



**UNIVERSITÄT PADERBORN**  
*Die Universität der Informationsgesellschaft*

# CENTER FOR INTERNATIONAL ECONOMICS

## Working Paper Series

---

Working Paper No. 2011-12

### 9/11's Legacy: How Abstract Fear and Collective Memory Lead to Real Economic Costs

Tim Krieger

December 2011

---

Tim Krieger

Department of Economics, University of Paderborn

November 16, 2011

## **9/11's Legacy: How Abstract Fear and Collective Memory Lead to Real Economic Costs**

### 1. Introduction

September 11, 2001, was a day of unprecedented shock and suffering not only in the history of the United States of America (cf. National Commission XV), but to people all around the world. Using airplanes as deadly weapons, terrorists hit the very heart of the New York City financial district, the World Trade Center's twin towers, as well as the Washington Pentagon, while a further attack on another symbolic place on U.S. soil could be prevented by the brave passengers of United Airlines Flight 93. The impact of the collapse of the Twin Towers to an unprepared nation was so enormous that there was – and still is – a widespread belief of living at a turning point in history in the aftermath of the 9/11 events (cf., e.g., Habermas 4). In fact, even ten years after the 9/11 terror acts 58 percent of Americans believe that the attacks fundamentally altered the way people in this country live their lives; and since 2001 there has been no decrease in the percentage of Americans who say they have permanently changed the way they live their *own* lives (Jones).

Compared to the 9/11 terror attacks, other important events in the history of transnational terrorism appear relatively minor despite their significant – mainly political – impact, such as the *Lockerbie bombing* with 270 fatalities on December 21, 1988. Similarly, the first terrorist attack on the New York World Trade Center on February 26, 1993, or later the Al Qaeda-related bombings in Madrid (March 11, 2004) and London (July 7, 2005) did not attract the same level of attention and did not cause comparable political, economic and social damage. Despite the large number of victims of the 9/11 terror attacks, it is striking that – in comparison – the impact of these events is so much stronger, longer-lasting and felt by so many people all around the world even until today. Accordingly, the aim of the present chapter is to analyze not only the costs and consequences of the 9/11 terror attacks to the U.S. society and the international community, but also to explain why and in which respect the attacks differ – especially in terms of their particularly strong impact – from other terrorist events, that is, why 9/11 could indeed be considered a turning point in history.

In order to better understand the impact of the 9/11 attacks, we will argue in the present chapter that 9/11 is characterized by an unprecedented interplay of several contributing factors. First, as terrorism causes significant costs to society in general, this was also true for 9/11. The cost component has thereby several dimensions ranging from the destruction of human and physical capital to a reduction in life satisfaction due to increased levels of fear. Today, still almost 40 percent of all Americans are worried that they or their family members could become a victim of terrorism (cf. Saad). Closely connected to this aspect is the second contributing factor: psychological effects that are related to the occurrence of rare, dangerous (i.e., costly to oneself and society) events. The probability of becoming a victim of a terror act is extremely small; however, terrorist attacks tend to cause strong emotional distress among the observers. By focusing their thoughts on the horrors of

possibly being involved in such an attack as a victim themselves, risk-averse individuals overrate the actual probability of becoming a victim, especially in comparison to *real* – that is, much more likely – dangers such as dying in car accident. Based on this biased perception, policy demands by the general public may lead to suboptimal policy actions by the administration. Third, there is a strong reinforcing effect of collective memory in the case of the 9/11 attacks. Due to the large number of victims and the highly symbolic target, 9/11 has quickly become part of collective memory which itself is reinforced by annual commemorative events, memorials, books, movies, extensive media coverage etc. This also implies that people are constantly reminded of the terrorist threat, which in turn reinforces the psychologically biased perception that people with regard to the 9/11 events. The ultimate consequence of this interplay of factors was and still is a too strong emphasis on costly counter-terrorism policies, including a constraining of civil liberties, all around the world.

The present chapter is organized as follows: In Section 2, we investigate the specific characteristics of the 9/11 attacks on the World Trade Center in New York. We show that – despite some common characteristics with, e.g., the previous attack on the World Trade Center in 1993 – the 9/11 attacks are very different from previous incidences of transnational terrorism by the damage they caused, by the power of the media images they created and by the emotions they generated among people all around world. We resort to the finding of behavioral economics in Section 3 that help to explain how the interplay of this unexpected and rare terror act with its powerful images and the strong emotions involved ultimately lead to so called '*probability neglect*' which, in turn, causes a relatively too high demand for terrorism counter-measures. In the following Section 4, we discuss which – direct and/or indirect – costs of 9/11 had (and still have) to be faced by both individuals and society. Finally, in Section 5 we conclude and summarize our findings.

## 2. The Specific Characteristics of the 9/11 Attacks on the World Trade Center in New York City

Although the 9/11 events involved an attack on the Pentagon in Washington D.C. and an airplane crash in Pennsylvania, too, their iconographic symbols are the pictures of two airplanes crashing into both towers of the New York World Trade Center and the later collapse of the Twin Towers burying hundreds of innocent people. In order to better understand the *emotional power* of these pictures, which will become an important part of the following argument, it may be instructive to briefly turn to the history of transnational terrorist events before 9/11, in particular to the 1993 terror attack on the World Trade Center in New York City.

The 1993 terror attack was the first Islamist attack on the United States and, in particular, on U.S. soil. It included a truck bomb detonation in a public parking garage below the North tower of the World Trade Center. The group of conspirators, which was connected to Al Qaeda network, hoped to destabilize the North tower such that it would crash into the South tower, ultimately destroying the whole building complex. Fortunately, the building remained stable (despite some substantial inside damages), but six adults and one unborn child were killed. This attack marks the beginning of a series of terror attacks on U.S. citizens and property culminating in the 9/11 events. Other remarkable events were the US embassy bombings in Kenya and Tanzania with 223 fatalities and more than 4,000 injured (August 7, 1998) and the attack on the *USS Cole* in the port of Aden, Yemen, with 17 deaths and 39 injured (October 12, 2000).

Comparing both World Trade Center attacks, important common aspects can be recognized. In particular, it is striking that the same group attacked the same place with the same intention, i.e., the intention to damage or even destroy a symbol of the Western capitalist world. From the perspective of a terrorist organization (Al-Qaeda in this case) this indeed appears to be a very plausible strategy to achieve their immediate and/or ultimate goals. From a rational-choice perspective, terrorist organizations carefully weigh the benefits and costs, including the opportunity costs, of running an attack. They derive benefits from achieving their long-run political objectives, such as redistributing wealth and power or gaining independence from U.S. interference in their home countries. Usually, they strive for economic and political destabilization and media attention in the short run (cf. Schelling), as this works as an important first step to weaken their enemy (i.e., the U.S. administration). At the same time, terrorist organizations are constrained by the direct costs of running an attack and by the fact that they depend on a sufficient supply of members willing to sacrifice their lives for a seemingly higher cause. This supply tends to dry out when frustrations about the political, economic and institutional conditions become less relevant, i.e., when the opportunity costs rise. Hence, the similar strategies and intentions of the attacks are well understood from the behavioral attitudes that terrorist organizations typically display.

In addition to similar intentions, both World Trade Center attacks have in common that they happened completely unexpectedly to the public, despite some previous, but rather unspecified, warnings by some intelligence services. This increased the feelings of shock and fear among U.S. citizens, who consequently demanded to be protected from future attacks (apparently, in case of the World Trade Center which was hit twice within eight years protective measures were not sufficient). Again, this effect is very much in line with the interests of a terrorist organization and therefore not surprising given the highly strategically and logical behavior of the Al-Qaeda network. In general, terror groups anticipate that a government that is attacked by terrorists carefully weighs the cost of giving in to (at least some) terrorist demands (i.e., political or social goals that are not enforceable in the ordinary political process, e.g., a withdrawal of U.S. troops from the Arab region) against the cost of a prolonged terrorist campaign that results from continued resistance by the government (cf. Sandler and Enders). When terrorists are successful at destabilizing a country, the (opportunity) costs of continued resistance increase, so that accommodating terrorists' demands becomes comparatively less costly (i.e., more likely) from the government's perspective. Clearly, Al-Qaeda's interest in both attacks was generate intense feelings of insecurity among Americans.

Finally, both attacks were very rare events with a very small chance of getting directly involved personally, i.e., the probability of getting harmed or killed in one of the two World Trade Center attacks is almost negligible compared to the chance of dying in an everyday's life situation. For instance, there were almost 34,000 traffic fatalities in the U.S. in 2009 alone (cf. U.S. Department of Transportation 3) which is more than ten times the number of people killed during the terrorist attacks (1993: 7 fatalities, 2001: approx. 3,000 fatalities).

Despite these similarities that can be explained from the terrorists' tactical and strategical intentions, there are very substantial differences between the two attacks on the New York World Trade Center. Here, for the sake of our following argument, we will focus on the emotional involvement of observers only. The 9/11 attacks caused more emotional distress than probably any other terrorist attack taking place before or after this event (including the first attack on the World Trade Center). This is not only because of the large number of victims and the highly symbolic target, but also because of (among other things) real-time media coverage. All around the world people could follow

the events in New York live on CNN and other TV channels as well as on the internet and on the radio. They became eye witnesses of the collapse of the Twin Towers. While watching for hours these very powerful images from New York, many of them started to focus their thoughts on the horrors of possibly being involved in this attack as a victim. The thought that 'it could have happened to me' caused very strong emotions and empathy toward the actual victims. This was particularly the case when the so called 'falling man' pictures (taken by Richard Drew at the Associated Press) and footage showing people falling or actually jumping from the buildings became available, although only few news organizations decided to use the footage (cf. Whitworth). These images caused an even stronger identification with the victims of the terrorist attack, including an estimated 50 to 200 'jumpers' (cf. Whitworth). To Whitworth and many observers, the 'falling man' pictures "were some of the most chilling images of the day". They were so powerful (even today) that they not only inspired Don DeLillo to choose 'falling man' as the title of his 9/11 novel but also led to a still ongoing investigation into the identity of the man shown on the most famous photograph of Drew's series. The photograph became the subject of a TV documentary and of some published essays. Ultimately, these pictures are a striking example of the very specific and very strong emotional distress that the 9/11 attacks were able to generate in people's minds.

### 3. The Psychological Aspects of 9/11 Attacks

The previous section has shown that the 9/11 attacks had three important ingredients that allow us to apply concepts from *behavioural economics* or *economic psychology* to explain the specific consequences, among them the extremely high costs, of these attacks. These ingredients are the facts (i) that a terrorist attack like 9/11 has to be considered a very rare event, (ii) that 9/11 was an unexpected or unpredictable event, and (iii) that its powerful images caused very strong emotions among observers in the U.S. and all around the world.

Behavioral economics and the related field of economic psychology study social, cognitive and emotional factors to gain a better understanding of the economic decisions of individuals (e.g., consumers, investors or voters) and institutions/organizations (e.g., firms, legislative bodies) and their effects on the economy. Different from standard economic theory, these fields are focusing on the bounds of rationality of economic agents. Therefore, they typically integrate insights from psychology with neo-classical economic theory. In particular, they investigate how biases toward promoting self-interest affect (economic) decisions and how this changes the outcomes of standard economic theory which relies heavily on the concept of 'homo economicus', i.e., the perfectly rational, utility maximizing economic agent. More specifically, a perfectly rational agent is assumed to be able to precisely predict the expected (utility) gain or loss from uncertain future events which is, however, a very difficult task when it comes to rare events such as a nuclear meltdown or a terrorist attack. In these cases, prior knowledge about probabilities is hardly available since little (or no) past experience with such events exists.

Sunstein (121) argues that terrorists are well aware of how the general public responds to a terrorist attack. In fact, they seem to show a good working knowledge about fear. One aspect of this knowledge relates to the fact that – in the face of ignorance – people assess probabilities through the use of heuristics, i.e., people often make decisions based on approximate rules of thumb, not strict logic. A frequently employed heuristic is the so called *availability heuristic* that is of particular

interest in the case of the 9/11 terror attacks. Psychologically, people tend to assess the probability of an event by the ease with which occurrences can be brought to mind (cf. Tversky and Kahneman 1127). For instance, one may assess the risk of breast cancer among young women by recalling such occurrences among one's acquaintances. The problem here is, however, that the retrievability of instances may be biased by other factors such as salience. It is, for instance, well known that the impact of being an eye witness of some (traumatic) event has a stronger impact on the subjective probability of such events than only hearing or reading about it. As a consequence, when trying to judge whether a specific event is likely to occur or not, people tend to overrate probabilities in their mind when similar (and recent) occurrences are available and salient. This is precisely what happened in 9/11's aftermath: People all around the world watched – in an infinite loop – the very powerful images of the attacks and the collapse of the Twin Towers as 'eye witnesses' on TV, i.e., the terror act was both available and salient, making people think that another such act is likely, whether or not it was in fact.

As argued before, terrorist organizations strive for political destabilization and media attention as this helps to weaken the government they consider to be their enemy. The way to achieve this (short run) goal most effectively is to increase fear in the population because people then demand from the government to be protected. If the government fails to do so, it is no longer supported by the public. Then, there is a good chance that governments (being interested in re-election) will be more willing to give in to the terrorists' demands (in fact, Gassebner et al. show that governments are more likely to be replaced in times of terror). Terrorists who understand this mechanism will exploit it by increasing fear through unpredictable attacks that make people – in a rather abstract sense – fear that they "cannot be safe anywhere" (Sunstein 122). In addition, unpredictable and unexpected terror acts are particularly effective in increasing the fear because – from a psychological perspective – people show a disproportionate fear of risks that seem unfamiliar and hard to control (in fact, Kuran and Sunstein, 687, call terrorists 'availability entrepreneurs' because of systematically employing this strategy to increase fear). The 9/11 attacks resemble this type of fear-enhancing event almost ideally. To Americans who were not used to terror acts on their soil, using airplanes as deadly weapons to attack skyscrapers was a very new and extremely frightening experience. In addition, there was no previous warning about (and, thus, no escape from) this attack. As a consequence, it is not surprising that 9/11 caused significant changes in private and public behavior. What is important to note in this context is, however, that these changes appear exaggerated when compared to the actual magnitude of the risk that a similar terror act could happen again.

The latter fact can be explained from economic psychology as well. When risk-averse individuals face a particularly fearsome risk, such as 9/11-type terrorist threats, and when people's emotions are intensely engaged, people tend to exaggerate the benefits of preventive, risk-reducing, or ameliorative measures (cf. Sunstein and Zeckhauser 3). The underlying reason for this behavior is that people have difficulties to correctly process (very) low probabilities of events, while at the same time having the highly negative consequences of these events in their minds. Under these circumstances, individuals fall victim to *probability neglect*, i.e., they focus their attention (too much) on the bad outcome itself despite its very low probability (cf. Sunstein 122). As a consequence, they are willing to give up not only (economic) resources, but also civil liberties to reduce or even entirely avoid the risk of future terrorist attacks. However, the 'price' (or 'insurance premium') they end up paying is usually *too high* when compared to the *expected loss*, i.e., the probability (which extremely low) times the damage (usually very high) of a terror act. Typically, for other – less emotionally

charged – negative events with the same expected loss, but relatively higher probability and smaller damage, the willingness-to-pay is much lower. Since most people are – to a greater or lesser degree – subject to probability neglect, in cases like the 9/11 attacks there is a strong demand that the government should counter the potential threat by ‘appropriate’ policy measures. The government then usually responds to these demands quite willingly. According to Patt and Zeckhauser (66) and Sunstein and Zeckhauser (3), an overreaction by the government (the so called *action bias*) is especially likely if the relevant actors will be able to obtain credit for responding to the risk. Not surprisingly, after the 9/11 attacks the public and policy response was much larger than the actual risk warranted.

An overreaction in response to a severe terrorist attack does not necessarily constitute a major problem when it is of a temporary nature only. As time passes, people and the government gather new information about the background of the attacks, sometimes perpetrators are captured or the political environment changes with new issues gaining importance. The memories of the attacks fade and individuals re-evaluate their initial assessment of the terrorist threat. Civil liberties and a smooth and unregulated business environment return into the focus of the people, such that reducing, e.g., security measures gets a higher priority. Often, the process of turning toward a new policy agenda is surprisingly rapid. For instance, the *USS Cole* attack hit the headlines only for a few days, before the public and the media lost their interest and turned to other topics.

In this respect, 9/11 differs substantially from previous terror acts because it has become part of *collective memory*. In general, we interpret collective memory as a nation’s representations and associated interpretations of the past, communicated through narratives and symbols that convey information about the nation’s values and norms (cf. Dessí 534), i.e., with the ultimate goal of transmitting cultural and national identity. Typically, this is done through a diversity of channels that are likely to have an impact on the beliefs of the young, while at the same time reinforcing the beliefs of those who eye witnessed the actual events. These channels include, e.g., school textbooks, newspaper articles, television and radio programs, film, art, monuments, museums, commemorative rituals, plays, novels etc (cf. Dessí 538). The enormous ‘production’ of narratives and symbols dealing with 9/11 shows that it has indeed become part of collective memory in general. However, 9/11 is specific in the sense that the transmission of values and norms of the American society cannot be separated from its terrorist counterpart. Values and norms evolve in opposition to the immoral standards of dangerous and ruthless terrorists. Positive ideals derived from, e.g., the solidarity of people and the bravery of fire fighters in New York appear particularly appealing against the background of the dirty deed of the terror act. Hence, when in this case positive values and norms are transmitted to future generations their negative counter-image is part of this transmission, too, including the memories (and feelings) of fear and insecurity. Hence, collective memory of 9/11 tends to reinforce negative emotions again and again, thereby reinforcing their psychological effects – such as probability neglect – as well.

The latter implies that the public and political overreaction to the terrorist threat continues at a high level instead of fading away. The longer the time span of living in fear of further terror acts, however, the more the institutional changes resulting from it become set as time passes. For instance, the creation of the U.S. Department of Homeland Security (which was the largest U.S. government reorganization since 50 years) and the granting of enormous additional resources, power and responsibilities to intelligence services is an institutional change that has become irrevocable. In fact, with more than 200,000 employees the Department of Homeland Security is nowadays the third

largest cabinet department in the U.S. government with far-reaching responsibilities (protection of the territory of the United States from terrorist attacks, man-made accidents, and natural disasters) and a budget of 98.8 billion dollars in 2011. Furthermore, although the highly problematic breaches of fundamental civil rights in Guantánamo and other places (such as the use of torture) still causes some protest today, they more and more appear as a part of the seemingly successful ‘war on terrorism’ and as legitimate instruments which may be used – with fewer moral concerns – in cases of future terrorist threat again. This clearly raises the costs of terrorism to society beyond the point of what may be seen as justified by the actual terror risk and resulting expected loss. In the following section, we will turn to the question of the costs of the 9/11 attack in more detail.

#### 4. The Individual and Societal (Economic) Costs of 9/11 Attacks

In general, the costs of terrorism may be distinguished along two lines: direct vs. indirect and individual vs. societal costs. Terrorism may harm individuals and society directly and indirectly, where the latter effect usually refers to the reaction of individuals (e.g., consumers, tourists, foreign investors) or institutions (e.g., government, agencies, firms) to terrorism. In this context, it is important to see that even non-monetary costs, such as reduced life satisfaction due to fear, easily transform into ‘real’, i.e., economically measurable, costs. The previous section has already indicated some of these costs, arising when abstract fear leads people to demand additional costly security measures. As argued before, these costs tend to be particularly high because risk-averse individuals overrate the actual risk of terror attacks due to probability neglect and are willing to pay a higher (insurance) premium to avoid the risk and reduce uncertainty. At the same time, changes at the societal or aggregate level (such as price changes) force individuals to re-optimize their initial decisions which usually leads to losses of individual welfare.

In the following, we will categorize and investigate the economic costs of terrorism in more detail (cf. Krieger and Meierrieks). Basically, there exist five main channels of transmission from terrorism to the economy: (i) destruction, (ii) disruption, (iii) diversion, (iv) dissaving, and (v) portfolio substitution. *Destruction* always refers to the direct costs of terrorism, given the fact that human and physical capital is destroyed through terrorist attacks, resulting in personal grievances (at the individual level) and a reduced economic output (at the aggregate level). In the case of 9/11, these costs are rather well-documented and already add up to a substantial amount. Next to the loss of 3,000 lives, many of them highly qualified experts in their respective fields (implying an enormous loss of human capital), there were substantial damages to property and infrastructure which are estimated to range between ten and thirteen billion dollars (all estimates, unless otherwise indicated, from IAGS). These numbers do not include the replacement costs of the World Trade Center of approximately three to five billion dollars and the cleanup costs of some one billion dollars. Part of the loss of physical capital is also four civilian aircrafts worth about 385 million dollars. Obviously, this brief list of examples of losses is still far from being complete. The total *insured* losses related to the 9/11 attacks have been estimated to range between 40 to 70 billion dollars (cf. Cummins and Lewis 153), but substantial losses were in fact not insured.

The other four effects refer mainly to the indirect consequences of terrorism on the economy that emerge from the response of economic agents. The *disruption* effect may become manifest in higher transaction costs, as the effectiveness of public institutions is challenged and manipulated by



terrorism, or as insecurity in general increases. Next to diversion costs, this cost type is the most relevant one in the context of the 9/11 attacks. Two types of disruption costs may be distinguished. First, changes of behavior at the individual or organizational level as well as disruption of some businesses processes (e.g., the New York Stock Exchange had to close down for some days due to damages of the business infrastructure) had effects on both sides of the markets, i.e., on the supply and demand for goods and services. For instance, the demand for airline tickets slumped as people were afraid of using airplanes. This led to substantial losses of air traffic revenue which were said to account for about ten billion dollars. Insurance companies, as stated above, had to cover the insured losses which caused substantial company losses, such that their stock prices fell dramatically.

All together, there were an estimated 83,000 direct job losses throughout the U.S. economy causing about 17 billion dollars in lost wages. In relative terms, the *immediate* impact of the 9/11 attack at the federal level was to reduce real GDP growth in 2001 by 0.5 percent, while the unemployment rate increased by 0.11% (cf. Roberts). Again, this list of examples is far from being complete. In particular, the previous examples include only directly visible effects of 9/11, but not to its 'hidden' costs. For instance, although people decided to no longer use airplanes they nevertheless continued to travel, now mainly by car. However, as already argued in Section 2, there is a relatively higher risk of dying in a car accident than through a terror act. Accordingly, there have been of 327 additional driving deaths per month in late 2001 because people avoided flying by airplane (cf. Blalock et al). This example nicely attests to the phenomenon of probability neglect in the face of a vivid threat.

The second type of disruption cost relates to the fact that – as argued in the previous section – people demand additional security measures which are then introduced by the government. These measures typically involve substantial transaction costs, i.e., they tend to severely slow down the functioning of markets and institutions. For instance, due to fear of terror acts people are willing to accept additional security measures at the airports. This not only leads to real economic costs in terms of the opportunity cost of waiting in line (instead of using the time for productive work), but may also involve a willingness to sacrifice civil liberties. According to Viscusi and Zeckhauser's survey (cf. Viscusi and Zeckhauser, *Sacrificing Civil Liberties*; and Viscusi and Zeckhauser, *Recollection Bias*), already with 10 minutes of delay from a random screening of all passengers at the airport, almost half of the respondents would favor a targeted risk profiling based on – most often salient – demographic characteristics (such as a person's age, race, gender, national origin, appearance, and baggage). This means that they are willing to accept that such targeting may systematically impose differential costs on particular groups within the population. Clearly, when there is a high correlation with ethnicity and race major concerns with respect to civil liberties are created (cf. Viscusi and Zeckhauser, *Sacrificing Civil Liberties* 103). The effective cost of a measure like this on individuals and society as a whole is, however, almost impossible to estimate in monetary terms. However, several studies have shown that civil liberties and political rights are positively correlated with and potentially fostering economic growth (cf. Aixalá and Fabro). Hence, the constraining of these rights is certainly neither advisable from an economic nor social point of view due to the high costs that government reactions to the threat of terrorism produce (cf., among others, Dreher et al.; Piazza and Walsh; Krieger and Meierrieks).

In addition, increasing transaction costs due to additional government intervention are not restricted to the country that was hit by a terrorist attack. In fact, we often observe spatial contagion, i.e., the costs spill over to other countries, such that countries around the world may be harmed by an event of local nature in the first place. For instance, additional security measures at the U.S.-Canadian

border delay the flows of goods substantially. The costs of these delays to Canadian exporters have been estimated to amount to 1.79 billion dollars annually (cf. Georges et al).

*Diversion* occurs when public resources are shifted from output-enhancing to inherently non-productive expenditures. For instance, a government may increase spending on security at the expense of (more productive) spending on education and infrastructure. From the perspective of politics this is a very rational choice as citizens, i.e., future voters politicians want to attract, demand this shift due to their fear of terrorism. However, from a social welfare perspective this (short-run) change is problematic. First, due to probability neglect the demand for non-productive security measures is too high. Second, the change in spending goes along with institutional change (e.g., building up new bureaucracy) that is often irrevocable with harmful consequences in the long run. And third, by its very nature spending on security is consumptive, while spending on, e.g., education is to be considered an investment (in human capital). Hence, this shift in public spending tends to impede future economic development, i.e., the efforts to curb terrorism will have negative effects in the long run which get amplified through probability neglect. The diversion effect of the 9/11 attacks is difficult to estimate because not all observable policy changes are necessarily a direct consequence of the 9/11 attacks. For instance, after 9/11 some 40 billion dollars in U.S. federal emergency funds have been used up for, e.g., heightened airport security, sky marshals and operations. Bilmes and Stiglitz even calculate the monthly costs of both the Iraq and Afghanistan war to amount to 16 billion dollars and claim that this numbers include all possible, i.e., also hidden, costs to the U.S. federal budget. Based on this calculation, they estimate the bill for the Iraq war alone to top three trillion dollars. Whether or not this calculation will prove to be correct at the end of the day, Bilmes and Stiglitz are correct in their assertion that – even a fraction of this number – could make a significant difference for many of the world's problems. Precisely in line with our argument, they suggest to rather set up a new Marshall Plan to help desperately poor countries by achieving literacy for all, which would clearly be a highly productive investment pointing toward a more optimistic future. Possibly, this could also have a terror-reducing effect as some of the underlying reasons of grievances and frustrations of people, which could turn them into terrorists, will be eliminated (however, a recent study by Brockhoff et al. shows that this hope is probably too optimistic).

The remaining two channels, dissaving and portfolio substitution did not play a major role in the aftermath of the 9/11 attacks. *Dissaving* refers to a decline in savings that affects an economy's capital stock. Typically, one observes this effect in countries with prolonged terrorist campaigns, e.g., Israel, the Basque country or Northern Ireland, where due to the continuous terror threat and the resulting immediate uncertainty of what the future will bring people prefer to consume today (rather than save for tomorrow's consumption). For the U.S. (with its already extremely low aggregate savings rate of about one percent in 2001), no relevant decline of the savings rate has been observed after the 9/11 attacks. *Portfolio substitution* means the flight of human, physical and financial capital from a country in the face of conflict. For instance, terrorism negatively affects an economy's foreign direct investment position since it poses a costly risk and reduces the returns to investment (cf. Abadie and Gardeazabal). The resulting withdrawal of international capital may hurt economic development, particularly when foreign finance is an important engine of economic growth (e.g., in developing economies). After 9/11, it was indeed feared that foreigners – in a similar move – could curtail their purchases of U.S. financial assets and reduce the total inflow of capital into the U.S. economy. Following the attacks, there was in fact a reduction of foreigners' purchases of Treasury securities; however, these effects were fully reversed within 30 days due to joint efforts by currency

traders, central bankers and financial ministers around the globe to ensure the smooth operation of the international financial markets (cf. Jackson 11). Other relevant effects of portfolio substitution following the 9/11 attacks are not documented, except that the city of New York suffered from a diversion of business away from the city to other locations (mostly within the US).

As a final remark, it should be emphasized that even when the economic repercussions of terrorism may be low (compared to the U.S. gross national product, the previously presented economic costs still appear relatively moderate), its political and social consequences may still matter substantially. We have already pointed at the political costs resulting from disregarding fundamental civil liberties, but again this does not fully take account of all possible costs. For instance, Frey et al. find that terrorism is accompanied by a robust decline in life satisfaction, which was certainly also the case in the U.S. in the years following the 9/11 attacks and which may have resulted not only from increased fear, but also from constrained civil rights.

## 5. Conclusion

The terrorist attacks of September 11, 2001, took the U.S. and observers all around by shock and surprise. Never before did the U.S. experience a similar act of transnational terrorism with such devastating consequences on their soil. In fact, the collapse of the Twin Towers (which were always a symbol of capitalism) was also seen as a sign how vulnerable to terrorism even seemingly robust capitalist economies can be. This chapter has shown that the (economic) costs of the 9/11 attacks were – and still are – higher and longer-lasting than those of any other terrorist attack. Especially, the indirect costs turned out to be very high, i.e., the costs following from the reaction of individuals and institutions to acts of terror (here: 9/11) and the terrorist threat. For instance, people avoided travelling by airplane (instead using their cars) and were more willing to accept additional security measures at the airports.

While these reactions seem perfectly understandable at first sight, we have shown that the level to which security measures were demanded by the citizens was sub-optimally high from a social-welfare perspective. This explains why the consequences of 9/11 were more severe and lasted longer than in the case of other terror attacks. We have shown that the underlying reason for this effect can be seen in an unprecedented interplay of several important contributing factors. First, severe terror acts causing major damages, such as the 9/11 attack, are rare and typically completely unexpected events. Second, due to certain behavioral dispositions people respond to this type of event in a specific (and predictable) way. Individuals fall victim to *probability neglect* and focus their attention too much on the available and salient images of this event. Due to their – overrated – fear of further terrorist attacks they ignore their very low probability and, as a consequence, they demand excessive counter-terrorism measures, which are not justified the actual *expected* damage. Third, the powerful and highly emotional images of the 9/11 attacks not only amplify probability neglect, but there is also a strong reinforcing effect of collective memory. Annual commemorative events, memorials, books, movies, extensive media coverage etc. are constantly reminding Americans of the terrorist threat, thereby impeding the process of adaption to living in an insecure environment and the slow fading of painful memories. The ultimate consequence of this interplay of factors was – and through the collective memory effect still is – a too strong emphasis on costly counter-terrorism policies, including a constraining of civil liberties, all around the world. Hence, in general the 9/11 attacks are

characterized by extraordinarily high and long-lasting costs. Furthermore, 9/11 led to costly institutional changes which are likely to be irrevocable, such that political, economic and social costs will continue to be high even in the very long run.

## References

- Abadie, Alberto; Gardeazabal, Javier. Terrorism and the World Economy. *European Economic Review*, Vol. 52 (2008), No. 1, pp. 1-27.
- Aixalá, José; Fabro, Gema. Economic Freedom, Civil Liberties, Political Rights and Growth: A Causality Analysis. *Spanish Economic Review*, Vol. 11 (2009), No. 3, pp. 165-178.
- Bilmes, Linda J.; Stiglitz, Joseph E. The Iraq War Will Cost Us \$3 Trillion, and Much More. *The Washington Post*, March 9, 2008.
- Blalock, Garrick; Kadiyali, Vrinda; Simon, Daniel H. Driving Fatalities after 9/11: A Hidden Cost of Terrorism. *Applied Economics*, Vol. 41 (2009), No. 14, pp. 1717-1729.
- Brockhoff, Sarah; Krieger, Tim; Meierrieks, Daniel. Ties That Do Not Bind (Directly) – The Education-Terrorism Nexus Revisited. Working Paper No. 2010-02, Center for International Economics, University of Paderborn.
- Cummins, J. David; Lewis, Christopher M. Catastrophic Events, Parameter Uncertainty and the Breakdown of Implicit Long-Term Contracting: The Case of Terrorism Insurance. *Journal of Risk and Uncertainty*, Vol. 26 (2003), No. 2/3, pp. 153-178.
- Dessí, Roberta. Collective Memory, Cultural Transmission, and Investments. *American Economic Review*, Vol. 98 (2008), No. 1, pp. 534-560.
- Dreher, Axel; Gassebner, Martin; Siemers, Lars H.R. Does Terror Threaten Human Rights? Evidence from Panel Data. *Journal of Law and Economics*, Vol. 53 (2010), No. 1, pp. 65-93.
- Frey, Bruno S.; Luechinger, Simon; Stutzer, Alois: The Life Satisfaction Approach to Valuing Public Goods: The Case of Terrorism. *Public Choice*, Vol. 138 (2009), No. 3/4, pp. 317-345.
- Gassebner, Martin; Jong-A-Pin, Richard; Mierau, Jochen O. Terrorism and Electoral Accountability: One Strike, You're Out! *Economics Letters*, Vol. 100 (2008), pp. 126-129.
- Georges, Patrick; Mérette, Marcel; Zhang, Qi. Assessing the Cost of Post-9/11 Security Measures and the Impact of a North American Security Perimeter – A Computable General Equilibrium Analysis. Final Report Presented to Canadian Border Services Agency, February 28, 2011.
- Habermas, Jürgen. *The Divided West*. 2004. Cambridge: Polity Press, 2006.
- IAGS: Institute for the Analysis of Global Security. How Much did the September 11 Terrorist Attack Cost America? 2003-2004. URL: <http://www.iags.org/costof911.html>.

- Jackson, James K. Foreign Ownership of U.S. Financial Assets: Implications of a Withdrawal. Report for Congress, Congressional Research Service, March 9, 2010. URL: <http://www.policyarchive.org/handle/10207/bitstreams/18849.pdf>.
- Jones, Jeffrey M. One in Four Americans Say Lives Permanently Changed by 9/11. Gallup, September 8, 2011. URL: <http://www.gallup.com/poll/149366/One-Four-Americans-Say-Lives-Permanently-Changed.aspx>.
- Krieger, Tim; Meierrieks, Daniel. Terrorist Financing and Money Laundering. Working Paper No. 2011-07, Center for International Economics, University of Paderborn.
- Kuran, Timur; Sunstein, Cass R. Availability Cascades and Risk Regulation. *Stanford Law Review*, Vol. 51 (1999), No. 4, pp. 683-768.
- National Commission on Terrorist Attacks Upon the United States (a.k.a. the 9-11 Commission). The 9/11 Commission Report. Washington D.C.: Government Printing Office, 2004.
- Patt, Anthony; Zeckhauser, Richard. Action Bias and Environmental Decisions. *Journal of Risk and Uncertainty*, Vol. 21 (2000), No. 1, pp. 45-72.
- Piazza, James. A.; Walsh, James I. Physical Integrity Rights and Terrorism. *PS: Political Science & Politics*, Vol. 43 (2010), No. 3, pp. 411-414.
- Roberts, Bryan W. The Macroeconomic Impacts of the 9/11 Attack: Evidence from Real-Time Forecasting. Office of Immigration Statistics, Working Paper, August 2009. URL: [http://www.dhs.gov/xlibrary/assets/statistics/publications/ois\\_wp\\_impacts\\_911.pdf](http://www.dhs.gov/xlibrary/assets/statistics/publications/ois_wp_impacts_911.pdf).
- Saad, Lydia. Americans' Fear of Terrorism in U.S. Is Near Low Point. Gallup, September 2, 2011. URL: <http://www.gallup.com/poll/149315/Americans-Fear-Terrorism-Near-Low-Point.aspx>.
- Sandler, Todd; Enders, Walter. Economic Consequences of Terrorism in Developed and Developing Countries: An Overview. In: Keefer, P.; Loayza, N. (eds.): *Terrorism, Economic Development, and Political Openness*. 2008. New York: Cambridge University Press: 17-47.
- Schelling, Thomas C. What Purposes Can "International Terrorism" Serve? In: Frey, R. G.; Morris, W.C. (eds.): *Violence, Terrorism, and Justice*. 1991. Cambridge: Cambridge University Press: 18-32.
- Sunstein, Cass R. Terrorism and Probability Neglect. *Journal of Risk and Uncertainty*, Vol. 26 (2003), No. 2/3, pp. 121-136.
- Sunstein, Cass R.; Zeckhauser, Richard J. Overreaction to Fearsome Risks. Harvard University Law School Program on Risk Regulation Research Paper No. 08-17, 2008.
- Tversky, Amos; Kahneman, Daniel. Judgment Under Uncertainty: Heuristics and Biases. *Science*, Vol. 185 (1974), pp. 1124-1131.
- U.S. Department of Transportation. Fatality Analysis Reporting System. General Estimates System. 2009 Data Summary. 2011. Washington D.C.
- Viscusi, W. Kip; Zeckhauser, Richard J. Sacrificing Civil Liberties to Reduce Terrorism Risks. *Journal of Risk and Uncertainty*, Vol. 26 (2003), No. 2/3, pp. 99-120.

Viscusi, W. Kip; Zeckhauser, Richard J. Recollection Bias and the Combat of Terrorism. *Journal of Legal Studies*, Vol. 34 (2005), No. 1, pp. 27-55.

Whitworth, Melissa. 9/11: 'Jumpers' from the World Trade Center Still Provoke Impassionate Debate. *The Telegraph*, September 3, 2011.

## Recent discussion papers

2011-12	Tim Krieger	9/11's Legacy: How Abstract Fear and Collective Memory Lead to Real Economic Costs
2011-11	Yuanhua Feng	Data-driven estimation of diurnal duration patterns
2011-10	B. Michael Gilroy Birke Thuy Duong Nguyen	Ist Fairer Handel Wirklich Fair?
2011-09	Yuanhua Feng Zhichao Guo Christian Peitz Xiangyong Tan	A tree-form constant market share model for growth causes in international trade based on multi-level classification
2011-08	Tim Krieger Daniel Meierriecks	Ökonomische Aspekte des neuen globalen Terrorismus
2011-07	Tim Krieger Daniel Meierriecks	Terrorist Financing and Money Laundering
2011-06	Thomas Gries Stefan Jungblut Wim Naudé	New Firm Creation and Failure: A Matching Approach
2011-05	Daniel Kaimann	"To infinity and beyond!" - A genre-specific film analysis of movie success mechanisms
2011-04	Yuanhua Feng Zhichao Guo Christian Peitz Xiangyong Tan	A tree-form constant market share analysis for modelling growth causes in international trade
2011-03	Zhichao Guo Yuanhua Feng Xiangyong Tan	Impact of China's accession to WTO and the financial crisis on China's exports to Germany
2011-02	Alexander Haupt Tim Krieger Thomas Lange	Competition for the International Pool of Talent: Education Policy and Student Mobility
2011-01	B. Michael Gilroy Daniel Kruse	Die Prinzipal-Agent-Theorie als Erklärungsinstrumentarium von Korruption: Angewendet auf den Praxisfall „Siemens“
2010-09	Yuanhua Feng	An iterative plug-in algorithm for decomposing seasonal time series using the Berlin Method
2010-08	Zhichao Guo Yuanhua Feng Xiangyong Tan	Short- and long-term impact of remarkable economic events on the growth causes of China-Germany trade in agri-food products <i>[published in: Economic Modelling 28 (2011), 2359-2368]</i>
2010-07	B. Michael Gilroy Elmar Lukas Christian Heimann	Welchen Einfluss hat die Anwesenheit von ausländischen und multinationalen Unternehmungen auf die deutschen Exporte?
2010-06	Stefan Gravemeyer Thomas Gries	Income and disparity in Germany and China
2010-05	Thomas Gries Margarete Redlin	Short-run and Long-run Dynamics of Growth, Inequality and Poverty in the Developing World

2010-04	Stefan Gravemeyer Thomas Gries Jinjun Xue	Poverty in Shenzhen
2010-03	Alexander Haupt Tim Krieger Thomas Lange	A Note on Brain Gain and Brain Drain: Permanent Migration and Education Policy
2010-02	Sarah Brockhoff Tim Krieger Daniel Meierrieks	Ties That Do Not Bind (Directly): The Education Terrorism Nexus Revisited
2010-01	Claus-Jochen Haake, Tim Krieger, Steffen Minter	On the institutional design of burden sharing when financing external border enforcement in the EU
2009-06	Tim Krieger, Stefan Traub	Wie hat sich die intragenerationale Umverteilung in der staatlichen Säule des Rentensystems verändert? Ein internationaler Vergleich auf Basis von LIS-Daten <i>[published in: Jahrbücher für Nationalökonomie und Statistik</i> <i>231 (2011), 2, 266-287]</i>
2009-05	Karin Mayr, Steffen Minter, Tim Krieger	Policies on illegal immigration in a federation <i>[forthcoming</i> <i>in: Regional Science and Urban Economics]</i>
2009-04	Tim Krieger, Daniel Meierrieks	Terrorism in the Worlds of Welfare Capitalism <i>[published in: Journal of Conflict Resolution 54, 6, 902-939.]</i>
2009-03	Alexander Haupt, Tim Krieger	The role of mobility in tax and subsidy competition
2009-02	Thomas Gries, Tim Krieger, Daniel Meierrieks	Causal Linkages Between Domestic Terrorism and Economic Growth <i>[forthcoming in: Defense and Peace Economics]</i>
2009-01	Andreas Freytag, Jens J. Krüger, Daniel Meierrieks, Friedrich Schneider	The Origin of Terrorism - Cross-Country Estimates on Socio-Economic Determinants of Terrorism
2008-11	Thomas Gries, Magarete Redlin	China's provincial disparities and the determinants of pro- vincial inequality <i>[published in: Journal of Chinese economic and business</i> <i>studies 7 (2009), 2, 259-281.]</i>
2008-10	Thomas Gries, Manfred Kraft, Daniel Meierrieks	Financial Deepening, Trade Openness and Economic Growth in Latin America and the Caribbean <i>[forthcoming in: Applied Economics]</i>
2008-09	Stefan Gravemeyer, Thomas Gries, Jinjun Xue	Discrimination, Income Determination and Inequality – The case of Shenzhen <i>[forthcoming in: Urban Studies]</i>
2008-08	Thomas Gries, Manfred Kraft, Daniel Meierrieks	Linkages between Financial Deepening, Trade Openess and Economic Development: Causality Evidence from Sub- Saharan Africa <i>[published in: World Development 37 (2009), 1849-1860.]</i>
2008-07	Tim Krieger,	Diskretionäre rentenpolitische Maßnahmen und die Entwick-



	Sven Stöwhase	lung des Rentenwerts in Deutschland von 2003-2008 [ <i>published in: Zeitschrift für Wirtschaftspolitik</i> 58 (2009), 1, 36-54.]
2008-06	Tim Krieger, Stefan Traub	Back to Bismarck? Shifting Preferences for Intragenerational Redistribution in OECD Pension Systems
2008-05	Tim Krieger, Daniel Meierrieks	What causes terrorism? [ <i>published in: Public Choice</i> 147 (2010), 1-2, 3-27.]
2008-04	Thomas Lange	Local public funding of higher education when students and skilled workers are mobile [ <i>published in: Finanzarchiv</i> 65 (2009), 2, 178-199.]
2008-03	Natasha Bilkic, Thomas Gries, Margarethe Pilichowski	Stay at school or start working? - Optimal timing of leaving school under uncertainty and irreversibility
2008-02	Thomas Gries, Stefan Jungblut, Tim Krieger, Henning Meier	Statutory retirement age and lifelong learning
2008-01	Tim Krieger, Thomas Lange	Education policy and tax competition with imperfect student and labor mobility [ <i>published in: International Tax and Public Finance</i> 17 (2008), 6, 587-606.]
2007-05	Wolfgang Eggert, Tim Krieger, Volker Meier	Education, unemployment and migration [ <i>published in: Journal of Public Economics</i> 94 (2010), 5-6, 354-362.]
2007-04	Tim Krieger, Steffen Minter	Immigration amnesties in the southern EU member states - a challenge for the entire EU? [ <i>published in: Romanian Journal of European Studies</i> 5-6/2007, 15-32.]
2007-03	Axel Dreher, Tim Krieger	Diesel price convergence and mineral oil taxation in Europe [ <i>published in: Applied Economics</i> 42 (2010), 15, 1955-1961]
2007-02	Michael Gorski, Tim Krieger, Thomas Lange	Pensions, education and life expectancy
2007-01	Wolfgang Eggert, Max von Ehrlich, Robert Fenge, Günther König	Konvergenz- und Wachstumseffekte der europäischen Regionalpolitik in Deutschland [ <i>published in: Perspektiven der Wirtschaftspolitik</i> 8 (2007), 130-146.]
2006-02	Tim Krieger	Public pensions and return migration [ <i>published in: Public Choice</i> 134 (2008), 3-4, 163-178.]
2006-01	Jeremy S.S. Edwards, Wolfgang Eggert, Alfons J. Weichenrieder	The measurement of firm ownership and its effect on managerial pay [ <i>published under the title "Corporate Governance and Pay for Performance: Evidence from Germany" in: Economics of Governance</i> 10 (2009), 1, 1-26.]