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## THE ECONOMICS OF TERRORISM: AN OVERVIEW OF THEORY AND APPLIED STUDIES

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### INTRODUCTION

After the attacks on September 11, 2001 (9/11), March 11, 2004 (11/3), and July 7, 2005 (7/7), there has been a sharp increase in the interest in terrorism, both in the United States and Europe. Many of these concerns are about the costs, the economic consequences of these attacks, and provision of insurance cover, in addition to the traditional focus on the general causes of attacks, trends, theoretical predictions and political recommendations, sources of funding, responses from negotiations in incidents with hostages, or how economic development affects terrorism or vice versa.

Though terrorism is by no means new, particularly in European history, the massacres perpetrated in New York and Madrid attracted interest in all quarters concerning how to increase our knowledge in any way about these serious questions: who are the attackers? Why do they do it? How do they do it? What are the consequences apart from death? Does it affect me, and how? Is there any pattern of behaviour in the attacks? Can we predict forthcoming attacks? Or, the most difficult problem, how can they be avoided? These questions can be approached from different perspectives: the psychological, political, judicial, or economic. In each of these fields there has been a great development in the literature in recent years.

In this chapter a summary is presented of the economic literature on terrorism. After a review of the concepts of terrorism and the presentation and analysis of the main data sources used in the literature, the principal arguments as to the causes of terrorism are presented from an economic viewpoint, analyses made on the financing of terrorism and its economic effects, as well as assessments of counter-terrorism policies from the economist's point of view.

In the development of these studies, we see that techniques from time series analysis, game theory, rational expectations, cost-benefit analysis, and economic growth models are applied. And we will be able to elicit the consensus reached and the areas where there is still debate, both in the area of Islamic terrorism and in the not-yet-extinct terrorism of a national, separatist, or domestic type.

Finally, some of the ways in which research could advance in this field are posited.



## DEFINITION AND TYPES OF TERRORISM

The literature on terrorism has been prolific in producing definitions. Almost all those studying this topic start out by specifying what is to be understood by terrorism in the development of their analysis. Krueger (2007) has managed to count more than 100 diplomatic or academic definitions of terrorism. This rich diversity leads others to state that it is impossible to arrive at a sole definition which includes all the aspects usually to be found in terrorist acts, albeit not at the same time: violence, intention, victims, harm to the state, with a cause, organization, elements of theatre or exhibitionism, and lack of sense of guilt, among others (Fletcher, 2006). Along these lines of stating how difficult it is to give a sole definition of terrorism, Omar Malik (2001) and Alex P Schmid (1984), or Shughart II (2006) should be included.

The pursuit of political aims is the key aspect of identifying terrorism for some authors (Sandler and Hartley, 1995: 308; Sandler, 2005); for others, it is the planning of the attacks, the lack of codes or rules of war, and the psychological burden of terror on the immediate victims (Hoffman, 1998: 15, 35, and 43).

Terrorism skates a thin line, hardly visible, between crime and war (see Chapter 2). The above-mentioned key aspects help to clarify these blurred areas. Uppermost is the fact that the instrument used to achieve political ends is the terror induced in people's minds by catastrophic events, this being much greater than that felt in the face of day-to-day dangers. From an economic viewpoint, terrorist actions are efficient: they manage to create the maximum anxiety at minimum cost. For example, the 9/11 and 11/3 attacks were relatively cheap for the terrorists compared to the economic costs of the damage caused and the costs of applying the subsequent prevention measures. These costs give rise in turn to a chain of other costs in the economic system of the country involved and in those countries with which it has economic relations.

Hand in hand with the intention of threatening and terrifying, there is the exhibitionist aspect of terrorist activity. Terrorist groups accept responsibility for their actions and exploit the media to spread fear. In this way they increase the psychological impact and harm which goes with direct economic damage, and increase its effect and consequences.<sup>1</sup>

The other side of the coin which endows terrorism with its criminal characteristics, apart from causing deaths or injuries in attacks and damage to public and/or private property, is the use of illegal techniques in general, for example, extortion, robbery, and kidnapping in order to achieve financing. The latter is one of the aspects which differentiate it from war, at least in its classic concept, since many consider terrorism to be modern war. Another aspect differentiating terrorism from traditional war is the fact that victims do not consider themselves to be participants, so that attacks in general are attacks on civilians or which result in civilian victims. In other words, in traditional warfare actions are directed against soldiers and directly against the government under attack, whereas in terrorism this is not the case.

<sup>1</sup> See for this, among others, *Transnational Terrorism, Security and the Rule of Law* (2008b).

With these premises, we dare to hazard a definition which is more or less representative of the consensus. Terrorism is *the premeditated and deliberate use of violence by a politically-motivated individual or group of people along with intimidation or threats towards a social group, exerted via immediate victims.*

We are also faced with various classifications of terrorism and even a certain amount of controversy about them. Depending on where it occurs, we can talk of national, transnational, or even international terrorism. *National terrorism* is that which is carried out by citizens of a country on those resident there and using national means.

Nowadays, globalization has done away with frontiers in many ways and aspects. For example, the training and financing of terrorists has now come to be carried out in third countries where controls are less strict or where anonymity is easier to maintain. *Transnational terrorism* springs up when the terrorists act in one country but have networks or infrastructures or elements of financing in another. Terrorism is *international* when it pursues international objectives. This differentiation is made by Reinares (2005). In accordance with these definitions, members of the terrorist organization ETA would be among those classified as transnational terrorists and members of al-Qaeda would be classed as international terrorists. In economic literature the term 'transnational' is normally used to link together the previous two concepts. A terrorist act is transnational when it is carried out in one country but affects victims, targets, institutions, governments, or citizens of another country. According to this definition, the 9/11 and 11/3 attacks were transnational ones (eg Sadler and Enders, 2004; Rosendorff and Sandler, 2005). There is an exporting of the externalities of terrorist acts in a country with costs or benefits to people or properties from other countries. On the contrary, according to Reinares' definition, the 9/11 and 11/3 attacks would belong to international terrorism, since their aim is to overthrow Western power. This distinction, which at first may not appear important, is so, insofar as it may justify the transfer of anti-terrorist policy from the police to national defence, and transfer criminal actions into a war concept.

Another classification of terrorism hinges on the sort of attack: kidnappings, assassinations, threats, etc; or in the weapons used: suicide, biological, bombs, weapons of mass destruction, etc; or in its political character: state terrorism, left wing, right wing, etc; or in the aims and motivations: religious, independence-seeking, etc; or by the way in which it acts: high frequency and low intensity (terrorist campaigns: ETA, IRA) or low frequency and high intensity (attacks by jihad terrorists: 9/11, 11/3).

## PRECEDENTS

The origins of terrorism are as difficult to cite as they are to define.<sup>2</sup> According to the concept of terrorism one chooses, many acts of terrorism can be found since the dawn

<sup>2</sup> On the origins of terrorism, see RG Frey and Christopher W Morris (1991) *Violence, Terrorism and Justice*, Cambridge, England: Cambridge University Press; David Rapaport (1984) 'Fear and Trembling: Terrorism in Three Religious Traditions', *American Political Science Review*, 13(4) (July 1981), 379–99.

of history. There is a general agreement pointing out the origin of the word ‘terrorism’ in 1794 with the French Revolution (*régime de la terreur*), even though it was coined without the negative connotation that it has nowadays.

Shughart II (2006) summarizes the evolution of modern terrorism from the Second World War until 2000, and this materialized in three stages: terrorism on behalf of national and ethnic liberation separatist movements, left wing terrorism, and Islamic terrorism.

Furthermore, Rapoport (2004) referring in general to insurgent terrorism, distinguishes four large scale waves, each of which has closed a cycle of violence lasting about four decades, and corresponding to a generation’s life cycle. These four waves are: the *anarchist* one (which lasted from 1880 to the 1920s); the *anticolonial* one (which replaced the previous one and came to an end at the end of the ’50s); that of *new left terrorism* (which saw the light of day in the ’60s, mainly, after the May 1968 revolution and finished at the close of the Cold War) within which we find nationalist terrorism still functioning in Spain, Sri Lanka, and Colombia; and, finally, the *religious* one (which began in 1979, with the Iranian revolution and is still going strong at the present time).

Economic studies on terrorism start from or become related to the economic study of crime (Landes, 1978) and conflicts and civil wars. The economics of crime considers that criminals are rational agents who aim to maximize the benefits of their actions providing that these outweigh their costs. Anti-crime policy would act on the costs to the criminal, by increasing them, until criminal activity is no longer attractive (Bentham, 1843; Becker, 1968; Brown and Reynolds, 1973; Freeman 1999). In line with the economy of crime, in the economic analysis of terrorism, models of rational choice are applied, based on microeconomic principles which seek to establish how the people involved in the conflict react. Hence, the behaviour of the terrorist incorporated to the economic analysis assumes that they are rational individuals and that as such they seek to maximize their welfare (for example, their political goal, reaching the Muslim paradise, recognition by their companions, help for their families), but are subject to restrictions (financial costs, loss of one’s own life, etc). They carry out their activities because the benefits they obtain outweigh their costs.

The evolution of the literature runs in parallel with the intensity and frequency of the attacks and the development of the instruments of economic analysis. Since the 9/11 attacks, special attention has been given in the academic field to the jihadist and suicide bomber attacks, even though the rise in the number of these attacks took place after the Soviet invasion of Afghanistan in December 1979 and the storming of the American embassy in Teheran in November 1979 (Hoffman, 1998; Enders and Sandler, 2000). Nowadays, there is a specialized theory which analyses the actions and motivations of suicide bombers, for example. This is useful for including in economic models, and we will summarize it in the coming pages. Others, such as Barros and Proença (2005), study the system behind the Islamist attacks in the period from 1979 to 2002, as to the type of attack, where it took place, and the number and nature of the victims. The favourite European locations are France, Italy, and Switzerland, and, since 9/11, Americans are safer in the USA, but more vulnerable outside their country.

## DATA SOURCES

When it comes to any type of applied study the most important circumscribing factor is the existence of data. In the study of terrorism this is one of the problems which the researcher must tackle. Many authors have had to compile their own data due to the lack of an official source which could provide information suitable for whatever definition of terrorism is being used. In general, the original source of data is the international press, information agencies either of the written press or, as a last resort, the digital press, and other media of a journalistic nature.

The definition above becomes even more significant when it is a question of marking the boundaries of data. For example, it is important to separate an act of war from a terrorist attack—are the civilian casualties and soldiers lost in Iraq the result of a war or of terrorist acts? Even the US government agencies do not agree on their reply to this question (Enders and Sandler, 2006), or on whether creating situations of terror for political motives even with no victims is considered a terrorist attack or not—were the attacks on 21 July 2005 in London, which seemed to be an attempt to maintain the state of terror created on 7 July, to be counted or not because there were no victims?

Added to the implications of the lack of consensus regarding this definition are other problems in the sources of data from newspapers. For example, most data do not record police actions which have aborted possible attacks, partly because these actions are secret and partly because they do not have the ‘spectacular’ consequences required to make them newsworthy. The latter is generalized for the case of attacks with few victims, and this could lead to the data being undervalued (Enders and Sandler, 2006). Moreover, most sources opt for international terrorism, and when they record national terrorism again there is a pronounced undervaluation, since only news published in English-speaking newspapers is counted. In some cases, the data sources show political bias, ie, not everyone considers the actions of certain groups to be those of terrorists.

Most of these studies on terrorism opt for just one data source (see Table 1.1), but faced with the possibilities of undervaluing the impact due to the above-mentioned

**Table 1.1** Data sources

| Origin | Name  | Author  | Coverage   | Web address   |
|--------|---|---|--|---|
| US     | Patterns of Global Terrorism/<br>Country Reports on Terrorism | Department of State (The Counterterrorism Office) | From 1968 to present-day.<br>Data of terrorist attacks of that year with number of deaths, those injured and attacks on US citizens and/or property. | < <a href="http://www.state.gov/s/ct/rls/crt/">http://www.state.gov/s/ct/rls/crt/</a> > |
|        |   | The RAND Corporation                              | 1968–1997.<br>They only cover international incidents.   |   |

(Continued)

Table 1.1 *Cont.*

| Origin | Name  | Author  | Coverage   | Web address   |
|--------|---|---|--|---|
|        | RAND-MIPT Terrorism Incident Database                             | RAND Memorial Institute for the Prevention of Terrorism (MIPT Terrorism Knowledge Base)   | From 1998 to present day. They incorporate all international and national incidents.   | < <a href="http://www.rand.org/ise/projects/terrorism/database/">http://www.rand.org/ise/projects/terrorism/database/</a> >   |
|        | The Global Terrorism Database (GTD)                               | The National Consortium for the Study of Terrorism (START) based at the University of Maryland<br><br>Monterey Institute of International Studies | This has included data both on national and international terrorism since 1970. Information for each incident includes the date, location, weapons used, type of target, number of injured, and, when possible, the identity of the perpetrator. | < <a href="http://www.start.umd.edu/start/">http://www.start.umd.edu/start/</a> ><br><br>Restricted to employees of the local, state, or federal government of the United States, or to members of the US armed forces. |
|        | Asia Pacific Initiative (API)                                     | The American Foreign Policy Council (AFPC)  | Asian–Pacific area.  | < <a href="http://www.afpc.org/special_project_listings/view/28">http://www.afpc.org/special_project_listings/view/28</a> >   |
|        | International Terrorism: Attributes of Terrorist Events (ITERATE) | Edward F Mickolus, Todd Sandler, Jean M Murdock, and Peter A Flemming   | This project began in 1968. It covers activities of international terrorists. The data are obtained from the press.  | < <a href="http://library.duke.edu/data/collections/iterate.html">http://library.duke.edu/data/collections/iterate.html</a> >   |
| Israel |   | Israel Security Agency (ISA, Shin Bet)  | Israeli government data on attacks in their country.   | < <a href="http://www.shabak.gov.il/english/enterrordata/pages/default.aspx">http://www.shabak.gov.il/english/enterrordata/pages/default.aspx</a> >   |

| Origin | Name   | Author   | Coverage   | Web address   |
|--------|--|--|--|---|
|        |  | The International Policy Institute for Counter-Terrorism (ICT) |  | < <a href="http://www.ict.org.il">http://www.ict.org.il</a> >                           |
| Europe | Terrorism in Western Europe: Events Data (TWEED) | Jan Oskar Engene, Bergen University (Norway)                   | This contains information on terrorist activities in 18 European countries from 1950 until 2004. | < <a href="http://folk.uib.no/sspje/tweed.htm">http://folk.uib.no/sspje/tweed.htm</a> > |

Note: all internet sources were accessible 4 August 2009.

collection problems, some incorporate more than one source. Others consider there are no advantages in combining more than two sources because of their similarities. LaFree, et al (2006) compare the differences between the data from ITERATE, RAND, and PGIS (General Intelligence Service).

## ECONOMIC ANALYSIS OF THE CAUSES OF TERRORISM

From the viewpoint of the economy, the points for discussion as possible causes of terrorism have been the income and education levels or the degree of development in the terrorists' country of origin. But a specific analysis has also occurred of how to introduce terrorist behaviour into economic models, bearing in mind their possible motivations.

Other non-economic approaches on the causes of terrorism are, for example, the psychological (Victoroff, 2005; Horgan, 2005; Hudson and Majeska, 1999); the political: nationalisms or separatisms (Engene, 2004; Crenshaw, 1981; Fearon and Laitin, 1996); extremist factions in ethnic minorities (Crenshaw, 1981; Williams, 1994); absence of democracy or otherwise (Wilkinson, 1977, 1986, 2001; Dworkin, 1997; Homer-Dixon, 2002; Eubank and Weinberg, 1994, 2001); sociological, crisis of leadership, and rigid social stratifications (Rubenstein, 1987; Radu, 2001); alienation of the middle class (Kristoff, 2002); of youth (Wilkinson, 1977 and Crenshaw, 1981); of the individual (Rathbone and Rowley, 2002); religious fanaticism (Radu 2001; Doyle 2003, Hayes 2002); or that supported by the multiple aspects of globalism (Li and Schaub, 2004; Pedahzur, 2006; Galtung, 2002; Guelke, 1995).

### THE RATIONAL CHOICE

An initial step in discovering the causes of terrorism is to review its motivations. From the '60s until the '80s, these were about nationalisms, separatisms, and Marxist and nihilist ideologies. In the '90s, with the emergence of groups of fundamentalists, religious motivations were the predominant ones. This change began to be noticeable

from the beginning of the '80s, with the increase in the proportion of religion-based groups in active terrorist squads: 2 out of 64 in 1980, 11 out of 48 in 1992, 16 out of 49 in 1994, and 25 out of 58 in 1995 (Hoffman, 1997: 3; Enders and Sandler, 2002).

Economic models tend to explain behaviours as rational individual decisions. This is necessary to be able to assert that changes in certain variables of the model will make possible changes in individuals' behaviour or vice versa, and to discover which one(s).

Thus, terrorists' motivations are translated into economic language by saying that they aim to maximize their benefits, subject to some restrictions. In this context, individuals or groups can be stated to be rational, but in themselves the results of their actions do not appear to stem from a rational mind.

In aerial attacks, terrorists maximize the expected benefits of the rewards sought, subject to some restrictions. The restrictions may be the actions of the authorities to cause the attack to fail. An offensive act is prepared (eg a number of hijackings), the independent variables of which include a subjective estimate of the chances of being caught, their estimates of the chance of being found guilty, and other actions by the authorities (eg, police presence). Landes (1978), by using data from hijackings between 1961 and 1976, shows that the increasing probability of arrest strengthens the deterrent effect.

The first point on which an argument has arisen is whether it is an individual or a group which maximizes the outcome of the attack. Specifically where rationality has been most questioned is in suicide attacks, where it is difficult to appreciate that maximizing benefits leads sane individuals to lay down their lives. The radical interpretation that it is the group, means that the individual has no personality or will of his own. In this case, the motivations of the organization are put forward as the only important ones and explain the rise in the number of suicide attacks (Pape, 2003, 2005). Others opt for a more integrating vision of the group and the terrorist. Wintrobe (2003, 2006) follows this line using the concept of solidarity, this being understood as social capital. In extremist groups, radicalism in beliefs joins forces with profound solidarity. And they are created by a trade-off between beliefs and social cohesion. Individuality is exchanged for group beliefs or unity of belief. An essential characteristic is the existence of a leader who contributes to this unity. The individuals have utility functions which have a positive dependency on autonomy and solidarity. This utility is maximized subject to the restriction of the organisation's efforts, which provide solidarity. An important aspect of the model is that once the individual chooses to forgo autonomy in exchange for solidarity, he is also losing the capacity to choose, which is transferred to the group leader. As a result, the individual's utility function incorporates his own decisions (autonomy) and decisions governed by the leader (solidarity). As the choice of solidarity by the individual increases, so the role of solidarity played by the leader's utility function in that of the other person is increased. To explain how suicide acts work it is necessary to analyse the forces driving leaders to order or request that these actions be carried out. On these lines, Pittel and Rübhelke (2006) maintain the idea that terrorists incorporate the leader's utility function and make it their own, but they take into account the reasons and the tools that the leaders can use to induce suicide acts: manipulating information,<sup>3</sup> isolating the terrorist from

<sup>3</sup> On forms of manipulation of information and ways of combating it, see Glaeser (2005) and Charney and Yakatan (2005).

outside influences, and improving the effectiveness of assistance for the terrorist. They suggest the optimization of simultaneous balance of the leader and the terrorist, which enables the interactions occurring between them to be explained.

Berman and Laitin (2008) apply the theory of local public goods to explain the behaviour of suicide terrorists. Religious organizations are clubs which can become powerful terrorist organizations, who choose the suicide-attack weapon when the target is difficult to destroy. They posit a model in which the choice of tactics to attack difficult targets considers the human cost and tactical benefits of suicide attacks.

## POVERTY AND UNDERDEVELOPMENT

Inequalities in income distribution and scarcity of resources are two of the factors put forward to explain terrorism (Kristof, 2002). Earlier literature on conflict, when analysing coups d'état or civil wars, anticipated these findings (Alesina et al, 1996; Collier and Hoeffler, 2004; Satyanath and Sergenti, 2004). They found that lower income countries are more likely to experience a civil war. But the link between economic inequality and political conflict is not so clear (Lichbach, 1989).

Some studies attempt to prove the connection between terrorism and underdevelopment. Terrorism could be the modern way of fighting due to the availability of new resources (Crenshaw, 1981; Aziz, 1995; Garfinkel, 2004; Blomberg et al, 2004). Models are proposed which link the appearance of conflicts to economic recessions. They consider two types of conflict: 'disturbances' or 'terrorism'. The choice between one system of struggle or another depends upon the capacity of the country to avoid surrendering in the face of dissident groups. In this context, terrorism appears related to the economic cycle: in periods of economic frugality solidly-based economies with defence capabilities are more likely to suffer terrorist attacks. Abadie (2006), analysing both national and international types of terrorism, concludes that terrorism is not significantly greater in poor countries. On the contrary, terrorism is better explained by political freedom, and thus countries at an intermediate level are more exposed to it than those found at the extremes. The transition of authoritarian regimes to democracy, as can be shown by the examples of Spain, Russia, and Iraq, can be accompanied by rises in terrorism. Another element contributing to explaining why some particular terrorist activities still continue is the question of geography, as with the mountains of Afghanistan and the jungles of Colombia. In line with this above-mentioned argument, and advancing along the lines laid down by the previous studies of Eubank and Weinberg (1994, 2001) and Weinberg and Eubank (1998), Li (2005) carried out an econometric analysis in which he took into account—in addition to economic development and income inequality—other variables which provide evidence of features of democracies, such as freedom of the press, durability of the regime, or participation of potential voters. He stresses that liberal democracies, in preserving individual rights, also protect terrorists. Along with press freedom there is an increase in the capacity to transmit terror and the motivations of the terrorists. By contrast, when voters participate, this limits the national groups' incentives to attack in their own country. Li (2005) also shows that countries where there is proportional representation suffer less transnational terrorism than other democratic alternatives, and that the regime's durability reduces transnational terrorism in the country.

But, despite the previous arguments, and regarding international terrorism, there is greater confusion when the origins and targets are studied jointly since the origins of terrorism are to be found in countries suffering political oppression and the targets are countries which are enjoying economic success (or their interests).

From the microeconomic viewpoint, several empirical studies defend the notion that income levels are not the causal factor of terrorism (Pittel and Rübhelke, 2006; Krueger and Maleckova, 2003; Berrebi, 2003; Schelling, 1991). The work by Krueger and Maleckova, one of the most cited, reviews the evidence of hate crimes (the crimes most comparable to terrorism) and finds that there is no relationship with economic conditions. Certainly, the rich and the educated can understand these feelings of hate most keenly. They found no relationship with unemployment levels, regional economic levels, or differences in income distribution, but, on the contrary, there is such a relationship with educational levels. Social and economic circumstances are considered less important than circumstances having their origin in historical and personal factors.

The nucleus of the study is the statistical analysis of factors determining the militant activities of Hezbollah, and the finding is that this participation has a positive relationship with living standards above the poverty line and secondary education or above; on the Israeli side, the settlers who attacked Palestinians at the start of the '80s worked in highly-paid jobs. Similarly, analysis of the data from opinion groups on support for attacks on Israeli targets in the Gaza area shows that support does not decline among those who are more highly educated or have a higher standard of living. In a recent study, Krueger (2007) draws similar conclusions specifically for terrorism: 'terrorism is not significantly higher for poorer countries, ... civil liberties are an important determinant of terrorism, ... education and poverty probably have little to do with terrorism.' Data on jihad terrorists follow this same line. Most of the 19 hijackers who took part in the 9/11 attacks belonged to middle-class Saudi Arabian families and many had a higher education. Osama Bin Laden belongs to one of the richest families in the Middle East.

For Benmelech and Berrebi (2007) highly qualified individuals will become suicide terrorists if the calculated profitability of suicide is higher than the foreseen gains (adjusted for ability) of their lives in the productive sector. Suicide attackers have, for themselves at least, made a rational choice: there is moral, psychological, and sometimes financial profitability in the act of killing many people to offset the economic loss of their own death. The authors test this hypothesis using a database of 148 Palestinian suicide terrorists between 2000 and 2005. And they discover that the oldest and most highly educated are assigned the most difficult targets, kill the most people, and are less likely to fail or be caught. Captured suicide terrorists who failed to hit their targets had a lower level of education than those who were successful with theirs.

Yet poverty can be a means of making manipulation possible. When misery reaches famine level, with unemployment rates of around 25 to 40 per cent, as is the case in Iraq, the population will attempt to survive at all costs. If the terrorists pay, the poor will work for them even when not sharing their beliefs. The situation of extreme poverty and the lack of government help make it easier for terrorist groups to provide social services, as in Colombia, Indonesia, or Palestine. With these methods, terrorist groups can avoid being denounced to the authorities when persecuted and, even, supported in Parliament (Whitehead, 2007).

Therefore, most studies carried out are not over-optimistic regarding the idea of a reduction in poverty or an increase in education being a help in reducing terrorism. Nonetheless, the debate is still open. Even if it is accepted that it is a problem of income or education, who is going to redistribute the income? What education?

## FINANCING TERRORISM

Although one of the key measures for destroying terrorist groups is to stifle their financing, it is also the most difficult thing to control. Although terrorism is ‘cheap’ from the viewpoint of the cost of instruments for carrying out the attacks (small arms, hand grenades, and home-made bombs) it is not so from the point of view of maintaining the organizational structure, preparation, training, and upkeep of the militants. Additionally there are the networks for infiltrating the areas where the victims live, maintaining and protecting the leader, and expenditure on popular support ( Hamas spends some 70 million dollars a year on social expenditure, according to the Council on Foreign Relations, quoted by Whitehead, 2007). Although studies have been made on the former,<sup>4</sup> finding out the latter is much more difficult. Just some aspects can be approximately calculated: those discovered in many cases only after the organization has been broken up or some of its organizational structures have been discovered.<sup>5</sup>

The most direct anti-terrorist measure has been that of seizing the bank accounts of those directly involved in terrorist actions, but the sources are so complex and the economic networks of the global world so tangled that flows of terrorist financing have not been cut off. After the 9/11 attacks, the anti-terrorist measures in the financial field were strengthened.<sup>6</sup> The international body devoted to controlling movements of capital and money laundering, the Financial Action Task Force (FATF), created in 1998, included in its mission the fight against the funding of terrorism. The FATF recommendations are recorded in OECD (2004), along with examples of best international practices. In this respect it must be highlighted that, even though international bodies maintain the validity of procedures designed for the fight against the funding of terrorism (Security Council, 2006), the latter—centring on blocking financial, business, and property assets—have been shown to be not very effective. Thus, the Security Council (2006: 23 and following) recognizes that of the 91.4 million dollars

<sup>4</sup> Passas and Giménez Salinas (2007) summarize several of the calculations made of the amounts needed by terrorists to carry out some attacks. The London attack cost some thousands of dollars, those on 9/11 some 400,000–500,000 dollars, and the Madrid attack around 100,000 euros.

<sup>5</sup> On the web page of Israel’s Ministry of Foreign Affairs, information is recorded on data regarding financing as provided by arrested terrorists: <<http://www.mfa.gov.il/MFA>> (accessed 4 August 2009). Mention is made, among other matters, of payments made through the bank accounts of terrorists’ sisters or wives, for amounts upwards of 10,000 dollars to fund military activity, or for the cost of purchasing arms or tools. Likewise, they give information on the seizing of accounts belonging to institutions financing terrorists and their families, or of terrorists and their families. After the 2009 incidents in Gaza, Hamas is offering a 3000 dollar reward for any man willing to marry the widow of a ‘shahid’ (a martyr), several Arab websites reported.

<sup>6</sup> On creating international judicial norms geared to the fight against the funding of terrorism, see Hinojosa Martínez (2008).

blocked prior to July 2006 ‘most of it was blocked during the initial period—that is, between September 2001 and mid 2002; since then the amount has scarcely varied despite the introduction of several additions and corrections to the list (of terrorist organizations and people linked to them)’. This ineffectuality has been brought about, mainly, by the application of procedures against the funding of terrorism that had been devised to combat money laundering by criminal organizations with no political aims—and, therefore, of a totally different nature to that of terrorist organizations. What is more, there has been no good prior analysis of the financial sources which are nurturing terrorist activities. Finally, terrorist organisations have been adapting their economy to avoid obstacles blocking their assets (Giménez-Salinas, 2007).

The most important inflow of funds for nationalist terrorists has traditionally been those obtained from extortion and kidnapping. Both are considered criminal activities. The demand for revolutionary taxes is linked to these same activities. These methods are accompanied by other more sporadic ones such as the theft of arms and explosives. International terrorism also uses other illegal methods, such as forged credit cards and coins, or illegal immigration (Dandurand and Chin, 2004).

Crime and terrorism join together on occasions with drug trafficking. The cocaine trade finances terrorism in Colombia and Peru; and in Afghanistan this role is played by opium. Nevertheless, some of the authors who have studied the funding of Islamic terrorism consider that, in this case, the relationship is a temporary or occasional one, for example, the case of Passas (2007), analysing the Madrid attacks. Another controversial aspect is the relationship between terrorism and the smuggling of gold and precious stones (Passas, 2004; Passas and Jones, 2006).

International terrorists led by Bin Laden are thought to have access to the leader’s enormous fortune. Specifically, one of the main preoccupations in the struggle against terrorism is that of controlling the movement of the funds financing it. Existing controls can be avoided by transferring small amounts through the banking system or by using transactions in kind. For example, in the Madrid attacks in 2004, the explosives were paid for in drugs. There are suspicions that the Islamic fund transfer system, Hawala,<sup>7</sup> was used to avoid the control of the Western financial system in financing the 9/11 attacks. Nevertheless, this fact could not be proved (Report by the 9/11 Commission—the National Commission on Terrorist Attacks upon the United States). Because it acts on the margins of official financial mechanisms, the Hawala system has been banned in some US states. But in underdeveloped countries or those in conflict, where the banking system does not work or is inadequate, it enables economic activity to continue. Maimbo (2003) calculates that in Afghanistan there are between 500 and 2,000 people devoted to this activity.

Other organizations suspected of having relations with terrorism are the charities (Lee, 2002; Passas, 2006a, 2006b). In November 2008, a non-profit-making Muslim organization (Holy Land Foundation for Aid and Development) and five of its former directors was found guilty by a judge in the United States of financing the Palestinian extremist group Hamas, of money laundering, and fiscal fraud.

<sup>7</sup> For a definition and explanation of how Hawala works, see the report of the US Treasury Office at <<http://www.treas.gov/offices/enforcement/key-issues/hawala/FinCEN-Hawala-rpt.pdf>> (accessed 4 August 2009).

Buesa (2006 and 2007) analyses the financial evolution of the Spanish terrorist group ETA. He estimates that, although available data are incomplete, prior to the proscription of Batasuna<sup>8</sup> (2003) it used some 24 million euros annually, of which 55 per cent came from public subsidies (two thirds of them granted by the Basque Government), another 22 per cent from the extortion of businessmen, and the rest from other activities, mainly trade. To this can be added a symbolic presence—only 1 per cent—in stolen goods. In 2006, Buesa estimates that financing fell, at 2002 prices, to little more than 7 million euros, obtained from criminal activities: extortion (25 per cent), raids on arsenals and other materials (19 per cent), the ‘herriko tabernas’<sup>9</sup> (33 per cent), from the quotas collected by Batasuna militants (10 per cent), and subsidies from the Basque Government and some councils to the PCTV<sup>10</sup> and organizations of prisoners’ families (another 10 per cent). In 2007, the amount of available funds rose to 8.7 million euros at 2002 prices (10.4 million at current prices). Extortion increased to 37 per cent, public resources were around a quarter of the total, stolen goods were almost non-existent, and businesses and collection of funds among militants were maintained. As we have seen, the maintenance of legal structures has enabled sources from businesses and subsidies to be added to the traditional sources (extortion and looting raids, which fluctuate in accordance with policing efficiency).

In recent years, sources of financing and financial networks have become more complex. It would not be unusual if terrorists also used more complex systems than the classic ones already mentioned, taking advantage of the democratic guarantee of individual freedom and economic liberalism. Reaction to stock market falls immediately following a terrorist attack leads some authors to suggest the possibility of terrorist groups exploiting inside information in their possession to speculate with financial derivatives, and maximizing profits (see Chapter 7).

Fitzgerald (2004) investigated international financial transactions funding terrorism and highlighted the lack of success enjoyed by the present regulatory systems. He suggests deterrent policies and improvements in the systems for channelling migrant remittances.

## ECONOMIC ANALYSIS OF THE CONSEQUENCES OF TERRORISM: ECONOMIC EFFECTS

Terrorists’ main aim is to create pathological fear or terror. This is achieved by means of harm to people and/or their properties. Consequently, the goals of terrorism in general are often economic. There is direct damage as a result of the attack itself and indirect damage stemming from the subsequent avalanche of economic reactions, both because of expenditure on protection measures and changes in behaviour occasioned

<sup>8</sup> Batasuna is the political group which in the Basque country (in Parliament and several councils) represented the political ideas espoused by ETA.

<sup>9</sup> Basque pro-independence bars.

<sup>10</sup> PCTV (Partido Comunista de las Tierras Vascas) is made up of former members of Batasuna after it was declared illegal.

by fear. The latter depend upon the citizenry's perception of insecurity. For citizens to consider themselves secure and not modify their behaviour, there must be a balance between their *perception of terrorist threat* and their *perception of the efficacy of the security measures applied* (Jackson, Dixon, and Greenfield, 2007). Hence, the analysis of the economic effects of terrorism centres on evaluating the costs of the attacks, either globally or by sectors of activity, and whether direct or indirect.

### ANALYSIS OF DIRECT COSTS

The direct costs of the attacks include the value of the goods destroyed or the losses of property, the value of human lives lost, expenditure in cleaning up and responding, rescue and recovery, costs of the injured (both psychological and physical), temporary help for those left homeless, and impacts on businesses (closures and loss of sales). These are the costs evaluated in 9/11 (GAO, 2002). Each attack has its own particular style which requires the incorporation of specific costs; for example, when assessing the Madrid attacks, the costs of identifying the dead and the costs of the demonstration in solidarity with those affected were included (Buesa et al, 2007).

The study of the direct costs of 9/11 gives a relatively low figure (Hobjin, 2002; International Monetary Fund, 2001; Navarro and Spencer, 2001). Lenain, Bonturi, and Koen (2002) estimate that the cost of the 9/11 attacks was 14 billion US dollars for the private sector, 1.5 million dollars for public, state, and local firms, 0.7 billion dollars for the Federal Government, along with 11 billion dollars from rescue and clean-up operations, these being shared between the public and private sector. Dixon and Stern (2004) give a figure of 38 billion dollars for compensation claimed.

Equivalent findings, in relative terms, were obtained in the study of the direct costs of Madrid attacks (3/11). These attacks gave rise to a loss of almost 212 million euros for the Madrid economy, which accounts for 0.16 per cent of regional GDP and is the equivalent of 0.03 per cent of national GDP (see Chapter 3).

The direct cost of terrorism in the case of organizations operating very frequently but at low intensity in terms of victims per attack, such as the IRA in Ireland, ETA in Spain, or terrorism in Colombia, is more difficult to measure accurately due precisely to the high frequency of the attacks. Nonetheless, a valid approach would be to calculate them from the compensation paid to victims who were injured or killed and for loss of property. In 1982, at that year's prices, 1,010 million pounds had been paid in Northern Ireland, and between 1983 and 1989, also at 1982 prices, an extra 182 million pounds was paid. To these figures, 31 million pounds, at 1982 prices, should be added for compensation in the Republic of Ireland (Jackson, Dixon, and Greenfield, 2007).<sup>11</sup>

In the case of Spain, with regard to ETA, Buesa (2006) has estimated the direct cost as 671.1 million euros a year during the period 1991–2002. Of this figure, 1.3 per cent relates to the evaluation of personal injury (deaths and injuries), another 5.1 per cent to extraordinary pensions paid to the victims, 43.1 per cent to material damage caused by attacks—among which 26.7 per cent is due to the closure of the Nuclear Power Station in Lemoniz—and the remaining 50.5 per cent to the costs of sustaining a broad security cover to prevent and combat the ETA terrorist organization. This has meant,

<sup>11</sup> See, among others, *Transnational Terrorism, Security and the Rule of Law* (2008a).

for the Basque country, losses amounting to 1.2 per cent of their GDP. More recently, a study published by the Chair of the Economics of Terrorism has estimated that ETA attacks committed in 2006 and 2007 have caused material damage to the tune of 54.5 million euros. In that same period, ETA-driven terrorist street action caused damage worth 4.3 million euros.

Furthermore, in the case of Colombia, detailed estimates are available of the costs originated by the terrorist activity of the FARC, the ELN, and other insurgent groups. Trujillo and Badel (1998), with regard to the period 1991–1996, estimate a total cost of 1,025.6 million pesos a year, which is the equivalent of 1.5 per cent of Colombian GDP. The most important component of this cost—60.8 per cent—is for extra military expenditure incurred by the country in its fight against terrorism. In turn, kidnappings and extortion are valued at 28.8 per cent of the total and personal and material damage at 5.2 per cent each. More recently, also with regard to Colombia, Pinto, Vergara, and La Huerta (2005) have estimated that, taking as a reference the period 1999–2003, the costs of terrorism rose to 3,302.8 million pesos annually, which amounts to 1.48 per cent of GDP. Once more, the main item of cost is in military and police resources devoted to fighting terrorism or drug smuggling—linked internally to terrorism in Colombia. Personal damage rose to 11.5 per cent, and material damage to 8.5 per cent. We should add to this another 5.8 caused by the forcible transfer of population and mine clearing operations. Also one per cent devoted to help in readjusting to civilian life for former members of armed groups must be included.<sup>12</sup>

## ANALYSIS OF INDIRECT COSTS

The indirect costs of terrorism depend upon the reaction they give rise to from the authorities or the private sector. The immediate reaction is to increase public and private expenditure to prevent terrorism. This gives rise, in turn, to a series of economic and behavioural reactions which spread through different economic sectors. These indirect costs vary in their distribution through sectors, countries, and time. Some activities and sectors suffer more than others, specifically those of firms which suffered the attacks directly. The sectors of activity which have received particular attention are tourism, foreign investment, insurance and security firms, the capital markets, airlines, the public sector, and planning and relocating people and businesses. The effects on macroeconomic growth have also been studied.

### Effects on Public Activity and the Budget

The public sector tries to prevent new attacks being perpetrated by stopping them or reducing their effectiveness when they cannot be prevented. For this purpose, two paths are normally followed: regulating the activities of citizens to achieve greater control of them and increasing expenditure on security. That is, dictating laws and norms and increasing the expenditure on home security and defence.

Some consider that the United States has overreacted in the face of the threat of fresh attacks after 9/11, thus creating a false sense of insecurity (Niskanen, 2006; Friedman, 2005; Mueller, 2004). In this way the Government has created additional costs,

<sup>12</sup> For a compilation of the data referring to the cost of terrorism in Colombia, see Otero-Prada (2007).

particularly important being those coming from restriction of freedoms, eg, the USA Patriot Act (Lynch, 2005); and control through the EU ports of entry of citizens of non-member countries. Niskanen (2006) describes the majority of these measures as irritating and ineffective. The vigilance procedures of the Transportation Security Administration cost taxpayers five billion dollars a year, and airline passengers an extra hour per trip. Niskanen complains that serious threats are not attended to, such as shoulder-fired anti-aircraft missiles, available in the arms black market for less than 5,000 dollars. Two dozen groups are estimated to have this type of armament, among them Al-Qaeda. Fitting all American planes with protection systems against this weapon would cost some eleven billion dollars, plus 2.1 billion dollars in annual costs (Peña, 2005).

As we have said, along with regulatory measures steps are taken to increase expenditure which can be concentrated in the Ministry of Defence or the Ministry of the Interior (Homeland Security). If terrorism is considered to be an undercover war it will increase in both Ministries. This revives the concern over the possible expulsion effect of security expenditure, with less attention being given to expenditure such as education or health and, as a result, of the possible loss of the 'peace dividend'.

In the case of IRA terrorism, the estimates of the cost of the conflict from the viewpoint of the security measures taken are 9,826 million pounds both in the North and the Irish Republic (these costs also include expenditure on maintenance of the armed forces in the North and private security costs). The costs of imprisonment are only available for 1983 and they show a total of 56 million pounds (Jackson, Dixon, and Greenfield, 2007).

Leaving on one side the question of whether the war in Iraq has raised or reduced the terrorist threat to Americans, the total defence budget has been increased by 100 million dollars from 9/11 onwards, as an additional cost to that of operations in Afghanistan and Iraq, all of which comes under the banner of terrorism (Niskanen, 2006). The United States budget for National Security, without including expenditure by the Ministry of Defence, tripled after the attacks, with the total of these expenditures (security and defence) coming to 3.8 per cent of GDP. The congressional Budget Office estimated expenditure on homeland security at 41 billion dollars (CBO, 2004).

In the face of these concerns there have been studies evaluating the consequences of terrorist activity for the public exchequer (Lenain et al, 2002; Hobjin, 2002; Gupta et al, 2004). Hobjin (2002) concludes that, even though security expenditure has risen, it is still below that of the period between 1947 and 1994. As a consequence, the 'peace dividend' is not believed to have been affected. Nor is it thought that there has been an expulsion effect, given that total spending on internal security (central, state, and local administration) is only 0.10 per cent of total public spending. And there has probably been a very slight impact on budget deficits (Eichenbaum and Fisher, 2004; Wildasin, 2002).

The analysis made by Gupta et al, (2004) was made on 22 episodes of conflict, and in the years immediately before and following them; thus a check was made on the possible expulsion effect. Empirical analysis gives the lie to this. The conflict has had a negative direct impact upon growth, more than an indirect impact through the way expenditure is made up. There is a greater effect on economic stability (higher deficit

and inflation) than on spending on health and education, at least when measured in GDP terms. But because the conflict is associated with lower growth of real GDP, the result is lower growth in government per capita spending on education and health during the time conflict is occurring. Ending the conflict and terrorism produces gains in terms of economic growth and the generation of higher fiscal revenue to pay for expenditure on poverty reduction. Thus, the existence of a peace dividend stemming from eliminating terrorism is confirmed.

### Effects on Economic Growth

When the economic effects of terrorism on economic growth are studied they are normally compared to those incurred by other conflicts or wars, as well as natural disasters. Comparisons with wars, including civil wars, indicate that the effects of terrorism are fewer (Blomber, Hess, and Orphanides, 2004; Addison, 2003; Stewart and Fitzgerald, 2001). The same conclusion is reached when comparing terrorist attacks with those of natural disasters (Tavares, 2004).

Despite this smaller relative impact compared to other great disasters, they do not cease to be important and thus need bearing in mind. The analysis by Gupta et al, (2004) highlights the direct effect on GDP. Similar are the works by Crain and Crain (2006), who estimate the macroeconomic effects of terrorism using a data panel for 147 countries during the period 1968–2002. The findings show that the potential gains from reducing terrorism are quite broad (World GDP would have been 3.6 trillion more in 2002), even though the estimates for each country depend on the population, level of initial output, and investment. That is, terrorism costs the world more than the GDP of the United Kingdom, Italy, and Argentina together, or one-third of American GDP. These estimates do not include the costs of the grief or suffering caused to the victims and other emotional costs among citizens.

The effects on growth are caused by the increased demand for security, with the changes in resource allocation that this demand brings about, and the changes in behaviour which begin with the perception of risk in an attack. Measures that do not manage to reduce this perception contribute to terrorists achieving their aims. After the 9/11 attack, there was an important increase in demand for security spending in firms, particularly between 2001 and 2002, and these became a permanent expenditure for some companies (Jackson, Dixon, and Greenfield, 2007). Security spending in the case of firms ranges from contracting guards to data protection or technological security, including adaptations to buildings to allow massive evacuation or limited capacity. There is no doubt that these expenditures impinge on fixed costs and even on variable costs as a burden, reducing productivity and firms' profits.

The previous analyses take as their reference the attacks which are low frequency and high impact. Other studies look at the impact of high-frequency, low-impact attacks. The latter are incorporated into the decisions of economic agents as a permanent cost and their consequences may be highly important, especially when they impinge upon a sector which is a key one for national development. In fact, this importance turns it into one of the main terrorist targets. These conclusions are reached by studies such as those of Abadie and Gardeazabal (2003) and Buesa (2004, 2006) for the Spanish Basque Country, the World Bank (2002, 2003) in its studies on the effects of the

Intifada in Israel and Palestinian territories, or the studies by Londoño de la Cuesta and Guerrero (2000) on the effects of terrorism in South America and Cotte Poveda (2003) on the case of Colombia.

All previous studies make comparisons, either of other events involving natural catastrophes or comparing the growth of regions, areas, or countries suffering terrorism, with others which do not, or growth in terrorism-free years with that when terrorism occurred.<sup>13</sup> Other studies perform simulations on the effects on productivity of changes in security spending (Australian Department of Foreign Affairs and Trade, 2004: 11–12; Penn, Buetre, and Tran, 2004).

Changes in behaviour are produced particularly in investment decisions (Baily, 2001; Eckstein and Tsiddon, 2004; Blomberg et al, 2004a, Fielding, 2003b) and consumption (Baily, 2001; Eckstein and Tsiddon, 2004; Fielding, 2003b), giving rise to contraction which reduces economic growth. This is also brought about by a fall in foreign investment (Abadie and Gardeazbal, 2007; Enders and Sandler, 1996, 2006) and international trade (Walkenhorst and Dihel, 2002; Nitsch and Schumacher, 2004). But there are other aspects related to uncertainty which can also bring about losses, such as, for example, the need to stock up on goods because of the transport problems which usually occur after attacks, especially those brought about by the security measures adopted, which lead to additional rises in the prices of products (OECD, 2002, 2003).

#### Effects on Town Planning in Cities and Location of Firms

Large urban areas are especially sensitive to terrorist activity due to their high concentration of people and buildings. But estimates tell us that these costs are not high in the long term (Bram, Haughwout, and Orr, 2002; Glaeser and Shapiro, 2002; Harrigan and Martin, 2002; Mills 2002; Rossi-Hansberg, 2004).

Blomberg and Sheppard (2007) analyse the impact of recent attacks in large cities where there was an important effect on the inhabitants' safety and confidence. They check whether, as well as the loss of life and damage to infrastructures, they have impacted on the structure of the urban economy. An example of these consequences is the re-siting of firms which had their offices in the World Trade Center (Czinkota and Knight, 2005; Rossi-Hansberg, 2004) and it is apparent that both cities (DeVol et al, 2002; Chernick, 2005) and firms (Sheffi, 2005) are very resilient. Rogers (2000) mentions the removal of firms in London due to the effects of the IRA, and in Buesa et al, (2004) the effects of uprooting in the case of firms in the Basque Country due to terrorist extortion from ETA are analysed.

But the effect on urban areas is also seen through human relocation. Thus, for example, between 1971 and 1981, in Northern Ireland there was a net departure of 8,000 people per year (New Ireland Forum, 1983). Some people claim that during the Second Intifada for the first time in history there were more Israeli emigrants than immigrants. Nevertheless, this statement is difficult to verify, given the unwillingness of the Israeli Government to give information on emigration figures.

<sup>13</sup> For example, in Buesa (ed) (2004) the effects of secession by the Basque Country (a claim by the terrorist group ETA) are registered for the economy of this Spanish Autonomous Community, from different aspects. Specifically, the chapter by Myro, Colino, and Pérez (2004) analyses the influence of the conflict on Basque economic growth.

### Effects on Foreign Investment and International Trade

As particular aspects of growth, the long-term effects on trade of terrorist activities have also been specifically studied. Walkenhorn and Dihel (2002) indicate that there is an increase in the cost of transactions not due to the attacks, but rather to the policy reaction to them. These policies are applied particularly at the border and include exhaustive inspections of people, vehicles, and goods, as well as greater regulation and restrictions on immigration. Nitsch and Schumacher (2004) show that the conflict in a broad sense has effects on bilateral trade (a doubling in the number of terrorist incidents reduces international trade by four per cent).

Enders and Sandler (1996) analyse the effects on foreign investment in Spain and Greece, and Abadie and Gardeazabal (2007) look at it on a world level. According to the latter the increase in uncertainty reduces the expected rate of return on the investment and in open economies this can bring about widespread movements of capital between countries, as investors attempt to diversify risk. On average, an increase in the standard deviation of terrorism risk is associated with a 5 per cent fall of GDP in foreign investment.

### Effects on Capital Markets

Attacks affect firms' profits and their business prospects (Frey, Luechinger, and Stutzer, 2004). It is logical to forecast that there would be negative effects on firms who had suffered the attack or those who had some relation to it (for example, transport firms) and there would be higher profits for security firms who would see a rise in demand for their services. In general, investors tend to reorganize their portfolios, getting rid of some stocks which are riskier in favour of assets of similar liquidity but greater security, such as government bonds with short-term maturity or similar (Saxton, 2002). Empirical findings show a short-term effect declining over time, probably due to risk diversification in portfolios, and which reduces influence on particular stocks or shares (Johnston and Nedelescu, 2005).

Berger and Sturm (2005) evaluate news on terrorism in the German economy. They use Media Tenor as a data source and apply a VAR model to see the effects of news about international terrorism, war, and politically motivated conflicts and crimes on real production in the German economy, the DAX index of the capital market and business prospects. They discovered that an increase in news not predicted by the model has an immediate negative effect on industrial production after the period of impact, and this continues to be significant for a whole year. It also has a negative impact on business expectations and the DAX capital markets index for half a year. Assuming that 9/11 had not taken place, industrial production would have been greater in Germany by a cumulative 0.25 per cent. In GDP terms, the effect would be a quarter to three quarters of percentage points of the GDP annual average. In turn, Baumert (2009) has stressed that, in the case of 3/11, stock markets reacted in the face of two types of news items: the number of victims—the sole indicator to estimate the importance of the attack—and who was responsible for it.

Karolyi and Martell (2006) with the database from the Counterterrorism Office of the US Department of State, identify 75 attacks between 1995 and 2002 in which commercial firms seemed to be the target. They obtain a negative reaction of 0.83 per cent

on the day of the attack, which corresponds with an average loss by firms of 401 million dollars. They conclude that the effects differ between the country where the firm has its headquarters and the one where the attack takes place. Another important conclusion is that the attacks in the richest and most democratic countries are associated with greater falls in share prices. Likewise, losses in human capital are more highly valued than material ones, since price reactions are greater. (A more detailed review of studies related to the effects of terrorism on stock markets is to be found in Chapter 7.)

### Effects on Productive Sectors

In the section below we summarize the effects on productive sectors most analysed in the literature on terrorism: tourism, airlines, and transport, the insurance sector, and security firms. Other sectors also analysed are the electrical sector (Chang, McDaniels, and Reed, 2005; Lave et al, 2005; Rose, Oladosu, and Liao, 2005; Amin and Gellings, 2005), and fishing (Gordon et al, 2005; Park et al, 2006). But models of input–output are also presented to analyse the interconnections in the economy and possible deluge effects. Santos and Haimés (2004) analyse the group of firms in the North American Industry Classification System (NAICS) to investigate the effects that falls in demand in certain sectors may introduce within the economic system as a whole.

One of the sectors seen to be most affected by insecurity is *tourism*. Studies centre on tourist areas which suffer from terrorism. Specifically, Fisher and Buccola (2002) analyse the effects in Israel, finding that foreign demand for housing is price-sensitive and also affected by terrorism. On the contrary, local demand is inelastic and shows no negative reaction to terrorism. Other studies analyse the effects of tourism in the Mediterranean area (Drakos and Kután, 2003; Enders, Sandler, and Parise, 1992; Enders and Sandler, 1991 and 1996; Sloboda, 2003). Richardson et al (2005) make the study for the United States, simulating attacks on national parks.

At the end of a terrorism-free period there is a recovery in tourist activity. Frey et al (2004) summarize a group of studies that establish periods of recovery from two or three months to eighteen or twenty-one.

When a sector is directly hit by a terrorist attack it is normal for there to be reduced demand as a result of the fear of fresh attacks. After 9/11 there was a fall in demand for *airlines* and an increase in costs in the aviation sector for security measures to support the falling demand (Drakos, 2004; Ito and Lee, 2005; Blunk, Clark, and McGuibany, 2006). Carter and Simkins (2002 and 2005) highlight that effects may vary with the airlines, but prices as a whole are significantly increased by the attacks. These effects can produce some chain reactions which increase other costs. For example, Blacock, Kadiyali, and Simon (2005) point out that the increased road traffic after 9/11 gave rise to a significant rise in the number of road accidents in the United States.

The *insurance sector* may be affected and produce a market imbalance. On the one hand there may be the problem that some of the risk covering policies are activated, and, on the other, that demand may increase at the same time as supply decreases, because the probability of new attacks is considered to be greater. As a result of all this, policy premiums will cost more, so the costs of insurance firms will rise and profits

fall. It can be foreseen that the effects of rising uncertainty and market imperfections will have less effect on the more highly capitalized insurers than on the weaker ones. The empirical analysis by Cummins and Lewis (2003) of 43 American insurers after 9/11 shows a strong impact persisting over time (see also Brown et al, 2004).

There is also a comparison of insurance market reaction to terrorist attacks with their reactions in the case of natural disasters (Cummins and Lewis, 2003) and though quite a number of similarities are found, there appear to be signs that reaction in the latter case does not appear to be a temporary imbalance as in previous ones. In fact, one of the insurance market reactions after 9/11 was to exclude cover against terrorism, instead of raising prices.

Terrorism is a difficult event to predict in all its facets: time, location, magnitude, etc. This makes it difficult for insurers to calculate premiums and most of them exclude terrorism from their cover or require a substantial increase in the premium. The 9/11 attacks gave rise to an estimated payment of 32.5 billion dollars in compensation. Hence, another debate in connection with terrorism and the insurance sector is who will have to pay compensation for the losses it causes, and, thus, assume the risks: the public or the private sector. In some countries, especially those which have suffered terrorism over a long period, the Government shares or assumes the cost of losses to a great extent, for example in Spain.<sup>14</sup> Those in countries where risk coverage is not left in the hands of the private sector wonder what is the limit of the cover that insurers and underwriters can bear in view of the new forms of terrorism (OECD, 2005; Michel-Kerjan and Pedell, 2005). In 2002, the Terrorism Risk and Insurance Act (TRIA) was passed in the United State, introducing a system of shared compensation between the public and private sectors for insured losses as a result of terrorist acts on the owners of commercial properties. TRIA came into existence as a temporary measure enabling the insurance industry to develop its own solutions against terrorism. It was expected to expire in 2005, but in December 2007 it was extended until 2014. Despite these measures, at the end of 2004 only half of American firms were insured. In general, OECD countries are concerned about the introduction of incentives for firms to extend their cover and increase compensation mechanisms. What is more, the systems introduced by which Government shares the cost have been calculated as insufficient against large-scale or mega-terrorism (OECD, 2005).

Lakdawalla and Zanjani (2004) studied the effect of the TRIA. In the most directly-affected industries (banks, construction, insurance, investment funds, real estate, transport, and public service firms) there was a negative incidence on the share price. They consider that this effect is caused by the TRIA hampering a more efficient assignation of the market and failing in terms of covering nuclear, chemical, and biological incidents, and reducing market expectations of help in future terrorist attacks.

Hunter (2004) and Smetters (2004) are against public aid from the TRIA. Jaffee and Russell (2005) review the arguments and posit as an alternative to the TRIA a permanent programme which would provide temporary loans to the insurance industry until it recovered its surplus. If loans were made at a market interest rate reflecting credit risk, all the price risk-based profits would continue to be produced.

<sup>14</sup> Other countries: Australia, Austria, Finland, France, Germany, Israel, Namibia, Holland, Russia, South Africa, Spain, Switzerland, Turkey, United Kingdom.

Finally, another sector analysed with regard to terrorism, though much less developed, is that of the *mass media*. The media, particularly television, are the most important vehicle for publicity that the terrorists enjoy. Whether they sympathize with the terrorist groups or are against them, they contribute to spreading fear and maintaining panic and the psychological state of anxiety which is produced after attacks. A terrorist–media symbiosis comes into existence which can create economic interests. These interests would be measured for the media via increased sales or audience figures and for the terrorists as an opportunity cost, with the publicity achieved being valued as the amount that a communications vehicle would pay for a legal activity to advertise (on these questions, see Frey and Rohner, 2006; and Melnick and Eldor, 2006). Following on the track of economic analysis to the relationship between the mass media and terrorism, we find the work by Scott (2001), who formulates a model in which he explains how terrorists compete for media attention, in such a way that—in an equilibrium—they crowd the media, and limit the benefits of additional incidents. This occurs because media activity or coverage is limited and if more coverage is given to one terrorist incident, less coverage will be given of another one.

## ANTI-TERRORIST POLICIES

The measures proposed against terrorism are closely related to what has been proposed as causes of it and the theories which are developed around them, for example, theories about if terrorist attacks are cyclic or not.

### IMPLICATIONS OF THE RATIONAL ANTI-TERRORIST CHOICE

The possibility of complementariness or substitution in terrorist actions must be taken into account (Enders and Sandler, 2004). This complementariness is produced when an action needs other previous ones to be a success (for example, threats followed by real attacks). Actions are substitutive when the alternative modes of attack produce results very akin and logistically similar. In this case, terrorists bear in mind the ‘price’ of alternative actions.<sup>15</sup> The price includes the value of time, resources, and anticipated risk of carrying out the act. To a great extent it is determined by government policy or whatever deterrent measures may be adopted. However, a rise in the price does not necessarily mean a fall in terrorism, but rather, the use of ‘cheaper’ alternatives. For example, the increased use of metal detectors in airports increases the relative price of hijacking compared to other types of terrorist acts. When it comes to evaluating the results of the measures taken in airports, as well as the reduction in hijackings it must be borne in mind that there has been an increase in substitutive actions. At times substitution and complementariness go hand in hand, e.g. fortifying American embassies has reduced attacks on their installations, but has increased the killing of military and staff outside the embassy (Enders and Sandler, 2004; Enders, Sandler, and Cauley, 1990; Im, Cauley, and Sandler, 1987). Frey (2004) presents the

<sup>15</sup> Giacomello (2004) wonders whether cyber-terrorism is a substitute for bomb attacks.

pros and cons of the alternative of the stick or the carrot (punishment or reward). Blomberg et al (2004b) study substitution with other forms of violence.

The conclusions drawn for anti-terrorist policy are the following:

1. Actions must lead toward the least harmful substitutes.
2. It must move against financial backing (Fitzgerald, 2004).
3. It must take into account at the same time a wide range of possible types of attack, in order to raise all prices and make it the equivalent of a reduction in resources which will facilitate the abandoning of activities.
4. Technological barriers must be placed prior to the attacks and not be reactive as they are at the moment.
5. Against suicide terrorism Berman and Laitin (2008) and Ferreo (2006) defend 'benign' tactics, to avoid promoting the 'martyrdom' effect.

Recommendations stemming from the previously presented analyses follow the line of proposing a combination of measures, rather than trusting in the effects of just one (Enders and Sandler, 2004; Frey, 2004), and there also need to be credible non-negotiation policies (Sandler and Enders, 2004). Frey and Lueghinger (2003, 2004) and Frey (2004) opt to raise the opportunity cost rather than the material costs of an attack. Several works concern themselves with the role that can be played by the institutions (Wilkinson, 2001; Enders et al, 1990) or increasing aid to them (Mueller, 2004). The analysis by Frey and Luechinger (2003, 2004) stresses the importance of decentralized systems in decision-making, since this makes the targets less attractive (the reason being that smaller units have less impact). One consequence of their argument is that the decision to centralize political decision-making in the European Union could attract terrorist attacks.

## GAME THEORY AND HOSTAGES

In anti-terrorist policy, police agents find themselves not knowing the reactions of terrorists to their measures. But terrorists have the same limitations as the police and political agents. Both terrorists and agents have conflicting interests so strategic modes of behaviour are produced in order to maximize their advantages. Game theory brings together all the necessary requisites to tackle these studies (Sandler and Arce, 2003; Arce and Sandler, 2005).

Game theory is applied for example to kidnappings when the terrorists are not suicide attackers. It attempts to decide whether a non-negotiation policy by the Government will deter terrorists from taking hostages. It also bears in mind the need to coordinate the policies of several countries. Normally costs are seen to be higher than benefits. This is due to the fact that the cost is private for the avenging country but the benefit is a public good for other countries. Furthermore, the benefit is seen to be less since action usually is a response to a previous attack (Enders and Sandler, 2006).

Interactions taking place between governments and terrorists are studied by Arce and Sandler (2005) who also analyse possible effects on other governments. Deterrent action by a government may displace attack on to a third (externality transfer–external costs) or rather protect others or give rise to a global drop in attacks (externality

transfers—external benefits). International cooperation would help to extend external benefits (Enders and Sandler, 2006). Attacks on Madrid and London could constitute examples of external costs (attacks on them because they are allies of the United States in the Iraq War) and the measures of action against the funding systems of fraudulent activities could be examples of external benefits. If cooperation policies were not put into practice, the terrorists' target countries could join a race to be the ones using the largest number of deterrents, something which would mean a high cost for each country and affect its economy. The tendency to attack weak targets or 'weakest links' increases the interdependent character of government choices on security (Arce and Sandler, 2005) or that of airline firms (Heal and Kunreuther, 2005) and thus the need for cooperation between governments and industry.

Arce and Sandler (2005) explain by means of game theory that, when a government has three strategic choices—to defend itself, do nothing, or take pre-emptive action—the defence strategy predominates in a large variety of scenarios. They are based on the fact that defensive actions impose a public cost (negative externality) on the other countries at risk, and since these are less protected they are a softer target for terrorists. On the other hand, taking pre-emptive measures gives rise to a public benefit (positive externality) for all the nations at risk (by destroying a potential threat, all its possible targets are saved). The main exception to this tendency is produced when a nation is the principal victim of terrorist attacks. In this case it will decide to take preventive measures which will favour the remaining potential allies. Countries at risk will set up defensive measures and terrorists will search out the least protected targets. The best results from anti-terrorist policies are produced when coordination of policies among each country at risk is carried out.

Siqueira (2005) and Bueno de Mesquita (2005) continue on the lines of applying game theory to terrorism, by considering a problem with three players: the target Government and two or more terrorist groups. Within this approach, Siqueira studies the interrelationships between factions of the same organization and Bueno de Mesquita centres on the conflict between the terrorist leader and the group. The former reaches important conclusions regarding the anti-terrorist struggle, namely, putting government goals as one of the factions reduces the possibility of action from the others. The only, albeit important, problem is that it is essential to have information about the terrorist group, its factions and the interactions among them. The work by Bueno de Mesquita does not deal with conflict within the group or rival factions, but rather the interactions between former terrorists and the Government. The latter uses the former terrorists to put a brake on terrorism, while not knowing how effective it is. It motivates their collaboration with threats of replacing them by other leaders as spokesmen and promises of political concessions, evaluating marginal benefits and costs of concessions. As reference it uses actions carried out by Israel to replace Yasser Arafat by a new spokesman and the conversations between the British Government and Irish Republicans.

## TRENDS AND CYCLES

Preventive actions against terrorism need to anticipate the attacks. Knowing whether they correspond to some pattern is an invaluable tool for the success of these measures. Economic analysis may help governments in these tasks by means of the study of the

time series of the attacks. Thus, not only is there pre-emptive action, but also efficient application of police resources.

The findings coincide in considering a cyclical trend, with shocks which are not permanent, so there is an average long-term trend. In these studies, the 9/11 attacks, for example, appear as an outlier, with the deaths on that day roughly equal to all the deaths originating from trans-national terrorism during 1998–2000.

The analysis also suggests that in each of the series there is persistence. Analyses have been made for the taking of hostages, bombs, threats, murders, incidents with consequences, and others, from 1968–2000.

The analysis of the cycles is particularly interesting. One of the former is that of Im, Cauley, and Sandler (1987), who carry out a spectral analysis to show clearly that the cycles have characterized the following time series: terrorism, hijacking, kidnappings, and all events involving hostages. They notice a general time period of 28 months, though some have a much longer cycle.

The cycles are a result of a multitude of factors: the publicity which stems from an attack attracts imitators and new attacks (eg, anthrax after 9/11); economies of scale in planning by groups of attacks (for example, the London attacks of July 2005); and processes of attack and counter-attack by the authorities (police measures make the attack unprofitable and reduce terrorist capacity. After a while, they regroup or recruit new members and see the weak points of the Government which has lowered its guard. Then new attacks take place). There are situations in which a climate of public opinion against anti-terrorist operations is created, so they almost come to a halt and the terrorists exploit this to bolster their situation and attack once again (this period has been estimated as between three and five years). Each operation or type of attack has been observed to have its very own cycle. Logistically complex actions such as hijacking airplanes, suicide attacks with bombs in vehicles, and murders have broader cycles than the less sophisticated ones (Enders and Sandler, 2006).

Enders and Sandler (2005) study whether there has been any trend change after 9/11. Prior to this moment they establish two moments of structural change: the mid-seventies, after the Arab-Israel conflict, and the mid-nineties, after the end of the Cold War. They anticipate a structural change from 9/11, due to al-Qaeda's problems in carrying out complex operations with hostages, with a substitution effect by bombs which are simpler, but more deadly.

## AREAS NEEDING FURTHER STUDY

Despite the noticeable development of the literature in the field of the economic analysis of terrorism, which has taken on a strong forward movement from 2001 onwards, there still remain areas in need of further study.

On the one hand, the economic analysis as to the causes of terrorism hitherto does not offer sufficient consensus.

More studies are still needed on the financing to clear up what is still a hazy area, namely, the financial links between crime and terrorism, as well as the legal economic

networks which enable capital movements to be made which could generate profits for the ultimate purpose of financing terrorists.

We have seen how the literature on the costs of terrorism has developed in a broad manner, even though the development of cost-benefit analysis has yet to be carried out. There have been cost-benefit approaches for terrorist decisions, but not for authorities who have to protect citizens. One of the main problems is that data sources on measures developed are less frequent than those for the attacks carried out. Moreover, enumerating, detecting, and quantifying costs is easier than doing so for the benefits. Among the immediate or direct benefits one can quote, by way of an example, the reduction in loss of life and a lesser amount of property loss, or an increase in the net value of profits on flights as a result of the greater security. Nonetheless, it would be logical to think that each policy for checking terrorism has its own costs and benefits.

Other advances which are needed are the perfection of the instruments of analysis applied to the study of terrorism, such as those referring to the use of game theory with, for example, differential game theory; the need to make adequate models and empirically check the reactions of the parts; or the need to model terrorist campaigns to choose the sequence and make-up of the attacks.

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