show a negative relation between terrorism and stock market values in the case of the Basque country. They show that stock markets react to an unexpected change in the risk of terrorism and not only to individual terrorist attacks (cf. Eldor and Melnick 2004). With the announcement of the cease fire, Basque stocks outperformed non-Basque stocks, while at the end of the cease fire, Basque stocks showed a negative performance. This indicates that stock markets in the Basque country reacted to the changes in risk associated with terrorism in the expected ways. This finding is in line with Zussman et al. (2008) for the Israeli-Palestine conflict.

In summary, while the impacts of a large-scale singular event in a comparatively well-diversified capital and stock market may be relatively short lived and small, the impact of protracted terror events (and changes in terror risk due to changes in the political landscape), even if smaller in scale, in relatively less diversified markets may create lasting negative impacts.

4.4 Macro-economic impacts

While a micro-economic analysis provides a disaggregate account of the impacts of terror on different agents and elements of the economy, an aggregate analysis identifying the impacts on various macro-economic variables sheds light on the repercussions of terrorism on the overall state of the economy. In this context, the literature focuses on two key variables to show the direct impacts of terror attacks, namely economic growth and economic integration (trade and capital flows).

4.4.1 Growth

The literature in general finds that impacts of terrorist attacks on growth are short-lived. It is estimated that 9/11 caused losses in US productivity amounting to US\$ 35 billion, 47 billion in total output and a rise in unemployment by almost 1% in the following quarter (Sandler and Enders 2004). Still, in general these impacts appear to have had relatively little significance for the US economy thanks not only to the latter's size and maturity but also due to prudent government policies which have been outlined above.³³

9/11 is an outlier compared to repercussions that more frequent smaller scale attacks incur especially when they happen in less diversified economies than the United States. The impacts of terrorism on the economies of Spain (especially the Basque country) and Israel have been studied in depth and provide illustrative examples. Both case studies show the negative impact that terror attacks can have on small scale economies, especially when these attacks are not single events but continue over a longer period of time. In the case of Spain, Abadie and Gardeazabal (2003) estimate the overall economic effects of terror in the Basque Country³⁴: after the outbreak of the ETA-campaign in 1975, GDP per capita declined about 12 percentage points relative to the synthetic control region in the late 1970's and about 10 percentage points during the 1980s and 1990s. In the case of Israel, Eckstein and Tsiddon (2004) estimate that Israel's per capita output could be 10% higher in 2004, had Israel not suffered from terror in the preceding three years.

Gaibulloev and Sandler (2008) provide an empirical investigation of the relationship between terrorism and economic growth for another developed part of the world, namely Western Europe for 1971-2004. They again find that terrorist activity reduces economic activity. For instance, for this part of the world an additional transnational terrorist attack per million inhabitants translates into a reduction of economic growth by about 0.4%. Similarly, domestic terrorism also has growth-reducing effects. The study concludes that both kinds of terrorism affect economic growth differently: while transnational terrorism leads to a crowding out of

³³ It is methodologically difficult to clearly relate growth dynamics to terrorism given that the US economy was already facing a recession (Enders and Sandler 2008). In more general words, the problem to assess impacts lies in the missing counterfactual as it is unknown how an economy would have developed without the terrorist attack (Frey and Luechinger 2004).

³⁴ The authors construct a "synthetic" control region to overcome the problem of the counterfactual, using a combination of other Spanish regions that resembles the Basque Country before the onset of the terrorism campaign.

investment, domestic terrorism tends to lead to an increase of inefficient government spending.

Focusing on a less-developed country, Araz-Takay et al. (2009) find that terrorism also reduces economic activity in emerging markets. The study also finds a non-linear relationship between terrorism and economic performance, so negative growth effects of terrorism are particularly strong in times of economic expansion.³⁵

The negative relation between terrorist attacks and growth found in these studies are confirmed at a more general level by Blomberg et al. (2004a). Employing a cross country regression with observations from 177 countries between 1968 and 2000, they find that terrorism depresses economies significantly. Importantly, the effect of terrorism is smaller and less persistent than the economic impacts of conflict. Similarly, Crain and Crain (2006) also estimate that a reduction in terrorist activity leads to a marked increase in income, analyzing a panel of 147 countries for the period of 1968-2002. For the year of 2002, the study finds that an elimination of all transnational terrorism would have caused an increase in global income of US\$ 3.6 trillion. Evidently, the reduction of terrorism would also lead to other positive economic effects, e.g. an increase in fixed capital investment.

To contextualize the negative economic impact of terrorism, Tavares (2004) compares the scale of different shocks, namely terrorist campaigns, natural disasters and financial crises. He finds that terrorist attacks on civilian and military targets (as opposed to e.g. public or government buildings) are the most detrimental, leading to potential decreases in GDP growth of up to 0.25% points. In comparison natural disasters have negative and significant impacts, currency crises negative and very significant impacts on GDP growth. When standard growth variables are included into the analysis, terrorism in fact exhibits no influence on growth. In sum, after taking into account additional determinants of income growth³⁶, he concludes that natural disasters and currency crises impact on growth, but not terrorism. Similarly, the eco-

³⁵ Araz-Takay et al. (2009) also show that economic performance influences terrorist activity (i.e., as a terror determinant) in Turkey in particular in times of economic decline. This matches our discussion in Section 3 on the possible impact of economic factors on the generation of terrorism.

³⁶ These determinants include the country's population—to control for scale effects—, the degree of trade openness, the rate of inflation, the share of primary goods exports in merchandise exports, the size of government measured as the share of government spending in GDP and the share of government spending in education. These variables capture most of the economic indicators shown to be associated with economic growth in cross-country growth empirics.

economic effects of terrorism on growth are smaller and less persistent than the economic impacts of conflict (Blomberg et al. 2004a).

Table 1: Some Empirical Evidence on the Growth Effects of Terrorism

Study	Scope	Main Results
Abadie and Gardeazabal (2003)	Basque Country, ca. 1955-2000	Terrorist activity reduced per capita income. Inter alia, terrorism negatively influenced the performance of firms.
Gaibullov and Sandler (2008)	18 European Countries, 1971-2004	Domestic terrorism has a small effect on growth by mainly increasing (unproductive) government spending. Transnational terrorism more strongly reduces growth by crowding out investment.
Araz-Takay <i>et al.</i> (2009)	Turkey, Quarterly Data 1987-2004	Terror has a large and negative impact on economic activity. This impact is stronger in times of economic expansion.
Blomberg et al. (2004a)	Unbalanced Panel of 177 Countries, 1968-2000	Terrorism reduces growth, but the effect is relatively small (e.g. compared to external war). Terrorism may reduce growth by fostering government spending.
Crain and Crain (2006)	Panel Data for 147 Countries, 1968-2002	Terrorism reduces economic growth and per capita income. Potential channels from terror to growth are reduced investment and tourism.
Tavares (2004)	Cross-Country Data, 1987-2001	Terrorism is not an important determinant of growth, once it is controlled for a number of factors (e.g. currency crises or natural disasters).
Eckstein and Tsidon (2004)	Israel, Quarterly Data for 1980-2003	Terror reduces economic activity, e.g. by affecting consumption, investment and trade unfavorable.

Even local economies appear to be able to recover quickly, given a certain degree of economic maturity. Especially cities and urban areas have been frequent targets of terrorist attacks. In theory, terrorism influences settlement patterns and urban areas through (i) the safe-harbor effect, (ii) the target-effect and (iii) the transportation effect (Brück 2006). Terrorism could therefore be understood as a “tax” on cities. The general consensus of the literature on war and cities in the 20th century shows that (especially in the long-run) costs to cities due to destruction are relatively low (Eisinger 2004; Brück 2006), where certain extreme events (Glaeser and Shapiro 2002) and especially prominent (target) parts of a city (Abadie and

Dermisi 2008) may possibly be exceptions. Even for the large-scale event of 9/11 Bram (2002) concludes that although New York City suffered from the attack, the major economic disruptions appear to have been short-lived and conditions began to recover already in 2002.

To conclude and as partially summed up in Table 1, macroeconomic consequences of terrorism events are generally noticeable, where growth and income can be affected by the negative (distorting) effects of terrorism on consumption and public and private investment (e.g., Llussa and Tavares 2009). Still, the negative effects of terrorism mostly appear to be of a rather modest and short-term nature. This is especially true for large and diversified economies that are able to withstand severe economic impacts through their ability to quickly reallocate capital and labor, given the immediate effects are localized. In contrast, the macroeconomic effects of terrorist attacks on small, less-developed economies are likely to be stronger, especially when these countries face sustained terrorist campaigns (cf. Enders and Sandler 2008).

4.4.2 Trade and FDI

Another set of macroeconomic variables receiving attention in the literature is international trade and investment. Terrorism affects trade directly when traded goods and infrastructure become terrorism targets³⁷, or when an increased level of insecurity stalls trade between countries, making it more costly (Mirza and Verdier 2008). Further negative impacts arise from increased security measures at for example border posts or important transport hubs, which will be discussed in Section 6. Quantifications of the trade impact are provided by Nitsch and Schumacher (2004) who assess the impact of terrorism on trade between more than 200 countries for the period 1960 to 1993. According to their results, countries targeted by terrorism trade significantly less with each other than countries not affected by terrorism. Moreover, the effect is economically large: a doubling of terrorist events in a trading partner's country is estimated to reduce international trade by 4%. Blomberg and Hess (2006) calculate that, for a given year, the presence of terrorism, as well as internal and external conflict is equivalent to as much as a 30 percent tariff on trade. This is larger than estimated tariff-equivalent costs of border and language barriers and tariff-equivalent reduction through GSPs and participation in the World Trade Organization. In general, the literature agrees that flows of international trade may be negatively affected by terrorism events.

As for foreign direct investment, Abadie and Gardeazabal (2008) argue that terrorism leads to changes in the net foreign direct investment position of countries affected by terrorism. In theory, terrorism increases uncertainty and decreases expected returns to investment, consequently causing global capital shifts. Empirically, Abadie and Gardeazabal (2008) show that increase in terror risk are associated with substantial falls in the net foreign direct investment position of targeted economies. This matches previous findings by Enders and Sandler (1996) that for Spain and Greece similarly show that terrorist activity leads to a decline in FDI in the respective countries. That is, terrorism may distort international capital flows, especially when the global economic system is open enough and therefore allows for rapid adjustments of investment in the face of terror risks.

4.5 Political consequences of terrorism

This survey is to focus on the economic analysis of terrorism. Nevertheless, one essential goal of terrorism (beside economic destabilization) is the destabilization of the political system. We thus do not want to leave out the political consequences of terrorism, especially as they have been analyzed from an economic point of view and as political effects of terrorism may easily translate into economic ones, e.g., following changes in government composition or policies. The political consequences of terrorism are of particular importance for democratic countries in which terrorist actions may e.g. lead to noticeable effects on voting behavior.

For the case of Israel, Berrebi and Klor (2008) offer evidence that the occurrence of a terrorist attack leads to more electoral support for right-wing parties. That is, the empirical findings indicate that voters are sensitive to terrorist actions, especially if they come along with fatalities or occur close to home. The results indicate that terrorist organizations time terrorist actions to influence voting behavior, e.g. in order to make democratic regimes to make concessions.

Similarly, the findings of Gassebner et al. (2008) suggest that terrorism exerts a positive effect on government replacement. Analyzing the relationship between terrorism and the probability of re-election over the period 1968-2002, the study finds that terrorist attacks increase the rate of government replacement at the next election, with severe attacks exercising stronger ef-

³⁷ Attacks on trade infrastructure include for example the repeated attacks on oil pipelines in Iraq after the fall of Saddam Hussein, which temporarily paralyzed oil exports; or the attack launched on the French supertanker

fects. The study's finding again point at the potential of terrorist organization to produce political fallout that matches their goal of political destabilization.

Furthermore, the findings of Indridason (2008) show another possibility of how terrorism may generate political effects. Considering the relationship between terrorism and cabinet formation for 17 Western European democracies over the period of 1950-2006, it is found that governments formed in times of terrorism are more likely to be surplus governments and less likely to be polarized ones. That is, terrorism tends to destabilize governments with no or short majorities and forces political elites to bridge political and social cleavages. Again this indicates that terrorism may constitute an important factor shaping domestic politics.

Lastly, the results of Gross et al. (2009) show a different mechanism through which terrorism affects the polity. Here, the attacks of 9/11 are found to first increase confidence in governmental institutions, where this confidence then fades away in the months after the attacks. The study detects a reciprocal relationship between confidence and hope, and also positive relationships between hope, pride, and confidence. Apparently, terrorist attacks may affect the emotional basis of an attacked society, where such emotional changes may translate into changes considering the effectiveness of the government (which may in turn affect voting behavior).

In general, some evidence (albeit sometimes anecdotal) indicates that terrorist organizations may be successful in achieving political destabilization as it manifests in voting behavior, government durability or formation. Consequentially, the political repercussions of terrorism may translate into economic ones, e.g., as public policies towards terrorism and security are affected.

4.6 The determinants of the economic impacts of terrorism

This section has shown that terrorism may produce substantial economic (and socio-political) costs, e.g., by impairing economic growth and development. In general, we find some support for the notion that terrorists have been successful in achieving one of their fundamental goals, namely economic destabilization. As we shall discuss below, the effectiveness of terrorism in this context may depend on some factors. However, before discussing these points, we first

"Limburg" off Yemen's coast in October 2002 (Frey and Lüchinger 2004).

want to revive an aspect we hinted at before, namely the issue of reverse causation. As argued before, while terrorists strive for economic destabilization they are also affected by the economic conditions they face in their country of origin (or in their target countries). That is, economic conditions may be (negatively) determined by terrorism but, at the same time, terrorism may also be influenced by economic conditions. This issue has not been taken seriously by some empirical approaches reviewed before. Thus, some caution is advised (as with the determinants of terrorism discussed in Section 3), given that reverse causation (and related biases) cannot be ruled out. Future research should focus on this issue in more detail.

Given that the issue of causation has not been studied extensively, we need to resort to the existing (potentially biased) evidence to assess how terrorism affects the economy (and polity). Here, a number of factors seem to determine the effectiveness of terrorism in achieving economic destabilization. These factors can be classified into three broad categories: the nature and characteristics of terror; the degree to which impacts are mitigated; and the maturity of the economy (or polity).

As has been argued above, terrorist attacks differ in the degree to which they harm an economy (or polity) depending on some key dimensions, including (i) the severity of the attack (which influences the extent of physical damage); (ii) the frequency of the attacks which results not only in the accumulation of direct losses but also in changes in the behavior of agents; (iii) the target and its direct relevance to the economy, e.g., as an attack on a government building, while costly, is likely to disrupt economic activity less than an attack on any critical infrastructure.

Regarding the severity of terrorism, there is an agreement that it has increased (Frey and Luechinger 2002; Enders and Sandler 2005; Human Security Centre 2006; Bellany 2007). Enders and Sandler (2002) find that an act of terrorism is about 17% more likely to result in casualties compared to the 1970s, which can be explained by the increased incidence of bombings in the proportion of deadly incidents (as compared to hostage takings, assassinations), the high proportion of mostly crowded civilian targets³⁸ and the rise of suicide attacks, which have a higher average rate of fatalities. Regarding the distribution of terror attacks, a shift of incidences of terrorism towards the Middle East, the Persian Gulf and to a lesser degree South Asia has been recorded. Collectively these regions carry the main burden of international

³⁸ These types of attacks account for more than half of all terrorist attacks (Tavares 2004).

terrorism (Human Security Centre 2005; Coolsaet and Van de Voorde 2006; Enders and Sandler 2006). However, it is true that Europe and the United States (even if they do not experience a higher frequency of terrorism) surely suffer an increased severity of terrorism, not least as suicide attacks that are on average more deadly than other incidences, until 9/11 were unconceivable (very much in contrast to countries such as Israel).

Regarding the frequency of terrorist strikes, the literature agrees that, accounting for the cyclical nature of terrorism, there is no increase in the incidences of terrorism (Sandler and Enders 2004). Still there is an open discussion in the literature: Frey and Luechinger (2002) contend that terrorism incidences have decreased since the mid-1990s, while for example Bellany (2007) argues that there is no visible trend at all.

The nature of the attack, its severity and location are not the only factors that determine the actual impact. The economic impact of terrorism are partly determined by the structure of the economic system itself, as argued above and summarized succinctly by Enders and Sandler (2008). The case of 9/11 is illustrative for the resilience of a mature, diversified economy to a large-scale shock. Even if the al-Qaeda's attack caused large-scale destruction and disruption of even geographically remote economic activity, the economic effect on the US and the global economy remained transitory. In contrast, only two terrorist attacks in Yemen dealt a severe blow to its economy which was largely based on its importance as a shipping port.³⁹ This illustrates the importance of the size and diversity of an economy which determine its ability to absorb shocks (*ibid*). Little attention has so far been paid on how terrorism impacts on small- and less-developed economies. Blomberg et al. (2004a) provide some insights confirming the above, yet, these are not sufficient according to Enders and Sandler (2008) to provide an adequate picture. Drawing inferences from the factors that stabilize economies, one can conclude that developing countries are likely to suffer more under terrorism due to (i) limited institutional abilities, (ii) small and often fragmented markets and (iii) policy inflexibility, e.g., in the case of high debt burdens.

Beyond economic factors, Tavares (2004) points out that the prevalence of democratic freedoms and rights may act stabilizing, even if not in terms of the occurrence of acts of terror-

³⁹ In 2000, a US ship was hit by a terrorist attack while refuelling in Yemen's shipping port. This incidence was followed in 2002 by a terrorist attack against a French tanker. Even though Yemen's port had a comparative advantage due to its location, these two incidences led to the collapse of Yemen's shipping industry as shipping activities were relocated to neighbouring ports. This had severe negative repercussions on Yemen's overall economy, which is largely dependent on its transport hub.

ism⁴⁰, at least in terms of reducing economic costs. In other words, his research shows that democracies are better able to withstand even a severe terrorist incidence. Yet, while the maturity of an economy is important to withstand a terror attack, it is not a sufficient condition. As pointed out in the literature, appropriate response reactions, particularly government policies are important to contain the escalation of negative repercussions. This, firstly, is determined at a technical level by the country's ability to provide relief and manage emergency and rescue actions effectively. Similarly, when a natural disaster occurs, a country's emergency preparedness is crucial in containing costs. Although not discussed explicitly in the literature, anecdotal evidence indicates that the preparedness of households and private individuals is critical to support relief efforts and mitigate damage.⁴¹ Related to this, but also related to general economic activity is the preparedness of service providers (especially of critical infrastructure) to remain operational in the event of an emergency, therefore containing the disruption in economic activity which leads to the escalation of impacts. Apart from the direct technicalities of emergency response, the ability of government institutions to apply appropriate monetary and fiscal policies and restore confidence into the economy form crucial part to mitigate impacts. It has been argued that well-orchestrated macroeconomic policies cushioned the blows of 9/11 (Chen and Siems 2004).

⁴⁰ As will be shown in section 3, the relation between democracies and the occurrence of terrorism is contested.

⁴¹ This has been suggested by for example R. Ackermann, vice-president of the International Association of Fire and Rescue Services CTIF in his presentation at the European Security Research Conference SCR '07, March 26-27th, 2007, in Berlin.

5 INTERACTION OF ACTORS OF INSECURITY AND SECURITY

This section concentrates on counter-terrorism policies and the dynamics between “actions of security and insecurity”. Earlier, we described the terrorists’ calculus, where the actual level of terrorist activity is dependent upon the costs, benefits and relative costs (opportunity costs) of terrorism. Consequently, counter-terrorism policies should reduce terrorist activity by (i) increasing of the costs of terrorism, (ii) reducing of the benefits from terrorist actions and (iii) making non-violent alternatives to terrorism more attractive (Frey and Luechinger 2008). An increase in the costs of terrorism is usually associated with an aggressive counter-terrorism strategy (deterrence) which uses harsh means such as pre-emption, retaliation or punishment. A reduction of terrorism benefits usually involves a rather defensive policy approach; this strategy acknowledges the main goals of terrorism (political and economic destabilization, and media attention) and tries to reduce payoffs from terrorist actions accordingly. Raising the opportunity costs of terrorism involves policies which offer positive incentives for potential terrorists. Implicitly, this line of argumentation is closely linked to the discussion of the ‘causes of terrorism’ which we presented in Section 3 of this contribution. By ameliorating conditions which may have otherwise provided incentives for terrorism (e.g. poverty, slow growth, repression, discrimination), it becomes less attractive for potential terrorists or terrorism supporters to engage in violence, even as the actual costs and benefits of terrorism do not change.

In the following, we will discuss several contributions which deal with counter-terrorism strategies along the aforementioned lines. Here, we focus on defensive policies as well as proactive ones; in any case, we will come back to the underlying argumentation of the terrorists’ calculus, i.e., to the policy effects on cost-benefit (and opportunity cost) considerations of terrorists. Still, we will also center on the repercussions of such strategies (i.e., the interaction of security measures and insecurity). As Enders and Sandler (2006) point out, security measures often do not take their full dynamic costs into consideration, failing to recognize that terrorist behavior is not static but adapts to security measures. In fact, terrorism, e.g., may increase instead of decrease when facing new or elevated security measures, so such repercussions add to the economic costs of security. Also, terror may not only increase over time, but

also shift geographically, taking advantage of weakest links in relatively less protected areas. Moreover, security measures may not influence the level of terrorism but its tactics, e.g., by making skyjacking less attractive by increased airport security.⁴²

5.1 Defensive policies

5.1.1 Protecting targets against attacks

Protecting targets aims to raise the costs of an attack by increasing the difficulty for terrorists to strike and reach their target and by increasing the risk of failure (Enders and Sandler 2006). Activities may include the installment of surveillance technology and placement of security personnel such as the introduction of metal detectors at airports in the 1970s or the fortification of embassies. Legal measures at national, regional or international level which lead to tightening of legal action taken against terrorists have a similar effect. Ultimately, all these actions aim at deterring terrorists from their terrorist activities in favor of other political means.

Enders and Sandler (2006) empirically analyze the effects of some protective measures, including the introduction of metal detectors at airports, the fortification of US embassies and the passing of international conventions. They show that metal detectors introduced in order to decrease skyjackings have proven effective insofar as they reduced the number of skyjackings by 12.2 incidents per quarter. However, rather than actually reducing terrorist activity, the introduction of metal detectors appears to have produced a shift of terrorist attention away from more costly skyjackings towards relatively “cheaper” hostage takings, indicated by an increase of 3.68 incidents per quarter of the latter. In contrast, international conventions⁴³ do not show to have had a significant effect on terrorist attacks, since these conventions do not as such reduce terrorists’ resource base or lower the relative costs of non-terrorist activities. While Landes (1978) and Cauley and Iksoon (1988) provides earlier evidence that increased security measures at airports (e.g., mandatory preboarding searches of passengers) has con-

⁴² Jackson et al. (2007) provide an extensive study on how certain terrorist groups (e.g., the IRA) have adopted to counter-terrorism measures. Evidently, groups such as the IRA have not reacted to counter-terrorism with a reduction of terrorism but with a change in their modus operandi. This means that we should always keep in mind when discussing the effectiveness of terrorism that counter-terrorism may produce a simple substitution and not a (desired) elimination effect.

⁴³ These conventions include for example the UN Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons (1973) and the UN Resolution against Taking Hostages (1985) and other conventions against hijackings.

tributed to a reduction in airplane hijackings, Cauley and Iksoon (1988) similarly argue that substitution (transference) has taken place, where skyjackings have been replaced by “cheaper” means of terrorism (cf. Jackson et al. 2007)

However, continued attempts to target for example major airports such as Heathrow, who since 9/11 have seen a decisive increase in security measures, contradict the prediction that terrorists will seek the weakest link to minimize costs. It appears that they are willing to pay higher prices and take on greater risks for a potentially higher return on a more prestigious target.

5.1.2 Mitigating impacts

A complementary action to protecting targets is the mitigation of actual impacts, which in theory does not raise costs but aims to lower the benefits resulting from a terrorist attack (Enders and Sandler 2006). Frey (2004) and Frey and Luechinger (2004, 2008) suggests two measures to reduce the benefits derived from terrorism: (i) decentralization and (ii) changes in media reporting practices.⁴⁴ Obviously, these strategies are directly linked to the central short-run goals of terrorism, namely economic and political destabilization, and media attention.

Political decentralization (e.g., via federalism or another form of division of power) makes attacks on political targets less attractive; even as an attack is successful, the effect of the attack on the general polity is less sizeable, compared to a comparable attack in a centralized country (Frey and Luechinger 2004). Economic decentralization (which should develop rather automatically in market economies) has a similar effect on terrorism benefits; even the attacks of 9/11 had no lasting impact as non-affected personnel and market participants were able to quickly recoup the damages (*ibid.*). In general, decentralization decreases the level of immediate interdependency and consequently the degree of potential damage.

Changes in media practices on the other hand, rest on the recognition that media and terrorism live in a certain “symbiosis” (Enders and Sandler 2006). On the one hand, a terrorist event is a welcome story to the media to report on and to boost sales; on the other hand, terrorists rely on the media to reach a large audience, beyond the directly affected victims of an attack, so as to instill fear in society. As the media determines the “cognitive experience” of terrorism by an audience larger than the directly affected victims, and magnifies the impact through con-

tinuous reporting of the topic (even at the expense of other topics) it plays an important role in “managing citizen” fears either positively or negatively (Kunreuther 2002). One potential counter-terrorism strategy in this connection is provided by Frey and Luechinger (2008). They argue that by providing the media with abounding information on terrorist attacks, the government may manipulate media recognition of terrorist groups; if the government achieves to conceal the true perpetrator of an attack (e.g., by not recognizing the true perpetrator although it is known, thereby inducing free rider behavior of other groups), it may reduce the benefits of an attack that manifest in media attention, thus frustrating active terrorists.

Empirically, Dreher and Fischer (2008) offer first support for the idea that decentralization is associated with a decreased likelihood of experiencing transnational terrorist attacks. Here, spending (fiscal) decentralization has a much stronger effect on terrorism than actual political decentralization. Interestingly (but in line with the previous argumentation), decentralization is not shown to produce security inefficiencies (as popular discourse may suggest); rather decentralization appears to generate a positive feedback between security means (decentralization) and insecurity.

Considering the interactions between the media and terrorism, Nelson and Scott (1992) show that media coverage may induce additional terrorist acts. Similarly, Rohner and Frey (2007) show that media attention and terrorism share a bidirectional causality relationship, so increased media attention granger-causes more terrorist events, and vice versa. These empirical findings indicate that by influencing media coverage of terrorist actions, terrorist activity may also be influenced. Still, existing evidence is rather sparse. Moreover, one can assume that terrorist organizations find their own ways of publicizing successful attacks, not least through the medium of the internet, which has become a popular terrorist platform.

In summary, protective measures (decentralization, influencing media behavior) aim at reducing potential benefits of terrorist actions.⁴⁵ Sparse empirical evidence shows that related poli-

⁴⁴ Neither of these approaches remains uncontested but a detailed discussion of their implications surpasses the scope of this document and is not necessary for the actual core argument.

⁴⁵ Recently, Frey and Rohner (2007) advocated another counter-terrorism strategy that aims at decreasing potential terrorism benefits. They introduce a simple game-theoretic model to illustrate the interactions between protective government policies and terrorism. The model focuses on terrorist attacks on cultural monuments, which naturally yield a high payoff for terrorists, making them preferred terrorist targets. When the government shows determination to rebuild a monument (by means of public announcements, reconstruction plans etc.), it lowers the potential benefits of a terrorist attack. Instead of deterrence (active protection), reconstruction (or the commitment to it) is shown to be a cost-efficient defensive policy means.

cies (decentralization) may indeed yield positive effects. Nevertheless, no empirical study implicitly shows that a reduction of benefits from an attack is linked to a reduction of future attacks; this is particularly true for the interaction of the media and terrorism, where evidence has just uncovered their symbiotic relationship. There exists the possibility that protective measures lead to a change in terrorists' behavior, so the effect of related counter-terrorism strategies is undermined. Even as such counter-terrorism strategies are successful in mitigating the effects of terrorist strikes, they may also induce a suite of substitution effects, which include a shift in targets, a change in the modes of attack, geographic transference between countries or in time. This implies that in order for related policies to be effective, they will need to address all possible modes of attacks, on all targets, in all possible countries, at all times. Given asymmetric information between terrorists and governments, this is hardly possible to achieve. This leads back to the question how to protect an economic system when the actual threats to security are unknown.

5.2 Proactive policies

5.2.1 Targeting terrorists' infrastructure

Proactive policies include measures such as employing intelligence and surveillance technologies to detect terrorist activity and capture perpetrators, the obstruction of terrorist financial flows and weapons supplies, as well as pre-emptive attacks. Beyond physical measures they can also include the tightening of legislation and curbing of citizen rights to increase difficulties for terrorists to organize, disseminate their information, recruit members, and so forth. In short, pre-emptive measures aim at starving terrorists of their (financial, human, physical, technological) resources, so as to disrupt their activities.

The interception of terrorist financing has surely received most attention within the literature analyzing the dynamic repercussions of proactive terrorist measures. This is not only due to the dependence of terrorist organizations on financial assets to implement their activities but also due to the possibility of detecting terrorist activity by tracing the money trail in the system. Yet, despite the potential elegance of this approach, it is difficult to actually implement it. Firstly, to effectively freeze assets of terrorists, cooperation between states and the banking sector is required, which (given disincentives to disclose information on money transactions)

has proven difficult to establish (FitzGerald 2004). Secondly, terrorists have shown to circumvent the freezing of their assets through diversifying their income sources, but also by blurring the traceability of their transactions (Schneider 2002; Napoleoni 2003; Alexiev 2004). Al-Qaeda, the epitome of an elusive terrorist organization, receives money from sources ranging from private individuals to state sponsors, covered up as “development organizations” and “charities”. Further, they employ techniques of blurring the traces of their transactions similar to the ones of organized crime (Schneider 2002). As a result, stringent measures to severely reduce their assets are said to have failed. Enders and Sandler (2006) liken the activities to curb illicit money flows to a “leaking bucket”, whose success is at best temporary (cf. Addison and Murshed 2005) as terrorists find ways to circumvent regulations. What is more, when we think of terrorism as a “weapon of the poor”, meaning that the financial needs of terrorists are often argued to be comparatively small (cf. Sandler et al. 2009), a disruption of terrorist finance may be even more difficult to achieve.

Apart from the failure to curb financial assets, the economics literature is pessimistic on the effectiveness of aggression to decrease human resources of terrorist organizations. The theory recognizes three channels through which proactive measures towards terror organizations could in fact aggravate terrorist behavior as response: firstly, aggression, specifically if it reduces freedoms of expression and therefore non-political means to express grievances will make non-terror activities relatively more costly, consequently leading to increased terrorist activity (Enders and Sandler 2006); secondly, aggression can fuel the legitimacy of terror organizations when their struggle for political rights is answered with a tightening of rights (Frey 2004); and thirdly, terror organizations may answer with a reorganization of their structures to evade aggression (Münkler 2004). Al-Qaeda again provides an example: the above mentioned elusiveness of this terror organization results from their success in decentralizing operations, which decreases the actual area of target and increases the independence of its functioning even if key leaders are caught (*ibid*).⁴⁶ Enders and Sandler (2006) provide the case study of the bombing of Libya in 1986⁴⁷ to show how aggression against terrorism is answered with further aggression. Their findings show that this retaliatory raid caused an immediate increase to over 38 terrorist attacks per quarter, which subsequently fell, yet re-

⁴⁶ Ironically, al-Qaeda has therefore achieved what some economists (e.g., Frey 2004) advice governments to do in order to decrease their vulnerability.

⁴⁷ This refers to the US attack on targets in Libya in response to the (supposed) bomb attack of Libyan terrorists on a West Berlin night club April 5, 1986.

mained at 12.7 incidents above the pre-intervention mean; that is, retaliation led to an increase rather than a reduction of terrorist attacks (Enders and Sandler 2006). Thus, coercive action towards terror organizations appears to result in a zero sum game which can potentially set of a spiral of violence – or as the literature concludes “deterrence may backfire” (Frey and Luechinger 2002).

As alternatives to aggression, Frey and Luechinger (2003) and Frey (2004) suggest a few “carrots” to induce terrorists to refrain from terrorist activities. Such benevolent measures may include, e.g., mindful of legal reprisal that terrorists are likely to face when giving up their illegal actions. Rather than raising the costs of terrorist activities, it is called for a lowering of the price when refraining from the latter. This could be achieved by, e.g., providing amnesty, re-socialization and political talks. Positive measures rather than inducing a zero or negative sum-game will at least in theory create a win-win situation where both sides (terrorist and the government) gain. Frey and Luechinger (2008) sum up some evidence suggesting that at least for Northern Ireland related policies (e.g., offering *Sinn Fein* as the IRA’s political arm negotiations) were successful in reducing violent activities. Frey (2004) himself recognizes that his tactics may induce adverse incentives to terrorists, resulting in the exploitation of positive measures and may be considered immoral, particularly by victims of terrorist attacks.⁴⁸

5.2.2 Targeting root causes of terrorism

The last policy approach that remains to be discussed focuses on targeting the “root causes” of terrorism. While the above sections summarized counter-terrorism strategies that target the “permissive factors” (Drakos and Gofas 2006b), this section will discuss approaches that aim at eradicating the actual grievances on which terrorist actions are built, thus undermining terrorist legitimacy (e.g., recruitment, financing, popular support). In general, related strategies are linked to an increase in the opportunity costs of violence (Frey and Luechinger 2008). If we assume that the IRA used violence because there was no other way to voice their dissent, than offering them alternatives to violence (as discussed before) may also be considered as a way of targeting the roots of terrorism (here, the lack of representation) while similarly undermining terrorists’ legitimacy. In general, targeting the roots of terrorism means to make

⁴⁸ This criticism has been voiced in a review of Frey (2004) by Inbar, E. (2006). "Book Review: Bruno S. Frey, Dealing with Terrorism—Stick or Carrot." *European Journal of Political Economy* 22(343-344).

non-violence comparatively more attractive for potential terrorists or terrorist supporters, instead of increasing the costs of terrorism or decreasing its benefits. Clearly, such strategies require (i) to identify the “true” causes of terrorism and (ii) to alter related conditions through policy actions in ways that reduce terrorist activity. This discussion is closely linked to the one in Section 3.

The main problem with targeting the root causes of terrorism is that existing evidence (especially when the analytical focus is global) does not deliver a clear result on which factors are actual roots of terrorism. What is more, different studies do not only stress the importance of different determinants (and thus advocate different policy solutions) but several studies also come to varying results with respect to the direction of influence of certain determinants.⁴⁹ The missing “one size fits all” result on terrorism causes makes any simple policy advice nearly impossible.

Clearly, evidence from country studies may be used to formulate policy advice suitable for the very country analyzed. For instance, as the evidence by Feridun and Sezgin (2008) indicates that economic underdevelopment encourages terrorism in Turkey, a sound policy advice is to foster economic development in this country. Still, it is unclear whether such strategies can be transferred to other countries. In any case, the analytical focus of the empirical analyses should be kept in mind when deducing policy implications from them.

Given that there is no “true” result on terrorism determinants, a number of (potentially) helpful counter-terrorism strategies can be thought of. Helpful strategies may include a reduction of economic, political (repression, inadequate representation etc.) and social (discrimination along ethnic or religious lines) underdevelopment. Also, political stabilization may work favorably in a reduction of terrorism. With respect to the empirical evidence on terrorism causes as presented in Section 3, an overall emphasis on political and institutional over economic factors seems to be advised.

On an international level, foreign aid (e.g., directed at sound education), assistance in economic and political transformation and international cooperation (e.g., with regard to the organization of international trade) may also be helpful. As stressed before, all of these strategies aim at making non-violence more attractive for potential terrorists and their supporters.

⁴⁹ As discussed before, there are studies arguing in favor of a “pure” (either autocratic or democratic) political regime to constrain terrorism, whereas other stress the role of repression in fostering terrorism and of democracy in reducing it.

However, several open questions remain. First, given that the empirics do not suggest a “true” root cause of terrorism, we cannot assess whether a certain strategy is helpful. Also, a strategy may be helpful but still constitute a waste of resources if other more effective ways of reducing terrorism exist (e.g. Sambanis, 2008). Second, the effectiveness of the suggested counter-terrorism strategies is thus very much context-dependent. Third, evidence is inconclusive on the interaction between various terrorism determinants and their links to terrorism. Such interactions may require a more holistic policy approach (i.e., tackling different terrorism roots simultaneously when their interaction is found to independently impact on terrorism).

In general, targeting the roots of terrorism may be effective when it makes non-violence more attractive and marginalizes terrorist groups. However, existing evidence does not allow for a clear strategy that is (globally) helpful in reducing terrorism. Consequently, this may lead to conflict mismanagement and a misallocation of resources. At the same time, targeting terrorism roots may be regarded as giving in to terrorists’ demands. As game theory shows, concessions to terrorists may trigger new terrorist actions, may lead to changes in the structure of terrorist groups and other forms of adaption (e.g., Enders and Sandler 2006; Bolechow 2005). As terrorism has (from the point of view of terrorists) worked as an effective tool for bargaining, a targeting of terrorism roots may thus be counter-productive and breed new (potentially more radical) terrorism.

5.3 The determinants of the dynamics between security and insecurity

By way of a simplified summary, defensive policies seem to incur substitution effects, changing the mode, target and timing of actual terrorist attacks, while proactive policies, whether benevolent or aggressive, whether tackling the symptoms or causes of terrorism appear to change the structure and organization of terror organizations. Overall, the theory and available data suggest that in fact, terrorism, even if it has not become more frequent, has already and will increasingly (i) become more severe, (ii) shift location towards places with relatively less security measures in place, such as the Middle East and Asia where it also encounters more ready support and (iii) has adapted its strategies and organizational structures to evade proactive policies. Even though no statistical prove may be available for the latter, al-Qaeda provides an illustrative example how a terrorist organization can render a high security environment impotent.

The literature predominantly suggests that the relative price of terrorist activities versus non-terrorist activities constitutes the key determinant for terrorist responses to counter-terrorist measures. Yet, as the above section has shown, there are several other determinants which (although having received less attention) appear to be critical:

First, the end of a policy, particularly the differentiation whether to protect targets, counter symptoms or actual root causes appears to be a factor in defining terrorist reactions to security measures. However, it is questionable whether the actual determinant is in fact the objective of the policy or rather the means employed to achieve these ends.

Irrespective of the actual goal (e.g., democracy in Iraq), the tools employed to reach this goal have proven to trigger potentially strong (negative) reactions. Essentially, the literature identifies negative repercussions from aggressive policies, and the possibility of a spiral of violence. Benevolence, in contrast, implies at least in theory a positive sum game or a win-win solution for both terrorists and targets (e.g., Anderton and Carter 2005). However, no empirical evidence exists that demonstrates this positive relation. Yet, at the most basic level, there is widespread agreement that terrorism requires economic and political but not military solutions.

Ultimately, the responses to security measures are determined by the actual preferences of the terror agents themselves. The summary above has shown that the simple model of terrorism behavior may be correct in its essence (terrorists as rational agents). Yet, it is too simplistic and requires extension to fully account for all possible reactions.

For instance, Addison and Murshed (2005) contend that the motivation of terrorists is important to understanding reactions to response measures. In a simplified model, Addison and Murshed (2005) differentiate between degrees of militancy, suggesting that more militant terrorist members will be less easily deterred from violent means than less militant terrorists.⁵⁰

Applying this framework to different players of terror organizations, it is possible to differentiate between three agents who are likely to differ in degrees of militancy and thus motivation:

Terrorist leaders are likely to fall into the category of the more militant terrorist actors as understood by Addison and Murshed (2005). Consequently, unless their respective grievances

⁵⁰ To illustrate this differentiation, while a more militant terrorist may have exclusively political objectives, a less militant actor may support the activities not only for political purposes but also for economic gain (through e.g. selling weapons, information, or other goods and services). With increased deterrence or alternative income opportunities, the latter may give up his political objectives in order not to jeopardise the economic gain.

are addressed, they will seek to circumvent security measures most ardently in favor of terrorist means. Their elasticity to substitute terrorism with non-violent action is likely to be small, if not zero or even negative.

Terrorist recruits could have less militant motivations, i.e., they may be driven by other (e.g. economic) factors than merely political goals. Therefore, a price change in the possible alternatives may be more successful in changing their behavior.⁵¹ Thus, it is possible to hypothesize that their elasticity to substitute terrorism for non-terrorist actions is likely to be greater than zero. Within the group of terrorist recruits, Frey (2004) makes the important distinction between actual terrorists and potential future terrorists. While disincentives to choose terrorist activities have to be created for the latter, specific incentives for the first have to be created in order to enable them to renounce their violent behavior (*ibid*).

Terrorist support groups are agents not directly involved in the actual planning and execution of terrorist acts but those who provide logistic support to terrorist organizations. As they often constitute the constituencies terrorists are fighting for, their support (and in reverse, a targeting to reduce their support) can be of significant importance. It is difficult to estimate their preferences but since they are not directly engaged in terrorist activities, their political objectives could weigh less than other (e.g., economic) considerations. Therefore, it could be inferred that their demand for non-terrorist actions is more price elastic.

Furthermore, it may be helpful not only to look at the hierarchy of terrorist organizations to assess the effectiveness of counter-terrorism policies (and their interaction with terrorism) but also to look at individual organizations. As Blomberg et al. (2009) find, recidivist terrorist groups (running prolonged campaigns) are more likely to be influenced by socio-economic and political factors than groups attacking only sporadically. This result may indicate that counter-terrorism focusing on an amelioration of terrorism root causes (to address the concerns of terrorist groups) may be only effective once terrorists have started a prolonged campaign.

⁵¹ Abrahms (2008) argues that (rank-and-file) terrorists do not (primarily) join terrorist groups because of ideological preferences but because they want to form or maintain social bonds (e.g., friendships). In this case, offering alternatives to violence may be a poorer (less efficient) counter-terrorism strategy than an attack on these very social bonds (e.g., via an infiltration of a group and the spread of mistrust). Although Abrahms (2008) strongly argues against the standard rational choice framework (on which we rely here), it may nevertheless help to explain phenomena such as “unclaimed” terrorism (where no group takes responsibility) and terrorism in closed societies (in which terrorism does not gain publicity). See also Harrison (2009) for an empirical work on terrorism in the USSR as an example of the mechanics of terrorism and counter-terrorism in a closed society.

Given that terrorists not only form organizations but also more loose networks, e.g., as al-Qaeda (e.g., Reuter 2004), an economic analysis of the issue of networks and terrorism may also be helpful to understand how such networks are run and how appropriate counter-terrorism measures may look. Here, Siqueira and Sandler (2009) provide a recent analysis of this issue. Future research on this issue may help to design counter-terrorism measures appropriate for dealing with the threat of loose terrorist networks (in comparison to more “traditional” terrorist organizations).

Lastly, the outcomes of the analysis of response reactions may also be influenced by the indicators used to measure terrorist actions. Most knowledge on terrorist trends and patterns is based on data measuring the frequency and severity of terrorist attacks as the only indicator of change. However, it is impossible to conclude with certainty that a change in number and severity of attacks provides the best indicator for a change in terror activity. By contrast a prolonged period of time without a terror event does not necessarily mean the ceasing of terror activity; a large scale strike could be in preparation. In other words, impressions of the nature of change are limited to the available indicators, yet these may not be the most representative for the real degree and nature of terror activity.

6 ECONOMIC EFFECTS OF ANTI-TERRORISM POLICY

The economic impacts of anti-terror measures have been classified as the “indirect costs of terrorism” which result from the actions of both public and private agents to protect themselves against the impact of a terrorist attack or to prevent a terrorist attack (Brück 2006). Estimating these economic impacts requires accounting for direct effects, resulting from the expenditures invested in security measures and indirect impacts which derive from (i) the opportunity costs of these security investments and from (ii) dynamic effects of externalities and spillover effects. The economic impacts of security measures should further account for their actual impact on terror behavior or the effectiveness of the chosen security measures.

Two broad classifications of security measures can be identified in the literature. Enders and Sandler (2006) differentiate between defensive and pro-active security measures: the former broadly concentrate on protecting targets from attacks or mitigating the impacts in case of attack; the latter concentrate on fighting the threat itself, i.e., target terrorists and terror organizations in an attempt to undermine their capacity and activities by reducing their resource base. As discussed earlier, both approaches aim at influencing the cost-benefit (and opportunity cost) considerations of terrorist leaders, active terrorists and terrorist supporters.

Frey (2004) classifies security measures not with respect to their object of focus (targets versus terrorists) but rather with regard to the adopted approach. He identifies “deterrence” in contrast to “positive” or benevolent measures.⁵² The first strategy incorporates both “physical” as well as legal measures aiming to deter terrorists from their activities; the second points towards measures that create incentives which induce terrorists to replace their acts of political violence with non-violent means.

Importantly, these classifications are not mutually exclusive, i.e., they do not provide alternative but complementary classifications, as illustrated in Table 2 below.

⁵² Here, “deterrence” not only refers to (traditionally military) acts of preventing (terrorists’) actions by instilling fear (e.g., retaliatory strikes) but is linked to a broader set of acts (e.g., surveillance, protection, intelligence operations).

Table 2: Classification of different types of counter-terror measures

	Defensive policies	Pro-active policies
Deterrence policies / negative incentives	<u>Increasing the costs of terror</u> e.g., surveillance and protection of targets	<u>Decreasing resource endowments of terror organizations</u> e.g., intelligence and military operations
Benevolent policies / positive incentives	<u>Decreasing the benefits derived</u> e.g., decentralization of targets, decreasing media attention	<u>Increasing opportunity costs of terrorism</u> e.g., tackling grievances /root causes of terrorism, re-socialization

In practice, “defensive policies” entail direct actions (such as investments in security technologies) and indirect actions including changes in consumption, investment and saving patterns to avoid exposure to risk situations.

“Pro-active policies” incorporate all measures that aim to undermine terrorist activity, directly through interrupting their supply of resources including financial assets, arms, recruits etc; measures can range from intelligence operations, to military strikes (e.g., Iraq and Afghanistan) (Enders and Sandler 2006).

Within these two broad categories, it is possible to identify two sub-categories: defensive measures can be differentiated whether they protect singular identified targets (i.e., raise the costs of terrorism) or whether they attempt to mitigate the impacts of an actual terrorist attack (i.e., decrease the benefits of terrorist strikes); pro-active measures can be differentiated whether they merely target the symptoms (i.e., inducing cost and benefit effects) or the root causes of terrorism (i.e., increase the opportunity costs of terrorism).

The economic literature explains the choice of counter-terrorism measures (especially in the case of transnational terrorism) mainly by the public-private good nature of security. Defensive policies are largely a private good, where benefits of security provision are mostly internalized by the investor, while pro-active policies exhibit characteristics of a public good (Sandler and Siqueira 2006). Game-theoretic approaches show that, given the absence of coordination mechanisms that make all to take proactive measures, countries will be better off

to take defensive measures and free ride on the pro-active measures of others in the case of transnational terrorism. This consequently may lead to an oversupply of defensive and an undersupply of pro-active measures.

The public-private good nature of security provision increases the need for cooperation at the international level between countries, and at national level between the private and public sector. The main obstacle is to overcome persistent coordination failures between different agents. Sandler and Siqueira (2006) conclude that leadership is apt to lessen inefficiency in providing defensive measures, yet fails to improve efficiency for pre-emptive measures.

When considering the factors that induce or prevent cooperation to enhance security, situations of (international) under- and over-supply of security (i.e., counter-terrorism measures) should not be overlooked, providing further needs for international coordination (cf. Sandler and Lapan 1988). Considering an under-supply of security, some states (often so-called “failed” states) are known to tolerate the activities of terrorist organizations in their territory in exchange for no direct harm at the expense of other nations, which is referred to as “paid riding” by Lee (1988) and Lee and Sandler (1988). In the case of over-supply of counter-terrorism in a country, terrorist attacks may be diverted to less protected areas (cf. Enders and Sandler 2006). These two phenomena make multilateral cooperation even more important, yet, as practice shows, not easier (Enders and Sandler 2006).

In the following, we want to discuss existing theoretical and empirical studies that analyze the economic effects of counter-terrorism policies at (i) the micro level, (ii) across industry sectors, (iii) the macro level and (iv) a global level. We also want to briefly discuss the political effects of counter-terrorism policies.

6.1 Micro-economic impacts

Just as in Section 4, the underlying micro-economic processes are explained before the aggregate impacts at the macro level are discussed. At micro-economic levels, security measures of economic agents can include direct expenditures on security technologies or indirect changes in consumption and investment behavior to hedge against the risk of falling victim to an attack. In addition, dynamic impacts of these changed consumption and investment patterns have to be accounted for.

6.1.1 Security measures of consumers and households

Sound research on measures of households to enhance levels of security hardly exists, even after 9/11. Consequently, not much more information is available than anecdotal evidence, such as accounts of panic purchases of antibiotics following the anthrax scares in the US in 2001. In contrast, a few localized studies (cf. West and Orr 2005) suggest that the American public's security measures are far less drastic than related anecdotes suggest. For example, a 2004 New York Times national survey revealed that households have hardly taken action to prepare themselves against a terrorist attack: 61% of the respondents had not put together an emergency food kit with water, and 70% stated that they had not chosen a family meeting place or communications plan in the event of an attack (in West and Orr 2005).

However, even if there is little actual investment in security equipment, consumption and savings preferences are influenced by security considerations.⁵³ These changes in demand patterns due to risk aversion become visible in the impacts on different sectors of the economy, some of which (as we will discuss later) have suffered substantial losses due to fear of terrorism. As an important policy conclusion, Drakos and Kutan (2003) point out that state aid to companies suffering from adjustments in consumer demand due to terrorism will be futile in cases where demand has permanently changed.

6.1.2 Security measures of the private sector

The available options of security measures of companies are very similar to households: investment in security equipment and technologies, and management decisions to hedge against the risk of a terrorist attack, reflected e.g. in investment decisions. In theory, companies that face direct threats from terrorism have to incur expenses for security technology, insurance cover and often have to pay a risk premium to their employees in the form of higher wages and salaries; actual quantities depend on the nature of the threat and the respective sector.

The underlying factor that drives security spending arises from a company's and its managers' degree of risk aversion. Both the academic and practical literature agrees that risk aversion and the willingness to accept risk vary markedly across time, space but especially between individual managers. A study by Ryans and Shanklin (1980) shows that in 1980, 82 top

⁵³ However, such security considerations are also very likely driven by fears of "ordinary" crime rather than by the fear of terrorism.

international officials from US and overseas multinationals ranked terrorism as a key barrier to investment. In contrast, PricewaterhouseCoopers 10th Annual Global CEO Survey in 2006 (PricewaterhouseCooper 2007) concludes that CEOs (even after the unprecedented attacks of 9/11) are less worried about unforeseen shocks such as terrorism or natural disasters but rather about an overregulation of the economy.⁵⁴ The report further highlights how degrees of risk perceptions differ across individual CEOs, across geographic areas and with respect to economic conditions. Michel-Kerjan and Pedell (2006) arrive at similar conclusions regarding the perceived risk of terrorism in a study which compares the up-take of terrorism insurance cover in Germany and the US in the years after the introduction of the respective terrorism risk insurance acts. On the one hand, they argue that a suite of factors other than an actually heightened sense of insecurity⁵⁵ account for the increased up-take of terrorism risk insurance; on the other, they provide data from a US Treasury Survey, which finds that 90% of respondents to a US Treasury survey that did *not* purchase terrorism insurance believe “it will not happen to them”.

Consistent with this low risk perception, McKinsey (2006) finds that only three out of ten respondents report that their companies have taken active steps to prepare for any one of the following scenarios that could harm virtually any company: a pandemic, a natural disaster or increased geopolitical instability, such as terrorism.⁵⁶ In a similar vein, PricewaterhouseCoopers 10th Annual CEO survey shows that “of all the threats, availability of key skills and low-cost competition are the two that companies are addressing with significant resources”, whereas terrorism does not induce significant spending (PricewaterhouseCooper 2007). Both studies offer support for Suder's (2004) main argument, who points to the necessity to incorporate geo-political risk (including terrorism) into risk assessment strategies.

Higher levels of risk further impact investment not only due to a change in allocation of resources but also due to an aversion to commit to new projects due to uncertainty (Brück

⁵⁴ Although no direct reference to security measures were made in this study, it could be inferred that companies are more worried about negative impacts of counter-terrorism measures involving security regulations on their businesses than about terrorism itself.

⁵⁵ These factors include regulatory measures, reduced prices for terrorist coverage and greater concern about possible liability under the Sarbanes-Oxley Act, should executives be deemed to have failed to protect corporate assets.

⁵⁶ The McKinsey Quarterly conducted the survey in March 2006 and received 3,470 responses from a worldwide representative sample of business executives, 44 percent of whom are CEOs or other C-level executives. Ranked according to importance, the three most important risks against which companies prepare are major regulatory changes (58%); substantial changes in currencies, interest rates or inflation; and a global or regional slow down. In contrast, only 26% prepare for geopolitical instability (e.g., terrorism).

2006). Yet, Purnell and Wainstein (1981) conclude that at least in the case of US businesses, neither the costs of terrorism nor the consequent costs of security measures seem to significantly impact profitability that US businesses would pull out of countries affected by terrorism. Yet, aggregate patterns of investment flows contradict this optimistic conclusion as will be shown below.

The limited concern about terrorism is not surprising, given that only specific sectors are likely to face a direct threat, and given that indirect terrorist threats work through other channels, i.e. changes in demand, disruption in supply chains and other operation risks. In other words, terrorism is likely to be addressed within other risk factors. But even if terrorism is addressed within these wider sets of risks, Buehler and Pritsch (2003) suggest that the corporate meltdowns of recent years show that many companies neither manage risk well nor fully understand the risks they are taking.

A potentially even more important reason for the lack of security measures could derive from the complexity to manage terrorism risk which arises from several factors such as the interdependent security environment in which businesses are located; the elusive threat and dynamic uncertainty created by terrorism; and the significance of government actions to increase or decrease the threat level that businesses face. Especially the first and third point create large disincentives to security investments, as the effectiveness of protection against terrorism is dependent on the level of protection of the weakest link; thus, investment by one company does not necessarily mean an actually enhanced level of security if other companies or government fail to cooperate.

In conclusion, it is necessary to ask whether businesses' little security investments are justified, given the low probability nature of terrorist events, or whether they are in fact underinvesting at the possible expense not only of their operations but also society at large, given that a terrorist attack can incur costs that stretch far beyond companies' boundaries (as 9/11 and other events have shown). These interdependencies give rise to the debate about public-private partnerships to overcome coordination failures between companies to ensure adequate security standards in industries. As the rest of this section will show, regulations can have significant repercussions on economic competitiveness, leading back to the above mentioned trade-off between scaling down on efficiency expectations and enhancing the security of the overall system.

6.1.3 Security measures at government level

While private agents' activities are mainly focused on enhancing their own level of security through protective measures, governments face the responsibility to allocate their available resources between defensive and pro-active measures.⁵⁷ The choice between the two is critical, especially regarding their actual impact on enhancing the security level of a country.⁵⁸ Enders and Sandler (2006) find that there is a proclivity to favor defensive counter-terrorist measures over pro-active ones, which will result in equilibrium with socially inferior payoffs when compared with pro-active responses. Pro-active policies tend to provide purely public benefits to all potential targets and are usually undersupplied, whereas defensive policies tend to yield a strong share of provider-specific benefits and are often oversupplied. The reaction to 9/11 has been a mix of defensive measures (e.g., security regulations at borders and transport hubs) and pro-active ones (the global pursuit of terrorists). Yet, while governments shoulder the costs of pro-active measures, it is the private sector and households who appear to be carrying much of the burden of e.g. regulatory protection measures by government. It has been estimated that the private sector will face about US\$ 10 billion a year due to US homeland security measures, although initially they could be much higher, i.e. in the range of US\$ 46 billion to US\$ 76 billion (Stevens 2003). Thus, governments' regulatory measures to enhance security can have significant impacts on the economy.

This leads to the question of appropriate government involvement in security provision. In this respect, the case of security provision in the aviation sector provides an illustrative example: The fact that security at one airport can affect the well-being of those at other airports provides an economic justification for governmental involvement in aviation security (Coughlin et al. 2002). A fundamental question is whether the role of the state should be restricted to setting and monitoring security standards or whether its role should also include the financing and implementation of security. In the US, in a controversial change the federal government has assumed responsibility for the actual provision of aviation security. Proponents of this change argue that (relative to private provision) public security provision reduces the incentives to reduce quality through cost reductions. Still, a public agency may not provide security

⁵⁷ Note that while governments are mandated to provide security (e.g., via military checkpoints), civilian actions (e.g., interventions by bystanders against terrorism) may also matter to the effectiveness of terrorism and thus security measures (Harrison 2006b). Fostering civilian intervention (through government policies) may be another way of countering terrorism, producing distinct costs and benefits.

services efficiently as it operates in a monopolistic way. Furthermore, a public agency may provide an excessive amount of security, thus incurring unnecessary expenses because it is likely to be judged on its security record and not on all the attributes encompassed by air transportation services for consumers. Thus, economic theory does not provide a clear answer to what is likely to be a continuing source of controversy - the appropriate scope of governmental involvement in aviation security.

6.2 Impacts across sectors

Congruently to the varying degree to which sectors are affected by direct effects of terrorism, the economic repercussions of security measures impact various sectors in different ways. Those sectors facing direct risks of terrorism are bound to incur the most costs to protect themselves against an attack. Particularly, the transport industry has invested large amounts into enhanced security.⁵⁹ While terrorist attacks on transport and infrastructure have happened in the past, it was 9/11 which induced major increases in security measures to be applied across the entire transport sector (aviation, maritime transport, road and rail).

The aviation industry surely was the sector strongest hit by security measures, firstly due to stringent security regulations introduced after 9/11, and secondly due to severe drops in demand in cargo as well as passenger traffic due to risk averse customers.⁶⁰ Since 9/11 it has been estimated that airlines have spent US\$ 43 billion on security measures, including more thorough baggage checks, greater in-flight inspection and new regulations for secure cockpit doors (World Bank 2003, in DFAT 2004).⁶¹ In the US, the US Aviation and Transportation Security Act of 2001 estimated the cost for the federal government at around US\$ 9.3 between 2002 and 2009. Airport operator's additional costs are expected to be around US\$ 56 million annually (Coughlin et al. 2002). Some of these costs have been shifted to customers: in response to the enhanced security, many airlines have started to add "security surcharges", resulting in fee increases of up to US\$ 8 per person or within the range of US\$ 0.10 to 0.15

⁵⁸ Governments may again also consider the international effects of counter-terrorism, i.e., the consequences of an (international) under- and over-supply of security (i.e., counter-terrorism measures) should not be overlooked.

⁵⁹ The figures given below, are based on estimates shortly after 9/11, thus, they are provided merely to give a dimension but should not be considered accurate in the present context.

⁶⁰ The negative effects of terrorism (the 9/11 attacks) are documented, e.g., by Ito and Lee (2005) who find a substantial decrease in demand for air travel after the 9/11 terrorist attacks.

⁶¹ DFAT is the abbreviation for the *Australian Department of Foreign Affairs and Trade* (henceforth *DFAT*).

per kg of cargo (Walkenhorst and Dihel 2002). The findings of Blalock et al. (2007) in this connection show that the implementation of baggage screening in the US after 9/11 has led to a considerable reduction in demand for air travel, even after controlling for other effects which may have simultaneously affected travel demand. That is, the study shows that counter-terrorism measures actually worsened the situation of an industry sector already hit by terrorism; the findings imply a trade-off between security (baggage screening) and industry profitability.

In the shipping industry, a series of measures aimed at strengthening maritime security have been adopted by the International Maritime Organization (IMO) which includes e.g. the International Ship and Port Facility Code (ISPS) in December 2002. The costs of implementing the ISPS to ship operators (including the installing of security equipment) has been estimated to reach US\$ 1.3 billion and ongoing operating cost of around US\$730 million annually. System wide procedural changes, though difficult to account for, have been estimated to amount to US\$ 282 million. The overall costs of those transport counter-terrorism measures were estimated in 2003 to amount to over US\$ 2 billion (in DFAT 2004).

Yet, increased security may not only incur negative impacts. At least in the case of the financial sector, the introduction of tighter monitoring of financial transactions seems to have had some positive returns. A survey on Anti-Money Laundering (AML) initiatives in the banking and financial sector implemented by PricewaterhouseCooper (2005) shows that AML initiatives are seen to contribute to improve competitiveness in the long run; still, they may disadvantage those countries with more stringent requirements if implemented unevenly across countries. Even as AML initiatives are one of the biggest drivers of increased compliance costs in the Western hemisphere and as smaller banks are beginning to feel the pressure and complain about this new regulatory burden, the industry in general believes that the approach is justified within the current (in-) security environment and the role of financial flows.

In general, security investments could contribute to improving efficiency and effectiveness of specific sectors and the economy as a whole, especially where security against terrorism can be coupled with general security issues (DFAT 2004). Yet, so far no analysis exists that demonstrates potential positive impacts of enhanced security on overall operations.

Apart from the direct costs that sectors incur to protect themselves and society against terrorism, changes in demand and consumption patterns, arising out of security concerns of clients

and customers as discussed above may have significant impacts on those sectors, through which customers face a direct risk of terrorism.

This includes the transport sector, and specifically the aviation industry which has received most attention in the literature. Airlines had already been facing difficulties before 9/11; the subsequent drops in demand which hit particularly American airlines led to estimated losses for IATA members of US\$ 15 billion in 2001 (Drakos 2004) and an additional aggregate loss of US\$ 12 billion in 2002. Boeing Commercial Airplanes announced a 30,000 manpower reduction (Hooke 2006). It is noteworthy, that the low-cost sector did not suffer from this decline: Southwest, jetBlue in the US and Ryanair and Easyjet in Europe did not only grow but were among the few to record profits.

Tourism is another sector which suffers significantly from changes in demand due to risk aversion. Either it will suffer from terrorism as a response to increased security measures or increased (perceived) vulnerability. Table 3 gives an overview of the effects of terrorism on tourism in affected countries. We discuss these studies (and others) in more detail below.

Table 3: Some Evidence on the Impact of Terrorism on Tourism

Study	Analytical Scope	Main Results
Enders and Sandler (1991)	Spain, Monthly Data 1970-1988	Terrorism negatively affects the number of visitors of Spain (tourists). There is no evidence of reverse causation.
Enders et al. (1992)	Greece, Italy and Austria, Quarterly Data 1974-1988	Greece, Italy and Austria suffered severe revenue losses from tourism as a consequence of terrorism.
Fleischer and Buccola (2002)	Israel, 1987-1999	Foreign tourism is sensitive to terrorism, while domestic terrorism is not. Shifts from foreign to domestic terrorism in the face of terrorism cannot compensate for losses due to reduced international tourism.
Llorca-Vivero (2008)	Cross-Sectional Gravity Model, 2001-2003	Terrorism works as “bad advertisement”, making tourism in targeted countries less attractive. This effect is stronger for developing countries.
Aly and Strazicich (2000)	Egypt and Israel, 1955-1997 and 1971-1997	While terrorism (along with instability and external war) negatively affect tourism flows, the tourism sector remains important as tourism flows are able to recuperate after negative shocks.
Pizam and	Israel, Monthly Data 1991-	A high frequency of terrorism is more

Fleischer (2002)	2001	dangerous to tourism flows than the severity of these attacks.
Drakos and Kutan (2003)	Greece, Italy and Turkey, Monthly Data 1991-2000	Terrorism reduces tourist arrivals, reducing market shares of targeted countries. Terrorism also produces regional spill-over effects, making tourism in a “terrorism infected” region generally less attractive.

For Spain, which has not only suffered from ETA but also other (mostly left-wing) terrorist groups, it has been estimated that a typical terrorist act scares away over 140,000 visitors, combining all monthly impacts (Enders and Sandler 1991). Enders et al. (1992) estimate the actual losses in tourism revenue for Austria, Italy and Greece to amount to US\$ 4.538 billion, US\$ 1.159 billion and US\$ 0.77 billion, respectively, between 1974 and 1988.⁶² For the same period, continental Europe as a whole lost US\$ 16.145 billion due to terrorism (total tourist revenues in 1988 were US\$ 74.401 billion).⁶³ This highlights the significance in tourism losses but also the variability of losses across countries. While Austria, Greece and continental Europe in general lost substantial portions of their revenues (40%, 23% and 21%, respectively), the losses in Italy amounted “only” to 6%. Negative relations between terrorism and tourist demand have also been observed in other countries, including Israel and Turkey. Fleischer and Buccola (2002) estimating a supply and demand model of the Israeli hotel industry between 1992 and 1998, calculate a 1.27% loss of total revenues over this period, which rises with a deterioration of the situation. That is, evidence in general shows that terrorism negatively affects the tourism industry because tourists factor in terrorism as a risk when planning their holidays. The findings of Llorca-Vivero (2008) add to this view as the study shows that both domestic and transnational terrorist attacks enter a tourist’s calculus when making traveling choices.

Not only impacts but also the immediacy with which these impacts come into effect seem to vary strongly: while Enders and Sandler (1991) and Fleischer and Buccola (2002) find relatively immediate effects of terrorism on tourism, i.e. after two to three months for Spain and

⁶² This was calculated in 1988 terms, using a real interest rate of 5%. For comparative purposes, total revenues in these countries in 1988 amounted to \$11.149 billion, \$19.311 billion and \$3.29 billion respectively. Note that we, inter alia, draw on information from Frey and Luechinger (2005) and Frey et al. (2007) when discussing the links between terrorism and tourism in this subsection.

⁶³ Note the methodological difficult to find an appropriate counterfactual: not the number of tourists before the attack should be taken as point of comparison, but the estimated increased number at the time of the terrorist attack.

Israel respectively, Enders et al. (1992) find a $\frac{3}{4}$ lag before terrorism affects tourism in Greece, while tourism remains unaffected by a terrorist incident until a full 18 to 21 months afterwards in the case of continental Europe and Austria respectively. Frey and Luechinger (2005) explain these variations with the differences in the structure of terror campaigns not just across countries but also across time. Differences in time lags could further stem from differences in booking systems, where existing bookings are kept while changes only become apparent in the number of new bookings.

Even if impacts are significant, research shows that these effects are transitory. Yet, empirical research provides no unambiguous conclusion regarding the relationship between continued attacks and permanency of impacts: Aly and Strazicich (2000) studying annual bed nights in Egypt and Israel conclude that the impacts on the tourism sector remain transitory despite continued acts of terror and regional instability. Pizam and Fleischer (2002) in contrast, focusing on Israel argue that the tourist industry can recover even from severe acts of terrorism as long as the terrorist acts are not repeated. Thus, when acts of terrorism (whether of high or low severity) occur at high frequency and regular intervals, tourism demand will constantly decrease, and eventually the destination's tourism industry will come to a standstill. It is interesting to note that the frequency of attacks seems to influence tourism, while the severity of an attack seems not to influence tourism demand.

A second effect which has been researched is trans-boundary impacts of terrorism on other tourist destinations, especially neighboring countries. Of importance here is Drakos and Kutan's (2003) study on spillover and contagion effects. Using monthly data for the period 1991 to 2000, they investigate the effect of terrorism in Greece, Israel and Turkey on each other's market share, with Italy serving as a control country, representing the rest of the Mediterranean region. They find significant substitution effects and also empirical evidence for contagion effects. Only around 11% of aggregate losses in market shares are directed towards other destinations within the group of countries under consideration, whereas around 89% flow out into safer regions (in Frey et al. 2007). This demonstrates the necessity to understand fears of tourists to base strategic and operational marketing strategies on them (Dolnicar 2005).

Yet, even sectors that are not directly targeted by terrorism can be negatively affected by security measures. As shown above, some of the costs of security investments in the transport sector have been passed on to clients rather than having been fully internalized by the companies themselves. Consequently, trading sectors relying on their services will face increased

costs not in the form of higher transport fees but also in the form of longer transport durations and delays as will be shown in the section below.

In contrast to these negative repercussions, those sectors providing security technologies and services, namely the defence and security industries⁶⁴, benefit from investments into security technologies. The military response to the attacks of 9/11 reversed the declining trend in military expenditure which had set in with the end of the Cold War. According to the *Stockholm International Peace Research Institute* (SIPRI), global military spending increased by 18% between beginning of 2002 and the end of 2003, with the US, Japan, UK, France and China accounting for 64% of the world market (note that the US alone spends 47% of the global total). Yet, one may not expect this increase to last, apart from the expenditure increase in the US where defence spending has increased by over 60% in the past ten years, amongst others for the reason of combating global terrorism. Further, given new characteristics of security challenges, particularly embodied in asymmetric warfare against a clandestine enemy, military expenditure is now demanding more flexible, responsive and mobile forces. Thus, the military industry will have to adjust its products and services in order to realize this increased demand.

The security industry in contrast appears to experience sustainable growth. Available estimates put the private security industry's turnover at between US\$ 100 billion and US\$ 120 billion worldwide.⁶⁵ The largest share is accounted for by the US, although other OECD countries have sizeable security industries as well. For example, Germany's is estimated to be around US\$ 4 billion and France's and the United Kingdom's around US\$ 3 billion (Stevens 2003). There is little evidence within the industry of a major upsurge in spending on security since 9/11. However, longer-term data suggest healthy growth in turnover in the order of 7-8% p.a., easily outstripping average annual economic growth rates. Prospects for some seg-

⁶⁴ The defence and security industry share some commonalities (e.g., both sectors may offer offensive means). However, there are also differences. For instance, the defence industry supplies the armed forces, while the security industry supplies public police forces and also private security firms. Given that "modern" forms of warfare (e.g., fight against guerrillas or terrorist networks) does not demand for large armed forces but new methods of military operations, some convergence between the defence and security sectors (e.g., with respect to products and customers) may be anticipated but a merger of the two sectors is not expected. The reader should keep in mind that defence expenditures are generally expected to be looser connected to terrorism than government spending on policing or intelligence. That is, it is unclear to what extent increases or decreases in defence spending actually affect the fight against terrorism (or are affected by it). Given that data (and literature) on defence spending is more available, we nevertheless report related findings and discussions, always keeping the previous remark on the (potentially) loose connection between the defence sector, defence spending and terrorism in mind. It is necessary to point to the difficulties to measure the value added of the security industry and spending on security mainly due to data but also accounting problems, and therefore the figures are merely an attempt to provide a some dimensions of this still somewhat elusive sector.

ments, including biometrics, radio frequency identification (RFID) technologies and computer security are particularly favorable (*ibid*). But terrorism is not the sole driver of the security industry; an increasing trend in organized crime, perceptions of increased personal insecurity and the characteristics of the global economic system which make protection more necessary spur the growth of the security industry, so not all growth effects can be attributed to terrorism.

In conclusion, it appears that in the short run the military industry benefited greatly from the first reactions to 9/11 while in the long run, it will be the security industry that will profit mostly from the new insecurity environment that is posed not just by terrorism but various other forms of human induced insecurity. Other industries will continue to suffer from terror. The tourism industry is one example, as it may either suffer from terrorism as a response to increased security measures or increased (perceived) vulnerability. However, due to substitution effects (cf. Drakos and Kutan 2003) the loss of one country's tourism sector may be another country's tourism sector gain. That is, it may be meaningful to analyze the effects of terrorism on certain industry sectors from an international perspective as well.

6.3 Macro-economic impacts

Ultimately, micro-economic processes and behavior translate into macro-economic impacts which are reflected in various variables. Just as at micro-economic level, it is necessary to account for a) the direct results from increased spending in security measures, which translate into fiscal effects, and effects on aggregate consumption and investment; b) for the indirect impacts, which result from the security measures taken, reflected in e.g. increased transaction costs and repercussions on the competitiveness of the economy and c) the aggregate impacts of changes in consumption and investment spending which do not result from direct security investments but rather from risk aversion.

6.3.1 Fiscal effects

In theory, a negative shock such as a terrorist event is expected to incur an increase in public security spending (Brück 2006), with the potential effect of retarding long-term growth as high budgets for defence and homeland security may crowd out more growth-enhancing investments; moreover, there is some evidence that public security spending may also crowd out potentially more efficient private sector attempts to increase security. In fact, Stevens

(2003) finds that governments and other public authorities have increased their overall spending on security, in some cases quite substantially. The US Homeland Security budget doubled from fiscal year 2002/03 to its current level (2004) of well over US\$ 30 billion: funding for aviation security is now running at US\$ 4.8 billion and for border security at US\$ 10.6 billion. Stevens (2003) concludes that such investments are funded by government taxes or private spending. Consequently, even if this will not incur significant budgetary impacts, economic impacts will still be significant.

Gupta et al. (2004) who analyze the changes in composition of public spending in low and middle income countries show that terror and armed conflict may lead to increases in defence spending, resulting in a negative impact of public spending on social and economic issues. Thus, they show that the fiscal effects of defence and security spending in medium and low-income countries can have a significantly negative fiscal impact, consequently reducing future economic growth.

6.3.2 Growth

Related to the fiscal impacts of security spending but more complex is the relation between security spending and growth. A large body of literature exists discussing the effects of defence expenditures on economic growth (Ram 1995; Cohen et al. 2003; Lee and Chang 2006) and analyzing potential spill-over effects of defence R&D for the economy (Lerner 1992; Cowan 1995; Lichtenberg 1995; Trajtenberg 2004). Yet, this literature does not identify a straightforward relation between the defence expenditures and growth. Various studies show that the defence-growth relationships can take many forms: defence spending can have a lagged effect on growth. It may even spur growth in the short run, while constraining it in the long run, or vice versa. Rather than directly, defence spending may influence the economy through indirect channels. In fact, the causality may even be reversed, so economic development may also influence defence spending. Cohen et al. (2003) provide a more nuanced analysis differentiating between short- and long-term effects, and between direct and indirect impacts, thus providing a more cautious conclusion about both the impacts of defence expenditure on the one hand, as well as the impacts of the so called “peace dividend”.⁶⁶

⁶⁶ The peace dividend refers to a shift of government expenditure away from defence spending into economically productive sectors (or into welfare programs, tax cuts etc.).

In contrast to the extensive literature on defence-growth relationships outlined above, hardly any literature exists on the impacts that terror security spending will have on economic growth. Baily (2001) concludes that (provided fiscal discipline prevails) there is no reason to fear that long-run growth is compromised for higher security. Rather than expecting negative effects from increased security spending, he alludes to the potential negative effects of a reversal of the current state of liberalization. Baily's argument accords to Hobijn's (2003) assertion that neither private nor public security spending will have a major impact on the US economy, estimating that private security spending will reduce labor productivity by only 1.12% and multifactor productivity by only 0.65%, resulting in only small aggregate results on US GDP. Regarding public security spending, he calculates that homeland security spending will reduce output only by 0.6 % over a five-year period. Judging by the much larger scale of military spending in the 1980s, he believes that to be negligible, also having no effect on the US budget deficit. Lenain et al. (2002) estimate that security spending leads to a reduction in real GDP by about 0.7 % after five years.

However, these results are thought to be too optimistic (Brück 2006). In addition, they were made shortly after the 9/11 attacks when the full extent of counter-terrorism measures could not be known. Therefore, it is necessary to treat these conclusions with caution. Furthermore, these estimates only refer to security spending in the US, i.e., a large and well-developed economy with an annual GDP of over US\$ 13 trillion. It is possible that security spending could have a significantly retarding effect on economic growth in small and less developed economies (Gupta et al. 2004).

6.3.3 Trade

The literature pays specific attention to the negative impacts of slowed down transport and trade flows due to heightened security measures at borders and transport hubs (Brück 2006). These "frictional costs" of trade arise not only from delays at transport hubs and border controls but also from increased insurance charges and prices for security measures which are passed on from operators to clients (e.g., Nitsch and Schumacher 2004). In quantitative terms it has been estimated that a one-day delay due to border controls costs 0.5% of the value of the delayed good (Hummels 2002). Leonard (2001) estimates rising trading costs of 1% to 3%

ad valorem after 9/11.⁶⁷ This increase corresponds to an annual increase in production costs of traded goods of US\$ 5.6 billion to US\$ 16.8 billion (Walkenhorst and Dihel 2002). Ultimately, with an estimated elasticity of trade flows (in volume terms) with respect to transport costs (ad valorem) of -2 to -3.5, Limao and Venables (2001) expect trade to reduce by this factor.⁶⁸ It is necessary to note that these impacts on trading costs and subsequently trading volumes will vary across goods as well as across trading countries: goods with a high value to weight ratio whose share of trading costs already before 9/11 had a lower proportion of the value (e.g., pharmaceuticals) are expected to be less affected than goods with a low value to weight ratio (Walkenhorst and Dihel 2002).

In 2001/2002, when these studies were implemented, authors such as Walkenhorst and Dihel (2002) expected security measures to abate over time, with an enhanced perception of security in the transport and trade sector, yet, given continued attempts to attack infrastructure, costs in fact are likely to have increased.

Yet, not all studies see increased investments in security necessarily in a negative light. For example, Mirza and Verdier (2008) point to the two-way relationship between terrorism and trade openness, which implies that the relative costs and benefits of openness in relation to terrorism⁶⁹ have to be carefully assessed against the costs of enhanced security measures.

6.3.4 Investment

Macro-economic impacts of security measures may also result from changes in investment behavior due to increased risk aversion. Ryans and Shanklin (1980) in their study of 82 executives of leading multinationals in the US show that a firm's decision to expose itself to the risk of terrorism in a host country will be determined by the returns on the investment, which must be considerably greater than under normal conditions. Thus, high returns on investment are likely to be the reason for Purnell and Wainstein's (1981) finding that despite potential

⁶⁷ Prior to 9/11, estimates of the cost of time delays, paperwork and compliance related to border crossing ranged from 5 to 13% of the value of the goods traded.

⁶⁸ As pointed out before, these figures were calculated shortly after 9/11 and are not based on empirical evidence but rather on crude estimations and assumptions. They are provided as more recent and accurate figures do not exist and to show the possible effects, even if they are merely hypothesised.

⁶⁹ Such assessment should not only focus on benefits to counter terrorism but should incorporate an analysis to what extent security measures against terrorism could enhance overall system security against a variety of vulnerabilities.

difficulties businesses will not pull out of a country but rather cope with terrorist threats or attacks as with other acts of violence.⁷⁰

Yet, in contrast to the relative manageability of terrorism that these micro-analyses suggest, aggregate studies are more pessimistic about the relation between terrorism and capital flows. For Spain and Greece Enders and Sandler (1996) find that protracted political insecurity through terrorism will have significant negative impacts on foreign investment inflows. Capital inflows to Spain decreased by 13.5% on average over the period 1968 to 1991; Greece which was plagued by two major terrorist organizations in the same time period, experienced a comparable reduction of direct foreign investment averaging 11.9% annually.⁷¹

At a cross-country level, Blomberg and Mody (2005) estimate the quantitative implications of violence on international investment. Three findings emerge from their analysis: firstly, violence at home tends to move investment abroad; secondly, violence in the host country deters both trade and FDI flows, where such an effect is particularly strong in developing countries; thirdly, WTO membership appears to counter the negative impacts on bilateral FDI flows, which suggests that while violence raises political risk and discourages investment flows, WTO membership signals a commitment to lower country risk.

As stated above, irrespective of more positive opinions at the micro-economic level, the literature on aggregate effects shows that transnational capital flows are adversely affected by measures adopted to avoid the risk of terrorism.

6.4 Political effects of counter-terrorism measures

As in one subsection of Section 4, we also want to briefly allude to the political effects of counter-terrorism policies. Clearly, a detailed discussion of the repercussions of anti-terrorism measures on civil liberties and democratic rights surpasses the scope of this report which focuses on the economic impacts. However, e.g., as Tavares (2004) finds a positive relationship between the resilience of economies and democratic rights, the potential negative reper-

⁷⁰ This is consistent with empirical findings of, e.g., industrial economies which shows that economic variables (linkages into the global market economy, available technological capabilities, etc) are more important than geopolitical factors.

⁷¹ For Spain, this translates into a decline in real direct foreign investment of almost 500 million dollars, or 7.6% of annual gross fixed capital formation. For Greece, this means a loss amounting to almost 400 million dollars, or 34.8% of annual gross fixed capital formation.

cussions of anti-terrorism measures on democratic freedoms warrant at least a short mentioning; its impact on the resilience of economies could be a further field of study.

Goderis and Versteeg (2008) find that as a reaction to terrorist threats after 9/11 human rights violations (e.g., in the form of torture and political imprisonment) by US allies have increased systematically. While some institutional constraints (e.g., in the form of an independent judiciary) may reduce such negative effects, the findings nevertheless imply that in times of crisis a trade-off between security (in whose name human rights are constrained) and liberty exists, where the magnitude of such a trade-off depends on the institutional setting of affected countries. On the international level, related changes in the allocation of aid to developing countries have also been made. New practices such as increases in aid for military expenditure (in the name of counter-terrorism) are criticized to run counter development objectives and international commitments to human rights (Tujan et al. 2004; Beall et al. 2006).

Thus, it is no surprise that Dreher et al. (2007) find that terrorism exercises a negative impact on governments' respect for human rights. That is, the likelihood of human rights violations (e.g., torture, extrajudicial killings) increases in the face of terrorist threats. Even some civil liberties may be constrained in consequence, although the study finds no systematic effect of terror on political participation and other freedoms associated with a liberal political system. Again, the findings are dependent on country-specific characteristics, where governments with initially high respect for human rights are most likely to curtail them.

Apart from the impacts of security measures on citizens' rights in terror target countries, the impacts of aggressive counter-terrorism measures in terror host countries have been found to terrorize innocent citizens (Kivimaeki 2003).

In general, preliminary results indicate that security measures to counter terrorism are linked to political costs which may (in a country-dependent and internationalized sense) manifest in a "terrorization" of terror-affected populations. In the name of security, governments appear to be willing to sacrifice certain human rights and related liberties. Ironically, such a trade-off implies that terrorists are successful in reaching one of their central goals (political destabilization) also through counter-terrorism actions of attacked governments. Existing evidence also points at the importance of institutional settings of affected countries for assessing the 'true' (indirect) political costs of terrorist activity that come along with counter-terrorism measures. As one direction of future research, analyses of the economic repercussions (in the

form of monetary and welfare losses) probably linked to related policy measures should be furthered.

6.5 The determinants of the economic impacts of anti-terrorism policy

In conclusion, while acts of terrorism have only temporary effects on a mature economy, this section has shown that counter-terrorism measures may potentially extent the impacts of terrorism throughout the economy. Compared to the direct impacts of a terror attack, related determinants and outcomes are much more diffuse and more difficult to anticipate and capture. Even though empirical proof is scant, the available literature points to the following factors which at least in theory determine the economic repercussions of security measures: (i) the choice of security measures that are adopted, (ii) how and by whom security is provided, (iii) the economic context in which security measures are implemented and (iv) the effects security measures have on future terrorist attacks.

As shown in this section, the economic effects of security measures are inter alia determined by the actual type of measure adopted by various economic agents. These measures do not only determine the actual overhead investment or financial outlay necessary but also the scope to create synergies between different security measures. Further, the respective security measures will influence the indirect impacts on the economy through, e.g., impacts on transaction costs and externalities.

Actual security measures adopted by economic agents are influenced by the perception of the actual level of insecurity and the underlying threats; in the case of public agents, political considerations also matter, e.g. by choosing means to retain the confidence of their constituencies and to demonstrate power towards perpetrators (Enders and Sandler 2006). Thus, especially at government level the appropriate form to reinstall security (actual and perceived) is often seen to lie in aggressive action. Considerations of economic impacts (often in the distant future and thus not easy to calculate) therefore appear to be mostly left out of policy considerations.

As importantly, actual security measures as well as the costs of these measures are determined by the expected behavior of other actors. Especially in the case of transnational terrorism, cooperation between countries is essential to maximize the cost effectiveness of counter-terrorism measures. Non-cooperation does not only imply that a few actors have to bear the

costs of the measures, but also, given inter-dependent security, that the measures are unlikely to be effective, which in turn creates disincentives to invest in certain policies.

Security can be provided more or less economically efficiently. As the case of airport security shows, one major question that has not been answered so far is whether governments or the private sector are more effective in providing maximum security at minimal costs. Related to this, in theory, economic repercussions will further differ depending on the mechanisms and approaches (e.g., market mechanisms versus regulations) that are employed to induce security provision. Brück (2006) models the implications of security spending, which could be voluntary, in response to market forces, or forced spending due to new security regulations and legislation: While the first scenario (voluntary security spending) is akin to an insurance spending, the second (responses to market forces) may result in higher costs, yet at the same time could prevent or even raise revenues, while the third (regulated security spending) is congruent to an environmental regulation, increasing social welfare, at the expense of producers with the effect of an overall decrease in the industry's productivity.

Lastly, the ability to coordinate security measures across economic agents not only within but also between economies is likely to impact economic repercussions in two ways. Firstly, given the inter-dependence of security and insecurity, a failure to coordinate measures yielding all links of a system may render individual security investments impotent, therefore rendering no or negative returns to the investment; secondly, given potential negative impacts of competitiveness on involved economic sectors, the economic repercussions of security provision will also be determined by the ability to coordinate security measures across competitors in different economies.

Even though little information is available, Gupta et al. (2004) suggest that security spending may have different effects on economies with different sizes, e.g. as a certain level of security spending implies a higher share in overall spending in a smaller than in a larger economy. However, as the *Australian Department of Foreign Affairs and Trade* DFAT (2004) argues, especially for developing economies spending on security measures can imply an investment into investor confidence and therefore boost economic development. Hypothetically, basic investments to enhance security could positively influence a smaller "less secure" economy up to a certain level, increasing its resilience as well as confidence of economic players in it. This effect could level off, the more developed the economy is, while in fact, reverse, i.e. create negative repercussions in highly developed and open economies due to negative im-

pacts on economic efficiency. This, however, is a hypothesis and the actual dynamics between security and economic development require more careful research.

Related to this, wherever investments in security technologies are necessary, the economic impacts will differ depending on whether an economy is a net importer or exporter of these technologies. If an economy's security sector is sufficiently large and competitive, this sector and the aggregate economy are likely to gain from increased investments in security. Yet, countries which do not produce necessary security technologies will need to import these goods and services. Thus, economic effects of security spending will partly be determined by whether a country is a net importer or exporter of security technologies and services. Long-run costs of security measures will be determined by their actual impact on terrorist behavior. In the best case scenario, security policies will be effective and acts of terrorism will cease; however, in the worst case scenario, terrorists will adjust their behavior to undermine security measures which may result in more severe actions and thus increased costs from terror activity. As Enders and Sandler (2006) show, these considerations are not merely theoretical but reality; however, these costs are often not incorporated into cost-benefit analysis of policy measures.

7 AN EUROPEAN PERSPECTIVE ON THE ECONOMICS OF INSECURITY

In this section, we want to re-evaluate our previous discussion, putting a special European (or EU) perspective on the issue of terrorism. That is, we want to (i) give an overview of historic and current trends in terrorist activity in Europe to assess actual threat levels; (ii) have a look at the causes of terrorism in Europe, acknowledging that the roots of terrorism may differ from one part of the world to the other; (iii) inspect the economic and political costs of terrorism; (iv) evaluate counter-terrorism efforts in Europe (with a special emphasis on EU strategies) and their potential interactions with terrorist activity. Avoiding unnecessary repetitions, we use previously discussed academic theory and evidence; as Europe-specific evidence on the issue of terrorism is generally sparse, some of our appraisals are rather based on the transfer of knowledge on terrorism in other parts of the world (e.g. with respect to its causes and effects) to the European theater. Given the importance of the European Union as a supranational organization, we will discuss its role in combating terrorism in particular.⁷²

7.1 Trends of terrorism in Europe

The TWEED dataset by Engene (2007) provides a good overview of the dynamics of domestic terrorism in many European countries from 1950-2004. During this period, France, the United Kingdom, Spain, Italy, Germany and Greece were most hit by internal terrorism, considering a simple count of events. In fact, almost all (ca. 98%) of all internal terrorist acts during the period of observations were conducted in these countries. With respect to the ferocity of domestic terrorism according to TWEED, during 1950-2004 over 2900 individuals were killed through domestic terrorism. Again, over 2800 individuals were killed in the six countries most affected by terrorism mentioned above. Domestic terrorist activity was more common in the 1970s and 1980s and these decades were also the most brutal ones. Nevertheless, internal domestic terrorist activity never ceased during 1950-2004. Most terrorist acts (about 80%) were committed by organizations with ethnic-nationalist ideologies, prominent

⁷² Delpech (2002) and Heller (2009) provide first overview of the issue of terrorism with a special emphasis on the European (EU) perspective towards it.

groups being the ETA in Spain and the IRA in the United Kingdom. Other groups (e.g., the RAF in Germany or the Action Directe in France) were driven by non-nationalist (left-wing) ideologies (Engene 2007). While left-wing terrorism seems to be on decline since the end of the Cold War, domestic terrorism from ethnic-nationalist groups remains a substantial threat. Furthermore, European countries may increasingly face new forms of home-grown terrorism, drawn from a pool of a radicalized youth incited by new globalized (al-Qaeda-styled) terrorist networks and their propaganda (Heller 2009).

European countries have not only been constantly plagued by internal terrorism but also by transnational one. Gaibullov and Sandler (2008) use data from the ITERATE dataset and show that the top-six countries that suffered from transnational terrorism in the past were again France, the United Kingdom, Spain, Italy, Germany and Greece. Transnational terrorism in Europe was more prominent in the 1990s than domestic terrorism, while internal terrorism accounted for most of the overall terrorist activity in the 1970s and 1980s, and also after the year 2000. This matches with the more general perception that domestic terrorism is a more common phenomenon than transnational terrorism.⁷³ Regarding transnational terrorist groups ideology, in the past were driven by nationalist motifs (e.g., the PLO). However, (as with internal terrorism) new forms of radicalization in Europe may create a new (religiously motivated) wave of terrorism directed at an international audience (Heller 2009).

Overall, Europe has been ridden by both domestic and transnational terrorism, with the relative importance of these two kinds of terrorism shifting over time. Here, some countries have faced the most attacks in total numbers and with respect to their ferocity. While in the past many organizations were incited by nationalist goals, currently a new wave of terrorism may develop associated with the radicalization and globalization of religiously motivated networks.⁷⁴

⁷³ However, the TWEED and INTERATE data sets do not necessarily measure distinct forms of terrorism. For instance, the TWEED set counts terrorism by the IRA in Great Britain as domestic terrorism, while ITERATE counts this form of terrorism as transnational (as Northern Ireland is not part of Great Britain). Technically, this leaves open the possibility that trends derived from these two datasets are to some extent driven by double counting problems (as similarly discussed in Section 2).

⁷⁴ See also the annual terrorism reports by Europol (e.g., Europol 2008). These reports similarly distinguish between religious (Islamic), left-wing, right-wing and ethnic-nationalist terrorism. They also introduce the single issue (e.g., environmental) terrorism as another form of terrorism.

Causes of terrorism in Europe

7.1.1 Domestic terrorism

As hinted at time and again, the lack of data on domestic terrorism has made an analysis of this specific kind of terrorism impossible. For Europe the development of the TWEED dataset by Engene (2007) allows to overcome these data issues. Given that the dataset is relatively young, only few studies have actually used in to conduct empirical analyses of terrorism causes similar to the ones extensively presented in Section 3 of this contribution. Furthermore, Sanchez (2009) employs a new and unique datasets.

Krieger and Meierrieks (2009) make use of the TWEED dataset and find that social welfare policies exercise a significantly negative effect on the genesis of domestic terrorism, resembling the findings of Burgoon (2006) for transnational terrorism. Their analysis also finds that larger populations are positively associated with domestic terrorism production. Overall, these findings suggest that economic factors (moderated through social policies) matter to domestic terrorism in Europe. The findings of Krieger and Meierrieks (2009) also stress the importance of “good” institutions (in the form of sound welfare systems) in decreasing terrorism risk, possibly be leveling social discontent associated with economic disparities. Similarly, Gries et al. (2009) who also build on the TWEED dataset find that economic growth is negatively related to terrorism production. In fact, the findings of Gries et al. (2009) provide causality evidence that economic performance leads (Granger-causes) domestic terrorism but not vice versa.⁷⁵ Again, this stresses the relative importance of economic factors in explaining domestic terrorism in Europe. In a theoretical sense, the results of these two studies imply that economic deprivation (or the lack or leveling thereof) are associated with the genesis of domestic terrorism in Europe.

Using a unique dataset, the analysis by Sanchez (2009) finds that revolutionary (i.e., left-wing) terrorism in Western Europe has been also driven by the experience of past dictatorships (e.g., in Germany, Greece and Italy), where Sanchez (200) argues that this relationship

⁷⁵ Note that Gries et al. (2009) directly investigate the issue of causation between economic conditions and terrorism, which implicitly follows from our review: While in Section 3 reviewed studies, inter alia, viewed economic conditions as a cause of terrorism, reviewed studies in Section 4 considered terrorism as a determinant of economic development. Given that Gries et al. (2009) focus only on few countries, we do not want to infer a general finding neglecting the impact of terrorism on the economy. However, their study surely hints at a promising field of future research.

may, e.g., be associated with past repression exerted by these very dictatorships and their effect on terrorist mobilization. He also finds that strong Communist parties matter to the genesis of terrorism, while economic factors do not matter strongly.⁷⁶

The aforementioned studies are the only ones available which analyze the determinants of domestic terrorism in Europe in a way comparable to the analyses presented in Section 3. Surely, the availability of TWEED will lead to more research on this area in the near future. Currently, we may assess that, first, economic success seems to matter insofar as it is distributed by means of functioning social policies. Second, political change and instability may have to do with terrorist activity during transition periods in Spain, Portugal or Greece, but also with (left-wing) terrorist activity in further countries with an authoritarian past. Here, terrorist organizations may find it cost-efficient to use violence against weak states to achieve political targets.

Beside these factors, we may also speculate about further determinants of domestic terrorism in Europe, where future research on these factors is advocated. First, it seems reasonable to assume that ethnic factors also matter. Identity-related conflict in Spain, France or United Kingdom may have influenced the calculus of individuals in these regions and may have filled the ranks of violent organizations in these countries. However, there are parts of Europe where ethnic conflict abounds (e.g., Catalonia) without strong terrorist activity. That is, ethnic conflict may have contributed to the escalation of violence but may not be its (only) root cause. Second, the Cold War antagonism may have given rise to left-wing terrorist groups in Western Europe. For instance, such organizations may have built on the (ideological and financial) support of Eastern governments. The end of the Cold War has consequently led to a decline in left-wing terrorist violence. However, while it seems reasonable to assume that ethnic factors and Cold War dynamics (along other factors) may explain the patterns of domestic terrorism in Europe, no study exists which analyzes these relationships empirically in an economic way.

⁷⁶ The notion that economic factors (i.e., the economic deprivation hypothesis) is not particularly valid for Western Europe is also supported by Thompson (1989) who provides time-series evidence for Northern Ireland and does not find that terrorism is rooted in poor economic conditions (e.g., chronic unemployment).

7.1.2 Transnational terrorism

As with domestic terrorism, there are few studies explicitly which analyze the determinants of transnational terrorism in Europe. However, we can draw on previously presented evidence to make several assumptions about transnational terrorism dynamics in Europe. As Bird et al. (2008) note, Europe has been one of the parts of the world most strongly targeted by transnational terrorism. However, Europe is not a region that predominantly produces transnational terrorism. Thus, we will in the following focus on the causes of Europe importing transnational terrorism.

Bird et al. (2008) argue that rich democracies are likely targets of transnational terrorism. On the one hand, they are likely to be targeted by individuals or organizations from poor economies, implying that the global distribution of income motivates terrorist attacks. On the other hand, democracies are targeted because they are the regimes which will most likely react to terrorist actions. Following this line of argumentation, Europe is targeted by transnational terrorism because of its economic success and relative political openness.

Following Dreher and Gassebner (2008), countries are likelier targets of terrorism when they are politically close to the United States. Undoubtedly, this is the case for Europe and the EU. The US and its allies are targeted because of foreign policy considerations, e.g., support for Israel or military interventions in Iraq and Afghanistan. In an economic sense, terrorist groups find it more cost-efficient to recruit and muster support when they can build on grievances associated with the existing global order dominated by Western interests. In fact, the evidence by Barros et al. (2007) suggests that US citizens are targeted in particular by left-wing and radical Islamic groups in Europe. These groups are the ones most likely incited by anti-systemic resentment. At the same time, terrorist groups may target European countries when these countries are allied to the terrorist groups' main enemy (e.g., the government of the terrorists' group home country). This strategic logic matches the theoretical model by Addison and Murshed (2006) where terrorists export violence by attacking the friends of their enemies, thereby trying to produce media attention and undermine support for their main antagonist.

As Heller (2009) notes other factors may also determine transnational terrorist activity in Europe, especially in the context of home-grown terrorism directed at an international audience. Here, a lack of education and of social inclusion (social integration) may be named as

determinants of terrorism. Here, institutional constraints may make it easier for terrorist groups to recruit new members when building on feelings of alienation and marginalization.

In short, while there is no evidence explicitly analyzing the determinant of transnational terrorist attacks in Europe, we may from existing (global) evidence conclude that European countries are targeted because of their economic success, their political openness and their closeness to the US and its general foreign policy. Other institutional factors which may constrain the lives of certain individuals (e.g. with immigration or minority backgrounds) create grievances within certain segments of a society and contribute to the radicalization of such groups.

7.2 Consequences of terrorism in Europe

7.2.1 Economic effects

As Europe has been attacked by domestic and transnational terrorist groups over the past decades, negative economic effects are anticipated. Again, the second-order (indirect) effects of terrorist strikes are more likely to reduce terrorist activity than the first-order (direct) ones.

First, several studies detect negative effects of terrorist strikes on the tourism sector, particular analyzing the impact of terrorism on tourism in countries that are strongly dependent upon income streams from tourism (e.g., Enders and Sandler 1991; Enders et al. 1992; Drakos and Kutan 2003). For instance, Enders et al. (1992) find that terrorist activity in Greece, Italy and Austria has led to substantial economic losses for these countries in the 1970s and 1980s. Mostly, these losses stem from changes in consumer behavior (i.e. in traveling) resulting from terrorist activity. As the risk of terrorism in a country increases, it generally becomes more attractive for individuals to travel to more safe countries (cf. Drakos und Kutan 2003).

Enders and Sandler (1996) also document a negative effect of terrorism on economic integration, namely on foreign direct investment (FDI). This study shows that Greece and Spain suffered from terrorism in the form of substantial losses in foreign direct investment (over 10% per year). While terrorist strikes may directly damage FDI-related property, the indirect effect of terrorism is anticipated to be much stronger. Potential investors weigh the risk of investment against its future profits. Clearly, terrorism increases the risks of investment and thereby makes it more likely that FDI is diverted. As Enders and Sandler (1996) note, this effect may be stronger for smaller countries because they are less able to diversify risk and

attract FDI from many different countries. In any case, the findings of Enders and Sandler (1996) demonstrate that terrorism may have a negative impact on economic integration.

Terrorism needs not only to affect certain business sectors or economic integration in Europe. As Fielding (2003) for Northern Ireland shows, terrorist conflict may have large scale impacts on economic activity in general. He demonstrates that terrorism discourages investment, production and employment. Again, these effects are a likely consequence of entrepreneurs responding to the uninsurable risks associated with terrorism, so they are effects of the second order. Similarly, Greenbaum et al. (2007) for Italy show that terrorism has a destabilizing impact on business activity. Terrorist activity is found to reduce business formation and expansion, and employment. Evidently, entrepreneurs react to the risk of terrorism.

Given that terrorism in Europe appears to have negative impacts on certain business sectors in particular but also on production and employment in general, we may anticipate that terrorism reduces overall economic growth. In fact, Gaibulloev and Sandler (2008) find that terrorist activity has reduced economic growth substantially between 1971 and 2004. It is argued that domestic terrorism led to an increase in government spending (crowding out private investment in consequence), whereas transnational terrorism causes a direct crowding out of investment, without noticeable effects on government spending. However, Enders and Sandler (2008) argue that negative shocks stemming from terrorist activity are absorbed effectively by economies that exhibit good institutions and diversified markets, so growth is not impaired by terrorism. While it appears to be intuitive that terrorism affects certain sectors of an economy, it is thus unclear whether these effects feed through to overall growth. In fact, Gries et al. (2009) offer time-series evidence that demonstrates that growth has not been substantially impaired by terrorism, giving support to the reasoning by Enders and Sandler (2008). However, terrorism may damage overall economic growth on regional levels, e.g. in the Basque country (Abadie and Gardeazabal 2003). Negative effects on regional levels do not need to show up on aggregate (national) levels.

7.2.2 Political and social effects

We also want to briefly discuss the more broad effects of terrorism on affected countries, especially in the political and social realm.

One central goal of terrorism is political destabilization. Such effects may also be detectable for the European theatre, even if affected polities are usually characterized as stable. Indri-

dason (2008) shows that terrorist activity indeed influences domestic politics by affecting government formation. In times of terrorism, governments are formed that exhibit lower degrees of ideological polarization and that build on larger parliamentary majorities. Such an effect may be interpreted as a counter-reaction to the terrorist threat of political destabilization. Nevertheless, it shows that political effects are noticeable even in Europe. In a more extreme scenario, Gassebner et al. (2008) argue that terrorism threatens government survival as the electorate punishes failures to counter terrorism. Here, the Madrid train bombings of March 11, 2004 may serve as an example that such mechanisms also work in Europe. Timed immediately before the Spain general elections, the terrorist attacks negatively affected government survival, leading to the political success of the opposition party.

On a final note, it has been argued that terrorism not only produces economic and political but also broader societal costs, e.g., measurable in terms of life satisfaction (Frey et al. 2009). For France, the United Kingdom and Ireland (as three European countries strongly affected by terrorism) Frey et al. (2009) show that terrorism has large negative effects on life satisfaction. The non-monetary losses in life satisfaction indeed translate into considerable monetary effects once converted. This finding may demonstrate that is not sufficient to look at economic losses (in terms of employment, investment etc.) but to also consider more holistic indicators (e.g., life satisfaction) which measure the impact of terrorism on the well-beings of individuals and their behavior.

7.3 Counter-terrorism policies in Europe

7.3.1 Policy actions

As we have argued before, governments may act against terrorism in defensive and proactive ways. All related strategies aim at influencing the costs, benefits and opportunity costs in ways that reduce the incentives for terrorist activity. On a supranational level, the EU has undertaken a number of policy actions in order to influence terrorist activity accordingly.⁷⁷

One set of coordinated policies of the EU aims at reducing terrorism within its borders. The EU has set up an action plan of combating terrorism, as critically reviewed by Bossong

⁷⁷ The counter-terrorism efforts by the EU have been developed in recent years, in particular after the events of September 11, 2001. They are, of course, matched by counter-terrorism efforts by member countries (e.g., efforts

(2008). Related coordinated policy actions include, inter alia, an increased protection of borders and critical infrastructure (Heller 2009), international intelligence cooperation (Müller-Wille 2009), actions against terrorism financing and money laundering (De Vries 2005) and an adjustment of EU foreign policy so as to provide assistance and coordination in the fight against terrorism on a global scale (De Vries 2005; Keohane 2008). In a theoretical sense, actions against terrorism financing and changes in intelligence and foreign policy aim at increasing the costs of terrorism, e.g. as the risk of terrorist organizations to be exposed increases. An increased protection of borders and infrastructure may simultaneously increase terrorism costs and lower its benefits. Many of these counter-terrorism policies are directed against internationalized forms of terrorism. It is less likely that such actions are especially helpful in combating domestic terrorism, although this kind of terrorism still is a considerable threat to several EU member countries (e.g., Spain and Greece).

Another way of fighting terrorism is to target the roots of terrorism, thereby influencing its opportunity costs in ways that reduce violence. Previously, we argued that Europe is targeted by transnational terrorism because of its economic success, political openness and foreign policy. Clearly, it is neither possible nor desirable to give up wealth or democracy for security, or to let terrorist groups influence European foreign policy. In this respect, EU policies that aim at increasing the costs of terrorism or to reduce its benefits appear reasonable to fight terrorism. Nevertheless, related policy strategies have been criticized (cf., Bossong 2008).

Fighting domestic terrorism by soft strategies appears to be more helpful. Existing evidence indicates that economic success and sound welfare policies discourage domestic terrorism within EU borders, thus suggesting that successful economic and social policies may yield an additional terrorist peace dividend. At the same time, political participation for fringe group (e.g., ethnic minorities) may be helpful to manage conflicts along ethnic or nationalist lines in peaceful ways. Barros (2003) argues similarly for the case of ETA in Spain, showing that hard political actions against minorities (e.g., banning parties representing the Basques while being potentially affiliated with ETA) may backfire.

by the Spanish government against ETA, as analyzed by Barros (2003). For this review, we will mainly focus on EU actions.

7.3.2 Effects of counter-terrorism policies

Policy actions against various forms of terrorism which have already been undertaken or which may (given the evidence) be implemented in the future may produce a variety of effects (costs). Potentially, there are economic costs. Counter-terrorism efforts divert public spending away from potentially more effective projects towards security. Potentially, such security measures are neither effective nor (economically) cost-efficient (Heller 2009). For instance, security measures at borders, ports and airports produce economic costs (transportation costs) which may distort economic activity, while not being particularly effective security means at the same time. Clearly, security measures which aim at increasing the costs of terrorism also increase the economic costs of other agents, thereby producing non-desirable second-order effects of terrorism.⁷⁸

With respect to the supranational counter-terrorism strategies of the EU, some undesirable effects are worth noting that are not purely economic. First, counter-terrorism strategies like intelligence cooperation, information exchange or migration control may endanger civil liberties and democratic standards and principles with the EU (e.g., Den Boer et al. 2008; Balzacq 2008). Guild (2008) explicitly discusses the issue of “terrorist lists” to show that there is an inherent conflict between security needs which lead to coordinated security means and individual rights. Similarly, intelligence cooperation and information exchange endanger the (democratic) foundations of the EU when such issues are not subject to political or judicial scrutiny in sufficient ways. In this respect, the second-order political effects of terrorism on EU level may very well contribute to erosion of democracy which may, ironically, potentially be a goal of terrorist attacks.

Second, counter-terrorism strategies may lead to changes in foreign policy. Joffe (2008) notes that EU countries cooperate with North African countries mainly in order to combat transnational terrorism (the shared threat of the EU and North Africa). Basically, Joffe (2008) criticizes that security concerns of the EU have replaced the European agenda to promote economic and political development in its neighborhood. Consequently, security considerations trump over efforts to foster democracy and human rights protection in adjacent parts of the world. Another second-order effect of terrorism in Europe is thus a change in foreign policy which may yield short-run benefits (e.g., improved migration control or intelligence coopera-

⁷⁸ We have discussed a variety of these effects earlier, so we will not repeat this discussion here.

tion). However, by essentially backing non-democratic regions in exchange for security, the European strategy may contribute to the production of more grievances and thus transnational terrorism in adjacent parts of the world (e.g., given that empirical evidence indicates that repression may be one root cause of transnational terrorism).

Third, counter-terrorism efforts by European governments may lead to transference and substitution effects. On the one hand, increases in internal security in the EU may lead to a transfer of terrorist activity to countries that are less capable of defending themselves against terrorism. However, transference of terrorism to other parts of the world does not imply that the EU (or the US) is safer. By contrast, the transfer of terrorist activity may mean that terrorist attack European (and American) citizens more strongly abroad instead of attacking them in their home countries (cf. Enders and Sandler 2006).

Similarly, counter-terrorism efforts by the EU may also induce a change in the tactics of terrorists. As Jackson et al. (2007) show, terrorist groups are capable of adapting to counter-terrorism measures, e.g., by using different kinds of weapons or organization. For instance, a tightened airport control may simply result in an increased vulnerability of other parts of the transportation system, making attacks on public buses or trains more likely.

Given that counter-terrorism efforts may produce a number of economic and political effects and may even significantly influence terrorist behavior, future research should surely focus on this are in particular.

7.4 Summary

Europe has been targeted by domestic and transnational terrorist groups, with the relative importance of these two kinds of terrorism shifting over time. While in the past many organizations were incited by nationalist or left-wing goals, currently a new wave of terrorism may develop associated with the radicalization and globalization of religiously motivated networks. There is little systematic evidence on the causes of domestic and transnational terrorist activity in Europe. Some evidence links domestic terrorist activity to economic decline and poor institutions. However, other factors are also anticipated to matter (e.g. ethnicity, history). Some factors which may constrain the lives of certain individuals (e.g. with immigration or minority backgrounds) create grievances within certain segments of a society and contribute to the radicalization of such groups, thus potentially providing the breeding ground for new

(radicalized or religious) terrorist activity in Europe. At the same time, Europe has been targeted by internationalized terrorism. Here, one may suggest that these attacks are driven by European economic success, its political openness and closeness to the US (i.e., to European foreign policy).

Terrorism in Europe has negatively impacted certain business sectors (e.g. the tourism industry), also affecting production, employment and overall economic growth. However, it is disputed whether economic shocks from terrorism produce long-run costs for countries that exhibit good institutions and diversified markets (as the EU countries) on national levels. Rather, it is more likely that terrorism damages economic activity in regions (at the sub-national level) most hit by terrorism. Still, the political and social costs of terrorism must not be underestimated, e.g. in terms of losses in life satisfaction.

Counter-terrorism efforts have (besides activity in national levels) been coordinated by the EU as a supranational organization. This counter-terrorism activity aims largely at increasing the costs of terrorism (e.g. by aggravating money laundering). Even as appeasement towards domestic and transnational terrorists does not seem to be an option (as this would mean e.g. giving up territory or changing foreign policy), the counter-terrorism efforts of the EU have been criticized. On the one hand, they produce negative (second-order) effects on the economy. On the other hand, they may endanger civil liberties and democratic standards within the EU or may lead to unfavorable biases in the EU's foreign policy. One may argue that such negative (second-order) effects of counter-terrorism and security efforts on the economy, and internal and external politics may produce new terrorism in Europe and abroad that is directed at the EU) or may make such a production at least more likely.

8 CONCLUSION AND RECOMMENDATIONS

Our analysis of the existing literature provides a number of insights regarding the direct and indirect impacts of terrorism on the economy. Hence, our survey shows the importance to differentiate between the direct impacts of terrorist attacks, the indirect impacts which arise from response reactions of economic agents, consumers, producers and the public sector and the longer term adaptation of terrorist groups to a new security environment. The direct economic impacts of terror attacks appear to be determined by the nature and scale of the actual attack, the structure and functioning of the economic system and the behavior of economic agents to mitigate the impacts of terror.

While much of the literature concentrates on the direct impacts of terror attacks, the analysis reiterates the argument of Chen and Siems (2004) and Brück (2006) that impacts resulting from security responses of economic agents could incur more significant economic repercussions than the direct impacts of a terror attack. This leads to the important questions whether counter-terrorist policy should focus on reducing the risk of low probability events or rather on containing economically sub-optimal responses to terror and how to reconcile security with the principles of a liberalized global economy.

One important feature of global terrorism is its objective of harming the twin processes of economic growth in developed countries and of globalization in general; terrorism therefore has an important economic dimension. While the direct economic repercussions of terrorism, especially the repercussions of 9/11 have been very visible, what is less obvious and thus less entrenched in public awareness are the economic consequences of security measures and counter-terrorism policies. Most countries are committed to create and safeguard an area of freedom and security while at the same time building an area of prosperity and economic growth. Yet, the interplay between security, insecurity and economic prosperity are only preliminary understood in academic and policy circles. Our survey provides an overview of the executing research and it aims to *map the “state of play of research” on the inter-relations between the economy and security with particular focus on terrorism, and to identify the level of knowledge on the interaction between the cost distribution of both terrorism and anti-terrorism measures.* Furthermore, it analyses the existing knowledge on the macro-economic

impacts and the current understanding of underlying processes at micro-economic level. Apart from considering aggregate indicators such as fiscal and trade impacts, investment, growth and productivity, the survey assesses the existing research on the impacts of insecurity on behavioral patterns of consumers, households, the private sector (in general, as well as specific sectors) and policy makers, whose behavior constitute the drivers underlying the aggregate impacts at macro-economic level.

9 LITERATURE

- Abadie, A. (2006). "Poverty, Political Freedom, and the Roots of Terrorism." American Economic Review **96**(2): 50-56.
- Abadie, A. and S. Dermisi (2008). "Is Terrorism Eroding Agglomeration Economies in Central Business Districts? Lessons from the Office Real Estate Market in Downtown Chicago." Journal of Urban Economics **64**(2): 451-463.
- Abadie, A. and J. Gardeazabal (2003). "The Economic Costs of Conflict: A Case Study of the Basque Country." American Economic Review **93**(1): 113-132.
- Abadie, A. and J. Gardeazabal (2008). "Terrorism and the world economy." European Economic Review **52**: 1-27.
- Abrahms, M. (2008). "What Terrorists Really Want. Terrorist Motives and Counterterrorism Strategy." International Security **32**(4): 78-105.
- Ackerman, G.A. and K.S. Moran (2006). "Bioterrorism and Threat Assessment." Weapons of Mass Destruction Commission Paper **22**.
- Addison, T. and M. Murshed (2005). "Transnational terrorism as a spillover of domestic disputes in other countries." Defence and Peace Economics **16**(2): 69 - 82.
- Alexander, D. and Y. Alexander (2002). Terrorism and Business: The Impact of September 11, 2001, Transnational Publishers.
- Alexiev, A. (2004). "Ömilliarden für den Dschihad. Saudi-Arabien finanziert den globalen Islamismus." Internationale Politik **February**: 21-28.
- Aly, H.Y. and M.C. Strazicich (2000). "Terrorism and Tourism: Is the impact permanent or transitory? Time series evidence from some MENA countries." Ohio State University.
- Anderton, C.H. and J.R. Carter (2005). "On Rational Choice Theory and the Study of Terrorism." Defence and Peace Economics **16**(4): 275 - 282.
- Arce, D.G., Sandler, T. (2003). An Evolutionary Game Approach to Fundamentalism and Conflict. Journal of Institutional and Theoretical Economics **159**: 132-154.
- Arin, K.P., D. Ciferri and N. Spagnolo (2008). "The price of terror: The effects of terrorism on stock market returns and volatility." Economics Letters **101**: 164-167.
- Araz-Takay, B., K.P. Arin and T. Omay (2009). "The Endogenous and Non-Linear Relationship Between Terrorism and Economic Performance: Turkish Evidence." Defence and Peace Economics **20**(1):1-10.
- Auerswald, P., L.M. Branscomb, T.M. La Porte and E. Michel-Kerjan (2005). "The Challenge of Protecting Critical Infrastructure." Issues in Science and Technology **22**(1): 77-83.

- Azam, J.-P. (2005). "Suicide-bombing as inter-generational investment." Public Choice **122**(1): 177–198.
- Azam, J.-P. and A. Delacroix (2006). "Aid and the Delegated Fight Against Terrorism." Review of Development Economics **10**(2): 330-344.
- Azam, J.-P. and V. Thelen (2008). "The roles of foreign aid and education in the war on terror." Public Choice **135**:375-397.
- Baily, M.N. (2001). Economic policy following the terrorist attacks. Washington DC., Institute for International Economics.
- Balzacq, T. (2008). The Policy Tools of Securitization: Information Exchange, EU Foreign and Interior Policies." Journal of Common Market Studies **46**(1): 75-100.
- Barros, C.P. (2003). "An Intervention Analysis of Terrorism: The Spanish ETA Case." Defence and Peace Economics **14**(6): 401-412.
- Barros, C.P., I. Proenca, J.R. Faria and L.A. Gil-Alana (2007). "Are USA Citizens at Risk of Terrorism in Europe?" Defence and Peace Economics **18**(6): 495-507.
- Basuchoudhary, A. and W.F. Shughart (2007). "On Ethnic Conflict and the Origins of Terrorism." Defence and Peace Economics (forthcoming).
- Beall, J., T. Goodfellow and J. Putzel (2006). "Introductory Article on the Discourse of Terrorism, Security and Development." Journal of International Development **18**: 15-76.
- Beck, U. (1992). Risk society : towards a new modernity. London, Sage Publications.
- Becker, G. and Y. Rubinstein (2004). "Fear and the Response to Terrorism: An Economic Analysis." Mimeo.
- Bellany, I. (2007). "Terrorism: Facts from Figures." Defence and Peace Economics **18**(2): 101 - 112.
- Benmelech, E. and C. Berrebi (2007). "Human Capital and the Productivity of Suicide Bombers" Journal of Economic Perspectives **21**(3): 223-238.
- Bergesen, A.J. and O. Lizardo (2004). International Terrorism and the World-System. Sociological Theory **22**(1): 38-52.
- Berman, E. and D. Laitin (2005). "Hard Targets: Theory and Evidence on Suicide Attacks." National Bureau of Economic Research NBER Working Paper **11740**.
- Bernholz, P. (2006). International political system, supreme values and terrorism. Public Choice **128**: 221-231.
- Berrebi, C. (2007). "Evidence about the Link Between Education, Poverty and Terrorism among Palestinians" Peace Economics, Peace Science and Public Policy **13**(1): Article 2.
- Berrebi, C. and E.F. Klor (2005). "The Impact of Terrorism Across Industries: An Empirical Study". C.E.P.R. Discussion Paper **5360**.
- Berrebi, C. and E.F. Klor (2008). "Are voters sensitive to terrorism? Direct evidence from the Israeli electorate." American Political Science Review **102**(3): 279-301.
- Berrebi, C. and D. Lakdawalla (2007). "How Does Terrorism Risk Vary Across Space and Time? An Analysis Based on the Israeli Experience." Defence and Peace Economics **18**(2): 113-131.
- Bird, G., S.B. Blomberg and G.D. Hess (2008). "International Terrorism: Causes, Consequences and Cures." The World Economy **31**(2): 255-274.
- Blalock, G., V. Kadiyali and D.H. Simon (2007). "The impact of post-9/11 airport security measures on the demand for air travel." Journal of Law & Economics **50**: 731-755.

- Blandford, D. (2002). The agricultural economics of terrorism: Markets in peril, international trade dimensions. Annual meeting of the American Agricultural Economics Association, Long Beach, CA.
- Blomberg, S.B., R. Engel and R. Sawyer (2009). "On the Duration and Sustainability of Terrorist Organizations." Journal of Conflict Resolution (forthcoming).
- Blomberg, S.B. and G. Hess (2006). "How Much Does Violence Tax Trade?" The Review of Economics and Statistics **88**(4): 599-612.
- Blomberg, S. and G. Hess (2008a). The Lexus and the Olive Branch: Globalization, Democratization and Terrorism. Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 116-147.
- Blomberg, S. and G. Hess (2008b). From (No) Butter to Guns? Understanding the Economic Role in Transnational Terrorism. Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 83-115.
- Blomberg, S.B., G.D. Hess and A. Orphanides (2004a). "The Macroeconomic Consequences of Terrorism." Journal of Monetary Economics **51**(5): 1007-1032.
- Blomberg, S.B., G.D. Hess and A. Weerapana (2004b). "Economic Conditions and Terrorism." European Journal of Political Economy **20**(2): 463-478.
- Blomberg, S.B. and A. Mody (2005). "How Severely Does Violence Deter International Investment?" Claremont McKenna College.
- Bolechow, B. (2005). "The United States of America Vis-à-Vis Terrorism." American Behavioral Scientist **48**(6): 783-794.
- Bossong, R. (2008). "The Action Plan on Combating Terrorism: A Flawed Instrument of EU Security Governance." Journal of Common Market Studies **46**(1): 27-48.
- Braithwaite, A. and Q. Li (2007). "Transnational Terrorism Hot Spots: Identification and Impact Evaluation." Conflict Management and Peace Science **24**(4): 281-296.
- Bram, J., J. Orr and R. Rapaport (2002). "Measuring the effects of the September 11 attack on New York City." Economic Policy Review **8**(2): 5-20.
- Brown, J.R., J.D. Cummins, C.M. Lewis and R. Wei (2004). "An Empirical Analysis of the Economic Impact of Federal Terrorism Reinsurance." Journal of Monetary Economics **51**(5): 861-898.
- Brown, J. R., R.S. Kroszner and B. Jenn (2002). "Federal Terrorism Risk Insurance." National Tax Journal **55**(3): 647-657.
- Brück, T. (2004). "An Economic Analysis of Security Policies." Defence and Peace Economics **16**(5): 375-389.
- Brück, T. (2006). The economic analysis of terrorism. London, Routledge.
- Brück, T. and B.-A. Wickström (2004). "Editorial: The economic consequences of terror: Guest editors' introduction." European Journal of Political Economy **20**: 293-300.
- Buehler, K.S. and G. Pritsch (2003). "Running with risk. It's good to take risks—if you manage them well." McKinsey Quarterly **2003**(4): http://www.mckinseyquarterly.com/article_page.aspx?ar=1351andL2=5andL3=5.
- Bueno de Mesquita, E. (2005). "The Quality of Terror" American Journal of Political Science **49**(3): 515-530.
- Burgoon, B. (2006). "On Welfare and Terror: Social Welfare Policies and Political-Economic Roots of Terrorism." Journal of Conflict Resolution **50**(2): 176-203.

- Camacho, A. (2008). "Stress and birth weight: evidence from terrorist attacks." American Economic Review: Papers & Proceedings **98**(2): 511-515.
- Campos, N.F. and Gassebner, M. (2008). International Terrorism, Political Instability and the Escalation Hypothesis. Mimeo, Brunel University and ETH Zurich.
- Caplan, B. (2006). Terrorism: The relevance of the rational choice model. Public Choice **128**: 91-107.
- Caplan, H. (2003). "War and Terrorism Insurance: Plans for Long-Term International Stability and Affordability." Geneva Papers on Risk and Insurance: Issues and Practice **28**(3): 426-447.
- Cauley, J. and I.E. Iksoon (1988). "Intervention Policy Analysis of Skyjackings and Other Terrorist Incidents." American Economic Review **78**(2), 27-31.
- Chalk, P. (2001). Terrorism, Infrastructure Protection, and the US Food and Agricultural Sector. RAND Cooperation.
- Chalk, P., B. Hoffman, R. Reville and A.-B. Kasupski (2005). Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act. RAND Centre for Terrorism Risk Management Policy.
- Chen, A. H. and T. F. Siems (2004). "The Effects of Terrorism on Global Capital Markets." European Journal of Political Economy **20**(2): 349-366.
- Cohen, J.S., A. Mintz, et al. (2003). Defence Expenditures and Economic Growth in Israel: The Indirect Link. The economics of conflict. Volume 3. Case studies. T. Sandler and K. Hartley, Elgar Reference Collection. International Library of Critical Writings in Economics, vol. 168. Cheltenham, U.K. and Northampton, Mass.: Elgar: 387-398.
- Coolsaet, R. and T. Van de Voorde (2006). "The Evolution of Terrorism in 2005 -- A statistical assessment." Universiteit Gent.
- Coughlin, C.C., J.P. Cohen and S.R. Khan (2002). "Aviation security and terrorism: a review of the economic issues." Federal Reserve Bank of St. Louis Review **84**(5): 9-24.
- Council of the European Union (2002). Council Framework Decision of 13 June 2002 on combating terrorism. 2002/475/JHA.
- Council of the European Union (2005). The European Union Counter-Terrorism Strategy. <http://register.consilium.europa.eu/pdf/en/05/st14/st14469-re04.en05.pdf>.
- Cowan, R., and D. Foray (1995). "Quandaries in the economics of dual technologies and spillovers from military to civilian research and development." Research Policy **24**: 851 - 868.
- Crain, N.V. and W.M. Crain (2006). "Terrorized economies." Public Choice **128**: 317-349.
- Crenshaw, M. (2007). "Explaining Suicide Terrorism: A Review Essay." Security Studies **16**(1): 133-62.
- Cummins, D.J. and C. Lewis (2003). "Catastrophic Events, Parameter Uncertainty and the Breakdown of Implicit Long-Term Contracting: The Case of Terrorism Insurance." The Journal of Risk and Uncertainty **26**: 153 178.
- Cummins, J.D., N. Doherty and A. Lo (2002). "Can Insurers Pay for the `Big One? Measuring the Capacity of the Insurance Market to Respond to Catastrophic Losses." Journal of Banking and Finance **26**(2-3): 557-83.
- Delpech, T. (2002). "International terrorism and Europe." Institute for Security Studies Chaillot Papers **56**.
- Department of Foreign Affairs and Trade [DFAT] (2004). "Combatting Terrorism in the Transport Sector Economic Costs and Benefits." Australian Government.

- Den Boer, M., C. Hillebrand and A. Nöle (2008). "Legitimacy Under Pressure: The European Web of Counter-Terrorism Networks." Journal of Common Market Studies **46**(1): 101-124.
- De Vries, G. (2005). "The European Union's Role in the Fight Against Terrorism." Irish Studies in International Affairs **16**: 3-9.
- Dixon, L. and R. Reville (2005). National Security and Compensation Policy for Terrorism Losses. Catastrophic Risks and Insurance. O. f. E. C.-O. a. Development, Proceedings: Policy Issues in Insurance, no. 8. Paris and Washington, D.C.: Author: 59-71.
- Dolnicar, S. (2005). "Understanding barriers to leisure travel: Tourist fears as a marketing basis." Journal of Vacation Marketing **11**(3): 197-208.
- Downes-Le Guin, T. and B. Hoffman (1993). The Impact of Terrorism on Public Opinion, 1988 to 1989, RAND Corporation.
- Drakos, K. (2004). "Terrorism-Induced Structural Shifts in Financial Risk: Airline Stocks in the Aftermath of the September 11th Terror Attacks." European Journal of Political Economy **20**(2): 435-446.
- Drakos, K. (2008). "Security Economics: A Guide for Data Availability and Needs." Paper presented at the Second Workshop of the Network for the Economics Analysis of Terrorism (NEAT), September 22, 2008, Brussels.
- Drakos, K. and A. Gofas (2006a). "The Devil You Know but Are Afraid to Face: Underreporting Bias and its Distorting Effects on the Study of Terrorism." Journal of Conflict Resolution **50**(5): 714-735.
- Drakos, K. and A. Gofas (2006b). "In search of the average transnational terrorist attack venue." Defence and Peace Economics **17**(2): 73 - 93.
- Drakos, K. and A.M. Kutan (2003). "Regional Effects of Terrorism on Tourism in Three Mediterranean Countries." Journal of Conflict Resolution **47**(5): 621-641.
- Dreher, A. and M. Gassebner (2008). "Does political proximity to the U.S. cause terror?" Economics Letters **99**, 27-29.
- Dreher, A., M. Gassebner and L.-H.R. Siemers (2007). "Does Terror Threaten Human Rights? Evidence from Panel Data." Journal of Law and Economics (forthcoming).
- Dreher, A. and J.A.V. Fischer (2008). "Decentralization as a Disincentive for Transnational Terror? An Empirical Test." International Economic Review (forthcoming).
- Eckstein, Z. and D. Tsiddon (2004). "Macroeconomic Consequences of Terror: Theory and the Case of Israel." Journal of Monetary Economics **51**(5): 971-1002.
- Eisinger, P. (2004). "The American City in the Age of Terror: A Preliminary Assessment of the Effects of September 11." Urban Affairs Review **40**(1): 115-130.
- Ehrlich, P.R. and J. Liu (2002). Some Roots of Terrorism. Population and Environment **24**(2): 183-192.
- Eldor, R. and R. Melnick (2004). "Financial Markets and Terrorism." European Journal of Political Economy **20**(2): 367-386.
- Enders, W. and T. Sandler (1991). "Causality between transnational terrorism and tourism: The case of Spain." Terrorism **14**(1): 49-58.
- Enders, W. and T. Sandler (1996). "Terrorism and Foreign Direct Investment in Spain and Greece." Kyklos **49**(3): 331-352.
- Enders, W. and T. Sandler (2002). "Patterns of Transnational Terrorism, 1970-1999: Alternative Time-Series Estimates." International Studies Quarterly **46**(2): 145-165.

- Enders, W. and T. Sandler (2005). "After 9/11: Is It All Different Now?" Journal of Conflict Resolution **49**(2): 259-277.
- Enders, W. and T. Sandler (2006). The political economy of terrorism. Cambridge, Cambridge University Press.
- Enders, W. and T. Sandler (2008). Economic Consequences of Terrorism in Developed and Developing Countries: An Overview. Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 17-47.
- Enders, W., T. Sandler, G. Parise (1992). "An Econometric Analysis of the Impact of Terrorism and Tourism." Kyklos **45**(4): 531-54.
- Engene, J.O. (2007). "Five Decades of Terrorism in Europe: The TWEED Dataset" Journal of Peace Research **44**(1): 109-121.
- Ericson, R. V. and A. Doyle (2004). "Catastrophe Risk, Insurance and Terrorism." Economy and Society **33**(2): 135-173.
- ESRAB (2006). Meeting the Challenge. The European Security Research Agenda, Brussels.
- Eubank, W. and L. Weinberg (2001). "Terrorism and Democracy: Perpetrators and Victims." Terrorism and Political Violence **13**(1): 155-164.
- European Commission (Directorate-General Justice Freedom and Security) (2006). Terms of Reference, Tender JLS/D1/2006/10. Brussels.
- Europol (2008). "EU Terrorism Situation and Trend Report 2008." European Police Office.
- Evans, R.G., J.M. Crutcher, B. Shadel, B. Clements and M. S. Bronze (2002). "Terrorism from a public health perspective." American Journal of the Medical Sciences **323**: 291-298.
- Eyerman, J. (1998). "Terrorism and Democratic States: Soft Targets or Accessible Systems." International Interactions **24**(2): 151-170.
- Feldmann, A.E. and M. Perälä (2004). "Reassessing the Causes of Nongovernmental Terrorism in Latin America." Latin American Politics and Society **46**(2): 101-132.
- Feridun, M. and S. Sezgin (2008). "Regional Underdevelopment and Terrorism: The Case of South Eastern Turkey." Defence and Peace Economics **19**(3): 225-233.
- Fielding, D. (2003). "Investment, Employment, and Political Conflict in Northern Ireland." Oxford Economic Papers **55**(3): 512-535.
- Fischhoff, B., R.M. Gonzalez, D.A. Small and J.S. Lerner (2003). "Judged Terror Risk and Proximity to the World Trade Center." The Journal of Risk and Uncertainty **23**(2-3): 137-151.
- FitzGerald, E.V.K. (2004). "Global financial information, compliance incentives and terrorist funding." European Journal of Political Economy **20**(2): 387-401.
- Fleischer, A. and S. Buccola (2002). "War, Terror and the Tourism Market in Israel." Applied Economics **34**, 1335-1343.
- Frey, B.S. (2004). Dealing with terrorism stick or carrot? Cheltenham, Elgar.
- Frey, B.S. and S. Luechinger (2002). "Terrorism: Deterrence May Backfire." University of Zurich.
- Frey, B.S. and S. Luechinger (2003). "How to Fight Terrorism: Alternatives to Deterrence." Defence and Peace Economics **14**(4): 237-249.
- Frey, B.S. and S. Luechinger (2004). "Decentralization as a disincentive for terror" European Journal of Political Economy **20**: 509-515.

- Frey, B.S. and S. Luechinger (2005). Measuring Terrorism. Law and the State: A Political Economy Approach. A. Marciano and J.-M. Josselin, New Horizons in Law and Economics series. Cheltenham, U.K. and Northampton, Mass.: Elgar: 142-181.
- Frey, B.S. and S. Luechinger (2008). "Three Strategies to Deal with Terrorism." Economic Papers **27**(2): 107-114.
- Frey, B.S., S. Luechinger and A. Stutzer (2007). "Calculating Tragedy: Assessing the Costs of Terrorism." Journal of Economic Surveys **21**: 1-24.
- Frey, B.S., S. Luechinger and A. Stutzer (2009). "The life satisfaction approach to valuing public goods: The case of terrorism." Public Choice **138**: 317-345.
- Frey, B.S. and D. Rohner (2007). "Protectiong Cultural Monuments Against Terrorism" Defence and Peace Economics **18**(3): 245-252.
- Gaibulloev, K. and T. Sandler (2008). "Growth Consequences of Terrorism in Western Europe." Kyklos **61**(3): 411-424.
- Gassebner, M., R. Jong-A-Pin and J.O. Mierau (2008). "Terrorism and electoral accountability: One strike, you're out." Economics Letters **100**: 126-129.
- Gigerenzer, G. (2006). "Out of the Frying Pan into the Fire: Behavioral Reactions to Terrorist Attacks." Risk Analysis **26**(2): 347-351.
- Glaeser, E.L. and J.M. Shapiro (2002). "Cities and Warfare: The Impact of Terrorism on Urban Form." Journal of Urban Economics **51**(2): 205-224.
- Goderis, B. and M. Versteeg (2008). Human Rights Violations after 9/11 and the Role of Institutional Constraints." Paper presented at the Second Workshop of the Network for the Economics Analysis of Terrorism (NEAT), September 22, 2008, Brussels.
- Greenbaum, R.T., L. Dugan and G. LaFree (2007). "The Impact of Terrorism on Italian Employment and Business Activity." Urban Studies **44**(5-6): 1093-1108.
- Gries, T., T. Krieger and D. Meierrieks (2009). "Causal Linkages Between Domestic Terrorism and Economic Growth." Defense and Peace Economics (forthcoming).
- Gross, K., P.R. Brewer and S. Adlay (2009). "Confidence in Government and Emotional Responses to Terrorism After September 11, 2001." American Politics Research **37**(1): 107-128.
- Guild, E. (2008). "The Uses and Abuses of Counter-Terrorism Policies in Europe: The Case of the 'Terrorist Lists'" Journal of Common Market Studies **46**(1): 173-193.
- Gupta, S., B. Clements, R. Bhattacharya and S. Chakravarti (2004). "Fiscal consequences of armed conflict and terrorism in low- and middle-income countries." European Journal of Political Economy **20**:403-421.
- Gurr, T. (1970). Why Men Rebel. Princeton University Press: Princeton.
- Harrison, M. (2006a). "An Economist Looks at Suicide Terrorism." World Economics **7**(3): 1-15.
- Harrison, M. (2006b). "Bombers and Bystanders in Suicide Attacks in Israel, 2000-2003." Studies in Conflict and Terrorism **29**(2): 187-206.
- Harrison, M. (2009). "Counter-Terrorism in a Police State : The KGB and Codename Blaster, 1977" University of Warwick Economics Research Paper Series **918**.
- Heller, R. (2009). "Notions of Insecurity and Security Policy within the EU: A Historical Perspective." DIW Berlin Economics of Security Working Paper **4**.
- Hilsenrath, P. (2005). "Health Policy as Counter-Terrorism: Health Services and the Palestinians." Defence and Peace Economics **16**(5): 365 - 374.

- Hobijn, B. (2003). "What Will Homeland Security Cost?" Economic Policy Review **8**(2): 21- 33.
- Hoffman, B. (1998). Inside Terrorism. New York, Columbia University Press.
- Hogarth, R. (2002). "Insurance and Safety after September 11, 2001: Coming to Grips with the Costs and Threats of Terrorism" Universitat Pompeu Fabra Economics and Business Working Paper **656**.
- Hooke, R., Agens, G., Chambers, I., et al, (2006). "Civil aerospace in the 21st century - Business as usual ... or a fresh start?" Price Waterhouse Cooper.
- Human Security Centre (2005). "The Human Security Report." University of British Columbia.
- Human Security Centre (2006). "Human Security Brief." University of British Columbia.
- Hummels, D. (2001). "Time as a trade barrier." GTAP Working Paper **18**.
- Huntington, S. (1996). The Clash of Civilizations and the Remaking of World Order. Simon & Schuster: New York.
- Hyams, K.C., F.M. Murphy and S. Wessely (2002). "Responding to Chemical, Biological, or Nuclear Terrorism: The Indirect and Long-Term Health Effects May Present the Greatest Challenge." Journal of Health Politics, Policy and Law **27**(2): 273-291.
- Indridason, I.H. (2008). "Does Terrorism Influence Domestic Politics? Coalition Formation and Terrorist Incidents." Journal of Peace Research **45**(2): 241-259.
- Ito, H. and D. Lee (2005). "Assessing the Impact of the September 11 Terrorist Attacks on U.S. Airline Demand." Journal of Economics and Business **57**(1): 75-95.
- Jackson, B., P. Chalk, R.K. Cragin, B. Newsome, J.V. Parachini, W. Rosenau, E.M. Simpson, M. Sisson and D. Temple (2007). Breaching the Fortress Wall: Understanding Terrorist Efforts to Overcome Defensive Technologies. RAND Cooperation.
- Joffe, G. (2008). "The European Union, Democracy and Counter-Terrorism in the Maghreb." Journal of Common Market Studies **46**(1): 147-171.
- Keohane, D. (2008). "The Absent Friend: EU Foreign Policy and Counter-Terrorism." Journal of Common Market Studies **46**(1): 125-146.
- Katiuscia, S., V. Galletto and E. Blanzieri (2003). "How Has the 9/11 Terrorist Attack Influenced Decision Making?" Applied Cognitive Psychology **17**(9): 1113-1127.
- Keefer, P. and N. Loayza (2008). Terrorism, Economic Development, and Political Openness. Cambridge University Press: New York.
- Keyfitz, R. (2004). "U.S. Consumers and the War in Iraq." Business Economics **39**(2): 18-23.
- Kirk, R.M. (1983). Political terrorism and the size of government: A positive institutional analysis of violent political activity. Public Choice **40**: 41-52.
- Kivimaeki, T. (2003). "Terrorism in Southeast Asia." NIASnytt **3**(September).
- Kleindorfer, P.R. and G.H. Saad (2005). "Managing Disruption Risks in Supply Chains." Production and Operations Management Journal **14**(1): 53-58.
- Knight, F.H. (1921). Risk, Uncertainty, and Profit. Houghton Mifflin: Boston and New York.
- Koch, M.T. and S. Cranmer (2007). "Testing the "Dick Cheney" Hypothesis: Do Governments of the Left Attract More Terrorism than Governments of the Right?" Conflict Management and Peace Science **24**(4):311-326.
- Krieger, T. and D. Meierrieks (2008). "What causes terrorism?" CIE Working Paper 12, University of Paderborn.

- Krieger, T. and D. Meierrieks (2009). "Terrorism in the Worlds of Welfare Capitalism." CIE Working Paper 22, University of Paderborn.
- Krueger, A.B. (2007). What Makes a Terrorist: Economics and the Roots of Terrorism. Cambridge University Press: New York.
- Krueger, A.B. (2008). "What makes a homegrown terrorist? Human capital and participation in domestic Islamic terrorist groups in the U.S.A." Economics Letters **101**: 293-296.
- Krueger, A.B. and J. Maleckova (2003). "Education, Poverty and Terrorism: Is There a Causal Connection?" The Journal of Economic Perspectives **17**(4): 119-144.
- Krueger, A.B. and D.D. Laitin (2008). Kto Kogo?: A Cross-Country Study of the Origins and Targets of Terrorism. Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 148-173.
- Kunreuther, H. (2002). "Risk Assessment and Risk Management in an Uncertain World." Risk Assessment **22**(4): 655-664.
- Kunreuther, H. (2006). "Risk and Reaction: Dealing with Interdependencies." Harvard International Review **28**(3).
- Kunreuther, H. and G. Heal (2003). "Interdependent Security." The Journal of Risk and Uncertainty **26**(2-3): 231-249.
- Kurrild-Klitgaard, P., M.K. Justesen and P. Klemmensen (2006). The political economy of freedom, democracy and transnational terrorism. Public Choice **128**: 289-315.
- Lacker, J.M. (2004). "Payment System Disruptions and the Federal Reserve Following September 11, 2001." Journal of Monetary Economics **51**(5): 935-965.
- LaFree, G. and L. Dugan (2006). "Introducing the Global Terrorism Database" Terrorism and Political Violence **19**(2): 181-204.
- Lai, B. (2007). "'Draining the Swamp': An Empirical Examination of the Production of International Terrorism, 1968-1998." Conflict Management and Peace Science **24**(4): 297-310.
- Landes, W.A. (1978). "An Economic Analysis of US Aircraft Hijackings, 1961-1976." Journal of Law and Economics **21**(1): 1-31.
- Lee, C.-C. and C.-P. Chang (2006). "The Long-Run Relationship between Defence Expenditures and GDP in Taiwan." Defence and Peace Economics **17**(4): 361-385.
- Lee, D.R. (1988). "Free Riding and Paid Riding in the Fight against Terrorism." American Economic Review **78**(2): 22-26.
- Lee, D.R. and T. Sandler (1988). "On the Optimal Retaliation Against Terrorists: The Paid-Rider Option." Public Choice **61**:141-152.
- Lenain, P., M. Bonturi V. Koen (2002). "The Economic Consequences of Terrorism." OECD Working paper 334, Department of Economics, Paris: OECD.
- Leonard, J.S. (2001). Impact of the September 11, 2001 Terrorist Attacks on North American Trade Flows., Manufacturers Alliance E-Alert, Arlington Virginia.
- Lerner, J. (1992). "The Mobility of Corporate Scientists and Engineers between Civil and Defence Activities: Implications for Economic Competitiveness in the Post-Cold War Era." Defence and Peace Economics **3**(3): 229-42.
- Lerner, J.S., R.M. Gonzalez, D.A. Small and B. Fischhoff (2003). "Effects of Fear and Anger on Perceived Risks of Terrorism: A National Field Experiment." Psychological Science **14**(2), 144-150.
- Li, Q. (2005). Does Democracy Promote or Reduce Transnational Terrorist Incidents? Journal of Conflict Resolution **49**(2): 278-297.

- Li, Q. and D. Schaub (2004). "Economic Globalization and Transnational Terrorism: A Pooled Time-Series Analysis." Journal of Conflict Resolution **48**(2): 230-258.
- Lichtenberg, F. (1995). Economics of Defence RandD. Handbook of Defence Economics. K. Hartley, and T. Sandler, Amsterdam, Elsevier.
- Limao, N. and A.J. Venables (2001). "Infrastructure, Geographical Disadvantage, Transport Costs, and Trade." World Bank Economic Review **15**(3): 451-479.
- Llorca-Vivero, R. (2008). "Terrorism and international tourism: New evidence." Defence and Peace Economics **19**(2): 169-188.
- Llussa, F. and J. Tavares (2008). "Economics and Terrorism: What We Know, What We Should Know and the Data We Need." Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 233-254.
- Llussa, F. and J. Tavares (2008). "Which Terror at Which Costs? On the Economic Consequences of Terrorist Attacks." Mimeo, University of Lisbon.
- London Chamber of Commerce (2005). The economic effects of terrorism on London. Experiences of firms in London's business community. London, Press and Public Affairs, London Chamber of Commerce.
- Mansdorf, I.J. and J. Weinberg (2003). "Stress reactions in Israel in the face of terrorism: Two Community Samples." Traumatology **9**(3): 155-168.
- Maurer, V. (2007). The European Union and Counter-Terrorism. Zuerich, Centre for Security Studies, ETH.
- McKinsey (2006). An executive take on the top business trends : A McKinsey Global Survey. McKinsey Quarterly at http://www.mckinseyquarterly.com/article_page.aspx?ar=1754andL2=21andL3=114andpagenum=1. **2007**.
- Michel-Kerjan, E. and B. Pedell (2006). "How Does the Corporate World Cope with Mega-Terrorism? Puzzling Evidence from Terrorism Insurance Markets." Journal of Applied Corporate Finance **18**(4): 61-75.
- Mickolous, E.F., T. Sandler, J.M. Murdock and P. Flemming (2004). International Terrorism: Attributes of Terrorist Events, 1968-2003 (ITERATE). Dunn Loring, Vinyard Software.
- Midlarsky, M., M. Crenshaw and F. Yoshida (1980). "Why Violence Spreads: The Contagion of International Terrorism." International Studies Quarterly **24**(2): 262-298.
- Miller, A.H. (1994). "Comment on Terrorism and Democracy." Terrorism and Political Violence **6**(4): 435-439.
- Mirza, D.T. and T. Verdier (2008). "International trade, security and transnational terrorism: Theory and a survey of empirics." Journal of Comparative Economics **36**: 179-194.
- Moghadam, A. (2006). "Suicide Terrorism, Occupation, and the Globalization of Martyrdom: A Critique of *Dying to Win*." Studies in Conflict and Terrorism **29**(8): 707-729.
- Muenkler, H. (2004). "Terrorismus heute. Die Asymmetrisierung des Krieges." Internationale Politik **February**: 1-11.
- Müller-Wille, B. (2008). "The Effect of International Terrorism on EU Intelligence Cooperation." Journal of Common Market Studies **46**(1): 49-73.
- Naor, Z. (2006). "Untimely death, the value of certain lifetime and macroeconomic dynamics." Defence and Peace Economics **17**(4): 343 - 359.

- Napoleoni, L. (2003). Modern jihad : tracing the dollars behind the terror networks. London, Pluto.
- Navarro, P. and A. Spence (2001). "September 2001. Assessing the Costs of Terrorism." Milken Institute Review **2**: 16-31.
- Nelson, P.S. and J.L. Scott (1992). "Terrorism and the Media: An Empirical Analysis." Defence Economics **3**(4): 329-339.
- Neumayer, E. and T. Plümper (2009). "Terrorism and the Clash of Civilizations. Was Huntington Right After All?" British Journal of Political Science **39**(4): 711-734.
- Nitsch, V. and D. Schumacher (2004). "Terrorism and International Trade: An Empirical Investigation." European Journal of Political Economy **20**(2): 423-433.
- Pape, R.A. (2003). "The Strategic Logic of Suicide Terrorism." American Political Science Review **97**(3): 1-19.
- Phillips, P.J. (2005). "The 'Price' of Terrorism." Defence and Peace Economics **16**(6): 403 - 414.
- Piazza, J.A. (2006). "Rooted in Poverty?. Terrorism, Poor Economic Development, and Social Cleavages." Terrorism and Political Violence **18**(1): 159-177.
- Piazza, J.A. (2007). "Draining the Swamp: Democracy Promotion, State Failure, and Terrorism in 19 Middle Eastern Countries." Studies in Conflict & Terrorism **30**(6): 521-539
- Piazza, J.A. (2008a). "Do Democracy and Free Markets Protect Us From Terrorism?" International Politics **45**(1): 72-91.
- Piazza, J.A. (2008b). "Incubators of Terror: Do Failed and Failing States Promote Transnational Terrorism?." International Studies Quarterly **52**: 469-488.
- Piazza, J.A. (2008c). "A Supply-Side View of Suicide Terrorism: A Cross-National Study." The Journal of Politics **70**(1): 28-39.
- Pizam, A. and A. Fleischer (2002). "Severity versus Frequency of Acts of Terrorism: Which Has a Larger Impact on Tourism Demand?" Journal of Travel Research **40**(3): 337-339.
- PricewaterhouseCooper (2005). Draft Anti-Money Laundering and Counter-Terrorism Financing Bill 2005. PricewaterhouseCooper.
- PricewaterhouseCooper (2007). 10th Annual Global CEO Survey. PricewaterhouseCooper.
- Purnell, S.W. and E.S. Wainstein (1981). Problems of U.S. businesses operating abroad in terrorist environments. U.S. Department of Commerce.
- Ram, R. (1995). Defence Expenditure and Economic Growth. Handbook of Defence Economics. K. H. a. T. Sandler. Amsterdam, Elsevier: 251-273.
- Rapoport, D.C. (2004). "Modern Terror: The Four Waves." Attacking Terrorism: Elements of a Grand Strategy. A. Cronin and J. Ludes, Georgetown University Press: Washington, D.C.: 46-73.
- Reuter, C. (2004). "Parasiten des Zorns. Wie Al Khaïda neue Akteure rekrutiert." Internationale Politik **February**: 12-20.
- Robison, K.K., E.M. Crenshaw and J.C. Jenkins (2006). Ideologies of Violence: The Social Origins of Islamist and Leftist Transnational Terrorism. Social Forces **84**(4): 2009-2026.
- Rohner, D. and B.S. Frey (2007). "Blood and ink! The common-interest game between terrorists and the media." Public Choice **133**: 129-145.
- Ross, J.I. (1993). Structural Causes of Oppositional Political Terrorism: Towards a Causal Model. Journal of Peace Research **30**(3): 317-329.
- Rotberg, R.I. (2002). The New Nature of Nation-State Failure. The Washington Quarterly **25**(3): 85-96.

- Russell, T. (2002). "The Costs and Benefits of the Terrorism Risk Insurance Act: A First Look." NBER Insurance Conference Paper.
- Ryans, J.K., Jr. and W.L. Shanklin (1980). "How Managers Cope with Terrorism." California Management Review **23**(2): 66-72.
- Samaranayake, G. (1999): "Patterns of political violence and response of the government in Sri Lanka, 1971-1996." Terrorism and Political Violence **11**(1): 110-122.
- Sambanis, N. (2008). "Terrorism and Civil War." Terrorism, Economic Development, and Political Openness. P. Keefer and N. Loayza, Cambridge University Press: New York: 174-206.
- Sanchez-Cuenca, I. (2009). "Revolutionary Dreams and Terrorist Violence in the Developed World: Explaining Country Variation" Journal of Peace Research **46**(5): 687-706.
- Sanchez-Cuenca, I. and L. de la Calle (2009). "Domestic Terrorism: The Hidden Side of Political Violence." Annual Review of Political Science **12**: 31-49.
- Sandler, T., D. Arce and W. Enders (2009). "Transnational Terrorism." Global Crises, Global Solutions, S.B. Blomberg, Cambridge University Press: Cambridge (forthcoming).
- Sandler, T. and W. Enders (2004). "An Economic Perspective on Transnational Terrorism." European Journal of Political Economy **20**(2): 301-316.
- Sandler, T. and H.E. Lapan (1988). "The Calculus of Dissent: An Analysis of Terrorists' Choice of Targets." Synthese **76**(2): 245-261.
- Sandler, T. and K. Siqueira (2006). "Global terrorism: deterrence versus pre-emption." Canadian Journal of Economics **39**: 1370-1387.
- Schelling, T.C. (1991). "What Purposes Can "International Terrorism" Serve?" Violence, Terrorism, and Justice, R.G. Frey and C.W. Morris, Cambridge University Press: Cambridge: 18-32.
- Schneider, F. (2002). "The hidden financial flows of Islamic terrorist organisations: Some preliminary results from an economic perspective." Paper presented at the DIW Workshop on the Economic Consequences of Global Terrorism, June 14-15, Berlin.
- Shapiro, J. (2004). Domestic Dilemmas: US Homeland Security Policy and Transatlantic Relations. An American Perspective. European Homeland Security Post-March 11th and Transatlantic Relations. B. Didier, Shapiro, J., Fedorov, A., Brussels, Belgium, Centre for European Policy Studies (CEPS): 15-23.
- Shieh, J.-Y., J.-H. Chen, J.-J. Chang and C.-C. Lai (2005). "Terrorist Threats and Transnational Dynamics in an Overlapping Generations Model." Defence and Peace Economics **16**(6): 415 - 425.
- Shughart, W.F. (2006). "An Analytical History of Terrorism, 1945–2000." Public Choice **128**: 7-39.
- Singh, P. (2009). "Impact of Terrorism on Investment Decisions of Farmers." Paper presented at the Fourth Workshop of the Network for the Economics Analysis of Terrorism (NEAT), October 19, 2009, Brussels.
- Siqueira, K. and T. Sandler (2009). "Terrorist Networks, Support, and Delegation." Public Choice (forthcoming).
- Smith, V.K., C. Mansfield and L. Clayton (2009). "Valuing a Homeland Security Policy: Countermeasures for the Threats of Shoulder Mounted Missiles." Journal of Risk and Uncertainty **38**(3): 215-243.
- Stecklov, G. and J. Goldstein (2006). "Terror attacks influence driving behavior in Israel." Proceedings of the National Academy of Sciences of the United States of America **101**(40): 14551-14556.

- Stevens, B. (2003). Factors Shaping the Demand for Security Goods and Services. Paper presented at the OECD Forum for the Future on The Security Economy: What Trade- Offs in an Open and Mobile Society? Paris.
- Suder, G., (2004). Terrorism and the international business environment : the security-business nexus. Cheltenham, Elgar.
- Sunstein, C.R. (2003). "Terrorism and Probability Neglect." The Journal of Risk and Uncertainty **26**(2-3): 121-136.
- Tavares, J. (2004). "The Open Society Assesses its Enemies: Shocks, Disasters and Terrorist Attacks." Journal of Monetary Economics **51**(5): 1039-1070.
- Testas, A. (2001). "The Economic Causes of Algeria's Political Violence." Terrorism and Political Violence **13**(3): 127-144.
- Testas, A. (2004). "Determinants of Terrorism in the Muslim World: An Empirical Cross-Sectional Analysis." Terrorism and Political Violence **16**(2): 253-273.
- Thompson, J.L.P. (1989). "Deprivation and Political Violence in Northern Ireland, 1922-1985: A Time-Series Analysis." Journal of Conflict Resolution **33**(4): 676-699.
- Trajtenberg, M. (2004). Crafting defence. RandD in the anti-terrorist era. Innovation Policy and the Economy. Cambridge, MIT Press.
- Tujan, A., A. Gaughran and H. Mollett (2004). "Development and the 'Global War on Terror'." Race Class **46**(July): 53-74.
- Victoroff, J. (2005). "The Mind of the Terrorist. A Review and Critique of Psychological Approaches" Journal of Conflict Resolution **49**(3), 3-42.
- Viscusi, K. and J. Aldy (2003). "The Value of a Statistical Life: A Critical Review of Market Estimates throughout the World." Journal of Risk and Uncertainty **27**(1): 5-76.
- Viscusi, W., K. and R.J. Zeckhauser (2003). "Sacrificing Civil Liberties to Reduce Terrorism Risks." Journal of Risk and Uncertainty **26**(2-3): 99-120.
- Wade, S.J. and D. Reiter (2007). "Does Democracy Matter? Regime Type and Suicide Terrorism." Journal of Conflict Resolution **51**(2): 329-348.
- Walkenhorst, P. and N. Dihel (2002). The Impact of the Terrorist Attacks of 11 September 2001 on International Trading and Transport Activities. OECD, Paris.
- West, D. M. and M. Orr (2005). "Managing Citizen Fears: Public Attitudes Toward Urban Terrorism." Urban Affairs Review **41**(1): 93-105.
- Wintrobe, R. (2006). Rational Extremism: The Political Economy of Radicalism. New York, Cambridge University Press.
- Wolgast, M. (2002). "Global Terrorism and the Insurance Industry: New Challenges and Policy Responses." Insurance and September **11**(239-253).
- Zussman, A. and N. Zussman (2006). "Assassinations: Evaluating the Effectiveness of an Israeli Counterterrorism Policy Using Stock Market Data." Journal of Economic Perspectives **20**(2): 193-206.
- Zussman, A., N. Zussman and M.O. Nielsen (2008). „Asset Market Perspectives on the Israeli–Palestinian Conflict.” Economica **75**: 84-115.