The Economics of Terrorism and Counter-Terrorism: A Survey (Part I)

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Abstract

This survey provides an in-depth analysis of existing research on the economic analysis of terrorism and counter-terrorist measures. First the existing evidence on the causes of terrorism is analyzed, then we consider the evidence of the consequences of terrorism and we demonstrate why it is important to regarding of the issue of counter-terrorism policy. Moreover the survey presents the existing knowledge on the interrelation between the economy and the issue of security and it incorporates analysis the level of knowledge about the causal chains between security and the economy. Also it focuses on perspective and methodologies from the discipline of economics but also refers to research from related disciplines (sociology, political science). 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 an actual terrorist event determine consumer and producer behaviour, public policy, as well as terrorist responses to these policies. Finally a European perspective on the terrorism security annexes is discussed and here we analyze the causes of terrorism in Europe.

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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).

This paper consists of two parts (WP-nos. 3011 and 3012). Part I comprises chapters 1 to 4 and part II comprises chapters 5 to 9 – including also the references.

Contents

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 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.

[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).

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 terror-

ist 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 DEFINTIONS 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 likelihoods 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 secu-

rity. 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

[2] Transnational terrorism denotes an act of terrorism which involves actors and targets from at least two different nationalities. Actors could refer to either the terrorists themselves as well as to their wider support structure.

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).

(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 valuation[3], hedonic market pricing[4] 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, implying 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

[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.

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).

[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.

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]

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-

[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.

[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 sys-

tem 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

[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.

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 terrorists 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. 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

[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).

[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.

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 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 so 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 terrorist'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]

[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).

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.

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]

[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) distin-

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 accounted 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.

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.

guishes 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] Rapaport (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.

4.1 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 permanent 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

[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.

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 announced 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 problem[18], 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).

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

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 to 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.

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]

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

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

[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.

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 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 Bank[26], 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,

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

[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.

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 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. Jeanniot)[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 be 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 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 poten-

[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)).

tially 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).

[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).

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).

Chen and Siems (2004) who study the impacts of terrorist events on the US capital market in comparison to other military attacks[31], show that the latter led to substantial negative cumulative returns. In contrast, the event of terrorist bombing attacks[32] 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.

[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).

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 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 Isreali-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 Country[34]: 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 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

[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.

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 growth[36], he concludes that natural disasters and currency crises impact on growth, but not terrorism. Similarly, the 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.
Gaibulloev 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

[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.

		reduces growth by crowding out investment.
Araz-Takay *et al.* (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 Tsiddon (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 targets[37], 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

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

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 effects. 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 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 targets[38] 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 terrorism (Human Security Centre 2005; Coolsaet and Van de Voorde 2006; Enders

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

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 terrorism[40], 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

[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.

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

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).

[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.

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