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Essays on terrorism: its effects on subjective wellbeing, its socio-economic drivers, and the related attitudes

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Statement of Originality

This work has not previously been submitted for a degree or diploma in any university.

To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Margarita Vorsina
Abstract

Terrorism is an enduring consequence of the willingness of humans to use violence with the goal of affecting politics or of forcefully promoting one's ideology by inducing fear in the populace. Alarmingly, the frequency of terror attacks appears to be increasing. The most recent Global Peace Index Report notes that their terrorism impact indicator recorded the greatest deterioration over the period from 2008 to 2017, with 60 per cent of countries having higher levels of terrorism than a decade ago (Institute for Economics and Peace, 2017).

The main objective of this research is to investigate socio-economic reasons for terrorism and the effects of terrorism on subjective wellbeing. In doing so, this research estimates the association between terrorism, self-reported life satisfaction and national income; explores the effect of the 2002 Moscow theatre siege on the level of expectations of life in the future of the Russian population; assesses the role of social dominance orientation (SDO) in explaining individuals’ fear of experiencing a terrorist attack and support for counter-terrorism policies; and analyses the effect of ethnic economic inequality on domestic terrorism.

The results indicate that on the macroeconomic level terrorism is negatively associated with life satisfaction. This suggests that the social costs of terrorism are potentially much higher than the economic costs, and measuring only the conventional economic costs of terrorism significantly underestimates the true costs. When a different measure of wellbeing is used in the analysis, the net effect of a terrorist incident may not necessarily be negative. The findings indicate that people often experience positive reactions after a terrorist attack. These results are explained by the theory of post-traumatic growth – a theory that refers to the positive psychological change experienced
as a result of adversity, with terrorism incidents inadvertently promoting more meaningful interpersonal relationships, new views of the self and new views of the world. This suggests that the wellbeing effects of terrorism are complex: to expand the understanding of the social consequences of terrorism it is necessary to pay equal attention to the positive effects of terrorism.

This research expands the knowledge of the socio-psychological determinants of attitudes towards terrorism and counter-terrorism policies. The results show that social dominance orientation – an individual’s preference for inter-group hierarchies within a social system or group-based discrimination – positively predicts support for ‘defensive’ counter-terrorism policies, fear of terrorism and fear of Islamic extremism. It also predicts the relationship between social dominance orientation and support for defensive policies is mediated by fear. These findings have policy implications for the study of individuals’ willingness to forgo liberties in order to preserve the inter-group hierarchies and the conditions of support for liberty-infringing counter-terrorism policies. Finally, the results of this research indicate that ethnic economic inequality is robustly, positively and significantly associated with domestic terrorism. This in turn has an important implication that governments should pursue policies that promote the economic and social inclusion of minority ethnic groups.
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- **Vorsina, M.,** Manning, M., Fleming, C., Ambrey, C., Smith, C. 2015. The welfare costs of terrorism. 44th Australian Conference of Economists, Brisbane, Australia
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1. Background to thesis

Terrorism is affecting more and more people around the globe. Since 2000 the number of deaths from terrorism has increased nine-fold. Alarmingly, 32,685 people died from terrorism in 2014, which is the highest recorded level since 1970. Although terrorism is a highly concentrated phenomenon, with over 78 per cent of all deaths occurring in only five countries (Iraq, Afghanistan, Pakistan, Nigeria and Syria), the majority of countries are experiencing at least one terrorist incident per year (The Institute for Economics and Peace (IEP), 2015). The economic impact of terrorism is enormous: The Institute for Economics and Peace estimated a total economic loss of $89.6 billion in 2015 (The Institute for Economics and Peace, 2016).

Terrorism is constantly evolving. Today’s terrorism is simpler and more wide-spread than previously, which makes it harder for governments to respond to terrorist threats (Wright, 2017). Although governments spend billions of dollars on counterterrorism measures – the annual counterterrorism expenditure of the United States are estimated at $100 billion (Sahadi, 2015), and the Australia’s defense expenditure reached $34.6 billion in 2017-2018 (The Sydney Morning Herald, 2017) –the year 2015 was recorded the second deadliest year of the 21st century in terms of casualties from terrorism (The Institute for Economics and Peace, 2016).

It is not surprising, that the study of terrorism is one of the fastest growing areas of academic research, with thousands of papers addressing the nature, reasons, motives, effects, and trends of terrorism. These studies go back to the 1960s (Crenshaw, 2014), however, the interest in the area of terrorism research was boosted by the 9/11 terrorist attack, with over 90 per cent of the literature written after this event (Silke, 2004).
It has been shown, that at the macroeconomic level, terrorism affects Gross Domestic Product (GDP) per capita (Blomberg, Hess, & Orphanides, 2004; Gaibulloev & Sandler, 2008, 2011; Gaibulloev & Sandler, 2009; Tavares, 2004), national consumption (Eckstein & Tsiddon, 2004; Fielding, 2003a), national investment (Fielding, 2003b; Frey, Luechinger, & Stutzer, 2007), stock markets (Abadie & Gardeazabal, 2003; Drakos, 2010; Eldor & Melnick, 2004; Essaddam & Karagianis, 2014), foreign direct investment (Enders & Sandler, 1996) and foreign trade (Mirza & Verdier, 2008; Nitsch & Schumacher, 2004); at the individual level terrorism significantly affects subjective wellbeing (Frey, Luechinger, & Stutzer, 2009; Metcalfe, Powdthavee, & Dolan, 2011; Vorsina, Manning, Fleming, Ambrey, & Smith, forthcoming). Among the most studied determinants of terrorism are GDP per capita (Kis-Katos, Liebert, & Schulze, 2011; Tavares, 2004), level of democracy (Abadie, 2006; Kurrikl-Klitgaard, Justesen, & Klemmensen, 2006; Piazza, 2006), population size (Gassebner & Luechinger, 2011; Krieger & Meierrieks, 2011; Krueger & Laitin, 2008; Krueger & Maleckova, 2003), trade openness (Krieger & Meierrieks, 2011), and geographical barriers (Abadie, 2006).

Despite such popularity, the study of terrorism lacks consistency in methods and results. Schmid and Jongman (1988) argue that:

*There are probably few areas in the social science literature in which so much is written on the basis of so little research. Perhaps as much as 80 percent of the literature is not research-based in any rigorous sense; instead, it is too often narrative, condemnatory, and prescriptive.*

(Schmid & Jongman, 1988, p. 179)
Regretfully, this statement is still valid. Till now academics cannot agree on the single definition of terrorism, and most of the literature “struggles in its efforts to explain terrorism or to provide findings of genuine predictive value” (Silke, 2001, p. 13).

This thesis, written as a series of essays, contributes to the literature of economics of terrorism. In particular, it employs economic methods to identify the effects of terrorism of subjective wellbeing, the socio-demographic characteristics of attitudes towards terrorism, and the effect of ethnic inequality on domestic terrorism. We believe that applying economic methods to this area will increase predictability of the results and help policymakers to develop better counterterrorism responses.

1.1. Defining terrorism

There is no single definition of the term terrorism. The definitions applied by researchers and government agencies are influenced by recording systems that are designed and maintained to meet individual and organisational needs (Manning, 2009). In addition, the standardization of this term terrorism is difficult because the term is politically and emotionally biased (Hoffman, 2006, p. 23). Schmid and Jongman (1988), studying 109 definitions of terrorism, identified the most frequently occurring words in these definitions. The top ten elements in the definitions are presented in Table 1.1, where column 1 is the rank, column 2 is the element (or frequently occurring set of words) and column 3 is the percentage of definitions that include the element.
### Table 1.1. Top ten elements in terrorism definitions

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Violence, force</td>
<td>83.5%</td>
</tr>
<tr>
<td>2</td>
<td>Political</td>
<td>65%</td>
</tr>
<tr>
<td>3</td>
<td>Fear, terror emphasized</td>
<td>51%</td>
</tr>
<tr>
<td>4</td>
<td>Threat</td>
<td>47%</td>
</tr>
<tr>
<td>5</td>
<td>(Psychological) effects and (anticipated) reactions</td>
<td>41.5%</td>
</tr>
<tr>
<td>6</td>
<td>Victim-target differentiation</td>
<td>37.5%</td>
</tr>
<tr>
<td>7</td>
<td>Purposive, planned, systematic, organized action</td>
<td>32%</td>
</tr>
<tr>
<td>8</td>
<td>Method of combat, strategy, tactic</td>
<td>30.5%</td>
</tr>
<tr>
<td>9</td>
<td>Extra-normality, in breach of accepted rules, without humanitarian constraints</td>
<td>30%</td>
</tr>
<tr>
<td>10</td>
<td>Coercion, extortion, induction of compliance</td>
<td>28%</td>
</tr>
</tbody>
</table>

Source: Schmid & Jongman (1988, pp. 5-6)

Typically, the definitions focus on three elements:

1. **Targets:** terrorists pick their targets intentionally and selectively. These targets may be civilians, non-active military personnel or physical objects such as buildings.

2. **Objectives:** terrorists aim to generate fear, intimidation or uncertainty among a wider circle than the direct victims.

3. **Motives:** terrorists are motivated by political or religious ideals and are not primarily interested in personal gain (De Nederlandsche Bank, 2005, p. 48).

In this research, the most recent and comprehensive terrorism database, Global Terrorism Database (GTD), is used as the main dataset for the analysis. GTD defines terrorism as “…the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation” (START, 2014a, p. 8). As such, the GTD definition is used as a working definition of terrorism in this thesis. The GTD definition directly addresses two of the elements of terrorism - objectives and motives. The third element, targets, is addressed indirectly in the GTD Codebook by stating that an incident is classified as a terrorist attack only when the violence is intentional (START, 2014a, p. 8).
It is essential to define terrorism in terms of geographical range, because domestic and international/transnational terrorism may have different drivers and consequences. Enders and Sandler (2008) designed a procedure to separate GTD data into international and domestic incidents, and their definitions of international and domestic terrorism are employed in this research.

In particular, domestic terrorism affects citizens, institutions, property and policies of just the host country, while transnational terrorism affects more than one country (Enders & Sandler, 2008). The criteria used to determine the geographical range of the terrorist attack include:

1. The country in which the terrorist attack(s) occurred;
2. The citizenship of the victims of the attack; and
3. The citizenship of the perpetrators of the attack.

If the second and/or third elements are different from the country in which the terrorist attack took place, the incident is considered international/transnational. Enders and Sandler (2008) provide a broader range of criteria, capturing the international aspect not only from victims and perpetrators, but also from targets, institutions, supporters, and transnational consequences.

1.2. Trends in terrorism since 1970

Drawing upon the Global Terrorist Database (GTD) (2016) Figures 1.1 and 1.2 depict the dynamics associated with terrorist incidents and casualties since 1970, although the data for 1993 are missing. The number of incidents has grown significantly since 1970. Between 1995 and 2004, the number of terrorist attacks declined, but began to rise

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1 Data for the year 1993 were lost during an office reallocation by Pinkerton Global Intelligence Service (PGIS) (Global Terrorism Database, 2016).
again after 2004. Indeed, from 2004 to 2013, the number of terrorist attacks increased 10.3 times while the number of human casualties increased 3.43 times in the same period, as shown in these figures. The success rate\(^2\) of terrorist attacks is very high. On average, 92 per cent of terrorist attacks are successful. In 2007, the success rate was the highest and was equal to 97 per cent.

The sharp decline in 1997 can be explained by changes in the inclusion criteria for incidents. Before 1998 incidents were collected according to the following definition of terrorism: "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation." This definition is broader than the definition used after 1998, since from then each incident included after 1998 should be an "intentional act of violence or threat of violence by a non-state actor" and two of the following three criteria should be met:

- The violent act was aimed at attaining a political, economic, religious, or social goal; or
- The violent act included evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) other than to the immediate victims; or
- The violent act was outside the precepts of International Humanitarian Law (START, 2014b).

\(^2\) Success of a terrorist strike is defined according to the tangible effects of the attack. Success is not judged in terms of the larger goals of the perpetrators. For example, a bomb that exploded in a building would be counted as a success even if it did not succeed in bringing the building down or inducing government repression (START, 2014a, p. 24).
The decline post-2001 may relate to by the establishment of the United Nations Security Council Counter-Terrorism Committee following the 9/11 terrorist attack. The sharp increase post-2004 occurred mostly because of the Iraq War, while that in 2007 is probably due to the wave of terrorism that swept through Pakistan at the time. The rise in terrorist incidents in 2012 is most certainly due to the commencement of the spring “fighting season” in Afghanistan and to the Syrian civil war, which started in 2011. The year 2015 showed the first decline in the number of terrorist attacks since 2004. This improvement was achieved as a result of military operations against the Islamic State of Iraq and the Levant (ISIL) in Iraq and against Boko Haram in Nigeria. Although this decline is heartening, 2015 is still the second deadliest year in the past decade.

**Figure 1.1. Number of terrorist attacks since 1970**

Source: Global Terrorism Database (GTD) (2016)
Figure 1.2 reveals an upward trend in the number of injuries and fatalities resulting from terrorist activities since 1970, although there appears to be a small decline between 2000 and 2004. A significant spike in the numbers after 2011 is largely due to events in Iraq, Afghanistan, Pakistan, Nigeria and Syria. More than 80 per cent of all terrorist deaths occurred in these five countries in 2013 (The Institute for Economics and Peace (IEP), 2014).

**Figure 1.2. Number of fatalities and injuries due to terrorist activities since 1970**

Source: Global Terrorism Database (GTD) (2016)

### 1.3. Key gaps in existing literature

A number of gaps in the literature have been recognised in relation to the effects of terrorism on wellbeing as well as the economic roots of terrorism.

First, most of the literature covers the macroeconomic consequences of terrorism, with only a few studies focusing on the effect of terrorism on subjective wellbeing. To the
best of our knowledge, previous studies of life satisfaction and terrorism have focussed mostly on a single country or region (Frey et al., 2009; Metcalfe et al., 2011); with only one study carried out on the link between life satisfaction and terrorism using a large cross-national sample (Farzanegan et al., 2017).

Second, although research shows that the net effect of a terrorism incident on wellbeing may not necessarily be negative, positive reactions after terrorist attacks have a very limited coverage in the existing literature, with most of the results derived from studies whose aim was to assess the negative effects of the attack (Vazquez, Hervas, & Perez-Sales, 2008). In addition, these studies are short-term and focus mainly on the direct or indirect victims of the attacks. A limited number of longitudinal studies estimate the dynamics of the changes induced by terrorism threats to the general population.

Third, the socio-psychological and socio-demographic determinants of attitudes towards terrorism may play an important role in the public acceptance of and the subsequent perceived legitimacy of statutory counter-terrorism measures. Social-dominance orientation (SDO) – the desire for hierarchical relations between social groups, with a preference for particular groups – is identified as one of the predictors of the support for terrorism or counter-terrorism policies (Lemieux & Asal, 2010; Lindén, Björklund, & Bäckström, 2016). Nevertheless, no attempt has been made to estimate the link between SDO and attitudes towards terrorism using an Australian sample.

Fourth, a substantial body of empirical research has focussed on the key determinants of terrorism in the hope that more effective policies can be implemented to reduce this phenomenon. The Gini Index, as a measure of economic inequality, is widely accepted as one of the key determinants (Abadie, 2006; Koch & Cranmer, 2007; Li & Schaub, 2004). The potential effect of inequality on terrorism may be influenced not only by
vertical inequalities (i.e. inequality among individuals or households), but also by horizontal inequalities (i.e. inequality among groups, typically culturally defined by ethnicity, religion or race) (Stewart, 2011). Only one study estimated the effect of horizontal inequalities on terrorism (Sørensen, 2013). This study, however, has two limitations. First, Sørensen focuses on a specific type of terrorism - ethno-nationalist terrorism. Second, the author used a static measure of horizontal inequalities. Thus, to the best of our knowledge, no previous study has been conducted to estimate the dynamic effect of ethnic inequality on domestic terrorism.

1.4. The approach of this research and its expected contribution

The purpose of this research is to extend the existing body of knowledge on the economics of terrorism. In particular, this thesis will contribute to four salient components of this literature: (1) the economics of happiness, which explores the impact of terrorism on subjective assessments of wellbeing; (2) the theory of post-traumatic growth, which studies the positive emotions caused by terrorism; (3) the socio-psychological and socio-demographic characteristics of political attitudes, which include a focus on attitudes towards terrorism and counter-terrorism; and (4) the economic determinants of terrorism, which examines the indirect impact of ethnic economic inequality on the number of terrorist attacks.

Estimating changes in life satisfaction due to terrorist attacks will demonstrate the importance of indirect methods in the measurement of terrorist consequences. Subjective measures of wellbeing are starting to gain more recognition in policy development. Policymakers should take into account changes in citizens’ life satisfaction as a response to terrorist events. The budget priorities of policymakers are influenced by citizens, and hence the resultant policy initiatives could be misguided because of the citizens’ psychological state in the immediate aftermath of a terrorist
event (McGraw, Todorov, & Kunreuther, 2011). The estimation of the effect of terrorism on life satisfaction will allow for the subsequent evaluation of the need for and the efficiency of various counter-terrorism policy initiatives.

Using self-reported measures of wellbeing is a promising means for increasing our understanding of the costs of terrorism. Wellbeing, however, is best understood as a multifaceted phenomenon that can be assessed by measuring a wide array of subjective and objective constructs. Focusing on the different measures of wellbeing (such as self-reported expectation of life in the future) will demonstrate that the net effect of a terrorism incident may not necessarily be negative. Positive reaction after the attack is a common outcome, despite its gaining very little attention in the literature. It shows individuals’ lifelong plasticity, which renders them capable of dramatic recovery from significant adversity. Focusing on the positive effects of terrorism (as opposed to the more conventional negative effects) will broaden our understanding of the social consequences of terrorism. This will allow for the development of more refined policies that respond to both the prevention of, and the reaction to, terrorist attacks.

Other factors of support for counter-terrorism policies are the socio-psychological and socio-demographic characteristics of the population. Existing studies show that individual fear of terrorism and SDO are associated with the support for government measures to prevent and punish terrorist attacks on national soil (Lindén et al., 2016). However, no attempt has been made to estimate the link between fear, SDO and attitudes towards terrorism using an Australian sample. This research will expand the knowledge of the socio-psychological determinants of attitudes towards terrorism and counter-terrorism policies using Australian data. The findings will have implications for the public acceptance and subsequent perceived legitimacy of statutory counter-terrorism measures in liberal democracies such as Australia.
Finally, this research expands the literature of the economic determinants of terrorism by focussing on ethnic inequality in particular. Applying a rational choice model to terrorist actions will allow us to predict the terrorist’s decisions on committing an attack or being involved in peaceful economic activity. Under the assumption of a rational agent, economic conditions could potentially have an indirect impact on the number of terrorist attacks. Understanding the economic determinants of terrorism will contribute to the development of more comprehensive counter-terrorism policies, which will consider not only direct anti-terrorist measures, but also the indirect effects of other economic measures, such as ethnic economic inequality.

Thus, in the first part of the thesis the negative and positive emotions caused by terrorism are demonstrated. In the second part, the socio-demographic characteristics of attitudes towards terrorism are explored. Finally, in the third part effective ways of controlling and reducing the incidence of terrorism are considered.

1.5. Research questions

This research investigates the economic drivers and the wellbeing effects of terrorism. The central research question of the thesis is:

What are some social and economic reasons for terrorism and what effects does terrorism have on subjective wellbeing?

In answering the main research question several additional research questions have been developed. These key research questions expected to be answered in Chapters 4 to 7 are detailed below.

RQ1: Does the level of terrorism activities affect life satisfaction in various countries? (Chapter 4)
RQ2: Did the Russian population experience post-traumatic growth after the Moscow theatre hostage event (23 October 2002)? (Chapter 5)

RQ3: What are the socio-psychological and socio-demographic determinants of attitudes towards terrorism in Australia? (Chapter 6)

RQ4: Does ethnic economic inequality promote domestic terrorist attacks? (Chapter 7)

1.6. Structure of the Thesis

The thesis contains eight chapters, including an introductory chapter on the background to this research. Chapter 2 presents a detailed literature review on the theoretical foundations of this study. First, it provides detailed analysis of the definitions of terrorism and proposes the working definition used in this study. Second, it describes theoretical models used to formulate hypotheses on the economic drivers of terrorism, in particular, ethnic economic inequality. Third, the chapter explores other socio-economic determinants of terrorism. The chapter finishes with the literature review on the consequences of terrorism and on the attitudes towards fear of terrorism.

Chapter 3 provides a detailed explanation of the data used in this study, as well as justifies the reasons for the selection of these datasets. In particular, it compares existing terrorism databases and introduces the GTD as the main database for this research. The chapter describes in great details the separating procedure used for separating the GTD data into transnational and domestic terrorist events, and proposes the advantages of the GTD data over other datasets. The chapter then provides detailed descriptions of the subsequent databases used in each chapter: the life satisfaction data (Chapter 4), the Russia Longitudinal Monitoring Survey - Higher School of Economics (Chapter 5), the ANUpoll data (Chapter 6), and the ethnic inequality data (Chapter 7).
Chapter 4 explores the association between terrorism, self-reported life satisfaction and national income across a large sample of countries. The results show the negative and significant association between terrorism and life satisfaction, and do not confirm the a significant association between terrorism and real GDP per worker. This chapter raises the question of the ‘true’ costs of terrorism, and suggests that the social costs of terrorism are much greater than the economic costs.

Chapter 5 studies the effect of the 2002 Moscow theatre siege on the level of expectations of life in the future of the Russian population. It addresses the possibility of positive emotions, which could be developed as a coping strategy after the attack. The chapter applies the theory of post-traumatic growth to explain the positive effect of the Moscow theatre siege on the expectation of the life in the future.

Chapter 6 examines both the direct and the mediating effects of individuals’ SDO on their fear of terrorism and their support for counter-terrorism measures. This chapter discovers that SDO positively predicts support for ‘defensive’ counter-terrorism policies as well as fear of terrorism and Islamic extremism. The chapter also finds the mediation effect of fear on the support for defensive policies.

Chapter 7 uses the panel data for 152 countries to examine the relationship between ethnic economic inequality and domestic terrorism. The results show a robust, positive and significant association between ethnic inequality and domestic terrorism. Policy implications of these findings are addressed in the end of the chapter.

Chapter 8 provides some concluding remarks, identifies limitations of the research reported in this thesis, discusses some policy implications of this research, and points to some useful directions for future research.
References


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2. Overarching Literature Review related to Thesis

At its core, this thesis is a study of the economic determinants and wellbeing effects of terrorism. Although all four chapters apply econometric methodology to estimate the effects of and/or reasons for terrorism, they address three different literatures. In Chapters 4 and 5, we analyse the negative and positive effects of terrorism on wellbeing; in Chapter 6 we focus on attitudes towards fear of terrorism and counter-terrorism policies, and in Chapters 7 we discuss particular determinants of terrorism. While each subsequent empirical chapter commences with a literature review specific to the research question that is sought to be addressed therein, there are overarching concepts and literatures that are usefully documented at the start.

The structure of this preliminary chapter is as follows. In section 2.1 we discuss problems associated with getting universal agreement on a definition of terrorism before narrowing down to the definition used in this research. In section 2.2 we outline the theoretical model used in the literature to analyse terrorism and its determinants. In section 2.3 we discuss the empirical literature which addresses economic determinants of terrorism. In section 2.4 we shift focus to the effects of terrorism on life satisfaction, recognising that these can be both positive and negative; in section 2.5 we demonstrate how the lens of social dominance orientation can be used to analyse attitudes relating to both the fear of terrorism and the various counter terrorism policies. Section 2.6 concludes the Chapter.

2.1. Definition of terrorism

Different bodies, organisations and governments use different definitions of the term terrorism. Since the 1972 Munich Olympics massacre, the United Nations have made various attempts to reach agreement on a legal and universal definition of terrorism, but have not succeeded. One reason for this failure was that Middle Eastern, Western,
African and Asian governments refuse to label groups as terrorist organizations if they 
sympathise with the aims of these groups (Bruce, 2013). After the 9/11 terrorist attacks, 
the United Nations produced a draft definition that defined an act of violence as a 
terrorist attack if it is “resulting or likely to result in major economic loss, when the 
purpose of the conduct, by its nature or context, is to intimidate a population, or to 
compel a Government or an international organisation to do or abstain from doing any 
act” (Bruce, 2013, p. 26). However, this draft has never been adopted and the 
associated legal definition has not been accepted.

Similar to the members of the United Nations, academics also cannot reach agreement 
on a unified definition of terrorism. Hundreds of researchers propose their own 
definition; many others try to identify the critical features of terrorism (see for example 
Gibbs, 1989; Richards, 2014). Some scholars have attempted to systematically study 
existing terrorism definitions and, based on these, propose the one that they believe 
could meet an academic consensus (Schmid & Jongman, 1988; Schmid, 2011; 
Weinberg, Pedahzur, & Hirsch-Hoefer, 2004). The most popular study in this area is 
one undertaken by Schmid and Jongman (1988), who analysed 109 definitions, 
identified the most frequents words in these definitions and based on these words 
proposed an “academic consensus definition”:

Terrorism is an anxiety-inspiring method of repeated violent action, 
employed by (semi-)clandestine individual, group or state actors, for 
idiiosyncratic, criminal or political reasons, whereby – in contrast to 
assassination – the direct targets of violence are not the main targets. The 
immediate human victims of violence are generally chosen randomly 
(targets of opportunity) or selectively (representative or symbolic targets) 
from a target population, and serve as message generators. Threat- and
violence-based communication processes between terrorist (organisation), (imperilled) victims, and main targets are used to manipulate the main target (audience(s)), turning it into a target of terror, a target of demands, or a target of attention, depending on whether intimidation, coercion, or propaganda is primarily sought.

(Schmid & Jongman, 1988, p. 28)

Schmid subsequently revised this definition to the following:

*Terrorism refers, on the one hand, to a doctrine about the presumed effectiveness of a special form or tactic of fear-generating, coercive political violence and, on the other hand, to a conspiratorial practice of calculated, demonstrative, direct violent action without legal or moral restraints, targeting mainly civilians and non-combatants, performed for its propagandistic and psychological effects on various audiences and conflict parties.*

(Schmid, 2012, p. 158)

Ramsay (2015), however, points out that Schmid’s method of analyzing existing definitions and then combining the most frequently use words into one “academic consensus definition” is not appropriate. Different elements of the definition could contradict each other or could have hierarchical connection, thus using them in the same definition may cause confusion. Ramsay (2015) provides an example when some definitions specify that terrorism *must* have only a political reason. Thus, combining political reasons with economical or religious goals in one definition will contradict the assumption that terrorism *must* be only political.
Ramsay (2015) claims that the attempts to create a unique definition for terrorism cause “more confusion than clarity” (p. 7). For instance, if the definition of terrorism is written too broadly, then there is a chance that incidents involving non-terrorist social movements could be classified as terrorist attacks. Ramsay (2015) gives an example of the objection by Amnesty International to the UK definition of terrorism. It states that “The definition is vaguely worded and could be used to prosecute supporters of social and political movements, for example, anti-nuclear campaigns. The lack of a clear definition gives cause for concern because the decision to bring a prosecution for such offences leaves scope for political bias in making a decision to bring a prosecution” (Ramsay, 2015, p. 9).

A second problem arises when trying to identify terrorist organisations. Are all actions by terrorist organisations classified as terrorist attacks? On the other hand, if an organisation committed only one terrorist attack and had hundreds of operations which have not had civilian casualties, should this organisation be classified as a terrorist group?

In summary, Ramsay (2015) claims that terrorism is a “hollow” concept. He states that different acts of violence, all of which are called “terrorism”, may share no essential feature in common. Instead, the diagnosis of terrorism arises from how the act of violence is presented to the audience. In particular, the author identifies two factors which affect the decision whether the act of violence would be classified as a terrorist attack: (1) the radical violation of the expected conventions, (2) the explanation of the violent act in term of broader social issues. As such, “terrorism can never be defined then, because the meaning of terrorism lies in the debates which it itself produces regarding its own meaning and significance” (Ramsay, 2015, p. 16).

Although a unique and universally accepted definition of terrorism cannot be found, we
still need to define terrorism in this thesis. The definition allows us to include or exclude a particular act of violence in the terrorism database used in subsequent empirical analysis. In this thesis we use the Global Terrorism Database as a primary dataset, and draw our definition of terrorism from it. Thus, in this thesis terrorism is defined as “...the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation” (START, 2014, p. 8).

2.2. Theoretical background

2.2.1. Rational behaviour of terrorists

In order to use conventional economic methods when studying reasons for terrorism, we should first be able to apply a rational choice model to terrorists’ actions. At the first glance, terrorist activity is often seen as irrational behaviour, and as such represents behaviour that cannot be explained adequately by economic theory. However, some recent researchers, who have thrown doubt on the notion of the inherent ‘irrationality’ of terrorism, have attempted to apply a rational choice model to explain certain types of terrorist actions. Caplan (2006), for example, defined three types of rationality – responsiveness to incentives, narrow self-interest and rational expectation – and applied these to three types of terrorists: “sympathizers, who favour terrorism without doing much about it; active terrorists, who actually belong to a terrorist organization; and suicidal terrorists, who kill themselves for their cause” (Caplan, 2006, p. 93).

Responsive to incentives means “having a negatively-sloped demand curve” (Caplan, 2006, p. 94). All three types of terrorists meet this requirement. Sympathisers will more likely join a terrorist organization if the cost of participation in terrorist activities declines. Active terrorists and suicide terrorists will use riskier tactics only when they
are more effective, because an organization would not lose a member if a “hit-and-run” attack were an available action.

The selfishness of terrorist sympathizers could hardly be controversial. By contrast, it is often contended that active and suicidal terrorists act for group interests, not for themselves. However, this contention could be rejected in some circumstances. First, the death rate among terrorist organization members is generally small – only a few people die relative to the total number of members. This risk could be argued to be comparable to the death risk of criminals or war-time soldiers (Caplan, 2006, p. 95). Joining a terrorist organization could be considered then as a rational decision – similar to the decision as to whether to join the regular armed services. During economic downturns, a high unemployment rate could encourage even highly educated persons to join a terrorist organization. Also, the suicide terrorist’s family often receives a high death benefit from the terrorist organisation. Therefore, from an evolutionary theory perspective, becoming a suicide terrorist could represent rational behaviour for some individuals. From a non-evolutionary perspective, suicidal terrorists are often seen as the counter-example of rationality. This, in turn, highlights why suicidal terrorism tends to be less common than other forms of terrorism.

The third type of rationality discussed by Caplan (2006) is rational expectations, defined as an ability to estimate the cost and benefits of irrationality without bias. For sympathizers and active terrorists, the price of irrationality is often seen as close to zero because they do not lose anything from being irrational as other people pay the costs of terrorism. Suicide terrorists can be argued to be close to irrational, because “…they do not buy less irrationality when the price skyrockets, suggesting that they believe their doctrines all the way down” (Caplan, 2006, p. 101).
A summary of rational choice criteria for the three types of terrorist categories is provided in Table 2.1. All three types of terrorists are argued to be responsive to incentives. Sympathizers and active terrorists are classified as being close, or probably close, with respect to narrow self-interest and rational expectations. Suicide terrorists, however, do not appear to demonstrate narrow self-interest or rational expectations (and are classified in Table 2.1 as ‘Probably not close’). In summary, it can be argued, based on Table 2.1, that the actions of sympathizers and active terrorists can be explained using economic theory.

**Table 2.1 Rational choice criteria and types of terrorists**

<table>
<thead>
<tr>
<th></th>
<th>Responsive to incentives</th>
<th>Narrow self-interest</th>
<th>Rational expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sympathizers</strong></td>
<td>Yes</td>
<td>Close</td>
<td>Close</td>
</tr>
<tr>
<td><strong>Active terrorists</strong></td>
<td>Yes</td>
<td>Probably close</td>
<td>Probably close</td>
</tr>
<tr>
<td><strong>Suicidal terrorists</strong></td>
<td>Yes</td>
<td>Probably not close</td>
<td>Probably not close</td>
</tr>
</tbody>
</table>

Source: Caplan (2006, p. 99)

While Caplan (2006) argues that the behaviour of suicidal terrorists is close to irrational, Kacou (2013) provides a critical review with respect to arguments against the rationality of suicide terrorists. He states that the aim of rational actors is survival, but the main unit of survival could be different - it could be individual actors themselves, their genes, or their cultures (p. 542). If individuals are not defined as the main units of survival, then suicide terrorists could be considered as rational actors, because their main goal is preservation of culture. From this cultural point of view, it is rational to motivate some individuals to sacrifice their lives in defence of a culture. This pattern is very similar to the evolution theory in biology, where some animals sacrifice themselves in order to promote survival of their genetic code and genetic line.
Moreover, the fact that only a minority of terrorists commit suicide attacks\(^3\) could be explained by the division of labour principle\(^4\) (p. 546).

### 2.2.2. Rational Choice Model

If terrorists’ behaviour could be considered as rational, then the rational choice model may be adapted to terrorists or terrorist organizations to explain the choice between violent/non-violent activities or the choice between types of attacks. This model will be used to formulate subsequent hypotheses related to the effects of ethnic economic inequality on the level of terrorism, which is the focus of Chapter 7 in this thesis.

First, the rational choice model may be applied to terrorist organisations. Anderton and Carter (2009) propose a model, where a terrorist organisation makes a decision on how to distribute its income \(I\) between terrorist activity \(T\) and composite goods \(Y\) (all other goods, for example, food, clothes, housing). The budget constraint of such organisation could be written as \(P_T \cdot t + P_Y \cdot y = I\), where \(P_T\) and \(P_Y\) are prices of per unit cost of terrorist activity \(t\) and composite good \(y\), correspondingly. The model assumes that an increase in terrorist activity could be made by sacrificing some composite goods, which is represented by negatively sloped indifference curves between \(T\) and \(Y\).

Two policies identified could potentially deter terrorist activity according to Anderton and Carter (2009). Firstly, the government could pursue an income policy. For example, reducing the incidence of money laundering could cut or constrain the money that is diverted to terrorism, thus reducing the level of terrorism by decreasing the budget constraint (as depicted in Figure 2.1).

---

\(^3\) Since 2002, only five per cent of all terrorist attacks have been suicide attacks (The Institute for Economics and Peace (IEP), 2014).

\(^4\) Division of labour is the separation of a work process into a number of tasks, with each task performed by a separate person or group. In terrorist organizations, some individuals could be “specialised” on sacrificing themselves in order to let the others, who are better positioned, to achieve the group goals.
Figure 2.1 Income policy deterring terrorist activity

Secondly, the government could pursue a price policy. There are two types of price policy relevant in this situation: deterrence and benevolence. A deterrence price policy seeks to increase the unit cost of terrorism; an example could be an increase in airport security (see Figure 2.2.a). A benevolence price policy decreases the cost of the composite good, thereby increasing the opportunity cost of terrorism. Examples of benevolence price policies are government housing programs or improved access to political participation. The main contrast between these two types of policies is that the deterrence policy will always decrease the level of terrorism (with negatively-sloped indifference curves), while the benevolence policy could have either a negative or a positive effect on the level of terrorism (due to the oppositely directed income effect (IE) and substitution effect (SE), such that the net outcome depends on the relative sizes of these two effects) (see Figure 2.2.b and Figure 2.2.c).
Figure 2.2 Deterrence and benevolence price policies

a) Deterrence price policy

b) Benevolence price policy with decrease in terrorism

c) Benevolence price policy with increase in terrorism

Source: Anderton and Carter (2009)

Similarly, Freytag, Kruger, Meierrieks, and Schneider (2011) adapt the rational choice model on the assumption that socio-economic conditions affect individual incentive structures. They argue that there are two types of people who engage in terrorist activities: active terrorists (“the ‘foot soldiers’ of terrorism”) and associates of terrorists.
(“their environment, e.g., friends, parents or sympathizers in the general public”) (p. S6). Both types of individuals allocate their income between material reward (i.e. regular goods and services) and mental reward from terrorism (e.g. social solidarity, status, identity, power). A decrease in socio-economic conditions acts to reduce total income and to increase the relative price of the material compared to the mental reward. In this context, individuals could be expected to prefer more terrorist activity relative to consumption of regular goods and services. As shown in Figure 2.3, the resultant shift of the terrorist’s budget constraint (from AB to A’B) encourages increased mental reward from terrorist activity (and a shift from point C⁰ to C¹). Freytag et al. (2011) propose that this model can also be applied to suicide terrorists. The decisions of suicide terrorists could be explained as a ‘corner’ solution, where mental rewards are extremely attractive, while gains from material consumption are seen as close to or equal to zero (approximating point B in Figure 2.3).
According to rational choice theory, an appropriate specification of terrorist preferences will assist in the design of better counter-terrorism policy. Sandler and Enders (2004) state that government policy should be focussed on: (1) making the terrorist substitute into less harmful forms of terrorism; (2) targeting and appropriating sources of terrorism funding; and (3) raising the price (to the terrorist) of committing an act of terrorism.

2.2.3. Limitations of the rational choice model

It should be noted that the rational choice model has some limitations. For example, Abrahms (2008) points out that if the goal of the terrorist organisation is purely political, seven contradictory puzzles arise. First, the model predicts that attacks will
open the bargaining space between terrorists and the government. In reality terrorist attacks often close the negotiation space and provoke the government to implement harsher counter-terrorism policies. Thus, targeting civilians does not achieve the primary political purpose. Second, the model suggests that terrorists use violence because non-violent actions are inefficient. In real life however, terrorists do not use attacks as a "last resort" and seldom switch to less violent options when these options become available. Third, according to the model, terrorists are open to negotiation. However, in reality terrorists often reject compromise proposals from the government. The rational choice model explains these rejections based on the assumption of terrorists’ extreme political preferences. Nonetheless, Abrahms (2008) shows that most terrorist organisations have moderate political views. Fourth, the model assumes that terrorists have stable utility functions, but in practice terrorist organisations do not have a stable and consistent set of political goals. Fifth, the rational choice model does not explain the existence of anonymous attacks. Moreover, some attacks do not carry any specific political demands. Sixth, the model fails to explain why terrorist organisations with similar political platforms often fight each other. According to the model they are supposed to unite against the common enemy. Finally, the model predicts that if terrorism is ineffective the organisation will disband. However, organisations can exist for decades without achieving any political goals. Abrahms (2008) proposes that one of the explanations of his seven paradoxes could be that the main goal of the organisation is not political, but psychological. People join the organisation to achieve social solidarity. Terrorist organisations should thus be considered as social units and this assumption should be incorporated into the rational choice model.

In this research we explore only one determinant of terrorism using a rational choice approach – ethnic economic inequality. Ethnic groups are social units with common
cultural background, beliefs and traditions. As such we incorporate this social factor in our analysis by considering economic differences between ethnic groups instead of economic differences between individuals.

2.3. Socio-economic determinants of terrorism
At a macroeconomic level, researchers have devoted a huge effort to better understanding the socio-economic determinants of terrorism. The general econometric model used in these studies could be written as follows:

\[
\text{Terrorism} = \beta_1 + \beta_2 \times \text{SED} + \sum_{n=3}^{N} \beta_n \times \text{Controls} + \epsilon
\]  

(2.1)

where \( \text{Terrorism} \) is the number of terrorist attacks, \( \text{SED} \) is a socio-economic driver of terrorism such as GDP per capita or level of democracy, \( \text{Controls} \) is a vector of control variables and \( \epsilon \) is an error term. In the next subsection we will discuss the most common socio-economic drivers of terrorism.

2.3.1. GDP capita and terrorism
GDP per capita is probably the most popular and well-explored driver of terrorism. However, there is no consensus on the direction of the association between these two variables.

Some studies propose a negative influence of the level of economic development on terrorist attacks. For example, Li and Schaub (2004) estimate that a 1% increase in a country’s GDP per capita reduces the number of terrorist incidents in this country by 19.3%. This association may be explained by adopting opportunity cost theory adapted to the individual choice of committing an act of terrorism. According to this theory, the opportunity cost of terrorism is high in high-income countries: individuals prefer consumption of regular goods and services relative to terrorist activity (Freytag et al., 2011).
Another group of researchers finds a positive association of terrorism and GDP per capita (Blomberg & Hess, 2008b; Krueger & Laitin, 2008). Tavares (2004), for example, demonstrates that an increase of one thousand constant 1995 US Dollars is associated with an increase of 0.09 in attacks and 1.62 in casualties, respectively. Similarly, Blomberg and Hess (2008a) find that economic development has a positive effect on transnational terrorist incidents, especially in high income countries. According to this ‘Economic Model of Terrorism’, countries with a high level of economic development have better institutions, stronger economies, and well-equipped armies; the cost of open rebellion in these countries is higher, which makes them more prone to terrorist attacks (Blomberg et al., 2004b).

A third group of researchers propose a non-linear link between GDP per capita and terrorism. At first, higher GDP per capita promotes terrorist activity, but after a certain threshold, terrorism decreases with an increase in economic development (Enders & Hoover, 2012; Freytag et al., 2011).

The last group of studies does not find any significant link between terrorist attacks and economic development (Abadie, 2006; Kurrild-Klitgaard, Justesen, & Klemmensen, 2006; Piazza, 2006). Other factors, such as political rights and civil liberties (Kurrild-Klitgaard et al., 2006) or structure of party politics (Piazza, 2006) have more significant effects on the number of terrorist incidents.

### 2.3.2. Democracy and terrorism

Similar to GDP per capita, the relationship between democracy and terrorism has been explained by two opposing theoretical arguments. According to the first theory, democracy decreases terrorism activity because minorities can express their grievance through the voting process, not through violent actions (Eyerman, 1998). Thus, access to electoral participation in democratic countries can be argued to act as a restraint on
terrorist activity (Li, 2005). The type of political voting system also plays an important role. The proportional system gives extreme groups more representation, hence terrorist incidents are argued to be less likely in countries with a proportional system of voting compared to a majoritarian one (Li, 2005; Reynal-Querol, 2002).

The second theory proposes that democracies encourage terrorism by providing civil liberties such as freedom of speech and or freedom of movement and association. It is proposed that these liberties potentially help with the organization of terrorist groups and reduce the cost of terrorist activity (Eubank & Weinberg, 1994; Eyerman, 1998; Li, 2005). For example, freedom of speech allows terrorist groups to spread their ideas among the population without any constraints. However, press freedom in democratic societies could be the reason for reporting bias within the available data (Drakos & Gofas, 2006a). In democratic countries terrorist incidents have been observed to be reported more often than in authoritarian countries (Kis-Katos, Liebert, & Schulze, 2011; Li, 2005; Li & Schaub, 2004).

There could be a non-linear relationship between democracy and terrorism (Abadie, 2006; Eyerman, 1998; Kurrild-Klitgaard et al., 2006), i.e. at the beginning democracy promotes terrorism, but after reaching a threshold point, further enhancements to democracy act to decrease terrorism. Highly democratic countries and autocratic countries may have fewer terrorist attacks than democratic countries with an intermediate range of political rights. Semi-open democratic countries could not, by this line of argument, solve the conflict either by political participation, or repression.

Copppedgea et al. (2011) show that democracy is a comprehensive concept, and one that potentially could contain many components. Some components of democracy could have different influences on terrorism activity. For instance, in democracies with different types of political systems (proportional or majoritarian), the terrorist activity
level may be different (Li, 2005; Reynal-Querol, 2002). Other important variables associated with democracy could be religious freedom or gender equality.

2.3.3. Civil war and terrorism

Theory suggests that terrorist attacks happen more often in unstable countries affected by civil war (Krieger & Meierriecks, 2011). First, the opportunity costs of terrorism in unstable states are low. Failed states often do not offer non-violent options to express grievances, but provide opportunities for potential terrorists to “learn” all the necessary skills to become successful in violent actions (Krieger & Meierriecks, 2011). Domestic instabilities (such as guerrilla warfare or civil war) provide opportunities for training and schooling new terrorists and for the development of terrorist human capital (Campos and Gassebner, 2009).

Second, unstable governments often do not have the resources to control the territory or to supress radical groups (Lai, 2007). Unstable states are associated with low operating, recruiting and mobilizing costs for terrorist groups, which allows such groups to organize more efficiently and also act to increase the potential payoff from terrorist activity.

Empirical findings support this hypothesis about the positive and significant influence of civil wars or interstate conflicts on the number of terrorist events (Campos & Gassebner, 2009; Findley & Young, 2012).

2.3.4. Population and terrorism

Researchers also identify population size as a determinant of terrorism. The theoretical explanation of this connection is straightforward. The higher the number of people, the broader the recruitment pool for terrorist organisations (Lai, 2007). Recruitment costs in populous countries are low, and these countries are more likely to have a greater

Similarly, a higher urban population may positively affect terrorist attacks. For example, the high population density and busy traffic in urban areas could make terrorist attacks more effective (Campos & Gassebner, 2009).

### 2.3.5. Trade openness and terrorism

Trade openness is argued by some to be another determinant of terrorism (Krieger & Meierrieks, 2011). The literature, however, shows mixed results in this area. On the one hand, international trade improves the political and institutional order in the country, which may deter terrorist activity (Kurridl-Klitgaard et al., 2006). On the other hand, economic integration could encourage grievances in countries which are perceived to be losing from enhanced international trade. In addition, it has been argued by some that terrorist organizations could fund their activities through legal and illegal trade (Li & Schaub, 2004).

### 2.3.6. Geographical barriers and terrorism

Geographical barriers, such as rough and mountainous terrain, may affect the number of terrorist attacks (Abadie, 2006). Mountainous terrain gives an opportunity for terrorists to hide from government forces and reduces the ability for the state military forces to operate freely (Fearon & Laitin, 2003). In addition, as rough and mountainous regions are harder to inhabit, they tend to have lower population densities in comparison to other regions, and for these reasons the number of military and police personnel can be limited, making detection of some types of terrorist organisation activity less likely (Malji, 2015). Another possible explanation could be the poor political development and low literacy rates associated with some rough and mountainous regions. Lack of
public services and poor institutions in geographically isolated places may also promote grievances and marginalization of the population (Malji, 2015).

2.3.7. **Education and terrorism**

Education could reduce terrorism in a number of ways. First, it increases the opportunity costs of joining a terrorist organization and makes terrorism organizations less attractive to people who have benefited from this education (Berman, 2003; Bueno de Mesquita, 2005). Second, education raises moral constraints toward the use of violence (Victoroff, 2005). Third, education could indirectly reduce terrorism though eliminating poverty and inequality as well as promoting democratic development and participation (Brockhoff, Krieger, & Meierriecks, 2014).

However, in countries with unfavourable country-specific conditions (such as economic crisis, unemployment, institutional constraints), education could potentially encourage terrorist activity (Brockhoff et al., 2014). Well-educated people may have higher chances of successfully joining a terrorist organization in these circumstances, since terrorist organizations generally select the most educated and qualified volunteers (Bueno de Mesquita, 2005). These arguments go towards explaining why terrorists are usually well-educated (Krueger & Maleckova, 2003).

Empirical findings do not reach a consensus, showing contradictory results in this area. Some studies find a negative influence of education on terrorism (e.g. Azam & Thelen, 2008; Bravo & Dias, 2006), while others demonstrate a positive link (e.g. Berrebi, 2007; Kurrild-Klitgaard et al., 2006). A third subset of studies does not find any significant relationship between education and terrorism (Drakos & Gofas, 2006b).
2.3.8. **Inequality and terrorism**

Some researchers argue that the roots of terrorism lie in poor economic conditions and lack of economic opportunities (Blomberg, Hess, & Weerapana, 2004a; Bueno de Mesquita, 2005; Caruso & Schneider, 2011). According to the rational choice model described in section 2.2, high poverty levels and marked income inequality decrease the opportunity cost of participation in terrorist organizations. Inequality promotes a sense of grievance among the poorest and most unsuccessful people – again making them more inclined to be susceptible to recruitment activities undertaken by some terrorist organisations. The smaller the set of economic opportunities available, the higher the willingness of individuals to join terrorist organizations observed (Caruso & Schneider, 2011). Applications of the rational choice model appear to have mixed empirical evidence.

Several empirical studies have found a positive connection between income inequality and terrorism (cf. Koch & Cranmer, 2007; Li & Schaub, 2004). Enders and Hoover (2012) estimated that “…as inequality rises, the estimated number of domestic incidents in country i increase from about 2 to about 15” (p. 270). Moreover, Enders, Hoover, and Sandler (2014) show that greater income inequality is positively associated with domestic and international terrorism between 1970 and 1992, but there is no significant effect between 1994 and 2010. They explain this change in the significance of inequality by the different types of terrorist organizations which were dominant in the pre-1993 and post-1993 periods. Before 1993, left-wing terrorism was dominant: the left-wing terrorist wanted “to right social wrongs”, and so aimed their attacks against rich capitalist systems and their governments (Enders et al., 2014). After 1993 the number of religious fundamentalist and nationalist/separatist terrorist organisations
increased, which led to a decrease in the impact of income inequality on terrorist attacks.

Most studies, however, do not identify a significant influence of inequality on terrorism (cf. Abadie, 2006; Kis-Katos et al., 2011; Kurrild-Klitgaard et al., 2006; Li, 2005; Piazza, 2006). Variables such as GDP per capita, or the score on the Human Development Index, have been found to effect terrorist attacks to a greater extent than inequality per se (Abadie, 2006; Li, 2005).

Several researchers find a counter-intuitive negative relationship between the Gini index of income inequality and the terrorism level (Freytag, Kruger, & Schneider, 2006; Goldstein, 2005). This outcome has been argued to be explained by lack of adequate econometric specification (Goldstein, 2005) or by the influence of regime type (Freytag et al., 2006). In particular, it has been suggested that in repressive regime countries, terrorism can be suppressed more efficiently (Davis, 2004; Eubank & Weinberg, 1994; Li, 2005).

Although the connection between income inequality and terrorism has been widely studied, the potential effect of inequality on terrorism could be influenced not only by vertical inequalities (i.e. inequality among individuals or households), but also by horizontal inequalities (i.e. inequality among groups, typically culturally defined by ethnicity, religion or race) (Stewart, 2011). The theoretical association between terrorism and horizontal inequalities among ethnic groups could be addressed by rational choice theory and social science theories related to ethnic identity conflicts. Ethnic groups share common beliefs and cultural traditions, and have a higher mutual understanding, which endorses a sense of self-identification with the group. Once differences between groups become significant, members of the
same ethnic group are more prone to compare themselves with other groups (Turner, 1981). Unequal access to economic resources increases resentment and a sense of grievance among the disadvantaged group. As a result, high horizontal inequalities among ethnic groups could act to raise ethnic mobilization and collective violence (Cederman, Weidmann, & Gleditsch, 2011). If the disadvantaged group has access to resources or the ruling group is weak, these grievances could trigger civil war or open rebellion. However, if the resources are limited and the ruling group is powerful, the rebels may select terrorism as their tactic for expressing their grievance (Blomberg et al., 2004b).

In addition, ethnic groups tend to develop negative and dehumanising images of members of other groups (“othering”), which leads to greater tension and conflict (Asal & Rethemeyer, 2008). Dehumanisation often occurs in relation to ethnicity and race, which has been claimed to be a pre-condition for violent actions (Haslam, 2006). For example, Lindén, Björklund, and Bäckström (2016) demonstrate that dehumanisation is related to positive attitudes towards torture in the context of the war on terrorism. Similarly, Goodwin (2006) shows that terrorism more likely appears when revolutionaries and civilians speak different languages and/or practice different religions.

Few studies have addressed the effect of economic horizontal inequalities on terrorism. Of those that do, Piazza (2011) shows that there is a strong correlation between economic discrimination of minority groups and domestic terrorism, while Ezcurra and Palacios (2016) show that horizontal inequalities (measured as interregional income inequalities) are positively and significantly associated with the number of domestic terror events. A more extended literature review on this topic is included in Chapter 7.
Of all of these socio-economic determinants of terrorism, this study has chosen to primarily focus on ethnic inequality. The main reason for this is that, while the theories suggest a strong connection between horizontal economic inequalities and terrorism, a limited number of empirical studies have been conducted in this area, with no studies focussed on the effect of ethnic inequality on terrorism. We assume that the lack of such studies could be, to some extent, explained by lack of relevant data. However, Alesina, Michalopoulos, and Papaioannou (2016) recently developed an index that captures ethnic horizontal inequalities, namely the between-ethnicity economic inequality index. The data provided by Alesina et al. (2016) give us a unique opportunity to close the gap in the existing literature by comprehensively assessing the association between terrorism and ethnic horizontal inequality. In addition, we include as many of the other socio-economic determinants of terrorism as possible in the list of control variables in our econometric analysis in order to capture any other associations.

2.4. The consequences of terrorism

Macroeconomic studies not only focus on the economic reasons for terrorism, but also investigate economic costs. This section introduces two structural classifications of terrorism costs and discusses the positive and negative indirect effects of terrorism.

2.4.1. Classifications of the economic costs of terrorism

Several studies have been devoted to the development of a structural classification of the terrorism costs. For example, Krugman (2004) adapted Glaeser’s (1999) classification of criminal acts to terrorist activity. In particular, Krugman (2004) separates economic costs of terrorism into three categories: the direct losses from terrorism; the costs of law enforcement; and the costs of distorted individual decisions because of fear of terrorism. The first category includes direct damage caused by a
terrorist attack, such as fatalities, casualties or damage to buildings and infrastructure. The second category includes government expenses as a response to a terrorist attack. For example, this category would include such costs as national defence expenses or costs of metal detectors installed in airports. The last category in this classification includes the costs incurred by people due to changes in their behaviour caused by fear of terrorism, for example, extra time spend in airport queues or extra costs imposed on shipment of goods caused by strengthened import regulations.

Another classification, developed by De Nederlandsche Bank (2005), separates economic costs of terrorism into two categories: direct and indirect costs. Direct costs include the direct impact of terrorism on the economy, such as implemented counterterrorism programmes or the need for the replacement of destroyed physical capital. Indirect costs include costs occurred due to damage of confidence such as changes or postponement of consumption or investments. In general, apart from few minor differences, we could assume that direct costs include the first two categories of the Krugman’s classification (the direct losses and the costs of law enforcement), while indirect costs cover the costs of distorted individual decisions.

Direct costs are relatively easy to calculate; however, estimates conducted by different agencies may vary. For example, Thompson (2002) estimated that the 9/11 terrorist attack incurred a one-time wealth loss for the City of New York that accounted for $30.5 billion, which includes $21.8 billion of psychical losses and $8.7 billion of human losses. Lenain, Bonturi, and Koen (2002) estimated that the 9/11 terrorist attack caused the destruction of physical assets equal to $14 billion for private businesses, $1.5 billion for state and local government companies $0.7 billion for federal government. In addition, more than $11 billion were spent on rescue and clean-up operations. Navarro
and Spencer (2001) estimate property damage costs of $10 to $13 billion, loss of human life of $40 billion and lost economic output in the immediate aftermath of $47 billion.

Indirect costs of terrorism are much greater than direct costs. For example, Krugman (2004) states that behavioural responses to the 9/11 terrorist attack were estimated at 1.5 per cent of GDP per year, which is equal to $180 billion. The New York Times calculated the total cost of the 9/11 attack of $3.3 trillion, which includes only $55 billion of direct costs (costs of toll and physical damage) (Carter & Cox, 2011).

This research contributes to the literature on the indirect costs imposed by the fear of terrorism. In particular, we estimate the effect of terrorism on subjective wellbeing (in Chapter 4), the socio-demographic predictors of the fear of terrorism as well as the effect of the fear of terrorism on the support for particular counter-terrorism policies (in Chapter 6).

2.4.2. Negative effects of terrorism on life satisfaction

Most researchers estimate the effects of particular variables on terrorist attacks using econometric methods. In general, their studies apply panel analysis or vector autoregressive models to estimate the equation:

\[ DV = \beta_1 + \beta_2 * \text{Terrorism} + \sum_{n=3}^N \beta_n * \text{Controls} + \epsilon \]  

(2.2)

where \( DV \) is a dependent variable such as GDP per capita, \( \text{Terrorism} \) is the number of terrorist attacks, \( \text{Controls} \) is a vector of control variables and \( \epsilon \) is an error term. Studies focus on the effect of terrorism on GDP per capita (Kis-Katos et al., 2011; Tavares, 2004), as well as on other macroeconomic indicators such as foreign trade (e.g. Mirza & Verdier, 2008), foreign direct investment (e.g. Enders & Sandler, 1996), national consumption (e.g. Eckstein & Tsiddon, 2004) and national investment levels (e.g. Fielding, 2003).
In this research we apply a different approach. Indirect costs of terrorism can include the costs incurred by fear of terrorism. Thus, an investigation of people’s reactions to terrorist attacks is extremely important, because these reactions can strongly influence the overall macro-economic effects. However, the analysis of the effects on population imposed by fear of terrorism is extremely difficult since fear of terrorism is a subjective measure. One of the methods to overcome this limitation is to use life satisfaction as a measure of subjective wellbeing.

Subjective measures of wellbeing have received increased attention among economists in recent years (cf. Bruni & Porta, 2005; Frey, 2008). This interest is motivated by the recognition that traditional means of measuring economic progress, such as GDP, are not the only measure of social progress. For example, the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen, & Fitoussi, 2009) reports that both objective and subjective indicators of progress are important, placing them on an equal footing. The Commission states:

_Research has shown that it is possible to collect meaningful and reliable data on subjective as well as objective wellbeing. Subjective wellbeing encompasses different aspects (cognitive evaluations of one’s life, happiness, satisfaction, positive emotions, such as joy and pride, and negative emotions such as pain and worry): each of them should be measured separately to derive a more comprehensive appreciation of people’s lives...._

(Stiglitz et al., 2009, p. 16 p. 16)
McGillivray and Clarke (2006, p. 4) state that “...subjective wellbeing involves a multidimensional evaluation of life, including cognitive judgments of life satisfaction and affective evaluations of emotions and moods.”

To measure subjective wellbeing, economists use self-reported levels of life satisfaction or happiness. Researchers ask people to rate their life satisfaction level on a scale from 0 to 10 (World Value Survey (Institute for Comparative Survey Research) or European Value Survey (EVS)) or ask people to answer the question “Taken all together, how would you say things are these days: would you say that you are very happy, pretty happy or not too happy?” (National Opinion Research Center (NORC)). Although there are some differences between the terms ‘happiness’ and ‘life satisfaction’, economists tend to use them interchangeably (Easterlin, 2004). The life satisfaction data could be drawn from several sources: readily available household panel datasets (Haisken-DeNew, 2001), repeated representative cross-national surveys (for example, General Social Survey USA (National Opinion Research Center (NORC)) or General Social Survey Australia (Australian Bureau of Statistics (ABS)), or cross-country surveys (Better Life Index (OECD), World Value Survey (Institute for Comparative Survey Research) or European Value Survey (EVS)). Web-based archives of research findings on happiness, such as The World Happiness Database (Veenhoven, 2014), gather and systemize available survey data on happiness in one collection. As a result, they provide data on subjective self-reported levels of life satisfaction among the general population in different nations over an extended period of time.

Despite the fact that subjective measures of wellbeing have been recognised as important measures of social progress, a very small body of economic literature considers the relationship between terrorism and subjective wellbeing (Blomberg, Hess, & Tan, 2011; Frey, Luechinger, & Stutzer, 2009; Metcalfe, Powdthavee,
Dolan, 2011; Romanov, Zussman, & Zussman, 2012). Most of the studies focus on a single country or region (Frey et al., 2009; Metcalfe et al., 2011; Romanov et al., 2012), with only two studies examining the relationship between terrorism and life satisfaction using a cross-national sample (Blomberg et al., 2011, Farzanegan et al., 2017). A more extended literature review on this topic is included in Chapter 4.

2.4.3. **Negative psychological effects of terrorism**

Although not many economists have examined the relationship between terrorism and life satisfaction, psychologists have significantly contributed to the literature on the effects of terrorist attacks on psychological and emotional states. Most of the studies find significant relationships between terrorism attacks and stress, post-traumatic stress disorder (PTSD) and depression that last up to six months after the attack (e.g. Schuster et al., 2001; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). Salguero, Fernández-Berrocal, Iruarrizaga, Cano-Vindel, and Galea (2011) analyse 11 studies on the prevalence of major depressive disorders in the general population and in victims directly affected by terrorist attacks. They find that terrorist attacks incite fear and horror among the population, undermining confidence in community safety and governmental institutions.

A large number of studies have analysed the psychological effects of the 9/11 terrorist attacks on the mental health of US citizens (Galea et al., 2002; Schlenger et al., 2002; Silver et al., 2002). The results show consistently that the effect of the 9/11 terrorist attack was substantial during the first week following the event. Similarly, citizens of London (following the 7 July 2005 terrorist attack) and citizens of Madrid (following

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5 Direct victims of terrorism attacks are people who experienced the event in first person either because they were injured in the attack, or suffered material losses, or lost relatives or close friends (Salguero, Fernández-Berrocal, et al., 2011).
the 11 March 2004 terrorist attack) experienced stress and PTSD symptoms lasting up to three weeks after the attack (e.g. Rubin, Brewin, Greenberg, Simpson, & Wessely, 2005; Salguero, Cano-Vindel, Iruarrizaga, Fernandez-Berrocal, & Galea, 2011).

Researchers have also studied the long-term effects of terrorism using the case of the Second Palestinian Intifada in Israel. Results from a study by Bleich, Gelkopf, and Solomon (2003) show that more than 70 per cent of the respondents displayed at least one symptom of stress, about 9 per cent had PTSD symptoms and about 58 per cent reported being depressed. In a subsequent study, Bleich, Gelkopf, Melamed, and Solomon (2006) estimated that after 44 months of Intifada over 86 per cent of the respondents had at least one traumatic stress related symptom, 9 per cent had PTSD and about 30 per cent felt depressed.

2.4.4. Positive reactions

While terrorist attacks undoubtedly have negative impacts on people’s health and wellbeing, some studies suggest that people may also experience some positive emotions after a stressful event. The theory of post-traumatic growth (PTG) suggests that positive adaptation could happen after a traumatic event. Tedeschi and Calhoun (2004) define PTG as “the experience of positive change that occurs as a result of the struggle with highly challenging life crises” (p. 1). Thus, according to the theory of PTG, a traumatic event can motivate people and enhance their expectations about the future.

It is important to note that PTG and negative psychological effects are arguably independent in some senses and could both be present after a terrorist attack. However, positive reactions may help to reduce negative psychological effects. For example, Ai, Cascio, Santangelo, and Evans-Campbell (2005) found that hope and spiritual meaning
were negatively associated with the level of depression and anxiety developed by Americans after 9/11 terrorist attacks. The reason for this association could be that positive emotions distract attention from the negative event. They also broaden attention focus and behavioural repertoire, which act to widen an individual’s perspective on the problem (Fischer & Ai, 2008).

Theories agree that positive reactions after stressful events are possible. PTG could be either an outcome of the attack, or a coping strategy developed after terrorist attack, or both (Zoellner & Maercker, 2006). Fredrickson, Tugade, Waugh, and Larkin (2003) find that respondents experienced positive emotions – gratitude, interest, and love – after the 9/11 terrorist attack. These results are also consistent with Ai et al. (2005), who demonstrated that three months after the 9/11 attacks people changed their views about themselves, their behaviour, relations, worldviews, spiritual beliefs and purpose in life. A more extended literature review on this topic is included in Chapter 5.

There are several limitations to PTG studies. The most important limitation is that the majority of the existing studies were conducted after the event, and thus these studies do not account for pre-existing personal characteristics (Fischer & Ai, 2008). The results of such research should be treated with caution due to the possibility of omitted variables. It is also important to remember that changes in attitudes or views do not necessary lead to any change in behaviour. For example, Waxman (2011) did not find any significantly change in daily routines or behaviour of the Israelis during the second Intifada despite the previously experienced fear and stress.

2.5. Attitudes towards fear of terrorism

Terrorist attacks often incite fear and horror among the population (Salguero, Fernández-Berrocal, et al., 2011). People in societies experiencing conflict orient their
life around this fear; and these people become more conservative and aggressive and have a feeling that they are surrounded by a seemingly uncontrollable world (Bar-Tal, 2001). It has been argued that fear promotes prejudice toward immigrant groups (Stephen & Stephen, 1996) and acts as a predictor for “defensive” public policies such as deporting Arab Americans, Muslims, and first generation immigrants (Skitka, Bauman, Aramovich, & Morgan, 2006). Thus, fear of terrorism may also promote support for particular counter-terrorism policies.

This thesis focuses on another factor which could be a predictor for both policy preferences and fear of terrorism, namely social dominance orientation (SDO). SDO reflects a desire for hegemonic relationships between social groups and shows whether a person favours equal or hierarchical intergroup relationships (Pratto, Sidanius, Stallworth, & Malle, 1994). Research shows that SDO is associated with different socio-demographic and political traits, such as gender (Sidanius, Sinclair, & Pratto, 2006), and education (Sidanius, Pratto, & Bobo, 1996), as well as in-group identification with dominant racial, ethnic, gender, and other social groups (Pratto, Sidanius, & Levin, 2006).

People high in SDO want to preserve the hierarchical status quo (Ho, Sidanius, Cuddy, & Banaji, 2013) and picture the world as a competitive jungle between social groups (Golec de Zavala & Kossowska, 2011). As such, it could be argued that people high in SDO will experience more fear of terrorism, because they are concerned about potential threats to their group dominance (Golec de Zavala & Kossowska, 2011).

Studies also show that SDO could be one of the predictors of policy preferences. For example, people high in SDO are more likely support hierarchy-based policies, while people low in SDO favour more equality-based policies (Pratto et al., 1994). In addition, people high in SDO are more likely to prefer harsh methods and violent
actions to maintain a group-based hierarchy; they also demonstrate more aggressive
decision making (Carnahan & McFarland, 2007) and are more likely to support punitive
criminal justice policies (Sidanius, Mitchell, Haley, & Navarrete, 2006), wars, and
torture (Lindén et al., 2016). On the other hand, people low in SDO prefer more
humanitarian military approaches and are opposed to the use of a death penalty (Henry,
Sidanius, Levin, & Pratto, 2005). In addition, several researchers have explored the
association between SDO and support for terrorism or counter-terrorism policies.
Lemieux and Asal (2010) show that people high in SDO are more likely to choose or
justify a terrorist attack, while Lindén et al. (2016) demonstrate that high SDO is related
to positive attitudes towards using torture in the war on terrorism. A more extended
literature review on the attitudes towards fear of terrorism, the support for counter-
terrorism policies and the association between them is included in Chapter 6.

2.6. Concluding Remarks

This chapter provides the theoretical background of the research. In particular, it
introduces the working definition of terrorism and the theoretical model used to identify
economic determinants of terrorism. It argues that terrorists can be considered as
rational actors so economic methods could be applied to predict their behaviour.
Furthermore, this chapter discusses the most popular socio-economic determinants of
terrorism, such as GDP per capita, democracy level, civil war, population size, trade
openness, geographical barriers, education and inequity. The chapter also addresses two
classifications of the economic costs of terrorism and narrows down the focus of this
research towards the indirect economic costs imposed by the fear of terrorism.
Moreover, the chapter provides a literature review of reactions to terrorist attacks, and
in particular, the positive and negative effects of terrorism on subjective wellbeing.
Finally, it reviews the literature related to social dominance orientation as a predictor
of the attitudes relating both to the fear of terrorism and to various counter terrorism policies. The theoretical and empirical background discussed in this chapter constructs the foundation for the hypotheses proposed in Chapter 1. This will be examined further in the remainder of this thesis.
References


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3. Data used in the Empirical Components of this Thesis

3.1. Existing terrorism databases

A characteristic feature of terrorism data is the absence of a sole, comprehensive, terrorism database. This is partially explained by the lack of a clear definition of such a complex phenomenon as terrorism. To be classified as a terrorist attack, an act of violence needs to meet certain criteria. While most of the definitions include such conditions as presence of a political purpose, or intention to influence the behaviour of larger audience than the immediate victims, the restrictions on other factors may be different. For example, some terrorist databases restrict inclusion criteria by sub-national level, while others allow inclusion of state terrorism\(^6\) (Sheehan, 2012).

Historic terrorist incidents themselves provide very limited and hard-coded information regarding the nature of the attack and its impact. Most of the time, the location and timing of terrorist events can be identified with some certainty. However, details on the type of attack, the human causalities, the property damage, the perpetrators, the terrorist organization, the target and the aim are often very difficult to identify (Drakos, 2011).

Another reason lies in the source of information about terrorist attacks. In most cases terrorism data are drawn from media outlets (Fowler, 1981), which can deliberately or accidentally distort the facts (Herman & Chomsky, 1988; Schmid, 2004). Finally, the absence of a centralised body dealing with terrorism, as well as the treatment of transnational and domestic terrorist attacks as independent processes, has resulted in the development of independent databases that suited the interests of the collecting organisations (Drakos, 2011).

\(^6\) Around 85 per cent of all terrorist attacks in the TWEED dataset are initiated by non-state agents, while the remaining attacks are government actions (Engene, 2007).
There are currently six main terrorist databases that correspond to chronologies of terrorist attacks (Drakos, 2011):

1. World Incident Tracking System (WITS);
2. Memorial Institute for Prevention of Terrorism (MIPT);
3. RAND database;
4. Terrorism in Western Europe: Event Data (TWEED);
5. Global Terrorism Database (GTD); and
6. International Terrorism: Attributes to Terrorist Events (ITERATE).

The WITS contains data relating to over 69,000 international and domestic terrorist events since 2005; however, it was discontinued in April 2012 (Kimery, 2012).

The MIPT and the RAND databases have now been merged into the MIPT Terrorism Knowledge Base (TKB). This database contains two separate components: the RAND Terrorism Chronology Database (1968–1997) and the RAND-MIPT Terrorism Incident Database (1998–2009). The RAND Terrorism Chronology Database tracked international terrorist incidents, while the RAND-MIPT Terrorism Incident Database included both domestic and international terrorist incidents. The MIPT TKB was, however, discontinued in March 2008 (Straw, 2008).

TWEED records domestic terrorist incidents in 18 European countries from 1950 to 2004. Although there is no official information available relating to the discontinuation of TWEED, the last update of the database was almost 10 years ago and the frequency of any future update(s) is unknown (Engene, 2004).

Currently, the only up-to-date databases are GTD and ITERATE. ITERATE contains only international terrorist events for the time period 1968 to 2015 (Mickolus, 2015). The working definition of transnational terrorism used by ITERATE is
“... the use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behaviour of a target group wider than the immediate victims” (Mickolus, Sandler, Murdock, & Flemming, 2013, p. 2).

GTD, the most recently developed database, contains both domestic and international terrorist events and covers the period from 1970 to 2015 (Global Terrorism Database (GTD), 2016). The working definition of terrorist attack used by the GTD is:

“... the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation” (START, 2014, p. 8).

In order to include an incident in the GTD, it has to be an intentional act of violence or threat of violence by a sub-national actor. In addition, at least two of the following three criteria have to be met:

- The act must be aimed at attaining a political, economic, religious, or social goal.
- There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims.
- The action must be outside the context of legitimate warfare activities (START, 2014, p. 8).

Based on the data from GTD, the Institute for Economics and Peace (IEP) publishes the Global Terrorism Index (GTI). The GTI, an annual index, combines four terrorism measures: total number of terrorist incidents in a given year; total number of fatalities caused by terrorists in a given year; total number of injuries caused by terrorists in a
given year; and the approximate level of total property damage from terrorist incidents in a given year. The annual index is an average of these four measures, weighted according to an assumption relating to the psychological effect of the terrorist attack. Fatalities have the greatest weight, equal to 3; Property Damage is given a weight equal to 2; Incidents are assigned a weight equal to 1; and Injuries are given a weight of 0.5. Thus, the annual GTI formula is \(1 \times \text{Incidents} + 3 \times \text{Fatalities} + 0.5 \times \text{Injuries} + 2 \times \text{Property Damage}\) (The Institute for Economics and Peace (IEP), 2012). The GTI systematically ranks and compares 163 countries from 2002 to 2015 based on their performance on these four terrorism measures (The Institute for Economics and Peace (IEP), 2016).

3.1.1. Relationship between datasets

Several studies have compared terrorist databases. Fowler (1981) concluded that the different definitions determine the scope and content of the databases, leading to a wide variation in their respective sample sizes. Schmid (2004) states:

For the 10-year period 1968–1977, for example, depending on which of four American databases was consulted, the total number of terrorist incidents that could be found would differ substantially: 936 (RAND), 2,413 (Central Intelligence Agency (CIA)), 3,027 (ITERATE) and 4,091 (United States Department of State) (Schmid, 2004, p. 54)

These large differences in incidents could, for example, be due to occasions when “…40 bombings occur in a single night in one city”. In the CIA dataset, this would be coded as 40 different terrorist incidents, while in RAND this would be coded as a single terrorist incident (Schmid, 2004, p. 55).
Schmid (2004) also identifies the problem of the sources of data used by the different databases and the potential distortion of information by various media outlets. Since most datasets rely on open sources only, the media could be biased or inaccurate. For example, without courageous journalists or foreign correspondents in a particular country or region, the reported number of terrorist incidents is often lower than the actual number of incidents (Schmid, 2004). Factors such as government censorship, false responsibility taken by perpetrators, definition problems or the simultaneous presence of other forms of violence (for example, civil war), make the process of data collection even harder (Schmid, 2004).

Drakos (2011) compared the various terrorism definitions and the main variables used in ITERATE, TWEED and GTD using a sample of 15 European countries from 1970 to 2004. The author combined the ITERATE and TWEED data and compared those with GTD data\(^7\). He found that the average country level correlation was 0.4191, ranging from 0.82 for Belgium to 0.04 for Netherlands. The average cross-sectional correlation was 0.69, ranging from 0.27 in 1982 to 0.99 in 1974.

This review of the literature shows that there is no single comprehensive terrorist database. Moreover, due to differences in data sources and the different working definitions of terrorism, the data in the different terrorist databases vary significantly. Some terrorist databases provide information only about international terrorist attacks (ITERATE); the others are limited by the number of countries (TWEED). All these factors need to be taken into account when choosing the database for the current research.

\(^7\) ITERATE provides information about international terrorist attacks, TWEED contains data for domestic terrorist incidents, and GTD does not distinguish between international and domestic terrorism.
3.1.2. Separation of GTD into domestic and transnational terrorist incidents

The GTD, the most recent terrorism database, contains information about both domestic and international terrorist events since 1970. It is the most comprehensive unclassified database. However, the GTD does not distinguish between two types of terrorism – domestic and transnational. This separation is essential, because the two types of terrorism may have different roots and consequences. Enders, Sandler, and Gaibulloev (2011) developed a method to separate data from the GTD into transnational and domestic terrorist incidents for the period 1970 to 2007, subsequently updated for the period 2008 to 2010. These authors use a particular procedure to define international terrorist attacks and uncertain incidents: first, the authors compare the nationality of the victims and the venue country; second, they identify terrorist attacks against diplomatic targets or diplomatic staff; third, they determine terrorist attacks against international entities and foreign businesses; fourth, they look at the information about United States (US) victims, US hostages and US-specific demands; fifth, they examine the country where kidnappings/hijackings happened. If nationalities of the victims are different from the venue country, the attack is classified as international. If a terrorist attack was committed against a diplomatic target or diplomatic staff, the attack is classified as international. If a terrorist attack is directed at US entities outside US or international entities, the attack is classified as international. If the terrorist incident involved US victims and occurred outside the US, the attack is classified as international. If a plane is hijacked and directed to another country (i.e. two or more countries involved), the attack is classified as international. The remaining incidents are classified as domestic terrorist events. After that they calibrate the GTD international incidents with the
corresponding international incidents from the ITERATE database. The reasons for such calibration are:

- missing data for 1993 in the GTD,
- a change in inclusion criteria for incidents in the GTD after 1997, which resulted in a sharp decline in terrorist events,
- a large divergence in GTD and ITERATE data during some periods (Enders et al., 2011).

The separated data developed using the approach outlined in Enders et al. (2011) are open access and can be downloaded from [http://www.prio.org/jpr/datasets/](http://www.prio.org/jpr/datasets/).

Thus, in this research the data from GTD will be used, because:

- GTD contains information about both domestic and international terrorist events;
- GTD covers the period from 1970 to 2015;
- GTD contains data for 158 countries;
- GTD is an up-to-date dataset;
- The Enders et al. (2011) adaptation of the GTD data will be used when the separation into types (transnational and domestic) is needed;

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8 For the periods when GTD and ITERATE data diverge (1970:1–1977:2, 1991:2–1997:4), Enders, et al. (2011) scaled the GTD international and domestic terrorist incidents by a factor, which is the ratio of the mean number of ITERATE incidents to the mean number of GTD transnational terrorist incident. The authors made the implicit assumption that “PGIS coders improperly missed (or padded) the number of domestic and transnational terrorist incidents proportionately” (p. 325).

9 Cases from 1993 were lost during an office move by PGIS.

10 Before 1997, Pinkerton Global Intelligence Service (PGIS) collected data. After 1997 the PGIS definition was split into parts and coded for each incident.

11 From 1970:1 through 1977:2, the number of incidents in ITERATE consistently exceeds that in GTD. The mean number of quarterly incidents for ITERATE is 94.67, while the mean number of quarterly incidents for GTD is 45.93. Beginning in 1991:2, the number of transnational terrorist incidents in GTD greatly exceeds those in ITERATE. Beginning in 2005:1, the datasets begin to diverge. The divergence stems from GTD reporting more attacks occurring in Iraq and Afghanistan than does ITERATE. Apparently, GTD does not exclude terrorist attacks against combatants in these two countries, while ITERATE does (Enders, et al., 2011).
• GTI is calculated based on the data from the GTD; the GTI will be used when generalized panel data by country in a given year is needed.\textsuperscript{12}

The GTD therefore is the main database for this research. However, to answer the research questions addressed in each Chapter, we also obtained information from other complementary datasets. These complementary datasets and their advantages over other data sources are discussed below.

3.2. Life satisfaction data

The life satisfaction data used in Chapter 4 is drawn from the World Happiness Database (Veenhoven, 2014a). The World Happiness Database is a web-based archive of research findings on happiness in the sense of 'the subjective enjoyment of one's life as-a-whole'. It contains data on the subjective average self-reported levels of life satisfaction among the general population in 149 different nations, and covers the period 2000–2009. The scores are based on individuals’ responses to the question:

\textit{Here is a ladder representing the 'ladder of life'. Let's suppose the top of the ladder represents the best possible life for you; and the bottom, the worst possible life for you. On which step of the ladder do you feel you personally stand at the present time?}

(Veenhoven, 2014b)

The responses are rated on a ladder scale of 0 (worst possible life satisfaction) to 10 (best possible life satisfaction). It should be noted that the level of life satisfaction could be inflated in some nations, due to under-sampling of the rural and illiterate population.

\textsuperscript{12} GTI is calculated only from 2002, so the GTD missing data and the changing of the inclusion criteria are not applied to it. As a result, when short-period panel data (over say a 15-year period) are needed it is more convenient to use GTI.
Despite the partial correction of data by the use of weighting, the real differences in life satisfaction could still be greater than in the data provided (Veenhoven, 2014a).

The World Happiness Database is one of the largest collections of research findings and estimates for life satisfaction across nations. It has a clear conceptual focus as well as detailed description (Veenhoven, 2011). To the best of our knowledge the World Happiness Database contains the largest number of data points for self-reported levels of life satisfaction in different countries over the period 2000–2009. For this reason, data from the World Happiness Database has been used in this research.

3.3. Russia Longitudinal Monitoring Survey – Higher School of Economics (RLMS-HSE) data

Chapter 5 uses data taken from The Russia Longitudinal Monitoring Survey – Higher School of Economics (RLMS-HSE) (National Research University "Higher School of Economics", OOO “Demoscope”, Carolina Population Center, University of North Carolina at Chapel Hill, & the Institute of Sociology RAS, 2016). The RLMS-HSE is a nationally representative longitudinal survey aimed at monitoring socio-economic conditions and the health of households and individuals in the Russian Federation. The RLMS-HSE, the first and only non-government survey, covers data on individuals’ health status and dietary intake, the precise measurement of household-level expenditure and service utilisation, and the collection of relevant community-level data. At the moment, this survey contains 25 waves\(^\text{13}\) and covers the period 1992–2017.

The primary variable used in this research is a measure of self-reported expectations of life in the future. This measure is obtained from individuals’ responses to the question: “Do you think that in the next 12 months you and your family will live better than today or worse?”\textsuperscript{14}

Individual characteristics such as age, education, income, marital status and gender are also included in the analysis. The data covers a six-year period and includes about 6,000 individuals per year, which allows individual heterogeneity and underlying trends to be identified and controlled for.

The RLMS-HSE dataset is unique for a number of reasons. First, the RLMS-HSE questionnaire meets international standards and allows for cross-country comparisons. Second, the RLMS-HSE provides an alternative to the national microeconomic data. It also includes variables which are not covered by existing national statistics collections. Third, the RLMS-HSE survey is the only representative microeconomic panel survey in Russia. Fourth, the RLMS-HSE includes a section on value judgments, which provides data on individuals’ views and opinions on changes in the country. Therefore, the RLMS-HSE datasets provide opportunities for researchers to develop high-quality interdisciplinary explanatory models, to improve the quality of economic forecasts and to measure and predict the expectations and plans of various segments of the population.

\textbf{3.4. ANUpoll data}

Data in Chapter 6 are drawn from an ongoing series of public opinion polls conducted by the Australian National University (the ‘ANUpoll’ series), which are developed by Sheppard, Saikal, and Theodorakis (2016). The ANUpoll is a quarterly survey of

\textsuperscript{14} The original survey question (in Russian) is “Как Вы думаете, через 12 месяцев Вы и Ваша семья будете жить лучше или хуже, чем сегодня?”.
Australian public opinion, with a sample size of 1,200 Australian citizens aged 18 and over.

The sample is raised via random digit dialling, with a 60/40 composition of landline and mobile phone numbers. The random digit dialling approach allows the researchers to overcome such problems as (1) non-coverage of households with unlisted numbers or new listings in growth areas, and (2) the potential for under-representation of specific demographic groups (e.g. younger persons, persons of lower socio-economic status, recent migrants, single person households). This makes random digit dialling preferable, compared with the use of the electronic Telstra white pages. The sample is stratified, which guarantees that at least 100 interviews are commenced in each state or territory, with the remaining 200 interviews distributed across the five most populated states on a probability proportional-to-size basis. Thus, the sample includes respondents from each Australian state and territory (Sheppard, 2017).

The unit record file data for the ANUpoll are available from the Australian Data Archive (Sheppard, Saikal, and Theodorakis, 2016).

Each poll in the ANUpoll series focuses on a different topic of national importance; the topic of the poll used in this thesis was “Attitudes to national security: Balancing Safety and Privacy”. This poll was designed to explore Australians’ willingness to sacrifice their personal rights and freedoms for national security. It revealed that “even when posed as a trade-off between an individual’s rights and the protection of national security, the Australians surveyed express support for freedom-limiting policies in the fight against terrorism” (Sheppard et al., 2016).

The ANUpoll data provide a unique opportunity to explore socio-psychological and socio-demographic determinants of attitudes towards terrorism among the Australian
population. In addition, these data are very recent: the ANUpoll “Attitudes to national security: Balancing Safety and Privacy” results were released in October 2016. Thus, the results obtained will be particularly relevant for the formulation of public policies on important issues such as safety and civil liberties.

3.5. Ethnic inequality data

The ethnic inequality data used in Chapter 7 are drawn from the dataset developed by Alesina, Michalopoulos, and Papaioannou (2016). The between-ethnicity economic inequality index across countries is designed as a combination of information from ethnographic-linguistic maps on the location of groups, together with satellite images of light density at night (Alesina et al., 2016). Ethnic groups are identified and located via two datasets: the Geo-Referencing of Ethnic Groups (GREG), which is the digitized version of the Soviet Atlas Narodov Mira (Weidmann, Rød, & Cederman, 2010), and the 15th edition of the Ethnologue (Gordon, 2005). As a proxy for income per capita at the ethnicity level, Alesina et al. (2016) use satellite image data on light density, which are drawn from the Defense Meteorological Satellite Program’s Operational Linescan System. Alesina et al. (2016) aggregate luminosity data which falls into the boundaries of an ethnic group and then divide by the population of each area based on data from the Gridded Population of the World.

Thus, the between-ethnicity economic inequality index is measured as a Gini coefficient for each country using the following formula:

\[ G = \frac{1}{n} \frac{n + 1}{\sum_{i=1}^{n} y_i} \left(\frac{n}{\sum_{i=1}^{n} y_i} - \frac{1}{\sum_{i=1}^{n} y_i} \sum_{i=1}^{n} \left(\frac{n+1-i}{\sum_{i=1}^{n} y_i}\right) y_i\right) \]  

(3.1)

where \( n \) is the number of groups in each country and \( y_i \) is the luminosity per capita for the historical homeland of group \( i \). The between-ethnicity economic inequality index is
calculated for both the GREG and Ethnologue maps, and so provides a measure of ethnic inequality for 152 countries in the years 1992, 2000, 2006 and 2012.

The between-ethnicity economic inequality index is the first index that has been developed to capture ethnic horizontal inequalities – inequalities among groups, typically culturally defined by ethnicity, religion or race. This index allows the association between terrorism and ethnic horizontal inequality to be comprehensively assessed. To the best of our belief, no previous attempts have been done to estimate this association.

3.6. Concluding Remarks

This chapter has discussed in detail the data sources to be used in the empirical studies conducted as part of this research. These empirical studies provide the focus of the remainder of this research.
References


4. The welfare cost of terrorism

4.1. Introduction

Terrorism is an enduring consequence of the willingness of humans to use violence with the goal of affecting politics or forcefully promoting one's ideology by inducing fear in the populace. Such use of violence dates back, for example, to the Sicarii, a 1st century Jewish group who murdered enemies and collaborators in their campaign to remove their Roman rulers from Judea (Weingrod, 1997). The more modern notion of terrorism, believed to be derived from Maximilien Robespierre, follows the French revolution of the late 18th Century. Robespierre was the leader of a Committee of Public Safety, elected by the National Convention. A form of state terrorism, the committee enforced a reign of terror with the goal of expatiating democracy. According to Cobban (1946):

[Robespierre’s] view [was that] the people resorted to direct action for the purpose of protecting the principles of the Revolution by intimidating its enemies. This was only another way of saying that France was undergoing a revolution, in which intimidation was necessarily a part.

Direct popular action, in fact, was another word for terrorism.

The 20th Century saw a rise in ethnic nationalism, with an increase in the use of guerrilla tactics by non-state actors such as the Castilians in Basque (Greenwood, 1985), the Irish Republican Army (Horgan and Taylor, 1997) and various anti-colonial movements in British, French and German colonies in Africa (Ekeh, 1975; Cooper, 1975).
1994). Many of these groups agitated for self-rule in order to break away from what they saw as an oppressive state (e.g., Nelson Mandela’s African National Congress). They were, however, at that time viewed as terrorist groups. Terrorism as we know it in modern times is defined by acts such as the hijacking of the El AL Israel jet by the Popular Front for the Liberation of Palestine (Steelman, 1977) and the kidnapping and murder of Israeli athletes at the 1972 Olympic games (Reeve, 2011).

The 1990s saw an increase and escalation in religiously inspired groups (e.g., Al Qaeda, Hamas and Hezbollah) employing violent terrorist tactics to achieve their goals, the most notable being the attack on the World Trade Centre in New York on September 11, 2001 (9/11) (Schuster, et al., 2011). More recent terror events include the kidnapping of Nigerian school girls by Islamist terror group Boko Haram, and the activities of the Islamic State of Iraq and the Levant (ISIL), who aim to create a caliphate or Islamic state in the Middle East (Australian Bureau of Statistics (ABS), 1995).

Alarmingly, the frequency of terror attacks appears to be increasing (see Figure 1.1). For example, the 2012 Global Terrorism Index Report notes that between 2002 and 2011 the total number of terrorist incidents increased by 464% (Institute for Economics and Peace, 2012). Further, the Institute’s most recent Global Peace Index Report notes that terrorist activity (a composite weighted measure of the number of fatalities, injuries and property damage caused by terrorism) is one of the four indicators that recorded the greatest deterioration over the period 2008 to 2014 (Institute for Economics and Peace, 2014). Between 2013 and 2014, terrorist activity recorded the greatest deterioration of all the Global Peace Index indicators, declining by 10%, more than double the change.

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16 The other three indicators are: number of internal and external conflicts fought; number of displaced people as a percentage of the population; and number of deaths from organized internal conflict.
of the next largest deteriorating indicator (the number of external and internal conflicts fought).

In the context of increased terrorist activity, there is a growing body of literature which examines the macroeconomic cost of terrorism (Enders and Sandler, 2008; Blomberg, Hess and Orphanides, 2004; Blomberg, Hess and Weerapana, 2004). Our study takes a somewhat different approach to estimating the cost of terrorism – we measure the cost in terms of lower levels of life satisfaction. Specifically, we employ data from 117 countries over the period 2006 to 2011 to estimate a macroeconomic cross-country system of equations that examines the association between terrorism, self-reported life satisfaction and national income. This approach allows the welfare cost of terrorism to be expressed in life satisfaction terms and allows two effects to be estimated: first, the effect of terrorism on life satisfaction and second, the effect of terrorism on national income, which in turn effects life satisfaction (the ‘direct’ and ‘indirect’ effects respectively).

This chapter extends the existing body of literature by (1) demonstrating that, in addition to conventional objective measures such as per capita Gross Domestic Product (GDP), subjective measures of wellbeing should also be taken into account when evaluating the effects of terrorism; (2) estimating the link between life satisfaction and terrorism using a large cross-national sample (to the best of our knowledge previous studies of life satisfaction and terrorism have only focussed on a single country or region); and (3) estimating both the direct effect of terrorism on life satisfaction and as the indirect effect of terrorism on life satisfaction via its effect on national income - existing studies focus only on the former.

The chapter first discusses the literature with respect to the economic and psychological effects of terrorism in section 4.2. The empirical strategy is then outlined in section 4.3,
followed by the data and variables employed in section 4.4. Results are presented in section 4.5 and discussed in section 4.6.

4.2. Related Literature

4.2.1. The Economic Effects of Terrorism

A significant body of literature considers the cross-country macroeconomic effects of terrorism, in particular the effect of terrorism on GDP, national consumption, national investment, stock markets, foreign direct investment (FDI) and foreign trade. For example, Blomberg, Hess and Orphanides (2004) and Blomberg, Hess and Weerapana (2004) find that, on average, terrorism significantly reduces per capita growth in GDP. The negative association between terrorism and economic growth, however, is small and statistically insignificant for Organisation for Economic Cooperation and Development (OECD) member countries. Tavares (2004) also finds that terrorism has an immediate negative impact on economic growth. However, when controlling for additional determinants of growth (for example, trade openness, the inflation rate, and educational spending), the effect of terrorism becomes insignificant. More recently, Gai Bulloev and Sandler (2008, 2009, and 2011) find that international terrorism has a negative and significant effect on per capita income growth in Western European countries, African countries and developing countries in Asia. Domestic terrorism, in contrast, has a lower effect than international terrorism in Western European countries, while no impact is found in African countries. At a microeconomic level, Abadie and Gardeazabal (2003) estimate that per capita GDP in the Basque country of Spain decreased by more than 10% due to the terrorist attacks that occurred between 1975 and 1995. Similarly, Eckstein and Tsiddon (2004) show that terrorist attacks reduced Israel’s per capita GDP (by 10% to 15%) during the initial period of the Palestinian Al-Aqsa.
With regards to national consumption, the empirical evidence is mixed. Fielding (2003) suggests that terrorism in Israel leads to an increase in savings and a concomitant decrease in consumption. In contrast, Eckstein and Tsiddon (2004) find a negative association between terrorism and consumption in Israel, noting that a continued level of terrorism will lead to a decrease in per capita annual consumption by about five per cent. These contrasting findings may be explained by the fact that consumption may be affected by terrorist activity in different ways. On the one hand, political violence might increase perceived risks associated with savings, either because legal claims on assets are compromised or because individuals are prevented from accessing their financial assets. On the other hand, terrorism may induce individuals to place their money in safe havens rather than buy, for example, durable consumer goods. The two effects point in opposite directions; how consumption is affected by terrorism is, therefore, ultimately an empirical question that remains to be answered (Frey, Luechinger and Stuzer, 2007).

As noted by Frey et al. (2007), the effect of terrorism on aggregate consumption and savings is important as it influences the level of investment. One can also hypothesize that political violence affects not only the level, but also the composition, of investments (Collier, 1999). Fielding (2003) investigates the impact of political instability on the level and composition of investments in Israel. The indicators of political instability are the number of Israelis killed, the number of Palestinians killed, and the rate of growth of the Jewish settlements in the West Bank and Gaza areas. The author finds that both the number of Israelis killed and the rate of growth of Jewish settlements have a significantly negative impact on investment in non-residential construction. Manufacturing and equipment investment, however, is significantly lowered by an increase in the total number of deaths and the rate of growth of settlements.
Terrorist attacks are also found to have an impact on stock markets. Stock prices reflect expected future gains of a company, as well as the likelihood that these expected gains materialise – terrorist attacks influence both of these factors (Frey, Luechinger and Stutzer, 2007). Abadie and Gardeazabal (2003) find that stocks of firms with a significant part of their business in the Basque Country of Spain show a positive relative performance when a truce between the Basque separatists Euskadi Ta Askatasuna (ETA) and the Spanish state became credible, and a negative relative performance at the end of the ceasefire. Eldor and Melnik (2004) find that the number of suicide attacks had a permanent effect on Israel’s stock and foreign exchange markets, as did the numbers of victims, while location of a terror attack had no effect on either market. In a cross-country study of 22 countries, Drakos (2010) finds that terrorist activity leads to significantly lower returns on the day a terrorist attack occurs, and that the negative effect of terrorist activity is substantially amplified when terrorist incidents cause higher psychosocial impact. Most recently, Essaddam and Karagianis (2014) focus on the stock return volatility of American firms targeted by terrorist attacks. The authors find that terrorism risk is an important factor in explaining the volatility of stock returns, which should be taken into account when modelling volatility. Specifically, the authors find that volatility increases on the day of the attack and remains significant for at least fifteen days thereafter. Further, their analysis indicates that the impact of terrorist attacks differs according to the country characteristics in which the incident occurred. That is, firms operating in wealthier, or more democratic countries, face greater volatility in stock returns relative to firms operating in developing countries.

In regards to FDI, Enders and Sandler (1996) estimate that terrorism in Spain reduced average annual FDI inflow by 13.5% over the period 1975 to 1991. Similarly, terrorism in Greece reduced FDI by 11.9% per annum over the period 1976 to 1991. These
reductions in FDI are likely due to the fact that terrorism affects the allocation decision of firms investing money in real foreign assets. Terrorists can quite easily attack and damage foreign-owned firms, seriously disrupting their activities. As foreigners have a large choice of countries to invest in, even quite mild terrorist activity tends to considerably reduce the inflow of capital to a terror-stricken country.¹⁷

Terrorist activities can also affect foreign trade in several ways. First, the costs of doing business are raised by a general increase in insecurity as a result of terrorism. Second, augmented security measures in response to a terrorist campaign increase transaction costs. Third, there is the risk of a direct destruction of traded goods. Empirical evidence includes a study by Nitsch and Schumacher (2008) who show that terrorism has a negative association with foreign trade. Specifically, the authors find that countries that are targeted by terrorism trade less with each other than countries that are not targeted. Similarly, Mirza and Verdier (2008) reveal the negative effect of terrorism on trade, suggesting that a terrorist incident is associated with a 5.1% decline in bilateral trade. Further, in many countries, one of the largest export industries is the tourism industry; this is particularly vulnerable to terrorism (Frey, Leuchinger and Stutzer, 2007).

**4.2.2. The Psychological Effects of Terrorism**

Several studies estimate the effect of terrorist attacks on psychological and emotional states. For example, Salguero, et al. (2011) analyse 11 studies on the prevalence of major depressive disorder (MDD) in the general population and in victims directly affected by terrorist attacks. On average, 4% to 10% of the general population displayed MDD within the first few months following a terrorist attack, while the risk of MDD in direct victims ranges between 20% and 30%.

¹⁷ For a formal exposition of this argument, see Abadie and Gardeazabal (2008).
An extensive body of literature has explored the influence of the 2001 9/11 terrorist attacks on the mental health of citizens of the United States (US) (Silver, et al., 2002; Schuster, et al., 2001; Galea, et al., 2002; and Schlenger, et al., 2002). Results consistently show that the effect of the terrorist attack was substantial during the first week. For example, Silver, et al. (2002) show that 90% of interviewees displayed at least one symptom of stress for at least three to five days following the terrorist event. Symptoms significantly subsided, however, after two months. Schuster et al. (2001) and Schlenger, et al. (2002) estimate that approximately 7.5% to 20% of adults living in New York City displayed symptoms of post-traumatic stress disorder (PTSD) up to two months after the attack; whereas 5.8% of the US population living outside the city displayed PTSD symptoms up to six months post attack (Silver, et al., 2002).

Emotional reactions by Londoners, as a result of the July 2005 terrorist attacks in London, and citizens of Madrid, after the March 2004 terrorist attacks, were similar to the reaction of US citizens. Rubin, et al. (2005) report that substantial stress symptoms were reported by 31% of those interviewed 11 to 13 days after the London attacks. Salguero et al. (2011) report that 13.3% of citizens interviewed in Madrid had PTSD symptoms two to three weeks post attack.

Researchers have also studied the long-term effects of the Second Palestinian Intifada in Israel, which started in September 2000 and ended in February 2005. Results from a study by Bleich, Gelkopf, and Solomon (2003) show that, of the 512 participants, 84 (16.4%) had been directly exposed to a terrorist attack and 191 (37.3%) had a family member or friend who had been exposed. Of the 510 respondents who answered questions related to traumatic stress related (TSR) symptoms, 77% had at least one symptom, 9.4% of respondents had PTSD and 58.6% reported feeling depressed. Bleich, et al. (2006) conducted a telephone survey using strata sampling of 828
households. In total, 501 people agreed to participate. Employing the same method as in the 2003 study, the authors estimate that after 44 months of Intifada over 86% of the population had at least one TSR symptom, 9% had PTSD symptoms and 29.5% felt depressed.

While PSTD symptoms appear to substantially decrease several months after a terrorist attack, Braithwaite (2013) concludes that terrorists are often successful in installing a significant sense of fear into a broader population in the long-term. Individuals overestimate the likelihood of terrorism attacks and the risk that they will be a victim of future terrorist actions. For example, over 66% of Londoners remained concerned about another terrorist attack in London over two years after the July 2005 terrorist attacks and 25% of UK citizens believe that terrorism risk has increased in the five years after the event. Similar patterns are observed among US citizens. For example, Braithwaite (2013) reports that over 91% of US citizens considered terrorism as a vital threat in 2002, and over 70% in 2008.

A very small body of literature considers the relationship between terrorism and life satisfaction. For example, Frey, Luechinger, and Stutzer (2009) use combined cross-section time-series data to estimate the costs of terrorism for France and the British Isles. The authors find large negative effects of terrorism on life satisfaction. Specifically, an increase of one standard deviation in the number of recorded incidents lowers life satisfaction by 0.012 and 0.013 points on a four-point scale for residents of the British Isles and France respectively. An increase of one standard deviation in the number of recorded fatalities is associated with a decrease in life satisfaction of 0.009 points in both countries. These results translate into considerable compensating surpluses for a hypothetical reduction in terrorism. The costs of terrorism are estimated to be approximately 4% of annual household income in France and 26% in the British
Isles when the most terrorism prone regions are compared to the least terrorism prone regions.

In a similar study, Romanov, Zussman, and Zussman (2012) employ data from Israel’s Social Survey for the years 2002 to 2004 to investigate the relationship between terrorism and the happiness of Israelis during the second Palestinian Intifada. They find that terrorism has a limited impact on the life satisfaction of Jewish Israelis, while the life satisfaction of Arab citizens of Israel was negatively affected. The authors suggest that terrorist acts have become a part of everyday life for Jewish Israelis and, as such, do not affect their life satisfaction. On the other hand, the negative effect on the life satisfaction of Arab citizens of Israel may be explained by the increasing fear of discrimination.

In terms of inter-country affects, Metcalfe, Powdthavee, and Dolan (2011) examine the influence of the 9/11 attacks on the happiness of residents of the United Kingdom. They found that the attack led to a significant increase in mental distress among the United Kingdom population. This impact, however, was short, lasting for only approximately three months.

In a study most closely related to our own, Blomberg et al. (2011) employ a large cross-national sample to examine the effect of terrorism on income, including its indirect role through lowering trust. The authors show that terrorism has a negative and statistically significant impact on individual income. This impact is larger than that previously found in the literature. Blomberg et al. (2011) suggest that this is possibly due to aggregation effects and data selection. The authors then estimate the societal impact of terrorism on economic growth by examining the extent to which terrorism reduces trust and how this, in turn, hinders economic performance. A measure of the economic consequences of terrorism is then developed through the estimation of the magnitude
of the ‘trust tax’ from terrorism. This effect, however, is relatively minor compared to
the direct impact of terrorism on income.

4.3. Empirical strategy
This paper employs cross-country data on life satisfaction and terrorism, building on
recent developments in the economics of happiness literature. Frey and Stutzer (2002a,
2002b) provide seminal reviews. The method employed requires that self-reported life
satisfaction be regarded as a good proxy for an individual’s utility. Strong support for
this position is provided by Lucas and Donnellan (2012) and Diener, Inglehart, and Tay
(2013). The theoretical model is similar to that employed by Welsch (2008) and consists
of two equations: the life satisfaction equation and the income equation.

The life satisfaction equation is specified as:

\[ w = f(y, t, Z_1) \]  

(4.1)

where \( w \) is mean life satisfaction in a country (a measure of social welfare), \( y \) is per
worker income (real GDP per worker), \( t \) is the measure of the level of terrorism, and,
\( Z_1 \) is a vector of control variables (e.g. median age and educational attainment) that
might confound the link between terrorism and life satisfaction. A priori, worker
income is expected to be positively associated with life satisfaction, while terrorism is
expected to be negatively associated.

The income equation is a standard production function, as follows:

\[ y = g(k, t, Z_2) \]  

(4.2)

where \( k \) is the capital stock per worker and \( Z_2 \) is a vector of other relevant controls (e.g.
human capital and research). Capital stock per worker is expected to be positively
associated with income, while terrorism is expected to be negatively associated.
Substituting Equation (4.2) into (4.1) yields the reduced form of the model:

\[ w = f(g(k, t, Z_2), t, Z_1) \]  

(4.3)

The life satisfaction and income equations are specified as Cobb-Douglas functions, which explain variation in long-run economic growth rates across countries (Hall and Jones, 1999). The Cobb-Douglas specification for the life satisfaction equation introduces nonlinearity between the level of terrorism and life satisfaction (Welsh, 2008).

The estimating equation for life satisfaction can be stated as follows:

\[ w_{i,t} = \alpha_0 + \alpha_1 y_{i,t} + \alpha_2 t_{i,t-1} + \sum_{j=3}^{k} \alpha_j Z_{1,i,t} + \tau_t + \varepsilon_{1,i,t} \]  

(4.4)

where \( w_{i,t} \) is the natural log of mean life satisfaction of country \( i \) at time \( t \); \( y_{i,t} \) is the natural log of real GDP per worker; \( t_{i,t-1} \) is the lag of the natural log of the terrorism measure\(^{18}\); \( Z_{1,i,t} \) represents control variables including, for example, the natural log of median age and the natural log of mean educational attainment (with coefficients \( \alpha_j \) where \( j = 3...k \), where \( k \) is the sum of the independent and control variables); \( \tau_t \) denotes year fixed effects; and \( \varepsilon_{1,i,t} \) is the error term. Further, to address the potential problem of reverse causality (i.e. the case where low (high) life satisfaction leads to high (low) levels of terrorist activity) we include a measure of polity as a proxy for societal conflicts and grievances as a control variable in both Equations 4.4 and 4.5. The polity measure examines the quality of governing authorities, ranking countries from -10 (hereditary monarchy) to +10 (consolidated democracy). Of most relevance, one of the six components of the polity measure is the “extent to which alternative preferences

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\(^{18}\) Rather than employing the current period measure of terrorism, the one-year lagged is used. As terrorist incidents occur all year round, the lagged variable makes a causal interpretation more plausible.
for policy and leadership can be pursued in the political arena”. A more direct measure of societal conflict cannot be employed as these measures are highly correlated with the terrorism variable, which includes both domestic and international events.

The estimating equation for income can be stated as follows:

\[ y_{i,t} = \beta_0 + \beta_1 k_{i,t} + \beta_2 t_{i,t-1} + \sum_{j=3}^{k} \beta_j Z_{2,i,t} + \tau_t + \varepsilon_{2,i,t} \]  

(4.5)

where \( k_{i,t} \) denotes the natural log of physical capital stock per worker; \( Z_{2,i,t} \) represents control variables including, for instance, the natural log of mean total years of schooling; \( \tau_t \) is year fixed effects; and \( \varepsilon_{2,i,t} \) denotes the error term.

Equations (4.4) and (4.5) are estimated as a system. It should be noted that the system is not independent; income is assumed to affect life satisfaction, although not the reverse. For a recursive system of equations such as this, where the errors are conjectured to be correlated across equations, it is useful to estimate the system using seemingly unrelated regressions (SUR). SUR estimation is equivalent to maximum likelihood estimation in the present circumstances, providing gains in terms of efficiency whilst also accounting for heteroskedasticity and correlation of errors across equations (Welsh, 2008).

Many researchers in the economics of happiness literature appeal to the findings of Ferrer-i-Carbonell and Frijters (2004) to justify the estimation technique employed. In particular, these authors find that treating the life satisfaction variable as a continuous variable with cardinal qualities yields qualitatively similar results to those estimation techniques that treat the dependent variable as strictly ordinal. Kahneman (1999) is often cited as considering this distinction more of a theoretical, rather than a practical, difficulty. Nonetheless, treating the dependent variable as continuous may result in
estimates that predict values outside of the ordered range. As a result, a single equation
tobit model is compared to a single equation ordinary least squares (OLS) model to
check the robustness of results. As reported in Appendix 4A, this does not significantly
change the results.

4.4. Data and Variables

The dataset contains data for 117 countries covering the period 2006 to 2011, yielding
a total of 626 observations. The panel is unbalanced, as mean life satisfaction is missing
for some counties over this period.

The life satisfaction variable is drawn from the World Happiness Database Veenhoven
(2014). As discussed in Chapter 3, this database provides average self-reported levels
of life satisfaction by country and year, elicited from individuals’ responses to the
question:

_Here is a ladder representing the 'ladder of life'. Let's suppose the top of
the ladder represents the best possible life for you; and the bottom, the
worst possible life for you. On which step of the ladder do you feel you
personally stand at the present time?_

The responses are rated on a scale of 0 (worst possible life satisfaction) to 10 (best
possible life satisfaction). Country level mean life satisfaction is linearly interpolated
over time for countries missing data on life satisfaction for particular years.

Data on the level of terrorism is obtained from the Global Terrorism Database (GTD)
(2014). The GTD defines terrorism as “_the threatened or actual use of illegal force and
violence by a non-state actor to attain a political, economic, religious, or social goal
through fear, coercion, or intimidation._” Both domestic and international terrorist
events are included. In addition, as discussed in Chapter 3, at least two of the following
three criteria have to be met to be included in the GTD: (1) the act must be aimed at attaining a political, economic, religious, or social goal; (2) there must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims; and (3) the action must be outside the context of legitimate warfare activities.

From the GTD a Global Terrorism Index (GTI) can be calculated as discussed in Chapter 3, as follows:

\[
\text{Terrorism Index} = \frac{1}{\text{incidents} + 3 \times \text{fatalities} + 0.5 \times \text{injuries} + 2 \times \text{property damage}}
\]

(4.6)

where \text{incidents} is the total number of terrorist incidents in a given year, \text{fatalities} is the total number of fatalities caused by terrorists in a given year, \text{injuries} is the total number of injuries caused by terrorists in a given year and \text{property damage} is the approximate level of total property damage from terrorist incidents in a given year. The GTI is an index designed to systematically rank and compare countries according to the impact of terrorism. The weightings of each component are intended to reflect the latent psychological effect of terrorist acts over time (Institute for Economics and Peace, 2014).

Initially Equations 4.4 and 4.5 are estimated for the full sample of countries separately for each of the four components of the GTI and for the GTI itself. It should be noted that 27 of the countries in the sample did not experience any form of terrorist attack between 2006 and 2011. The sample is then truncated to exclude these countries in an attempt to more clearly identify the effect of a terrorist attack on social welfare in countries that have actually been exposed to a terrorist event. The results for the two samples are then compared. The list of all variables employed, their respective data
sources and summary statistics are provided in Table 4.1. The list of countries included in each sample is provided as Appendix 4B. Pairwise correlations are presented as Appendix 4C.
Table 4.1. Life satisfaction and terrorism: Data summary statistics

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Definition</th>
<th>Source</th>
<th>Observations</th>
<th>Mean (Standard Deviation)</th>
<th>[Minimum, Maximum]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life satisfaction</td>
<td>Mean self-reported life satisfaction (scale 0-10) (linearly interpolated between available observations)</td>
<td>Veenhoven (2014)</td>
<td>629</td>
<td>5.60 (1.09)</td>
<td>[2.9, 8]</td>
</tr>
<tr>
<td>Incidents (lag)</td>
<td>Total number of terrorist incidents in a given year</td>
<td>Institute for Economics and Peace (2014)</td>
<td>629</td>
<td>25.31 (113.39)</td>
<td>[0, 1,158]</td>
</tr>
<tr>
<td>Fatalities (lag)</td>
<td>Total number of fatalities caused by terrorists in a given year</td>
<td>Institute for Economics and Peace (2014)</td>
<td>629</td>
<td>59.68 (381.33)</td>
<td>[0, 6,100]</td>
</tr>
<tr>
<td>Injuries (lag)</td>
<td>Total number of injuries caused by terrorists in a given year</td>
<td>Institute for Economics and Peace (2014)</td>
<td>629</td>
<td>131.52 (841.38)</td>
<td>[0, 11,938]</td>
</tr>
<tr>
<td>Property damage (lag)</td>
<td>A measure of the total property damage from terrorist incidents in a given year</td>
<td>Institute for Economics and Peace (2014)</td>
<td>629</td>
<td>8.13 (42.31)</td>
<td>[0, 673]</td>
</tr>
<tr>
<td>GTI (lag)</td>
<td>A weighted average of four terrorist measures, calculated by 1 x incidents + 3 x fatalities + 0.5 x injuries + 2 x property damage</td>
<td>Institute for Economics and Peace (2014)</td>
<td>629</td>
<td>286.38 (1713.00)</td>
<td>[0, 25,666]</td>
</tr>
<tr>
<td>RGDP per worker</td>
<td>Output-side real GDP at chained PPPs per worker (in 2005 USD) (linearly interpolated between available observations)</td>
<td>Feenstra, Inklaar, &amp; Timmer (2014)</td>
<td>629</td>
<td>29,953.00 (27,084.52)</td>
<td>[410.98, 131,809.60]</td>
</tr>
<tr>
<td>Capital stock per worker</td>
<td>Capital stock per capita at constant 2005 national prices (in 2005 USD) per worker</td>
<td>Feenstra, Inklaar, &amp; Timmer (2014)</td>
<td>629</td>
<td>93,354.15 (87,229.89)</td>
<td>[1,246.86, 404,698.20]</td>
</tr>
<tr>
<td>Human capital</td>
<td>Mean total years of schooling (linearly interpolated between available observations)</td>
<td>Feenstra, Inklaar, &amp; Timmer (2014)</td>
<td>629</td>
<td>8.23 (2.71)</td>
<td>[1.35, 13.09]</td>
</tr>
<tr>
<td>Polity</td>
<td>Rescaled from 1 (full autocracy) to 10 (full democracy)</td>
<td>Marshall (2014)</td>
<td>621</td>
<td>7.99 (2.49)</td>
<td>[1, 10]</td>
</tr>
<tr>
<td>Age</td>
<td>Median age of a country’s citizens</td>
<td>UNESCO Institute for Statistics (2014)</td>
<td>629</td>
<td>29.09 (8.70)</td>
<td>[14.90, 44.90]</td>
</tr>
</tbody>
</table>

Source: Author’s compilation
4.5. Presentation of Results

It is clear when considering first the estimation of Equation 4.4 for the full sample (Table 4.2, Part A), irrespective of the measure of terrorism employed, that real GDP per worker and polity (a measure of democracy) are strongly positively associated with life satisfaction. No statistically significant relationship is found between life satisfaction and age or human capital. The coefficients associated with terrorism measures are of the expected (negative) sign. The only significant terrorism measure, however, is fatalities (p-value 0.059). It should be noted that both injuries and the GTI are close to being significant at the 10% level (p-values of 0.106 and 0.194 respectively).

In regards to the estimation of Equation 4.5 for the full sample (Table 4.2, Part B), human capital and capital stock per worker are strongly positively associated with real GDP per worker across all models. No relationship is found between polity and real GDP per worker. Counter to a priori expectations, all of the terrorism measures indicate a positive relationship between terrorism and real GDP per worker, although none are significant.
Table 4.2 Life satisfaction and terrorism: Model results – full sample

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>In(Age)</td>
<td>ln(Life satisfaction)</td>
<td>-0.0330 (0.0342)</td>
<td>-0.0362 (0.0342)</td>
<td>-0.0333 (0.0341)</td>
<td>-0.0330 (0.0342)</td>
</tr>
<tr>
<td>ln(RGDP per worker)</td>
<td>0.1336*** (0.0085)</td>
<td>0.1334*** (0.0084)</td>
<td>0.1333*** (0.0084)</td>
<td>0.1336*** (0.0085)</td>
<td>0.1337*** (0.0085)</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>-0.0114 (0.0216)</td>
<td>-0.0135 (0.0216)</td>
<td>-0.0117 (0.0215)</td>
<td>-0.0107 (0.0216)</td>
<td>-0.0123 (0.0220)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>0.0532*** (0.0125)</td>
<td>0.0517*** (0.0125)</td>
<td>0.0521*** (0.0125)</td>
<td>0.0533*** (0.0125)</td>
<td>0.0525*** (0.0150)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0039 (0.0035)</td>
<td>-0.0061* (0.0032)</td>
<td>-0.0044 (0.0027)</td>
<td>-0.0048 (0.0047)</td>
<td>-0.0031 (0.0024)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.4269*** (0.0651)</td>
<td>0.4492*** (0.0661)</td>
<td>0.4352*** (0.0653)</td>
<td>0.4242*** (0.0651)</td>
<td>0.4373*** (0.0653)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.5642</td>
<td>0.5660</td>
<td>0.5653</td>
<td>0.5641</td>
<td>0.5646</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Human capital)</td>
<td>0.3737*** (0.0586)</td>
<td>0.3721*** (0.0588)</td>
<td>0.3700*** (0.0585)</td>
<td>0.3730*** (0.0585)</td>
<td>0.3761*** (0.0588)</td>
</tr>
<tr>
<td>ln(Capital stock per worker)</td>
<td>0.7789*** (0.0181)</td>
<td>0.7797*** (0.0180)</td>
<td>0.7796*** (0.0180)</td>
<td>0.7787*** (0.0181)</td>
<td>0.7789*** (0.0180)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>-0.0056 (0.0353)</td>
<td>-0.0039 (0.0353)</td>
<td>-0.0044 (0.0353)</td>
<td>-0.0060 (0.0353)</td>
<td>-0.0044 (0.0352)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>0.0057 (0.0104)</td>
<td>0.0028 (0.0095)</td>
<td>0.0006 (0.0081)</td>
<td>0.0081 (0.0137)</td>
<td>0.0053 (0.0070)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.6002*** (0.1461)</td>
<td>0.5936*** (0.1495)</td>
<td>0.6017*** (0.1472)</td>
<td>0.6043*** (0.1461)</td>
<td>0.5893*** (0.1471)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8981</td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

Results for the estimation of Equation 4.4 with the truncated sample are presented in Table 4.3, Part A. The explanatory power of this model is substantially higher than the full sample model (adjusted-R² of approximately 0.64 compared with 0.56). Results between the two models are also substantially different. For example, age is now negatively associated with life satisfaction across all terrorism measures (statistically significant at the 5% level). Similarly, and contrary to a priori expectations, human capital is also negatively associated with life satisfaction (statistically significant at the
5% level). Consistent with the full sample model, both real GDP per worker and polity are strongly positively associated with life satisfaction. With respect to terrorism, the results differ from those associated with the full sample model, in that fatalities, injuries and the GTI are all negatively associated with life satisfaction, and are statistically significant at the 10% level. Further, the coefficients associated with terrorism incidents and property damage are negative and close to being significant at the 10% level (both with p-values of 0.101). This supports the hypothesis that terrorism is more significantly associated with life satisfaction in countries exposed to terrorist events.

Results from the estimation of Equation 4.5 with the truncated sample are presented in Table 4.3, Part B. The results demonstrate that both human capital and capital stock per worker, consistent with the full sample results, are positively associated with real GDP per worker at the 1% level of significance. All terrorism measures, however, have a changed sign and are now showing a negative association (although not significant at conventional levels). It should be noted that injuries and fatalities are, however, close to being significant (both with p-values of 0.115).
### Table 4.3 Life satisfaction and terrorism: Model results – truncated sample

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Age)</td>
<td>-0.1069** (0.0360)</td>
<td>-0.1117** (0.0360)</td>
<td>-0.1073** (0.0359)</td>
<td>-0.1066** (0.0360)</td>
<td>-0.1084*** (0.0359)</td>
</tr>
<tr>
<td>ln(RGDP per worker)</td>
<td>0.1736*** (0.0092)</td>
<td>0.1728*** (0.0092)</td>
<td>0.1728*** (0.0092)</td>
<td>0.1739*** (0.0092)</td>
<td>0.1734*** (0.0092)</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>-0.0577** (0.0217)</td>
<td>-0.0575** (0.0217)</td>
<td>-0.0564** (0.0216)</td>
<td>-0.0573** (0.0217)</td>
<td>-0.0578** (0.0217)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>0.0817*** (0.0128)</td>
<td>0.0796*** (0.0128)</td>
<td>0.0798*** (0.0128)</td>
<td>0.0818*** (0.0128)</td>
<td>0.0805*** (0.01285)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0056 (0.0034)</td>
<td>-0.0060* (0.0031)</td>
<td>-0.0046* (0.0026)</td>
<td>-0.0072 (0.0044)</td>
<td>-0.0039* (0.0023)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.3198*** (0.0693)</td>
<td>0.3477*** (0.0713)</td>
<td>0.3301*** (0.0697)</td>
<td>0.3133*** (0.0692)</td>
<td>0.3315*** (0.0700)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.6414</td>
<td>0.6424</td>
<td>0.6419</td>
<td>0.6412</td>
<td>0.6416</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Human capital)</td>
<td>0.4826*** (0.0607)</td>
<td>0.4778*** (0.0607)</td>
<td>0.4826*** (0.0604)</td>
<td>0.4870*** (0.0606)</td>
<td>0.4807*** (0.0607)</td>
</tr>
<tr>
<td>ln(Capital stock per worker)</td>
<td>0.7112*** (0.0196)</td>
<td>0.7084*** (0.0197)</td>
<td>0.7097*** (0.0196)</td>
<td>0.7111*** (0.0197)</td>
<td>0.7104*** (0.0196)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>-0.0079 (0.0374)</td>
<td>-0.0140 (0.0371)</td>
<td>-0.0119 (0.0372)</td>
<td>-0.0098 (0.0375)</td>
<td>-0.0107 (0.0372)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0117 (0.0108)</td>
<td>-0.0152 (0.0097)</td>
<td>-0.0129 (0.0082)</td>
<td>-0.0070 (0.0139)</td>
<td>-0.0090 (0.0072)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.1660*** (0.1607)</td>
<td>1.2235*** (0.1661)</td>
<td>1.1953*** (0.1622)</td>
<td>1.1539*** (0.1604)</td>
<td>1.1893*** (0.1628)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8962</td>
<td>0.8964</td>
<td>0.8964</td>
<td>0.8960</td>
<td>0.8962</td>
</tr>
<tr>
<td>Observations</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

To check the robustness of the findings, a number of tests are undertaken. First, we re-estimate the results without the inclusion of the polity control variable. While the pairwise correlation coefficients between polity and our measures of terrorism are low (Appendix 4C), previous research finds a significant association between democracy and terrorism. See for example Eyerman (1998); Li (2005); Abadie (2006); Kis-Katos, Liebert and Schultze (2011). The low pairwise correlation coefficients could, therefore, be a result of a non-linear relationship between democracy and terrorism (Abadie, 2006;
Eyerman (1998); and Kurrild-Klitgaard, Juestesen and Klemmensen, 2006). As shown in Tables 4.4 and 4.5, excluding polity strengthens the significance of the terrorist variables in the life satisfaction equation for both the full and truncated samples.

Table 4.4 Life satisfaction and terrorism: Abridged model results – full sample, excluding polity

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0062*</td>
<td>-0.0091***</td>
<td>-0.0068***</td>
<td>-0.0079*</td>
<td>-0.0048***</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.5514</td>
<td>0.5552</td>
<td>0.5538</td>
<td>0.5513</td>
<td>0.5521</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>0.0111 (0.0099)</td>
<td>0.0085 (0.0090)</td>
<td>0.0055 (0.0077)</td>
<td>0.0154 (0.0130)</td>
<td>0.0087 (0.0066)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8982</td>
<td>0.8981</td>
<td>0.8980</td>
<td>0.8982</td>
<td>0.8982</td>
</tr>
<tr>
<td>Observations</td>
<td>629</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

Table 4.5 Life satisfaction and terrorism: Abridged model results – truncated sample, excluding polity

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0075**</td>
<td>-0.0095***</td>
<td>-0.0074***</td>
<td>-0.0097**</td>
<td>-0.0057***</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.6113</td>
<td>0.6152</td>
<td>0.6139</td>
<td>0.6112</td>
<td>0.6123</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0054 (0.0102)</td>
<td>-0.0079 (0.0091)</td>
<td>-0.0072 (0.0078)</td>
<td>0.0006 (0.0131)</td>
<td>-0.0048 (0.0069)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8964</td>
<td>0.8965</td>
<td>0.8965</td>
<td>0.8964</td>
<td>0.8965</td>
</tr>
<tr>
<td>Observations</td>
<td>507</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

The pairwise correlation between age and human capital is large (0.76). To check for possible multicollinearity, we re-estimate the model without the inclusion of the age
control variable. Tables 4.6 and 4.7 provide evidence that the results of our analysis are stable and do not substantively change with the exclusion of the age variable.

Table 4.6 Life satisfaction and terrorism: Abridged model results – truncated sample, excluding age

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0058* (0.0034)</td>
<td>-0.0056* (0.0031)</td>
<td>-0.0047* (0.0026)</td>
<td>-0.0075* (0.0044)</td>
<td>-0.0039* (0.0023)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.6399</td>
<td>0.6406</td>
<td>0.6404</td>
<td>0.6398</td>
<td>0.6401</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0119 (0.0108)</td>
<td>-0.0153 (0.0097)</td>
<td>-0.0130 (0.0082)</td>
<td>-0.0072 (0.0139)</td>
<td>-0.0092 (0.0072)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8962</td>
<td>0.8964</td>
<td>0.8964</td>
<td>0.8960</td>
<td>0.8962</td>
</tr>
<tr>
<td>Observations</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

Table 4.7 Life satisfaction and terrorism: Abridged model results – full sample, excluding age

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0040 (0.0035)</td>
<td>-0.0060* (0.0032)</td>
<td>-0.0044 (0.0027)</td>
<td>-0.0050 (0.0047)</td>
<td>-0.0031 (0.0024)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.5649</td>
<td>0.5666</td>
<td>0.5659</td>
<td>0.5647</td>
<td>0.5652</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>0.0058 (0.0104)</td>
<td>0.0027 (0.0095)</td>
<td>0.00058 (0.0081)</td>
<td>0.0082 (0.0137)</td>
<td>0.0053 (0.0069)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8980</td>
<td>0.8981</td>
</tr>
<tr>
<td>Observations</td>
<td>621</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.

Because mean life satisfaction in individual countries typically changes very slowly over time, autocorrelation may be present. We attempt to account for autocorrelation in
the error terms by including the first order lag in the life satisfaction equation. The inclusion of this lag does not affect the sign or significance of the terrorism variables.

We then split the truncated sample into OECD and non-OECD member countries. In regards to the estimation of Equation 4.4 for OECD members (Table 4.8, Part A), the terrorism measures are all negative and significant at the 1% level. In regards to the estimation of Equation 4.5 (Table 4.8, Part B), the terrorism measures are all positive but not significant, with the exception of fatalities, which is positively and significantly associated with GDP per worker at the 1% level. For non-OECD members, the estimation of Equation 4.4 (Table 4.9, Part A) shows that all terrorism measures are negatively associated with life satisfaction, but at statistically insignificant levels. Conversely, the estimation of Equation 4.5 (Table 4.9, Part B) reveals that incidents, injuries and the GTI have a negative and statistically significant association (at the 5% level) with real GDP per worker (Table 4.9, Part B).
Table 4.8 Life satisfaction and terrorism: Model results – truncated sample, OECD countries

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
</tr>
<tr>
<td>ln(Age)</td>
<td>-0.3166***</td>
<td>-0.3535***</td>
<td>-0.2848***</td>
<td>-0.2814***</td>
<td>-0.3123***</td>
</tr>
<tr>
<td></td>
<td>(0.0680)</td>
<td>(0.0727)</td>
<td>(0.0701)</td>
<td>(0.0670)</td>
<td>(0.0684)</td>
</tr>
<tr>
<td>ln(RGDP per worker)</td>
<td>0.2125***</td>
<td>0.2217***</td>
<td>0.2123***</td>
<td>0.2044***</td>
<td>0.2127***</td>
</tr>
<tr>
<td></td>
<td>(0.0284)</td>
<td>(0.0291)</td>
<td>(0.0296)</td>
<td>(0.0285)</td>
<td>(0.0286)</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>9.553e-04</td>
<td>0.0175</td>
<td>0.0350</td>
<td>0.0148</td>
<td>-2.662e-04</td>
</tr>
<tr>
<td></td>
<td>(0.0614)</td>
<td>(0.0605)</td>
<td>(0.0627)</td>
<td>(0.0613)</td>
<td>(0.0620)</td>
</tr>
<tr>
<td>ln(Policy)</td>
<td>0.9355***</td>
<td>0.7050***</td>
<td>0.7431***</td>
<td>0.9232***</td>
<td>0.8880***</td>
</tr>
<tr>
<td></td>
<td>(0.2054)</td>
<td>(0.2001)</td>
<td>(0.2056)</td>
<td>(0.2069)</td>
<td>(0.2039)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0278***</td>
<td>-0.0378***</td>
<td>-0.0159***</td>
<td>-0.0312***</td>
<td>-0.0195***</td>
</tr>
<tr>
<td></td>
<td>(0.0063)</td>
<td>(0.0088)</td>
<td>(0.0053)</td>
<td>(0.0077)</td>
<td>(0.0046)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.3872***</td>
<td>-0.8762**</td>
<td>-1.1516***</td>
<td>-1.4344***</td>
<td>-1.2916***</td>
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<tr>
<td></td>
<td>(0.4103)</td>
<td>(0.4230)</td>
<td>(0.4259)</td>
<td>(0.4143)</td>
<td>(0.4115)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.3980</td>
<td>0.3951</td>
<td>0.3612</td>
<td>0.3906</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(Human capital)</td>
<td>ln(Capital stock per worker)</td>
<td>ln(Policy)</td>
<td>ln(Terrorism) (lag)</td>
<td>Constant</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>-0.1191</td>
<td>0.6193***</td>
<td>0.8293**</td>
<td>0.0080</td>
<td>1.9159**</td>
</tr>
<tr>
<td></td>
<td>(0.1286)</td>
<td>(0.0423)</td>
<td>(0.3992)</td>
<td>(0.0124)</td>
<td>(0.8252)</td>
</tr>
<tr>
<td>ln(Capital stock per worker)</td>
<td>0.6323***</td>
<td>0.6182***</td>
<td>0.9577**</td>
<td>0.0435***</td>
<td>1.2843</td>
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<tr>
<td></td>
<td>(0.1228)</td>
<td>(0.0417)</td>
<td>(0.3845)</td>
<td>(0.0124)</td>
<td>(0.8392)</td>
</tr>
<tr>
<td>ln(Policy)</td>
<td>0.6182***</td>
<td>0.6189***</td>
<td>0.8824**</td>
<td>0.0149</td>
<td>1.7187**</td>
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<td></td>
<td>(0.1266)</td>
<td>(0.0423)</td>
<td>(0.3899)</td>
<td>(0.0124)</td>
<td>(0.8306)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>0.6212***</td>
<td>0.8049**</td>
<td>0.8086**</td>
<td>0.0128</td>
<td>1.9512**</td>
</tr>
<tr>
<td></td>
<td>(0.1271)</td>
<td>(0.0422)</td>
<td>(0.4010)</td>
<td>(0.0153)</td>
<td>(0.8256)</td>
</tr>
<tr>
<td>Constant</td>
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<td>0.6212***</td>
<td>0.8049**</td>
<td>0.0114</td>
<td>1.8644**</td>
</tr>
<tr>
<td></td>
<td>(0.1271)</td>
<td>(0.0422)</td>
<td>(0.3948)</td>
<td>(0.0153)</td>
<td>(0.8228)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.6548</td>
<td>0.6701</td>
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<td>0.6576</td>
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<td></td>
<td></td>
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</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses.
Table 4.9 Life satisfaction and terrorism: Model results – truncated sample, non-OECD countries

<table>
<thead>
<tr>
<th>Part A</th>
<th>Incidents</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>GTI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
<td>ln(Life satisfaction)</td>
</tr>
<tr>
<td>ln(Age)</td>
<td>-0.1258*** (0.0418)</td>
<td>-0.1275*** (0.0416)</td>
<td>-0.1252*** (0.0418)</td>
<td>-0.1265*** (0.0418)</td>
<td>-0.1266*** (0.0417)</td>
</tr>
<tr>
<td>ln(RGDP per worker)</td>
<td>0.1584*** (0.0110)</td>
<td>0.1583*** (0.0109)</td>
<td>0.1581*** (0.0109)</td>
<td>0.1587*** (0.0109)</td>
<td>0.1582*** (0.0109)</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>-0.0491** (0.0242)</td>
<td>-0.0496** (0.0242)</td>
<td>-0.0489** (0.0242)</td>
<td>-0.0489** (0.0242)</td>
<td>-0.0492** (0.0242)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>0.0623*** (0.0143)</td>
<td>0.0619*** (0.0143)</td>
<td>0.0618*** (0.0143)</td>
<td>0.0624*** (0.0143)</td>
<td>0.0619*** (0.0143)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0019 (0.0040)</td>
<td>-0.0025 (0.0034)</td>
<td>-0.0018 (0.0030)</td>
<td>-0.0020 (0.0052)</td>
<td>-0.0018 (0.0026)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.5234*** (0.0966)</td>
<td>0.5323*** (0.0974)</td>
<td>0.5249*** (0.0966)</td>
<td>0.5209*** (0.0965)</td>
<td>0.5310*** (0.0974)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
<td>0.4596</td>
<td>0.4601</td>
<td>0.4599</td>
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</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
<th>ln(RGDP per worker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Human capital)</td>
<td>0.5104*** (0.0677)</td>
<td>0.5083*** (0.0680)</td>
<td>0.5148*** (0.0675)</td>
<td>0.5159*** (0.0678)</td>
<td>0.5072*** (0.0677)</td>
</tr>
<tr>
<td>ln(Capital stock per worker)</td>
<td>0.6403*** (0.0245)</td>
<td>0.6394*** (0.0245)</td>
<td>0.6395*** (0.0245)</td>
<td>0.6416*** (0.0246)</td>
<td>0.6384*** (0.0245)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>-0.1108** (0.0437)</td>
<td>-0.1180*** (0.0435)</td>
<td>-0.1165*** (0.0435)</td>
<td>-0.1122** (0.0439)</td>
<td>-0.1173*** (0.0435)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0254** (0.0129)</td>
<td>-0.0177 (0.0110)</td>
<td>-0.0192** (0.0097)</td>
<td>-0.0208 (0.0169)</td>
<td>-0.0187*** (0.0086)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.9825*** (0.2229)</td>
<td>2.0064*** (0.2258)</td>
<td>1.9935*** (0.2234)</td>
<td>1.9462*** (0.2228)</td>
<td>2.0325*** (0.2254)</td>
</tr>
<tr>
<td>Adjusted-R²</td>
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<td>0.8487</td>
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</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Year fixed effects also included as controls. Standard errors in parentheses

4.6. Discussion of Results

This chapter sets out to analyse the link between life satisfaction and terrorism, particularly, both the direct effect of terrorism on life satisfaction and the indirect effect of terrorism on life satisfaction via its effect on national income. Arguably, the most notable finding is the generally significant and negative association found between terrorism and life satisfaction, while no such association is found between terrorism
and real GDP per worker. This implies that the true social costs of terrorism may not be adequately reflected in conventional economic data and, therefore, studies seeking to evaluate the cost of terrorism should consider employing datasets that capture subjective elements of welfare. This is not to say that conventional economic data is of no use; rather, subjective data can be used to augment conventional analyses of economic data to yield a more nuanced understanding of the issue. This view is consistent with the growing recognition that subjective measures (such as those provided by self-reports of life satisfaction or happiness) have an important role to play in policy development and evaluation.

With respect to the lack of any significant relationship between terrorism and real GDP per worker, this result is consistent with a number of other studies that observe very modest and short-term economic consequences of terrorism (Chen and Siems, 2004; Enders and Sandler, 2008). For example, Chen and Siems (2004) find that the effect of major terrorist attacks on capital markets, on average, lasts from one to three days. Further, our results are consistent with Tavares (2004), who shows that terrorism has no significant relationship with economic growth after controlling for conventional economic growth indicators (e.g. human capital, capital stocks etc.). This finding suggests that nations wishing to remain resilient to the economic impacts of terrorism may benefit from bolstering such economic growth indicators; in particular, those characteristics associated with OECD countries, such as the maintenance and integrity of political rights.

Truncating the sample to those countries that have experienced a terrorist incident in the years under consideration marginally increases the strength of the negative association between life satisfaction and our measures of terrorism. This suggests that direct experience of terrorism heightens the sensitivity of the population to the
consequences of terrorism. In other words, the effect of terrorism on life satisfaction is greater in those countries that have experienced a terrorism event than in those that have not. In regards to our alternative measures of terrorism, we find people are more sensitive to fatalities and injuries than to property damage or the number of terrorist incidents. This suggests that the human cost of terrorism is more damaging than the material cost. These results are robust to the exclusion of the polity and age control variables.

For OECD members, terrorism has a pronounced effect on life satisfaction, with a negative and statistically significant association found across all measures of terrorism at the 1% level. In contrast, a positive association is found between terrorism and GDP per worker, although this is only significant for the fatalities terrorism measure. This suggests that, to some extent, terrorism promotes economic activity among OECD countries, perhaps through increased security and intelligence spending. For non-OECD members, however, the reverse appears to be the case. That is, no significant association is found between terrorism and life satisfaction, whereas a negative association is found between three of the terrorism measures (incidents, injuries and GTI) and GDP per worker. These associations between terrorism and GDP per worker are broadly consistent with the findings of Blomberg, Hess and Orphanides (2004), which show a small and statistically insignificant negative association between terrorism and economic growth within OECD members, and a negative and significant association for non-OECD members.

The stark difference between the strongly negative life satisfaction effects for the OECD countries versus the insignificant effects for non-OECD countries is intriguing. The polarised results point to the comparative fragility of life satisfaction in OECD countries which have experienced far fewer terrorist events than countries outside of
the OECD. Only five per cent of terrorist fatalities since 2000 have occurred in OECD countries (Global Terrorism Database, 2014). In comparison, non-OECD countries appear to exhibit a relative psychological resilience to terrorism. In countries with frequent terrorist activity, violence could have become part of everyday life. For example, Bleich, et al. (2006) found that despite continuous terrorist threats in Israel, symptoms of depression among the Israeli population decreased from 58.6% in 2002 to 29.5% in 2004. In addition, citizens of countries with frequent terrorist attacks may also more accurately estimate the probability of being a victim. Becker and Rubenstein (2011) show that frequent users of public transport in Israel did not decrease their use of buses after terrorist attacks on public transport. In contrast, occasional users of public transport reduced their frequency of use. Similarly, during the three-month period after the 9/11 terrorist attacks, the number of US citizens who died in car crashes having avoided air travel was higher than the number of people killed in the four fatal 9/11 flights (Gigerenzer, 2004). Alternatively, media coverage of terrorist events is likely to trigger fear and anxiety. It is, therefore, possible that terrorist events in OECD countries have a larger impact on the population due to higher levels of press freedom (Ambrey, Fleming, Manning and Smith, 2016). It is also plausible that the most distressed citizens of non-OECD countries have migrated to OECD countries, where the threat of terrorism is markedly lower. Finally, an alternative explanation is that this finding is an artefact of the data (i.e. that citizens of OECD and non-OECD member countries answer life satisfaction questions differently). The issue of cultural measurement bias or the effect of culture on life satisfaction responses, however, is explicitly explored by Veenhoven (2012), who concludes that “…differences [in average life satisfaction scores] cannot be denounced as mere measurement bias, nor can they be explained as a result of cultural differences in the evaluation of life.”
In all, the results of this study suggest that the social costs of terrorism are potentially much higher than the economic costs, particularly for OECD member countries. This suggests that measuring only the conventional economic costs of terrorism significantly underestimates the true costs of terrorism. This has implications for the evaluation of policy responses to terrorism, in particular when weighing up the benefits and costs of public expenditure. *Ceteris paribus*, ignoring the social costs may lead to lower levels of expenditure than that which is truly optimal.
References


### Appendix 4A

Table 4.10 Life satisfaction and terrorism: OLS and tobit estimates, truncated sample, GTI

<table>
<thead>
<tr>
<th></th>
<th>OLS (ln(Life satisfaction))</th>
<th>Tobit model (ln(Life satisfaction))</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Age)</td>
<td>-0.1084*** (0.0359)</td>
<td>-0.0729** (0.0365)</td>
</tr>
<tr>
<td>ln(RGDP per worker)</td>
<td>0.1734*** (0.0092)</td>
<td>0.1543*** (0.0093)</td>
</tr>
<tr>
<td>ln(Human capital)</td>
<td>-0.0578** (0.0217)</td>
<td>-0.0356 (0.0218)</td>
</tr>
<tr>
<td>ln(Polity)</td>
<td>0.0805*** (0.0128)</td>
<td>0.0754*** (0.0128)</td>
</tr>
<tr>
<td>ln(Terrorism) (lag)</td>
<td>-0.0039* (0.0023)</td>
<td>-0.0040* (0.0023)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.3315*** (0.0700)</td>
<td>0.3660*** (0.0704)</td>
</tr>
<tr>
<td>Year fixed effects</td>
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<td>Yes</td>
</tr>
<tr>
<td>Adjusted-$R^2$</td>
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<td>-</td>
</tr>
<tr>
<td>Observations</td>
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<td>500</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Appendix 4B

Countries included in analysis
Albania; Argentina; Australia; Austria; Bangladesh; Belgium; Benin; Bolivia; Botswana; Brazil; Bulgaria; Cambodia; Cameroon; Canada; Central African Republic; Chile; China; Colombia; Costa Rica; Cote d'Ivoire; Croatia; Cyprus; Czech Republic; Democratic Republic of the Congo; Denmark; Dominican Republic; Ecuador; Egypt; El Salvador; Estonia; France; Gabon; Germany; Ghana; Greece; Guatemala; Honduras; Hungary; Iceland; India; Indonesia; Iran; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kuwait; Kyrgyz Republic; Laos; Latvia; Liberia; Lithuania; Malawi; Malaysia; Mali; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Morocco; Mozambique; Namibia; Nepal; Netherlands; New Zealand; Niger; Norway; Pakistan; Panama; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Republic of the Congo; Romania; Russia; Rwanda; Saudi Arabia; Senegal; Serbia; Sierra Leone; Singapore; Slovakia; Slovenia; South Africa; South Korea; Spain; Sri Lanka; Sudan; Sweden; Switzerland; Syria; Taiwan; Tajikistan; Tanzania; Thailand; Togo; Trinidad and Tobago; Tunisia; Turkey; Uganda; Ukraine; United Kingdom; United States of America; Uruguay; Venezuela; Vietnam; Yemen; Zambia; Zimbabwe.

Countries with no terrorist attacks between 2006 and 2011
Botswana; Costa Rica; Dominican Republic; El Salvador; Estonia; Gabon; Ghana; Iceland; Jamaica; Laos; Latvia; Liberia; Lithuania; Malawi; Mauritius; Mongolia; Namibia; Poland; Portugal; Republic of the Congo; Sierra Leone; Singapore; Slovakia; Slovenia; Togo; Vietnam; Zambia.

OECD members in truncated sample
Australia; Austria; Belgium; Canada; Chile; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Israel; Italy; Japan; Mexico; Netherlands; New Zealand; Norway; South Korea; Spain; Sweden; Switzerland; Turkey; United Kingdom; United States of America.
### Appendix 4C

Table 4.11 Life satisfaction and terrorism: Pairwise correlations

<table>
<thead>
<tr>
<th>Life satisfaction</th>
<th>Incidents (lag)</th>
<th>Fatalities (lag)</th>
<th>Injuries (lag)</th>
<th>Property damage (lag)</th>
<th>Index (lag)</th>
<th>RGDP per worker</th>
<th>Capital stock per worker</th>
<th>Human capital</th>
<th>Age</th>
<th>Polity4</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatalities (lag)</td>
<td>-0.1840</td>
<td>0.9636</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Injuries (lag)</td>
<td>-0.1565</td>
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<td>0.9599</td>
<td>1</td>
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</tr>
<tr>
<td>Property damage (lag)</td>
<td>-0.1412</td>
<td>0.9717</td>
<td>0.9250</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Index (lag)</td>
<td>-0.1734</td>
<td>0.9794</td>
<td>0.9941</td>
<td>0.9815</td>
<td>0.9468</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGDP per worker</td>
<td>0.6780</td>
<td>-0.1444</td>
<td>-0.1599</td>
<td>-0.1287</td>
<td>-0.1219</td>
<td>-0.1490</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital stock per worker</td>
<td>0.6315</td>
<td>-0.1544</td>
<td>-0.1695</td>
<td>-0.1419</td>
<td>-0.1319</td>
<td>-0.1598</td>
<td>0.9085</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human capital</td>
<td>0.4173</td>
<td>-0.1783</td>
<td>-0.1997</td>
<td>-0.1649</td>
<td>-0.1695</td>
<td>-0.1885</td>
<td>0.4674</td>
<td>0.4783</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.4044</td>
<td>-0.1731</td>
<td>-0.2021</td>
<td>-0.1717</td>
<td>-0.1637</td>
<td>-0.1908</td>
<td>0.5938</td>
<td>0.6601</td>
<td>0.7627</td>
<td>1</td>
</tr>
<tr>
<td>Polity4</td>
<td>0.3361</td>
<td>-0.0703</td>
<td>-0.0747</td>
<td>-0.0660</td>
<td>-0.0584</td>
<td>-0.0717</td>
<td>0.1645</td>
<td>0.1505</td>
<td>0.4315</td>
<td>0.4704</td>
</tr>
</tbody>
</table>
5. The effect of the Moscow theatre siege on expectations of wellbeing in the future

5.1. Introduction

The consequences of terrorism have been, and continue to be, felt by citizens of countries across the globe. Alarmingly, terrorist activity is increasing. Since 2000 the number of deaths from terrorism has increased fivefold, from over 3,000 in the year 2000 to almost 18,000 in the year 2013. Terrorism is a concentrated phenomenon, with over 80 per cent of the lives lost to terrorist activity in 2013 occurring in only five countries (Iraq, Afghanistan, Pakistan, Nigeria and Syria). Another 55 countries, however, recorded one or more deaths from a terrorism incident (Institute for Economics and Peace, 2014).

In the European context, there have been a number of high profile terrorism incidents in recent years. Incidents include the London Bridge attack on June 3 2017, in which seven people were killed and 48 were wounded (Chan, 2017); the Manchester Arena bombing on May 22 2017, in which 22 people died and 116 were injured (BBC News, 2017); the Westminster attack on March 22 2017, in which five people died and 50 were injured (Allen & Henderson, 2017); the Berlin attack on December 19 2016, in which 12 people were killed and 48 injured (BBC News, 2016); the string of terrorist attacks across Paris on Friday November 13 2015, with an estimated death toll in excess of 130 people and a further 350 wounded (Marcus, 2015); the attack on the headquarters

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19 A version of this chapter has been accepted for publication in the form of a co-authored refereed journal article. The bibliographic details of the co-authored paper, including all authors, are Margarita Vorsina, Matthew Manning, Christopher M. Fleming, Christine Smith (forthcoming) The Effect of the Moscow Theatre Siege on Expectations of Wellbeing in the Future, *Journal of Interpersonal Violence*. My contribution to the paper involved writing and compilation of the manuscript, data analysis and the preparation of the tables and figures.
of satirical weekly newspaper Charlie Hebdo on January 7 2015, in which 12 people were killed and 12 others injured (Withnall & Lichfield, 2015); the London bombings on July 7 2005, in which 52 people were killed and over 700 injured (Ray, 2010); the 2004 Madrid bombings, in which 191 people were killed and more than 2,000 wounded (De Ceballos, et al., 2005); and the 2002 Moscow theatre siege. The theatre siege is the subject of inquiry of this chapter.

The Moscow theatre siege was organized by terrorists from the Islamist militant separatist movement in Chechnya. Approximately 40 armed Chechens took 912 hostages in the Dubrovka Theatre (Krechetnikov, 2012). The motive of the siege was to demand the withdrawal of Russian forces from the region and the end to the second Chechen war. During the siege a videotape was released to the media, with the following statement:

*Every nation has the right to their fate. Russia has taken away this right from the Chechens and today we want to reclaim these rights, which Allah has given us, in the same way he has given it to other nations. Allah has given us the right of freedom and the right to choose our destiny. And the Russian occupiers have flooded our land with our children's blood. And we have longed for a just solution. People are unaware of the innocent who are dying in Chechnya: the sheikhs, the women, the children and the weak ones. And therefore, we have chosen this approach. This approach is for the freedom of the Chechen people and there is no difference in where we die, and therefore we have decided to die here, in Moscow. And we will take with us the lives of hundreds of sinners. If we die, others will come and follow us – our brothers and sisters who are willing to sacrifice their lives, in Allah’s way, to liberate their nation. Our nationalists have*
The siege lasted from October 23 to October 26 2002 and ended when Russian Special Forces raided the theatre. All 40 terrorists were killed, as were more than 130 hostages. In total, more than 170 people died and over 700 people were injured.

As discussed in Chapter 3, this chapter employs longitudinal household panel data for more than 6,000 individuals to estimate the effect of the Moscow theatre hostage siege on the self-reported expectations of life in the future of the Russian population. The Moscow attack was exogenous to the timing of the household survey and could, therefore, be described as an exogenous shock to the randomized sampled population. This allows us to employ a difference-in-differences approach to test the effect of the attack on self-reported expectations of life in the future (Metcalfe et al., 2011). This extends our current understanding of the effect of a terrorist event on the wellbeing of a population, which to date has received very little attention in the literature. The longitudinal nature of the data allows us to explore both the short- and long-term effects of terrorism on this population as well as to contribute to the limited number of quasi-experimental studies in this area (Metcalfe, et al., 2011). By focusing on expectations of life in the future, we broaden our understanding of the social consequences of terrorism. Our research allows for the development of more refined policies that aim to encourage post-traumatic growth while simultaneously attempting to minimise post-traumatic stress disorder. To achieve this, however, policymakers require evidence on the net effect of a terrorist incident on wellbeing and if, and to what degree, the impact is distributed equally over the population. Policymakers also need evidence on helping the population to cope with terrorism. This may involve engaging with the psychological community to devise policies and programs that target those in the
population who are most vulnerable, and for these groups devise strategies to enhance their psychological resilience following a terrorist (or other traumatic) event. In this chapter we provide evidence as to who these vulnerable populations may be.

The chapter is structured as follows. The related theoretical and empirical literature is provided in Section 5.2. Data, method and variables employed are described in Section 3. Results are presented in Section 5.4 and discussed in Section 5.5.

5.2. Related Literature

5.2.1. The economic and psychological impacts of terrorism

The impact of terrorism can be measured in a number of ways including its effect on gross domestic product (Gaibulloev & Sandler, 2008, 2009, 2011), national consumption (Eckstein & Tsiddon, 2004; Fielding, 2003a), national investment (Fielding, 2003b; Frey et al., 2007), stock markets (Drakos, 2010; Essaddam & Karagianis, 2014), foreign direct investment (Enders & Sandler, 1996) and foreign trade (Mirza & Verdier, 2008; Nitsch & Schumacher, 2004). A more thorough review of this literature was provided in Chapters 2 and 4.

The psychological and emotional negative effects of terrorism have also been studied, with an extensive body of literature exploring the influence of the 2001 9/11 terrorist attacks on the mental health of citizens of the United States (Galea et al., 2002; Schlenger et al., 2002; Schuster et al., 2001; Silver et al., 2002). As reported in Chapter 4, these results consistently show that the effect of the 9/11 attacks were substantial during the first week but declined significantly after two to three months (Silva, et al., 2002; Ford, et al., 2003; and De Lesi, et al., 2003). In regard to the terrorist attacks that occurred in Madrid in 2004 and London in 2005, researchers such as Miguel-Tobal et
al. (2006), Salguero et al. (2011), Rubin et al. (2005) and Handley et al. (2009) report similar impacts on mental health and post-traumatic stress disorder related conditions.

As also discussed in Chapter 4, a small body of literature also considers the negative relationship between terrorism and various measures of self-reported wellbeing. See for example, Frey, et al. (2009), Romanov, et al. (2012) and Metcalfe, et al (2011). Our own cross country study, reported in Chapter 4, covering 117 nations over the period 2006–2011, finds that terrorism is negatively associated with life satisfaction, whereas no such association is found between terrorism and real Gross Domestic Product per worker; suggesting that the subjective wellbeing costs of terrorism are potentially much higher than the economic costs.

5.2.2. Coping with Terrorism

When a terrorist attack occurs, people look for ways to cope with the associated stress and trauma. This sets off a chain of psychological events culminating in helplessness, vulnerability and grief. It often leads to xenophobia, which can become a danger to both individuals and society at large (Tedeschi & Calhoun, 2004).

There is also, however, a growing body of empirical evidence that suggests that many survivors of traumatic events experience positive psychological changes. Post-traumatic growth is defined as “...the subjective experience of positive psychological change reported by an individual as result of the struggle with trauma” (Zoellner & Maercker, 2006, p. 628). Examples of positive psychological change are an increased appreciation of life, setting of new life priorities, a sense of increased personal strength, identification of new possibilities, improved closeness of intimate relationships, or positive spiritual change (Tedeschi, et al., 1998). Post-traumatic growth describes the experience of individuals who do not only recover from trauma, i.e. return back to pre-
trauma functioning after a period of emotional distress, but use it as an opportunity for further individual development. Those individuals overcome trauma with improved psychological functioning in specific domains (Zoellner & Maercker, 2006).

A number of researchers have applied post-traumatic growth theory to examine psychological outcomes from terrorist attacks. For example, Fredrickson, et al. (2003) measure emotion, symptoms of depression and resilience resources before and after the 9/11 terrorist attacks. They find that the event increased sadness, anger and fear of future terrorist attacks. Respondents reported that they had problems with concentration on their studies and had concerns about friends or relatives living in and around New York City. Positive emotions such as gratitude, interest, and love, however, were also reported. Fredrickson, et al. (2003) suggest that these emotions helped individuals to cope with stress and the negative consequences of the terrorist event. In particular, people who experienced positive emotions after the attacks showed higher resilience and were less likely to develop depressive symptoms. In a subsequent study to examine the impact of the 9/11 attacks, Ai, et al. (2005) examine how respondents changed their views about themselves, their behaviour, relations, worldviews, spiritual beliefs and purpose in life. They find that stronger faith, hope and spiritual meaning are negatively correlated with depression and anxiety. This is consistent with Fischer, et al. (2006), who find that on the day of a terrorist attack in Istanbul, non-religious participants reported a higher degree of negative emotions and reduced positive emotions, while religious participants did not. Similarly, Val and Linley (2006) find that residents of Madrid experienced post-traumatic growth and other positive changes as a result of indirect exposure to the March 11 2004 terrorist attack. Additionally, Bhat and Rangaiah (2015) found that young adults directly exposed to armed conflict in Kashmir experienced high levels of post-traumatic growth and social support.
Vazquez, et al. (2008), who provide a review of the literature on positive effects of terrorism, show that terrorist attack may have positive consequences at individual and community levels. The authors suggest six directions for future research: (1) assess the positive effects of terror; (2) estimate the effect in the general population; (3) analyze the effects of different types of terrorism; (4) conduct more longitudinal studies on the dynamics of the changes induced by terrorist threats; (5) analyze whether some apparently positive effects could have collateral negative effects; and (6) estimate whether positive reactions generated by terrorist attacks are adaptive or somehow associated with positive health outcomes.

In this study we explore the positive emotions of the Russian population developed as a result of a terrorist attack. The data allow us to contribute to the existing literature by addressing three of the six points mentioned above. First, we directly focus on positive reactions; second, we estimate the effect of the attack on the general population; and finally, we apply longitudinal data to study the long-term effects of terror.

5.3. Data and Method

5.3.1. Data and Variables

Data are obtained from the Russia Longitudinal Monitoring Survey – Higher School of Economics (RLMS-HSE).\textsuperscript{20} RLMS-HSE is a series of nationally representative surveys designed to monitor the effects of Russian reforms on the health and economic welfare of households and individuals in the Russian Federation. These effects are measured by a variety of means including detailed monitoring of individuals’ health status and

\textsuperscript{20} The Russia Longitudinal Monitoring survey (RLMS-HSE) is conducted by National Research University Higher School of Economics and ZAO Demoscope together with the Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology RAS. See the following websites for further information: http://www.cpc.unc.edu/projects/rlms-hse; http://www.hse.ru/org/hse/rlms.
dietary intake, precise measurement of household-level expenditures and service utilisation, and collection of relevant community-level data. To qualify as a quasi-experiment, the timing of the siege needs to be exogenous and largely randomly assigned in terms of the survey interviews. In this case, respondents are interviewed between October and December each year, with the particular day and month of the interview allocated randomly. Thus, the siege is clearly exogenous to the survey.

To test for the presence of post-traumatic growth among the Russian population following the Moscow Theatre Siege, we employ a measure of self-reported expectations of life in the future. This measure is obtained from individuals’ responses to the question: “Do you think that in the next 12 months you and your family will live better than today or worse?”.21 This variable is scored from 1 to 5, where 1 is the highest score. For ease of interpretation and consistency with the wider literature, we reorder the responses to the question so that 5 is the highest measure and 1 is the lowest.

We consider an unbalanced sample for two different geographic regions.22 Sample 1 includes all residents of Russia, while sample 2 includes only residents of Moscow and its surrounds. To control for any possible effect of the Moscow region on the results for the Russian sample, we also develop sample 3, which includes residents of Russia excluding the Moscow region. Individual characteristics such as age, education, income, marital status and gender are included in the analysis as control variables. Self-

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21 The original survey question (in Russian) is “Как Вы думаете, через 12 месяцев Вы и Ваша семья будете жить лучше или хуже, чем сегодня?”

22 All model results for a balanced sample are available on request. Following Metcalfe, et al. (2011), to correct for any selection bias from moving from the unbalanced to balanced sample, we compute a Mills ratio using a selection variable that equals one if the individual is observed in both years 2001 and 2002, and zero otherwise as our dependent variable in the selection equation.
assessed relative income was employed as a proxy for household income due to a lack of reliable actual income data.\textsuperscript{23}

We separate all of our samples into two groups – the first (control) group consists of individuals who, in 2002, were interviewed before the siege (i.e. were interviewed before October 23, 2002), the second (treatment) group consists of individuals who, in 2002, were interviewed after the siege (i.e. from October 24 to December 31 2002). We note that there could be a chance that people from the treatment group are interviewed before the date of the siege in the years following the year 2002: as such it is possible that the annual reminder of the attack could affect the self-reported life satisfaction and the expectation of life in the future. However, the Russian media does not emphasise tragic events which happened in the past. Thus, the annual reminder of the attack was poor and could be argued to have a minor effect on wellbeing. Moreover, the annual reminder did not affect our results when using the sample covering the period 2001-2002. Descriptive statistics for all samples are available on request.

5.3.2. Empirical Strategy

Similar to the estimation strategy employed by Metcalfe, et al. (2011), we use a difference-in-differences approach. This method assumes that the Moscow theatre siege affects only the treatment (post-siege) group, which leads to a change in the expectations of life in the future of this group, and in the absence of the siege the differences in expectations of life in the future between the treatment and control groups would be approximately the same in each year. The approach then calculates the “normal” level of expectations of life in the future, which would have been associated with the treatment group if the siege had not occurred. Thus, the effect of the siege is

\textsuperscript{23} Fewer than half of the respondents answered the question on actual income, while the majority of respondents answered the relative income question.
the difference between the observed level in expectations of life in the future and the
predicted “normal” level of expectations of life in the future for the treatment group.

We begin by estimating Equation 5.1:

\[
\text{ELF}_{it} = \alpha + \beta_1 \text{Post10|23}_{it} + \beta_2 (\text{Year} = 2002)_{it} + \\
\beta_3 [\text{Post10|23}_{it} \ast (\text{Year} = 2002)_{it}] + \sum_{j=4}^{k} \beta_j Z_{it} + \epsilon_{it},
\]

(5.1)

where ELF\(_{it}\) is the self-reported expectations of life in the future of individual \(i\) in time \(t\); Post10|23 is a dummy variable denoting 1 if the individual was interviewed post October 23 in 2002 and 0 otherwise; Year = 2002 is a dummy variable representing the year of the attack; \(Z_{it}\) is vector of individual characteristics; and \(\epsilon_{it}\) is an error term.

The parameter \(\beta_3\) of Equation 5.1 represents the effect of the siege on expectations of life in the future of people interviewed post October 23 in 2002. In the absence of the siege, \(\beta_3\) would not be statistically significantly different from zero, since ELF\(_{it}\) would have changed similarly in both the treatment and control groups in each year. Thus, the unbiased estimate of \(\beta_3\) could be specified as Equation 5.2:

\[
\hat{\beta}_3 = \Delta \text{ELF}_{2001−2002}^{\text{post23|10}} - \Delta \text{ELF}_{2001−2002}^{\text{pre23|10}} = \\
(\text{ELF}_{2002}^{\text{post23|10}} - \text{ELF}_{2001}^{\text{post23|10}}) - (\text{ELF}_{2002}^{\text{pre23|10}} - \text{ELF}_{2001}^{\text{pre23|10}}),
\]

(5.2)

where ELF\(_{2002}^{\text{post23|10}}\) is the mean level of self-reported expectations of life in the future of the treatment group in 2002; ELF\(_{2001}^{\text{post23|10}}\) is the mean level of self-reported expectations of life in the future of the treatment group in 2001; ELF\(_{2002}^{\text{pre23|10}}\) is the mean level of self-reported expectations of life in the future of the control group in 2002; and ELF\(_{2001}^{\text{pre23|10}}\) is the mean level of self-reported expectations of life in the future of the control group in 2001.
5.4. Presentation of Results

Table 5.1 reports the results of the difference-in-differences model using ordinary least squares (OLS), generalised least squares with random-effects (RE), fixed effects (FE) and ordered probit with random effects (OPROBIT-RE); the latter accounts for the fact that the dependent variables in both cases are ordinally, rather than cardinally, measured. Consistent with the literature on the measurement of subjective wellbeing (MacKerron, 2012), control variables such as age, gender, marital status, labour force status, being a student, level of education and self-estimated relative income are included as part of the vector $Z_{it}$. The research questions which require linked macro and micro data are ones that postulate variation between the macro units, either in the distributions of some of the macro variables or in the patterns of association between micro variables (Fisher, 2016). However, we were unable to obtain reliable regional level data on gross regional product or unemployment, and the inclusion of national level gross domestic product data did not improve model results.

We can see from the interaction coefficients between ‘Post October 23’ and ‘Year = 2002’ reported in Table 5.1, that for sample 1 the Moscow theatre siege had a positive and statistically significant effect on self-reported expectations of life in the future across all model specifications, with Average Treatment Effects (ATEs) ranging from 0.068 to 0.150. Similarly, for sample 2, a positive and statistically significant effect is found, with ATEs ranging from 0.213 to 0.362. For sample 3, we also find a positive and statistically significant effect on self-reported expectations of life in the future for three model specifications (OLS, RE and OPROBIT-RE) with ATEs ranging from 0.064 to 0.124. It should be noted that FE model results are close to being significant at the 10% level (p-value of 0.118).
In Table 5.1 the signs and qualitative trade-offs between coefficients are broadly similar across the four model specifications, suggesting that there is little difference to the interpretation of the results, whether one assumes cardinality or ordinality in the self-reported wellbeing data (Ferrer-i-Carbonell & Frijters, 2004).

It is important to also check the underlying trends in self-reported expectations of life in the future between the treatment and control groups across a number of years. To satisfy one of the difference-in-differences conditions, it is necessary to show that, in the absence of treatment, the differences between the treatment and control groups would have remained constant over time (Meyer, 1995). We can check whether this is the case for the siege by plotting expectations of life in the future trends for the control and treatment groups prior to 2002. From Figure 5.1, for all three samples we can see that the difference between expectations of a better life in the future for the two groups is larger in 2002 than in most other years.
<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Sample Russia</th>
<th>Sample Moscow region</th>
<th>Sample Russia without Moscow region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td>OLS</td>
<td>RE</td>
<td>OPROBIT-RE</td>
</tr>
<tr>
<td>Post October 23</td>
<td>0.026 (0.024)</td>
<td>0.029 (0.024)</td>
<td>0.049 (0.044)</td>
</tr>
<tr>
<td>Year = 2002</td>
<td>0.036* (0.018)</td>
<td>0.034** (0.015)</td>
<td>0.053* (0.029)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2002</td>
<td>0.080** (0.032)</td>
<td>0.077**** (0.027)</td>
<td>0.150*** (0.051)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.517*** (0.077)</td>
<td>3.570*** (0.083)</td>
<td>4.927*** (1.658)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>10,435</td>
<td>10,435</td>
<td>10,435</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.184</td>
<td>0.035</td>
<td>0.152</td>
</tr>
<tr>
<td>Number of individuals</td>
<td>6,312</td>
<td>6,312</td>
<td>6,312</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level

Standard errors in brackets
Figure 5.1 Self-reported expectations of life in the future, 2000–2005
Table 5.2 incorporates multiple time periods and treatment groups into the analysis. All estimations in Table 5.2 include dummy variables for interview months November and December to control for any wellbeing effects of the holiday season (i.e. the possibility that people feel happier around the Christmas period). As with the results reported in Table 5.1, socio-demographic controls are included.

We also explore the possibility that the estimation of Equation 5.1 is subject to serial correlation, which could potentially lead to an upward bias in the standard error of the estimate (Bertrand et al., 2004). To take account of potential serial correlation, we first estimate a generalised least squares with random effects that also accounts for an AR (1) disturbance. This does not materially change our results across all three samples. However, allowing only for an AR (1) disturbance in the estimation of Equation 5.1 may not be enough to counter the serial correlation problem (Metcalfe, et al., 2011). Bertrand, et al. (2004) proposes that the solution is to ignore the time-series data when computing the standard error. We simply, therefore, average the data in the two years before the date of the siege and rerun Equation 5.1 on this averaged outcome variable and the self-reported expectations of life in the future reported in 2002 in a panel of time length equal to two. Results are consistent with Table 5.1 for all samples across all estimation techniques. This implies that our results continue to hold even when serial correlations in the dependent variable have been taken into account.
Table 5.2 Self-reported expectations of life in the future: Model results, 2000–2005

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Russia</th>
<th>Moscow region</th>
<th>Russia without Moscow region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RE</td>
<td>FE</td>
<td>AR(1)</td>
</tr>
<tr>
<td>Post October 23</td>
<td>0.029</td>
<td>0.029</td>
<td>0.021</td>
</tr>
<tr>
<td>Year = 2000</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.022)</td>
</tr>
<tr>
<td></td>
<td>-0.138***</td>
<td>-0.138***</td>
<td>-0.138***</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.024)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Year = 2002</td>
<td>0.029*</td>
<td>0.016</td>
<td>0.028*</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.023)</td>
<td>(0.015)</td>
</tr>
<tr>
<td></td>
<td>0.086***</td>
<td></td>
<td>(0.015)</td>
</tr>
<tr>
<td>Year = 2003</td>
<td>0.006</td>
<td>2.036e-04</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.037)</td>
<td>(0.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year = 2004</td>
<td>-0.031*</td>
<td>-0.037</td>
<td>-0.031*</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.053)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Year = 2005</td>
<td>0.010</td>
<td>0.003</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.068)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2000</td>
<td>0.005</td>
<td>0.019</td>
<td>-5.355e-04</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.033)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2002</td>
<td>0.078***</td>
<td>0.080***</td>
<td>0.077***</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.029)</td>
<td>(0.027)</td>
</tr>
<tr>
<td></td>
<td>0.064**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post October 23 x Year = 2003</td>
<td>0.074***</td>
<td>0.076**</td>
<td>0.074**</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.030)</td>
<td>(0.030)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2004</td>
<td>0.0021</td>
<td>-0.005</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.0309)</td>
<td>(0.032)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>Dependent Variable:</td>
<td>Russia</td>
<td>Moscow region</td>
<td>Russia without Moscow region</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td>---------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Post October 23 x Year = 2005</td>
<td>0.0412 (0.0327)</td>
<td>0.145 (0.114)</td>
<td>0.047 (0.035)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.623*** (0.0614)</td>
<td>3.674*** (0.200)</td>
<td>3.627*** (0.064)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>26,014</td>
<td>2,569</td>
<td>23,445</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.044</td>
<td>0.042</td>
<td>0.047</td>
</tr>
<tr>
<td>Number of individuals</td>
<td>6,678</td>
<td>897</td>
<td>5,781</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level

Standard errors in brackets
Given the robustness of results to alternative specifications, we now focus on the type of individual most impacted by the siege. Tables 5.3 to 5.5 show the results from re-estimating Equation 5.1 with our samples further split according to gender, age and income.24 Male and younger Russians are more (positively) affected by the siege (Tables 5.3 and 5.5, Columns 1 and 3), as are male, younger and poorer Moscow region residents (Table 5.4, Columns 1, 3 and 5).

Table 5.3 Self-reported expectations of life in the future: Model results (Sample 1 - Russia) 2001–2002 by gender, age and income (OLS)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post October 23</td>
<td>-0.044</td>
<td>0.075**</td>
<td>-0.049</td>
<td>0.063**</td>
<td>0.072**</td>
<td>-0.066</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.031)</td>
<td>(0.040)</td>
<td>(0.030)</td>
<td>(0.031)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Year = 2002</td>
<td>0.036</td>
<td>0.034</td>
<td>-0.016</td>
<td>0.060***</td>
<td>0.049**</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.024)</td>
<td>(0.031)</td>
<td>(0.023)</td>
<td>(0.023)</td>
<td>(0.056)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2002</td>
<td>0.125***</td>
<td>0.052</td>
<td>0.143***</td>
<td>0.053</td>
<td>0.062</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>(0.048)</td>
<td>(0.042)</td>
<td>(0.053)</td>
<td>(0.040)</td>
<td>(0.041)</td>
<td>(0.099)</td>
</tr>
<tr>
<td></td>
<td>(0.127)</td>
<td>(0.097)</td>
<td>(0.050)</td>
<td>(0.034)</td>
<td>(0.095)</td>
<td>(0.213)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>4,347</td>
<td>6,088</td>
<td>3,665</td>
<td>6,770</td>
<td>6,908</td>
<td>1,152</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.184</td>
<td>0.181</td>
<td>0.099</td>
<td>0.119</td>
<td>0.080</td>
<td>0.084</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level

Standard errors in brackets

24 In regards to the income split, the sub-sample is divided into those who report a 5 or below (poor) or more than 5 (rich) in response to the question “Please imagine a nine-step ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the ninth, stand the rich. On which step of the nine steps are you personally standing today?” The original survey question (in Russian) is “Представьте себе, пожалуйста, лестницу из 9 ступеней, где на нижней, первой ступени, стоят нищие, а на высшей, девятой - богатые. На какой из девяти ступеней находитесь сегодня Вы лично?”
Table 5.4 Self-reported expectations of life in the future: Model results (Sample 2 – Moscow region) 2001–2002 by gender, age and income (OLS)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post October 23</td>
<td>-0.096</td>
<td>-0.060</td>
<td>-0.244**</td>
<td>0.063</td>
<td>-0.027</td>
<td>-0.300</td>
</tr>
<tr>
<td></td>
<td>(0.119)</td>
<td>(0.101)</td>
<td>(0.120)</td>
<td>(0.101)</td>
<td>(0.098)</td>
<td>(0.295)</td>
</tr>
<tr>
<td>Year = 2002</td>
<td>-0.032</td>
<td>-0.119</td>
<td>-0.015</td>
<td>-0.099</td>
<td>-0.094</td>
<td>-0.218</td>
</tr>
<tr>
<td></td>
<td>(0.124)</td>
<td>(0.112)</td>
<td>(0.131)</td>
<td>(0.109)</td>
<td>(0.105)</td>
<td>(0.328)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2002</td>
<td>0.263*</td>
<td>0.183</td>
<td>0.283*</td>
<td>0.147</td>
<td>0.217*</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td>(0.152)</td>
<td>(0.135)</td>
<td>(0.156)</td>
<td>(0.133)</td>
<td>(0.129)</td>
<td>(0.382)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.377***</td>
<td>3.482***</td>
<td>2.755***</td>
<td>2.748***</td>
<td>3.797***</td>
<td>4.897***</td>
</tr>
<tr>
<td></td>
<td>(0.371)</td>
<td>(0.302)</td>
<td>(0.171)</td>
<td>(0.126)</td>
<td>(0.290)</td>
<td>(0.668)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>465</td>
<td>724</td>
<td>436</td>
<td>753</td>
<td>811</td>
<td>100</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.156</td>
<td>0.169</td>
<td>0.135</td>
<td>0.096</td>
<td>0.071</td>
<td>0.163</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Standard errors in brackets

Table 5.5 Self-reported expectations of life in the future: Model results (Sample 4 – Russia without Moscow region) 2001–2002 by gender, age and income (OLS)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post October 23</td>
<td>-0.056</td>
<td>0.045</td>
<td>-0.034</td>
<td>0.020</td>
<td>0.051</td>
<td>-0.111</td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
<td>(0.034)</td>
<td>(0.045)</td>
<td>(0.032)</td>
<td>(0.034)</td>
<td>(0.082)</td>
</tr>
<tr>
<td>Year = 2002</td>
<td>0.037</td>
<td>0.041*</td>
<td>-0.017</td>
<td>0.068***</td>
<td>0.056**</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.024)</td>
<td>(0.032)</td>
<td>(0.023)</td>
<td>(0.024)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Post October 23 x Year = 2002</td>
<td>0.098*</td>
<td>0.051</td>
<td>0.102*</td>
<td>0.056</td>
<td>0.0433</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>(0.053)</td>
<td>(0.046)</td>
<td>(0.059)</td>
<td>(0.044)</td>
<td>(0.045)</td>
<td>(0.108)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.832***</td>
<td>3.363***</td>
<td>2.706***</td>
<td>2.301***</td>
<td>4.275***</td>
<td>4.195***</td>
</tr>
<tr>
<td></td>
<td>(0.135)</td>
<td>(0.103)</td>
<td>(0.052)</td>
<td>(0.035)</td>
<td>(0.100)</td>
<td>(0.228)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.191</td>
<td>0.186</td>
<td>0.099</td>
<td>0.125</td>
<td>0.082</td>
<td>0.087</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Standard errors in brackets

Table 5.6 provides information on whether the effect of the attack on self-reported expectations of life in the future was most keenly felt immediately after the attack or in the weeks following...
the event. To do this, we split the post October 23 group into four sub-samples according to the date the respondent was surveyed. We then re-estimate Equation 5.1.

Results presented in Table 5.6 show that for sample 1 (Russia) expectations of life in the future are higher for those interviewed and in the first and fourth time periods. For sample 2 (Moscow) expectations of life in the future are higher for those interviewed in the third and fourth time periods. For sample 3 (Russia without Moscow region) expectations of life in the future are close to being significant at the 10% level for those interviewed in the first and second time periods (p-values of 0.118 and 0.129 respectively). In unreported results we re-estimate Equation 5.1 with 2003 as the base year to control for any wellbeing effects of the holiday season. No significant changes were found, suggesting that the increase in expectations of life in the future reported in Tables 5.6 cannot be attributed to the Christmas or New Year holidays.
Table 5.6 Self-reported expectation of life in the future: Model results, 2001–2002, by weeks (OLS)

<table>
<thead>
<tr>
<th>Dependent Variable: Expectations</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Russia</td>
<td>Moscow region</td>
<td>Russia without Moscow region</td>
</tr>
<tr>
<td>October 24 – November 6</td>
<td>0.017</td>
<td>0.0481</td>
<td>0.0042</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.105)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>November 7 – November 20</td>
<td>0.063</td>
<td>0.035</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.046)</td>
<td>(0.110)</td>
<td>(0.053)</td>
</tr>
<tr>
<td>November 21 – December 4</td>
<td>-0.005</td>
<td>-0.234**</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>(0.074)</td>
<td>(0.114)</td>
<td>(0.128)</td>
</tr>
<tr>
<td>December 5 – December 31</td>
<td>0.046</td>
<td>-0.194*</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.101)</td>
<td>(0.227)</td>
</tr>
<tr>
<td>Year=2002</td>
<td>0.036*</td>
<td>-0.081</td>
<td>0.040**</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.084)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>October 24 – November 6 x Year=2002</td>
<td>0.069*</td>
<td>0.180</td>
<td>0.060</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.137)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>November 7 – November 20 x Year=2002</td>
<td>0.034</td>
<td>-0.053</td>
<td>0.108</td>
</tr>
<tr>
<td></td>
<td>(0.062)</td>
<td>(0.145)</td>
<td>(0.071)</td>
</tr>
<tr>
<td>November 21 – December 4 x Year=2002</td>
<td>0.151</td>
<td>0.334**</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>(0.097)</td>
<td>(0.149)</td>
<td>(0.163)</td>
</tr>
<tr>
<td>December 5 – December 31 x Year=2002</td>
<td>0.222**</td>
<td>0.357***</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td>(0.094)</td>
<td>(0.133)</td>
<td>(0.276)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.516***</td>
<td>3.393***</td>
<td>3.528***</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.235)</td>
<td>(0.082)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>10,435</td>
<td>1,189</td>
<td>9,246</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.184</td>
<td>0.162</td>
<td>0.190</td>
</tr>
</tbody>
</table>

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Standard errors in brackets
5.5. Discussion of Results

This study uses RLMS-HSE data to estimate the effect of the 2002 Moscow theatre hostage siege on self-reported expectations of life in the future. Employing a difference-in-differences approach, we find that the siege had a positive effect on expectations of life in the future for residents of Moscow and the Russian population more broadly.

These results may seem counter intuitive. At the very least they suggest that the wellbeing effects of terrorism are complex and the net effect of a terrorism incident on wellbeing is not necessarily negative. This can be explained, at least in part, by the theory of post-traumatic growth – a theory that refers to the positive psychological change experienced as a result of adversity, with terrorism incidents inadvertently promoting more meaningful interpersonal relationships, new views of the self and new views of the world. This is somewhat consistent with the findings of Ai, et al. (2005), who show that, post the 9/11 attacks, students of US universities changed their views about their purpose in life. This result may also be partly explained by the relative frequency of terrorism events in Russia. As noted by Romanov, et al. (2012), once terrorism becomes part of everyday life, the negative wellbeing effects are reduced. Given the dramatic increase in the level of terrorism activity in recent years, it is, therefore, plausible that the effectiveness (in terms of instilling fear and hopelessness in the targeted society) of any single incident is diminished. In fact, in our case it would appear that, in many instances, the positive changes in wellbeing outweigh the obvious negative effects of the Moscow theatre siege.

This is most certainly not to suggest that terrorism is a positive phenomenon. It is important to note that our sample is for the population as a whole, not for those directly affected. It is self-evident that those directly affected are harmed by a terrorism incident – we are not questioning this. Rather, these results serve to highlight the fact that individuals have a lifelong plasticity that renders them capable of dramatic recovery from significant adversity. This suggests that
the primary objectives of terrorists are unlikely to be fully achieved in either the short- or long-run.

In terms of diversity, splitting the samples by gender, age and income yields further insights. The general finding is that the association between the siege and self-reported expectations of life in the future is stronger for young, male and poor respondents.

In terms of age, our results are consistent with Ramos and Leal (2013), who show that younger people are generally more likely to experience post-traumatic growth after a traumatising event. These findings may be explained by the fact that younger individuals prioritize future-oriented goals and reflect hopeful and positive expectations of the future (Boyle et al., 2016). According to Tedeschi and Calhoun (2004, p. 1), post-traumatic growth manifests itself in ways including “...an increased appreciation for life in general, more meaningful interpersonal relationships, an increased sense of personal strength, changed priorities, and a richer existential and spiritual life.”

With regards to gender, Akbar & Witruk (2016) show higher post-traumatic growth among women compared to men – our findings sometimes show an opposite relationship, where men, on occasions (e.g. expectations of the future for both the overall Russian sample and the Moscow sample – see Tables 5.3 and 5.4), reveal higher post-traumatic growth than women. A plausible explanation for our findings may be due to a distance variable, where women are more likely to be psychologically affected by an event when someone they know (e.g. family member) is involved. Conversely, when an event occurs but the female respondent does not know anyone involved then her psychological state is less affected. This latter scenario has the potential to manifest lower levels of post-traumatic growth (Akbar & Witruk, 2016). The results could also be partially explained by the fact that women are more likely than men to develop negative emotions such as depression or post-traumatic stress disorder (Galea, et al., 2002). Our results are consistent with Metcalfe, et al. (2011), who show that females and older
people experienced a decrease in life satisfaction after the 9/11 terrorist event. In addition, there is some speculation in the literature that terrorism has generally been conceptualised as a masculine dominated phenomenon such that females do not identify as strongly as their male counterparts with the consequences of terrorist acts (Grisard, 2014).

With respect to socio-economic status, for poorer respondents we find a weakly positive association between the Moscow siege and expectations of life in the future. However, the only statistically significant results are for Moscow (Table 5.4). This may be explained by the poor perceiving the attack to be focussed on the established elite, as most of the hostages in the Moscow theatre siege were from higher socio-economic backgrounds.

When we further disaggregate the results into discrete time periods (Table 5.6), we find a delayed response to the siege. Specifically, for both the Russian and Moscow samples, the strongest positive association appears one to two months after the event. There are two plausible explanations for this. First, it might take time for individuals to process the event and for post-traumatic growth to develop. Second, individuals may perceive the risk of future attacks to be lower as time passes. An alternative explanation is that this is a seasonal effect, whereby individuals reflect positively on their life and future plans during the Christmas and New Year holiday season. As discussed above however, this argument can be discounted as we examined responses from subsequent years and find no such seasonal effect.

We suggest that the use of self-reported measures of wellbeing is a promising means for increasing our understanding of the costs of terrorism. Wellbeing, however, is best understood as a multifaceted phenomenon that can be assessed by measuring a wide array of subjective and objective constructs. Future research may address the effect of terrorism on other domains of wellbeing not explored in this study such as happiness, positive emotion, engagement, meaning and purpose, relationships and social support and accomplishment and competence (Forgeard, et al., 2011). Further, much of the current literature focusses on terrorist events that
occur in developed countries. A useful exercise may be to test whether our findings can be replicated in developing countries where most of the world’s terrorist attacks take place, and whether societal norms, context and culture are likely to differ.
References


### Appendix 5A

#### Table 5.7 Self-reported expectations of life in the future: Descriptive statistics, 2001–2002

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1 Russia</th>
<th></th>
<th>Sample 2 Moscow</th>
<th></th>
<th>Sample 3 Russia excluding Moscow</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Pre Oct 23</td>
<td>Post Oct 23</td>
<td>All</td>
<td>Pre Oct 23</td>
<td>Post Oct 23</td>
</tr>
<tr>
<td>Observations</td>
<td>10435</td>
<td>6984</td>
<td>3451</td>
<td>1189</td>
<td>485</td>
<td>817</td>
</tr>
<tr>
<td>Better life</td>
<td>3.14</td>
<td>3.11</td>
<td>3.20*</td>
<td>3.29</td>
<td>3.23</td>
<td>3.32</td>
</tr>
<tr>
<td></td>
<td>(0.84)</td>
<td>(0.85)</td>
<td>(0.82)</td>
<td>(0.86)</td>
<td>(0.98)</td>
<td>(0.80)</td>
</tr>
<tr>
<td>Age</td>
<td>44.54</td>
<td>45.12</td>
<td>43.37*</td>
<td>44.35</td>
<td>45.47</td>
<td>43.84</td>
</tr>
<tr>
<td>Male (%)</td>
<td>41.66</td>
<td>41.14</td>
<td>42.71</td>
<td>39.11</td>
<td>40.59</td>
<td>38.43</td>
</tr>
<tr>
<td>Single (%)</td>
<td>20.88</td>
<td>20.89</td>
<td>20.86</td>
<td>21.45</td>
<td>24.19</td>
<td>20.20</td>
</tr>
<tr>
<td>Divorced (%)</td>
<td>7.34</td>
<td>6.89</td>
<td>8.26*</td>
<td>12.45</td>
<td>12.10</td>
<td>12.61</td>
</tr>
<tr>
<td>Widowed (%)</td>
<td>13.17</td>
<td>13.85</td>
<td>11.79*</td>
<td>11.77</td>
<td>11.29</td>
<td>12.00</td>
</tr>
<tr>
<td>Unemployed (%)</td>
<td>52.47</td>
<td>55.24</td>
<td>46.86*</td>
<td>43.31</td>
<td>46.51</td>
<td>41.86</td>
</tr>
<tr>
<td>Student (%)</td>
<td>11.23</td>
<td>10.80</td>
<td>12.11*</td>
<td>9.84</td>
<td>9.95</td>
<td>9.79</td>
</tr>
<tr>
<td>University degree (%)</td>
<td>16.71</td>
<td>14.35</td>
<td>21.50*</td>
<td>26.58</td>
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<td>3.80*</td>
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</tbody>
</table>

* Pre- and Post- October 23 sub-samples are statistically different from each other at the 5% level.

Standard deviations in brackets
## Appendix 5B

### Table 5.8 Self-reported expectations of life in the future: Descriptive statistics, 2000–2005

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample 1</th>
<th></th>
<th></th>
<th>Sample 2</th>
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<td>Russia without Moscow</td>
<td>Moscow</td>
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<tr>
<td></td>
<td>All</td>
<td>Pre Oct 23</td>
<td>Post Oct 23</td>
<td>All</td>
<td>Pre Oct 23</td>
<td>Post Oct 23</td>
<td>All</td>
<td>Pre Oct 23</td>
<td>Post Oct 23</td>
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<td>3.11*</td>
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<td>(0.86)</td>
<td>(0.93)</td>
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<td>(0.82)</td>
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<td>18.23</td>
<td>18.24</td>
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<td>14.67*</td>
<td>27.17</td>
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<td>27.67</td>
<td>16.01</td>
<td>14.13</td>
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<td>Self-estimated income</td>
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<td>3.63</td>
<td>3.89*</td>
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<td>3.79</td>
<td>3.81</td>
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</tbody>
</table>

* Pre- and Post- October 23 sub-samples are statistically different from each other at the 5% level.

Standard deviations in bracket
6. Social dominance orientation, fear of terrorism, and support for counter-terrorism policies

6.1. Introduction

The threat of terrorism – and the enactment of counter-terrorism laws – is a continuing feature of many western liberal democracies. Existing studies show that individuals’ fear of terrorism is associated with their support for government measures to prevent and punish terrorist attacks on national soil. Further, the literature shows that fear is distributed heterogeneously across societies: factors such as generalised anxiety, personal experience of traumatic events, low levels of education, and gender have all been shown to affect individuals’ perceived threat of terrorism (Huddy, Feldman, Taber, & Lahav, 2005; Skitka, Bauman, & Mullen, 2004). By contrast, individuals’ social dominance orientation (SDO) – their desire for hierarchical relations between social groups, with preference for particular groups – tends to have homogenously positive effects on their support for counter-terrorism measures, including measures which single out specific groups for additional surveillance or punishment (Thomsen, Green, & Sidanius, 2008).

Using data from a telephone-administered, probability-sampled survey of 1200 Australian adults, this study examines both the direct and mediating effects of individuals’ SDO on their fear of terrorist events and Islamic extremism, their support for stringent border security measures, and their concern about counter-terrorism measures that ‘single out’ Muslims for additional surveillance. These measures represent both fear of terrorism broadly, and the support for relatively ill-liberal counter-terrorism measures which potentially restrict people’s

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25 A version of this chapter has been submitted for publication in the form of a co-authored refereed journal article. The bibliographic details of the co-authored paper, including all authors, are Margarita Vorsina, Jill Sheppard, and Matthew Manning. “Social dominance orientation, fear of terrorism, and support for counter-terrorism policies”. My contribution to the paper involved writing and compilation of the manuscript, data analysis and the preparation of the tables and figures.
movement. We propose three hypotheses, based on the existing SDO and fear of terrorism literature, namely: (1) that SDO will positively predict individuals’ support for ‘defensive’ counter-terrorism policies (i.e. support for maintaining strong border protection policies and lack of concern that Muslims will be singled out for surveillance); (2) that SDO will positively predict fear of both terrorism and Islamic extremism; and (3) that fear has a significant mediating role in the relationship between SDO and support for defensive counter-terrorism policies.

This study constitutes the first empirical examination of the effects of SDO on individuals’ attitudes towards both the prospect of and the appropriate policy responses to terrorist attacks. It also extends the existing literature on SDO, anxiety towards terrorism, and attitudes towards counter-terrorism responses by examining both the direct and indirect effects of SDO (mediated via fear). Australia presents a timely case study; residents of that country experienced their first substantial ‘on soil’ terrorist attack in the form of the ‘Lindt café’ siege in December 2014. The study also expands on the existing literature by examining the mediating effects of individuals’ SDO on other factors known to predict terrorism-related attitudes, such as gender and education. The findings expand our collected knowledge of the socio-psychological and socio-demographic characteristics that combine to inform political attitudes, and specifically attitudes towards terrorism and counter-terrorism. The findings also have implications for the public acceptance and subsequent perceived legitimacy of statutory counter-terrorism measures in liberal democracies.

6.2. Related Literature

SDO is an individual-difference measure of desire for hegemonic relationships between social groups (Pratto, Sidanius, Stallworth, & Malle, 1994). In other words, SDO shows whether a person favours equal or hierarchical intergroup relationships. SDO is typically measured by a battery of attitudinal variables, summated to a unidimensional score (Ho et al., 2012). The
battery generally consists of statements such as ‘some groups of people are simply not the equal of others’, ‘some people are just more deserving than others’, and ‘if people were treated more equally we would have fewer problems in this country’ (Pratto et al., 1994, p. 760). The original battery, conceived by Pratto et al. (1994), consists of 16 items; subsequent revisions have used shorter batteries, but SDO instruments generally combine an equal number of pro-equality and pro-inequality measures.

Since introducing the concept of SDO in 1994, Ho et al. (2015) have argued that SDO is more validly understood as a two-dimensional concept than as a unidimensional concept. The two dimensions they identify within the 16-item battery measure preferences for intergroup dominance and intergroup anti-egalitarianism. The intergroup dominance (SDO-D) dimension represents support for group-based dominance hierarchies that maintain the subordination of one or more groups. SDO-D predicts support for active and violent actions to maintain an established hierarchy in which high status groups dominate low status groups. Ho et al. (2015) show that SDO-D is correlated with support for aggression against subordinate groups (e.g. immigrant persecution), approval of principles that would justify dominance and oppression (e.g. old fashioned racism) and a strong emphasis on group competition and threat (e.g. beliefs about the zero-sum nature of intergroup conflict). The intergroup anti-egalitarianism (SDO-E) dimension reflects a preference for intergroup inequalities that are supported by an interrelated network of subtle hierarchy-enhancing beliefs and social policies. SDO-E is more subtle in nature and is not connected to violent confrontation. Ho et al. (2015) find that SDO-E is connected with political conservatism, support for ideologies that subtly justify inequality (e.g. the ‘Protestant work ethic’) and resistance to policies that aimed to bring more intergroup equality (e.g. social welfare). This conceptualisation of SDO is only a recent update to the literature; accordingly, the main body of literature examined here focusses on SDO as a unidimensional construct.
SDO is associated with a range of socio-demographic and political traits. Gender is perhaps primary among the determinants of SDO: male respondents’ tendency towards higher levels of SDO recurs across cultural and situational contexts (Sidanius, Pratto, & Bobo, 1994). Subsequent studies contend that the ostensible effect of gender is attributable to factors other than the respondents’ gender. That is, the gender difference is either mitigated or removed entirely when studies control for respondents’ values (Caricati, 2007), strength of gender identification (Dambrun, Duarte, & Guimond, 2004; Wilson & Liu, 2003), or experience with women-dominated groups (Zakrisson, 2008). In summary, this literature suggests that the association between gender and SDO is mediated by men’s membership of and identity with the dominant gender group. When male respondents either weakly identify with the gender group or belong to a minority gender group, within the context of the study, they display no more SDO than women.

Higher rates of educational attainment are associated with decreased SDO at the individual level (Sinclair, Sidanius, & Levin, 1998), although education is not shown to reduce the gender gap in rates of SDO (Sidanius, Sinclair, & Pratto, 2006). Ethnic identity is also associated with SDO, with members of socially and economically dominant ethnic groups reporting the strongest support for intergroup hierarchies (Pratto et al., 2000). Across cultures and contexts, SDO is associated with in-group identification with dominant racial, ethnic, gender, and other social groups (Pratto, Sidanius, & Levin, 2006).

Alongside right-wing authoritarianism (RWA) but operating via different mechanisms, SDO is a commonly used predictor of individuals’ out-group prejudicial attitudes (Thomsen et al., 2008). More general personality measures such as the ‘Big Five’ appear to have only marginal effects on prejudice (Duckitt, 2006; Ekehammar, Akrami, Gylje, & Zakrisson, 2004). Individuals with high SDO are more likely to support public policies that support or recreate social hierarchies, while people with low SDO favour more equality-based policies (Pratto et
al., 1994). SDO also predicts prejudice against ethnic minority groups (Thomsen et al., 2010), women (Heaven, 1999), homosexuals (Licciardello, Castiglione, Rampullo, & Scolla, 2014), immigrants (Costello & Hodson, 2011) and refugees (Esses, Veenvliet, Hodson, & Mihic, 2008). Research also shows that people with high SDO are more likely to prefer harsh methods and violent actions to maintain a group-based hierarchy, while those with low SDO oppose violence. For example, people with low SDO prefer more humanitarian military action and oppose the death penalty (Henry, Sidanius, Levin, & Pratto, 2005), whereas people with high SDO demonstrate more aggressive behaviour (Carnahan & McFarland, 2007), often supporting punitive criminal justice policies (Sidanius, Mitchell, Haley, & Navarrete, 2006), wars and torture (Lindén, Björklund, & Bäckström, 2016).

Several studies have explored the association between SDO and support for terrorism or counter-terrorism policies. Lemieux and Asal (2010) show that people high in SDO are more likely to justify a terrorist attack. High-SDO is also related to positive attitudes towards using torture in the war on terrorism (Lindén et al., 2016). Similarly, Henry et al. (2005) find that high-SDO Americans are more inclined to support the use of military force in the Middle East. However, in the same study, Lebanese participants show the opposite association: those low in SDO demonstrate the most support for violence against the West, suggesting that context (in this case, the type of conflict) affects the hypothesised association between SDO and support of violence. When intergroup aggression is directed at maintaining or bolstering hierarchical relationships, SDO is positively correlated with violent actions (United States sample), while when intergroup aggression is directed at destabilising hierarchical relationships, SDO is negatively correlated with support of violence (Lebanese sample). Golec de Zavala and Kossowska (2011) find that individuals high in SDO support violence against a group that threatens the intergroup position of individuals’ in-group, and do not support violence against groups that do not constitute such a threat. This study also finds that people high in SDO are
more likely to view terrorist actors as belonging to a group, rather than acting as individuals. As such, participants high in SDO support military actions against terrorists and do not support criminal prosecution of terrorists, because terrorists are not seen as “*only individuals who commit criminal acts*” (p. 547).

Based on these studies, we propose the first hypothesis:

**Hypothesis 1:** Individuals high in SDO should tend to support ‘defensive’ policies such as increased surveillance and monitoring of Muslims in Australia, and maintaining strong border control policies.

As discussed above, people high in SDO are motivated by in-group dominance, superiority and power. They “*strive to belong to dominant groups, suffer if they do not and support beliefs that legitimize and maintain existing social inequalities*” (Golec de Zavala & Kossowska, 2011, p. 539). Such individuals view the world as a competitive jungle between social groups (Golec de Zavala & Kossowska, 2011), and seek to preserve the hierarchical status quo (Ho, Sidanius, Cuddy, & Banaji, 2013). Because of these traits, high-SDO people should show more fear of terrorists, as terrorists are threatening the status quo. This theory is consistent with Pratto et al. (2006), who find that individuals high in SDO are more likely than those with low SDO to perceive other groups as posing threats to their own in-groups.

Existing studies have not specifically examined the relationship between individuals’ SDO and their fear of terrorism. However, based on the theoretical construct of SDO, we might expect that high-SDO individuals report the highest rates of anxiety about the potential of a terrorist attack on their home soil, as any such attack would likely threaten their between-group dominance (Golec de Zavala & Kossowska, 2011). On the other hand, men tend to report lower rates of anxiety regarding both terrorism and crime in general (Box, Hale, & Andrews, 1988;
Huddy & Feldman, 2011). Drawing primarily on the SDO literature leads us to the following additional hypothesis:

**Hypothesis 2:** Individuals high in SDO will report greater fear of terrorism and Islamic extremism.

One of the main aims of terrorists is to install fear into a broader population, and they are often successful in this goal. For example, over 66 per cent of Londoners remained concerned about another terrorist attack in London for over two years after the July 2005 terrorist attacks, and 25 per cent of UK citizens believed that the terrorism risk increased in the five years after the event (Braithwaite, 2013). Similar patterns are observed among the US population, where over 91 per cent of US citizens considered terrorism as a vital threat in 2002, and over 70 per cent in 2008 (Braithwaite, 2013). Similarly, Bar-Tal (2001) shows that people in conflict societies tend to experience high levels of fear, and orient their life around it. In addition, they are more conservative and aggressive and have a feeling that they are surrounded by a seemingly uncontrollable world. Moreover, fear promotes prejudice towards immigrant groups (Stephen & Stephen, 1996). Thus, it is logical to assume that people with high levels of fear would support harsh policies against Muslims or border control policies.

Skitka, Bauman, Aramovich, and Morgan (2006) study factors that predict support for different public policies, finding that fear of terrorism positively predicts support for ‘defensive’ policies such as deporting Arab Americans, Muslims, and first generation immigrants. Their results also show that right-wing authoritarianism has both direct and in-direct effects – mediated by fear – on support for deporting groups.

It is important to note that although right-wing authoritarianism and SDO are connected (Henry et al., 2005; Hiel & Mervielde, 2002), these concepts are different from each other. SDO focusses on the maintenance of in-group superiority over out-groups (intergroup attitude),
while authoritarianism is related to individual intra-group attitude (Pratto et al., 1994). Thus, results of Skitka et al. (2006) allow us to assume that SDO (similar to that right-wing authoritarianism) might have two effects on support for border control policies and increased surveillance and monitoring of Muslims in Australia. The first effect is a direct one, and is discussed above (Hypothesis 1). The second effect is an indirect effect, which means that SDO is associated with fear, which then is associated with “defensive” policies. In other words, the relationship between SDO and support for counter-terrorism measures is at least partially attributable to a direct relationship between SDO and fear of terrorist threats. This leads to another hypothesis.

**Hypothesis 3:** Individuals high in SDO report greater fear of terrorism and Islamic extremism, which then explains their support for increased surveillance and monitoring of Muslims in Australia, and border control policies.

### 6.3. Data and Variables

As previously discussed in Chapter 3, our data are drawn from a survey of 1200 Australian citizens, aged 18 and over, conducted in October 2016. The sample is raised via random digit dialling, with a 60/40 composition of landline and mobile phone numbers, and stratified to include respondents from each Australian state and territory. The survey is part of an ongoing series of public opinion polls conducted by the Australian National University (the ‘ANUpoll’ series). Each poll in the series focusses on a different topic; the topic of this poll was community attitudes to terrorism risk and counter-terrorism policies. The unit record file data are available from the Australian Data Archive (Sheppard, Amin, & Katja, 2016). The data are weighted against population age, gender, location, and telephone access benchmarks.

We use four measures as dependent variables in our analysis: two measures of fear of terrorism and two measures of attitudes towards defensive public policies.
Fear of terrorism

The ‘fear of terrorism’ measure is drawn from individuals’ responses to the question: “How concerned are you personally about yourself or a family member being the victim of a future terrorist attack in Australia?” Fear of Islamic extremism is elicited from responses to the question: “How concerned, if at all, are you about the possible rise of Islamic extremism in Australia?” Both measures are scored on a scale of 1 (lowest level of concern) to 4 (highest level of concern).

Defensive public policies

We use two measures of defensive public policies: ‘border control policies’ and ‘Muslim monitoring concerns’. The wording for the ‘border control policies’ measure is: “Do you agree or disagree that current border control policies are necessary to protect us from threats such as Islamic extremism and terrorism?” The responses are scaled from 1 to 5, where 5 is the highest level of agreement. The ‘Muslim monitoring concerns’ measure is taken from the responses to the question: “How much, if at all, does it bother you that Muslims in Australia are singled out for increased surveillance and monitoring?” The responses are rated from 1 to 4, where 4 is the highest level of concern.

Social dominance orientation (SDO)

SDO is measured using responses to four questions: (1) In setting priorities, we must consider all groups (SDO$_1$); (2) Group equality should be our ideal (SDO$_2$); (3) Superior groups should dominate inferior groups (SDO$_3$); and (4) We should not push for group equality (SDO$_4$). All four measures are scaled from 1 to 10, where 10 is the highest level of agreement. For interpretation purposes SDO$_1$ and SDO$_2$ have been rescaled, where 1 is the highest level of agreement and 10 is the lowest. In other words, for all four measures 10 represents the highest level of SDO and 1 represents the lowest.
Additionally, a principal component analysis of the four measures extracts only one dimension, explaining 0.49 of variance. As we are confident that the four-item SDO battery is both internally consistent and unidimensional, we calculate the dependent SDO measure as an average of the four SDO variables using Equation 6.1:

\[ SDO = \frac{SDO_1 + SDO_2 + SDO_3 + SDO_4}{4} \]  

(6.1)

In our analysis we include control variables drawn from the literature on determinants of concerns about terrorism (Bruck & Muller, 2010). These include age, age-squared (to control for a potential non-linear relationship), income, and dummy variables for having children, higher education, home ownership, gender, employment, religion, access to internet and origin of parents. Table 6.9 in Appendix 6A provides an overview of the control variables, while Table 6.10 in Appendix 6B reports the means, the standard deviations and the correlations of the study variables.

6.4. Presentation of Results

First, we model the determinants of SDO within the sample. Table 6.1 reports the coefficient values fit statistics for models predicting the mean SDO score (column 1), as well as its components, namely SDO1, SDO2, SDO3, and SDO4 (columns 4 to 5 respectively). Gender (scored as male = 1) has strong and significant predictive effects on each dependent variable; it is strongest in predicting SDO3 (“Superior groups should dominate inferior groups”), and comparatively weak in predicting SDO4 (“We should not push for group equality”). Overall, gender predicts SDO in accordance with existing studies (Sidanius et al., 1994). Age (and age squared) has a small negative effects on SDO3 only; age coefficients in the other models are also negative, but with relatively large standard errors. Absence of religious identification (measured as a “no religion” dummy variable) has strong negative effects on all measures of SDO in this sample. While the relationship between absence of religion (e.g. agnosticism or
atheism) has not been studied in detail, we expect membership of a socially constructed group
(such as a church or religious denomination) to positively predict SDO (Sidanius & Pratto,
2001). Finally, higher education (a dummy variable where completing high school or higher is
scored as 1) has negative effects on SDO measures, varying from strong and significant (for
SDO and SDO3) to comparatively weak and non-significant (for SDO2).

Table 6.1 Predicting Social Dominance Orientation: Model results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1) SDO</th>
<th>(2) SDO1</th>
<th>(3) SDO2</th>
<th>(4) SDO3</th>
<th>(5) SDO4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.381***</td>
<td>0.439***</td>
<td>0.429***</td>
<td>0.457***</td>
<td>0.266*</td>
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<td>(0.135)</td>
<td>(0.156)</td>
<td>(0.138)</td>
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<td>(0.135)</td>
<td>(0.155)</td>
<td>(0.136)</td>
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<td>(0.042)</td>
<td>(0.041)</td>
<td>(0.048)</td>
<td>(0.042)</td>
</tr>
<tr>
<td>Age</td>
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<td>0.002</td>
<td>-0.076***</td>
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</tr>
<tr>
<td></td>
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<td>(0.025)</td>
<td>(0.027)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Age squared</td>
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<td>-0.0000</td>
<td>0.0006**</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
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<td>(0.0002)</td>
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<td>(0.175)</td>
<td>(0.202)</td>
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<td>(0.251)</td>
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<td>Higher education</td>
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<td>-0.435**</td>
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<td>(0.176)</td>
<td>(0.202)</td>
<td>(0.178)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.518***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.531)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>718</td>
<td>774</td>
<td>762</td>
<td>762</td>
<td>747</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; **significant at the 5% level; *significant at the 10% level. Standard errors in parentheses.

Column 1 predicts respondents’ mean SDO score using ordinary least squares regression
analysis. Columns 2 to 4 predict individual measures of SDO as described above using ordered
logit regression analyses. Having established the underlying distribution of SDO within the
sample, we next model the effects of SDO on respondents’ attitudes to terrorism and counter-
terrorism measures. The dependent variables are measured ordinally, and modelled using logit regression analyses. We begin by estimating equation 6.2:

\[
\text{Attitude to terrorism}_i = \alpha + \beta_1 SDO_i + \sum_{j=2}^{k} \beta_j Z_i + \epsilon_i \tag{6.2}
\]

where \( \text{Attitude to terrorism}_i \) is a subjectively measured attitude to terrorism (fear of terrorism, fear of Islamic extremism, border control policies or Muslim monitoring concern) of individual \( i \); \( SDO_i \) is an average of four SDO measures for individual \( i \); \( Z_i \) is a vector of individual characteristics (controls); and \( \epsilon_i \) is an error term.

The estimation results of Equation 6.2 are shown in Table 6.2. SDO is strongly positively associated with fear of terrorism, fear of Islamic extremism, and support for border control policies, while strongly negatively associated with Muslim monitoring concerns. The results support Hypothesis 2, in that individuals high in SDO report greater fear of terrorism and Islamic extremism (Table 6.2, columns 1 and 2). In particular, for a one-unit increase in SDO, the odds of the highest level of fear of terrorism or fear of Islamic extremism versus the combined three lower categories are 1.247 (\( e^{0.221} \)) or 1.376 (\( e^{0.320} \)) times greater, given the other variables are held constant in the model. The results also indicate that individuals high in SDO support “defensive” policies such as increased surveillance and monitoring of Muslims in Australia, and maintaining strict border control policies (Table 6.2, columns 3 and 4). In particular, for a one-unit increase in SDO, the odds of the highest level of support for border control policies versus the combined four lower categories are 1.282 (\( e^{0.249} \)) times greater, given that the other variables are held constant in the model. Similarly, for a one-unit increase in SDO, the odds of the highest level of concern that Muslims in Australia are singled out for increased surveillance and monitoring versus the combined three lower categories are 0.706 (\( e^{-26} \))

---

\[\text{The ordered logistic regression is often interpreted in terms of proportional odds ratios, which are obtained by exponentiating the ordered logit coefficients, } e^{\text{coef}}.\]
times lower, given the other variables are held constant in the model. SDO and Muslim monitoring concerns are associated negatively, because the Muslim monitoring concern variable is scored in such a way that a higher score represents higher concern that Muslims are singled out for increased surveillance and monitoring – in other words, the lower the score, the higher the support for increased surveillance and monitoring.

Regarding control variables, being male, having no religion and having higher education are negatively associated with both fear of terrorism and Islamic extremism, even with the SDO effects notwithstanding. The relationship between gender and self-reported fear of terrorism (and crime more generally) is widely covered in the literature (see for example Nellis, 2009). Having Australian parents and higher income are both negatively associated with fear of terrorism, while having children is positively associated with fear of Islamic extremism. Age has a non-linear correlation with fear of Islamic extremism. Being male is positively associated with support for border control policies, whereas having no religion and having higher education each have a negative association. Finally, being male and a home owner are negatively associated with Muslim monitoring concerns; higher education, no religion and being employed are positively connected with Muslim monitoring concerns.
Table 6.2 Predicting attitudes to terrorism and counter-terrorism: Model results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1) Fear of terrorism</th>
<th>(2) Fear of Islamic extremism</th>
<th>(3) Border control</th>
<th>(4) Muslim monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO</td>
<td>0.221*** (0.048)</td>
<td>0.320*** (0.051)</td>
<td>0.249*** (0.052)</td>
<td>-0.347*** (0.068)</td>
</tr>
<tr>
<td>Male</td>
<td>-0.359** (0.142)</td>
<td>-0.254* (0.145)</td>
<td>0.301** (0.148)</td>
<td>-0.807*** (0.195)</td>
</tr>
<tr>
<td>Australian parents</td>
<td>-0.271* (0.141)</td>
<td>-0.067 (0.144)</td>
<td>-0.214 (0.147)</td>
<td>-0.068 (0.193)</td>
</tr>
<tr>
<td>Income</td>
<td>-0.080* (0.044)</td>
<td>-0.019 (0.045)</td>
<td>-0.036 (0.045)</td>
<td>-0.081 (0.060)</td>
</tr>
<tr>
<td>Age</td>
<td>0.006 (0.027)</td>
<td>0.091*** (0.027)</td>
<td>-0.002 (0.027)</td>
<td>0.011 (0.036)</td>
</tr>
<tr>
<td>Age squared</td>
<td>-6.65e-05 (0.000260)</td>
<td>-0.000779*** (0.000264)</td>
<td>-6.68e-05 (0.000265)</td>
<td>-6.67e-05 (0.000353)</td>
</tr>
<tr>
<td>Employed</td>
<td>0.252 (0.183)</td>
<td>-0.040 (0.189)</td>
<td>-0.073 (0.192)</td>
<td>0.618** (0.248)</td>
</tr>
<tr>
<td>No internet</td>
<td>0.376 (0.268)</td>
<td>0.366 (0.290)</td>
<td>-0.017 (0.278)</td>
<td>-0.418 (0.405)</td>
</tr>
<tr>
<td>No religion</td>
<td>-0.491*** (0.150)</td>
<td>-0.506*** (0.153)</td>
<td>-0.639*** (0.154)</td>
<td>0.385* (0.205)</td>
</tr>
<tr>
<td>Children</td>
<td>0.244 (0.158)</td>
<td>0.364*** (0.161)</td>
<td>-0.027 (0.164)</td>
<td>-0.206 (0.222)</td>
</tr>
<tr>
<td>Higher education</td>
<td>-0.588*** (0.198)</td>
<td>-1.076*** (0.209)</td>
<td>-0.602*** (0.202)</td>
<td>0.611** (0.273)</td>
</tr>
<tr>
<td>Owner</td>
<td>-0.015 (0.187)</td>
<td>-0.035 (0.191)</td>
<td>0.222 (0.189)</td>
<td>-0.489* (0.253)</td>
</tr>
<tr>
<td>Observations</td>
<td>716</td>
<td>716</td>
<td>692</td>
<td>394</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; **significant at the 5% level; *significant at the 10% level Standard errors in parentheses.

6.4.1. Mediation hypothesis

To test Hypothesis 3, we apply an estimation strategy similar to Skitka et al. (2006). That is, four conditions should be satisfied to support the mediation hypothesis. First, the predictor (SDO) should be correlated with the outcome variable (border control policies or Muslim monitoring concerns). Second, the predictor should be correlated with the proposed mediator (fear of terrorism or fear of Islamic extremism). Third, the proposed mediator should be correlated with the outcome variable. Finally, the effect of the predictor on the outcome variable should be reduced if not eliminated when controlling for the proposed mediator.

Conditions 1 to 3 are satisfied, as shown in Tables 6.2 and 6.10 (Appendix 6B). Specifically, columns 3 and 4 of Table 6.2 show the correlation between SDO and defensive public policies (condition 1), while columns 1 and 2 of Table 6.1 demonstrate the association between SDO...
and fear of terrorism and Islamic extremism (condition 2). Table 6.10 (Appendix 6B) confirms condition 3, namely the correlation between defensive public policies and fear of terrorism and Islamic extremism.

To control for the fourth condition, we estimate the Equation 6.3 using an ordered logit model:

\[ \text{Defensive public policies}_i = \alpha + \beta_1 \text{SDO}_i + \beta_2 \text{Fear}_i + \sum_{j=3}^k \beta_j Z_i + \epsilon_i \]  

(6.3)

where \text{Defensive public policies}_i is the subjectively measured support for border control or Muslim monitoring concerns of individual \( i \); \text{SDO}_i is an average of four SDO measures of individual \( i \); \text{Fear}_i is a measured fear of terrorism or Islamic extremism of individual \( i \); \( Z_i \) is vector of individual characteristics (controls); and \( \epsilon_i \) is an error term. The results are presented in Table 6.3.

Fear of terrorism and Islamic extremism both have a positive association with support for border control policies, and have negative associations with Muslim monitoring concerns (Table 6.3). The association between SDO and both border control policies and Muslim monitoring concerns remains significant. However, the SDO coefficient decreases from 0.249 (Table 6.2, column 3) to 0.183 and 0.121 (Table 6.3, columns 1 and 2) when fear of terrorism and fear of Islamic extremism are modelled as mediators. Similarly, the SDO coefficient increases from -0.347 (Table 6.2, column 4) to -0.302 and -0.252 (Table 6.3, columns 3 and 4) when fear of terrorism or fear of Islamic extremism are modelled as mediators for Muslim monitoring concerns. These results support Hypothesis 3, showing that individuals high in SDO experience higher fear of terrorism (and Islamic extremism), which then affects support for increased surveillance and monitoring of Muslims in Australia or border control policies.
Table 6.3 Predicting attitudes to terrorism and counter-terrorism with mediating effects of fear: Model results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1) Border control</th>
<th>(2) Border control</th>
<th>(3) Muslim monitoring</th>
<th>(4) Muslim monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of terrorism</td>
<td>0.798*** (0.086)</td>
<td>1.229*** (0.099)</td>
<td>-0.540*** (0.114)</td>
<td>-1.017*** (0.128)</td>
</tr>
<tr>
<td>Fear of Islamic extremism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO</td>
<td>0.183*** (0.054)</td>
<td>0.121** (0.054)</td>
<td>-0.302*** (0.070)</td>
<td>-0.252*** (0.071)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>690</td>
<td>691</td>
<td>392</td>
<td>394</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level Standard errors in parentheses.

6.4.2. Robustness test

We examine the robustness of our results by first re-estimating equation 6.1 using alternative measures of SDO. Specifically, we use the four measures of SDO separately. Second, we re-estimate the mediation hypothesis using a seemingly unrelated regression model. Finally, in unreported results we also re-estimate Hypotheses 1 and 2 using order probit regression and adding controls such as a dummy measure for metropolitan residence, and a count of the number of people in the household. The results continue to hold with different specifications of the model and with additional controls.

SDO measures

The results hold when we disaggregate the mean score of SDO into the four original variables. Table 6.4 shows that all four measures of SDO are positively and significantly associated with fear of terrorism, with the coefficients varying from 0.081 to 0.139. Similarly, Table 6.5 presents positive and significant associations of SDO with fear of Islamic extremism (coefficients between 0.132 and 0.173). Tables 6.6 and 6.7 both support the significant association between SDO and defensive public policies. All four measures of SDO are positively associated with support for border control policies (coefficients between 0.084 and
0.123 in Table 6.6) and negatively associated with Muslim monitoring concerns (coefficients between -0.120 and -0.240 in Table 6.7).

Table 6.4 Predicting fear of terrorism with disaggregated SDO measures: Model results

<table>
<thead>
<tr>
<th>Dependent variable: Fear of terrorism</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO1</td>
<td>0.081**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO2</td>
<td>0.096***</td>
<td>0.139***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.038)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO3</td>
<td></td>
<td></td>
<td></td>
<td>0.100***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.026)</td>
</tr>
<tr>
<td>SDO4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Controls</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>772</td>
<td>760</td>
<td>760</td>
<td>745</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level Standard errors in parentheses. Note. For interpretation purposes SDO-1 and SDO-2 have been rescaled, where 1 is the highest level of agreement and 10 is the lowest.

Table 6.5 Predicting fear of Islamic extremism with disaggregated SDO measures: Model results

<table>
<thead>
<tr>
<th>Dependent variable Fear of Islamic extremism</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO1</td>
<td>0.136***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO2</td>
<td></td>
<td>0.173***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO3</td>
<td></td>
<td></td>
<td>0.160***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.040)</td>
<td></td>
</tr>
<tr>
<td>SDO4</td>
<td></td>
<td></td>
<td></td>
<td>0.132***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.027)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>772</td>
<td>760</td>
<td>760</td>
<td>745</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level Standard errors in parentheses. Note. For interpretation purposes SDO-1 and SDO-2 have been rescaled, where 1 is the highest level of agreement and 10 is the lowest.
Table 6.6 Predicting border control support with disaggregated SDO measures: Model results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Border control</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO1</td>
<td>0.084**</td>
<td>(0.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO2</td>
<td>0.116***</td>
<td>(0.035)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO3</td>
<td>0.092**</td>
<td>(0.039)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO4</td>
<td></td>
<td></td>
<td></td>
<td>0.123***</td>
<td>(0.028)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>742</td>
<td>730</td>
<td>729</td>
<td>720</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level
Standard errors in parentheses. Note. For interpretation purposes SDO-1 and SDO-2 have been rescaled, where 1 is the highest level of agreement and 10 is the lowest.

Table 6.7 Predicting Muslim monitoring concerns with disaggregated SDO measures: Model results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Muslim monitoring</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO1</td>
<td>-0.120***</td>
<td>(0.046)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO2</td>
<td>-0.240***</td>
<td>(0.047)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDO3</td>
<td></td>
<td></td>
<td>-0.179***</td>
<td>(0.054)</td>
<td></td>
</tr>
<tr>
<td>SDO4</td>
<td></td>
<td></td>
<td></td>
<td>-0.131***</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>413</td>
<td>414</td>
<td>408</td>
<td>404</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level Standard errors in parentheses. Note. For interpretation purposes SDO-1 and SDO-2 have been rescaled, where 1 is the highest level of agreement and 10 is the lowest.

Seemingly unrelated regression

To test the robustness of the mediator hypothesis (Hypothesis 3), we estimate equations 6.1 and 6.2 as a system. It should be noted that the system is not independent; fear of terrorism is assumed to affect defensive public policies, although not the reverse. A recursive system of equations often has a correlation of errors across equations. As such, it is useful to estimate the system using seemingly unrelated regressions (SUR) to improve efficiency and account for heteroscedasticity and correlation of errors across equations (Welsch, 2008). We use an ordered probit estimation method to account for the ordinal distribution of the dependent variables. Finally, to achieve convergence we include only the statistically significant variables from
Table 6.2 as controls. Results are presented in Table 6.8. SDO have both direct and indirect effects (through fear of terrorism and fear of Islamic extremism) on support for border control policies and Muslim monitoring concerns, which supports the mediator hypothesis.

Table 6.8 Seemingly unrelated regression predicting attitudes to terrorism and counter-terrorism: Model results

<table>
<thead>
<tr>
<th>Part A</th>
<th>(1) Border control</th>
<th>(2) Border control</th>
<th>(3) Muslim monitoring</th>
<th>(4) Muslim monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO</td>
<td>0.094***</td>
<td>0.099***</td>
<td>-0.176***</td>
<td>-0.132***</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.035)</td>
<td>(0.039)</td>
<td>(0.048)</td>
</tr>
<tr>
<td>Fear of terrorism</td>
<td>0.526***</td>
<td>-0.293**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.095)</td>
<td>(0.138)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of Islamic</td>
<td>0.460**</td>
<td>-0.624***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>extremism</td>
<td>(0.198)</td>
<td>(0.217)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part B</th>
<th>Fear of terrorism</th>
<th>Fear of Islamic extremism</th>
<th>Fear of terrorism</th>
<th>Fear of Islamic extremism</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDO</td>
<td>0.124***</td>
<td>0.165***</td>
<td>0.123***</td>
<td>0.166***</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.026)</td>
<td>(0.028)</td>
<td>(0.026)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>877</td>
<td>886</td>
<td>808</td>
<td>883</td>
</tr>
</tbody>
</table>

*** Significant at the 1% level; **significant at the 5% level; *significant at the 10% level
Standard errors in parentheses.

6.5. Discussion of Results

In the 15 years since the September 11 attacks in New York City, research on individuals’ fear of terrorism has proliferated. The literature gets ever closer to pinpointing precise mechanisms to explain why some people are fearful or anxious of the prospects of experiencing an act of terror, and others are more sanguine (see for example Lerner, Gonzalez, Small, & Fischhoff, 2003). Emotions, right-wing authoritarianism, personality traits, gender, education, and religious identification have all been shown to be associated with fear of terrorism, and with support for strong counter-terrorism policies. This study contributes to that literature by showing that SDO has strong and direct effects on individuals’ fear of terrorism and of Islamic extremism (separately), support for strong border protection policies, and lack of concern that Muslims might be singled out for additional surveillance in the pursuit of counter-terrorism.
Additionally, these results reveal that fear of terrorism has a mediating role in the relationship between SDO and attitudes to terrorism and counter-terrorism. SDO retains a significant direct effect on those attitudes in the mediated model, but that effect is dwarfed by the mediating effects of both measures of fear (although particularly fear of Islamic extremism).

Arguably, these findings are simple to explain. Individuals high in SDO tend to benefit from existing social hierarchies (Sidanius & Pratto, 2001). In this case (per Table 6.1), SDO is associated with being male, being under-educated (i.e. possessing less than a high school education), and having some kind of religious identification. Each of these represents membership of a social group that faces potential threats from increased social and cultural heterogeneity, globalization, and social progress generally (Cameron & Nickerson, 2009; Duckitt & Fisher, 2003). It stands to reason that, with the most to lose from inter-group equality, these Australians are the most fearful of threats to the status quo; in this case, that manifests as fear of a terrorist attack on Australian soil, and fear of the rise of Islamic extremism. It likewise stands to reason that fear of terrorism – and the associated threat to the group hierarchy status quo – drives individual-level support for strong counter-terrorism measures, even as they infringe upon civil liberties. At its core, this is what SDO purports to measure: the desire to preserve inter-group hierarchies even at a (separate) cost to individuals within those groups.

The implications for policymakers addressing the threat of terrorism are profound, and fraught. Among high-SDO citizens, the imperative to maintain inter-group hierarchies will ensure support for counter-terrorism policies, even as they constrain individual liberties. Increased anxiety – such as that stoked by increased consciousness of inter-group hierarchies and threats to the status quo – increases support for counter-terrorism policies (Huddy et al., 2005). In

---

27 Note that Australian society is characterized by a lack of distinct religious cleavages. There is little reason to expect to find significant differences in SDO between, for example, plurality religious affiliations such as Catholic or Protestant. Where religious affiliations might be expected to betray differences in SDO (e.g. Muslim or Hindu), subsamples are too small to support reliable claims.
other words, there is political capital to be gained from promoting inter-group hostilities. Moreover, counter-terrorism policies commonly encounter trade-offs between community-wide security and individual-level liberties; pursuit of optimal security tends to require infringement of those liberties. In the longer term, counter-terrorism policy creep can lead to concentrations of executive power, systemic failure of counter-terrorist strategies, and limits on judicial review of legislation (Donohue, 2008). In short, the issue at the heart of this chapter is a large and important one. Further understanding of public attitudes to terrorism and counter-terrorism has manifold benefits.

6.6. Conclusion

This chapter posed and tested three hypotheses. First, that individual-level social dominance orientation (SDO) would positively predict support for ‘defensive’ counter-terrorism policies, namely a strong border protection regime, and policies that may inadvertently single out Muslims for additional surveillance. Second, that SDO would positively predict individuals’ fear of experiencing a terrorist attack on their home soil, and their fear of the rise of Islamic extremism. Third, that SDO predicts individuals’ fear of a terrorist attack and Islamic extremism, which then positively predicts support for defensive counter-terrorism policies (i.e. that the relationship between SDO and support for defensive counter-terrorism policies is mediated by fear). The hypotheses were tested using survey data from a probability-based sample of 1200 Australian adults, and all three hypotheses were supported.

These findings contribute to the literature on SDO and threats to inter-group hierarchies generally, SDO and fear of terrorism, and fear of terrorism and support for defensive counter-terrorism policies. They support previous findings on the moderating effects of gender on individuals’ fear of terrorism and support for defensive policies, and expand existing knowledge on the effects of religious affiliation and educational attainment on both fear of terrorism and support for defensive policies. Future research should expand on these findings.
by exploring the relationship between SDO and individuals’ fear of terrorism and Islamic extremism more deeply. Do high-SDO individuals believe that terrorism poses a direct threat to the social order of western, liberal democracies? Is there a limit to the liberty-infringing policies that such individuals will support in the aim of maintaining current inter-group hierarchies? At which point does individual liberty outweigh that hierarchy status quo, for high-SDO and low-SDO individuals? Testing the limits of such cost-benefit calculations remains a foremost goal of social scientists, and of political scientists in particular.
References


Thomsen, L., Green, E., & Sidanius, J. (2008). We will hunt them down: How social dominance orientation and right-wing authoritarianism fuel ethnic persecution of immigrants in fundamentally different ways. *Journal of Experimental Social Psychology, 44*(6), 1455-1464.


## Appendix 6A

### Table 6.9 Attitudes to terrorism and SDO: Description of Control variables

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Questions</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Gender</td>
<td>1 Male; 0 Female</td>
</tr>
<tr>
<td>Australian parents</td>
<td>Were both of your parents born in Australia?</td>
<td>1 Both parents born in Australia; 0 Otherwise</td>
</tr>
<tr>
<td>Income</td>
<td>What is your total annual household income before tax or anything else is taken out?</td>
<td>1 Less than $20,000 2 $20,000 to less than $40,000 3 $40,000 to less than $60,000 4 $60,000 to less than $80,000 5 $80,000 to less than $100,000 6 $100,000 to less than $150,000, or 7 $150,000 or more</td>
</tr>
<tr>
<td>Age</td>
<td>Would you mind telling me how old you are?</td>
<td>1 Working full-time/part time for pay; 0 Otherwise</td>
</tr>
<tr>
<td>Employed</td>
<td>Which of these best describes your current employment situation?</td>
<td>1 No internet connection; 0 Otherwise</td>
</tr>
<tr>
<td>No internet</td>
<td>Can the internet be accessed at home/this dwelling?</td>
<td>1 No Religion (includes Atheist and Agnostic); 0 Otherwise</td>
</tr>
<tr>
<td>No religion</td>
<td>What is your religion or faith?</td>
<td>1 No Religion (includes Atheist and Agnostic); 0 Otherwise</td>
</tr>
<tr>
<td>Children</td>
<td>How would you describe this household?</td>
<td>1 Couple with children / One parent family (at home); 0 Otherwise</td>
</tr>
<tr>
<td>Higher education</td>
<td>What is the highest level of education you have completed?</td>
<td>1 Above year 12 0 Year 12 and below</td>
</tr>
<tr>
<td>Owner</td>
<td>Do you own outright, are you buying or renting the dwelling in which you now live?</td>
<td>1 Own outright/ Own, paying off mortgage 0 Otherwise</td>
</tr>
</tbody>
</table>
Appendix 6B

Table 6.10 Attitudes to terrorism and SDO: Means, Standard Deviations and Correlations

<table>
<thead>
<tr>
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<tr>
<td>Mean</td>
<td>2.43</td>
<td>3.03</td>
<td>2.99</td>
<td>2.60</td>
<td>2.78</td>
<td>0.49</td>
<td>0.56</td>
<td>4.22</td>
<td>52.94</td>
<td>0.55</td>
<td>0.11</td>
<td>0.38</td>
<td>0.35</td>
<td>0.78</td>
<td>0.70</td>
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<tr>
<td>Std. Dev.</td>
<td>0.98</td>
<td>0.91</td>
<td>1.22</td>
<td>1.07</td>
<td>1.55</td>
<td>0.50</td>
<td>0.50</td>
<td>2.03</td>
<td>17.55</td>
<td>0.50</td>
<td>0.31</td>
<td>0.49</td>
<td>0.48</td>
<td>0.41</td>
<td>0.46</td>
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<tr>
<td>1. Fear of terrorism</td>
<td></td>
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<tr>
<td>2. Fear of Islamic extremism</td>
<td>0.56</td>
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<tr>
<td>3. Border control</td>
<td>0.40</td>
<td>0.50</td>
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<tr>
<td>4. Muslim monitoring</td>
<td>-0.27</td>
<td>-0.41</td>
<td>-0.44</td>
<td></td>
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<tr>
<td>5. SDO</td>
<td>0.19</td>
<td>0.26</td>
<td>0.25</td>
<td>-0.36</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Male</td>
<td>-0.12</td>
<td>-0.08</td>
<td>0.01</td>
<td>-0.19</td>
<td>0.08</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>7. Australian parents</td>
<td>-0.04</td>
<td>0.04</td>
<td>0.01</td>
<td>-0.12</td>
<td>0.05</td>
<td>-0.04</td>
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<tr>
<td>8. Income</td>
<td>-0.11</td>
<td>-0.12</td>
<td>-0.08</td>
<td>0.04</td>
<td>-0.10</td>
<td>0.11</td>
<td>-0.01</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>9. Age</td>
<td>0.05</td>
<td>0.20</td>
<td>0.10</td>
<td>-0.17</td>
<td>0.12</td>
<td>-0.06</td>
<td>0.09</td>
<td>-0.31</td>
<td></td>
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</tr>
<tr>
<td>10. Employed</td>
<td>-0.03</td>
<td>-0.09</td>
<td>-0.05</td>
<td>0.14</td>
<td>-0.11</td>
<td>0.06</td>
<td>-0.07</td>
<td>0.51</td>
<td>-0.43</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11. No internet</td>
<td>0.10</td>
<td>0.08</td>
<td>0.06</td>
<td>-0.13</td>
<td>0.13</td>
<td>-0.05</td>
<td>0.09</td>
<td>-0.25</td>
<td>0.26</td>
<td>-0.23</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>12. No religion</td>
<td>-0.18</td>
<td>-0.24</td>
<td>-0.23</td>
<td>0.16</td>
<td>-0.21</td>
<td>0.12</td>
<td>0.00</td>
<td>0.07</td>
<td>-0.22</td>
<td>0.04</td>
<td>-0.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Children</td>
<td>0.01</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.08</td>
<td>0.00</td>
<td>0.32</td>
<td>-0.32</td>
<td>0.26</td>
<td>-0.16</td>
<td>0.0179</td>
<td></td>
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<tr>
<td>14. Higher education</td>
<td>-0.15</td>
<td>-0.18</td>
<td>-0.18</td>
<td>0.14</td>
<td>-0.16</td>
<td>0.11</td>
<td>-0.18</td>
<td>0.28</td>
<td>-0.29</td>
<td>0.28</td>
<td>-0.32</td>
<td>0.12</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Owner</td>
<td>-0.02</td>
<td>0.11</td>
<td>0.06</td>
<td>-0.13</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.07</td>
<td>0.14</td>
<td>0.40</td>
<td>-0.03</td>
<td>-0.02</td>
<td>-0.15</td>
<td>0.03</td>
<td>0.04</td>
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</table>
7. Ethnic inequality and terrorism

7.1. Introduction

As discussed in Chapter 2, a substantial body of empirical research has sought to better understand the key determinants of terrorism in the hope that more effective policies can be implemented to reduce this phenomenon. Despite this research effort, little consensus as to the key determinants of terrorism has emerged and this remains an area requiring further investigation.

In the most comprehensive review published to date, Gassebner and Luechinger (2011) re-assess the effect of 65 proposed determinants of terrorism. In regards to the number of terrorist attacks occurring in a particular country, the authors find that economic freedom, physical integrity rights, law and order, and infant mortality rates are negatively associated with terrorism, while population, military expenditures and personnel, internal and internationalized internal wars, guerrilla wars, strikes, government fractionalization, urbanization, foreign portfolio investments, OECD membership, political proximity to the United States, as well as religious and ethnic tensions are positively associate.

In regards to the number of terrorist attacks against citizens from a particular country, the authors find that economic freedom, physical integrity rights, primary goods exports and large population shares of young people are negatively associated with terrorism, while GDP per capita, population, military expenditures, internal and internationalized internal wars, guerrilla wars, OECD membership, political proximity to the United

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28 A version of this chapter has been submitted for publication in the form of a co-authored refereed journal article. The bibliographic details of the co-authored paper, including all authors, are Margarita Vorsina, Matthew Manning, Christopher M. Fleming. “Ethnic Inequality and Terrorism”. My contribution to the paper involved writing and compilation of the manuscript, data analysis and the preparation of the tables and figures.
States, and religious and ethnic tension are positively related. In regards to the number of terrorist attacks carried out by the citizens of a particular country, economic freedom, physical integrity rights, and the number of telephone mainlines are negatively associated with terrorism, while internationalized wars and centrist governments are positively associated. While the authors uncover some clearly robust correlates of terrorism, they caution that additional theoretical and empirical studies are needed to clarify issues regarding the underlying mechanisms.

Within the body of literature seeking to identify the determinants of terrorism, very little attention has been paid to the role of ethnic economic inequality. Therefore, in this study we employ data from Alesina et al.’s (2016) new measure of between-ethnicity economic inequality, coupled with the GTD, to empirically examine the association between ethnic inequality and domestic terrorism for 152 countries over the period 1993 to 2012. The measure of between-ethnicity inequality put forward by Alesina, et al. (2016) is employed because it overcomes the sparsity of income data along ethnic lines and allows country-level indicators of ethnic inequality to be constructed for the largest possible set of states. We use the GTD because it is the only global dataset from which it is possible to disaggregate domestic and international terrorism. To the best of our knowledge, this is the first study to comprehensively assess the association between ethnic inequality and terrorism.

Modern rational choice theory proposed by Becker (1968) underpins this study. In this theory, developed in the context of crime, Becker (1968) outlines a standard economic model whereby a person commits a crime if the utility from doing so is greater than the utility from engaging in other (non-criminal) activities. A key component of his utility function is the probability of being convicted as well as the severity of punishment. A third component is the “income available...in legal and other illegal activities, the
frequency of nuisance arrests, and...willingness to commit an illegal act” (Becker, 1968, p. 177). Similarly, Stigler (1970, p. 530) states: “…he [the offender] will reckon the expected value of the expected returns and costs of the criminal activity and compare their difference with the net returns from other criminal activities and from legitimate activities.” In short, both Becker (1968) and Stigler (1970) believe that the rational offender considers the benefits of the illegal act alongside the risk of detection, apprehension, conviction and severity of punishment. And, as such, offender decision making may be amenable to manipulation through changes (perceived or actual) in some or all of these factors.

While the argument that terrorists are rational actors is not without its critics, particularly for the case of those who wilfully commit suicide (see for example Hafez, 2007), more recent evidence provided by Kacou (2013) supports the rational actor hypothesis. In his analysis of five arguments against the rationality of suicide terrorists, Kacou (2013) concludes that the assumption that suicide terrorists are rational actors remains sufficiently strong – whether the terrorists’ interests are defined internally or externally. Further support for the idea that terrorist acts can be explained by the rational choice model is provided by Hoffman and McCormick (2004), Pape (2003), Silke (2004) and Sprinzak (2000), among others.

Since wilful engagement in the violation of illegal activity involves an ability to make self-serving (i.e. rational) choices, the application of an economic analysis to terrorism activities appears to be cogent. Following Becker (1968) and adapting Freeman’s (1999) formal model of crime, we therefore propose the following. An individual will choose to commit an act of terrorism at time $t$ if the utility from successfully committing that act ($U(A_{it})$), minus the utility if their ambitions are thwarted ($U(M_{it})$), weighted
by the probability of being apprehended \((p_t)\), is greater than the utility gained from not engaging in terrorist activity \((U(Q_{it}))\). That is, if:

\[
(1 - p_t)U(A_{it}) - p_tU(M_{it}) > U(Q_{it})
\]  

(7.1)

We also propose that high ethnic inequality decreases the utility gained from not engaging in terrorist activity and promotes a sense of grievance among the most economically disadvantaged, which in turn makes them more vulnerable to radical ideas and more susceptible to being recruited (Caruso & Schneider, 2011). That is:

\[
Q_{it} = f(X_{it}, S_t, I_t)
\]

(7.2)

And

\[
\frac{\partial Q}{\partial I} < 0
\]

(7.3)

where \((X_{it})\) is a vector of the individual’s socio-economic and demographic characteristics (e.g. age, income, marital status), \((S_t)\) is a vector of societal level characteristics (e.g. unemployment rate) and \((I_t)\) is a measure of ethnic inequality.

The chapter proceeds as follows. Section 2 summarises the existing literature with respect to inequality and terrorism. Section 3 describes method and data. Section 4 presents results and robustness tests. Conclusions are presented in Section 5.

7.2. Related Literature

The association between inequality more generally and terrorism has been widely explored. However, as with many of the determinants of terrorism, the empirical evidence is mixed. As discussed in Chapter 2, some studies report a positive correlation between income inequality and terrorism (Enders & Hoover, 2012; Koch & Cranmer, 2007; Li & Schaub, 2004), while others (Abadie, 2006; Kis-Katos et al., 2011; Kurrild-Klitgaard et al., 2006; Li, 2005; Piazza, 2006) find no significant relationship. Freytag
et al. (2011) and Goldstein (2005) find a negative association, which may be explained by a lack of adequate specification in the case of Goldstein (2005) and the influence of regime type in the case of Freytag, et al. (2011).

As commented on briefly in Chapter 2, the potential effect of inequality on terrorism may be influenced not only by vertical inequalities (i.e. inequality among individuals or households), but also by horizontal inequalities (i.e. inequality among groups, typically culturally defined by ethnicity, religion or race). Alesina and Zhuravskaya (2011) find that countries with a high level of ethnical and linguistic segregation have lower quality of government and national institutions. It seems plausible that when cultural differences coincide with economic and political inequalities between groups, this can cause deep resentment that may lead to violent struggles (Stewart, 2011). For example, Matuszeski and Schneider (2006) find that ethnic fractionalizations increase the chance of civil war and conflicts; Cederman et al. (2011) show that civil wars are more likely to occur in countries with high horizontal inequalities; while Brown (2010) shows that regions with high horizontal inequalities have an increased likelihood of secessionism.

Ethnic groups share common beliefs and cultural traditions, and have a higher mutual understanding, which endorses a sense of self-identification with the group. Once differences between groups become significant, members of the same ethnic group are more prone to compare themselves with other groups (Turner, 1981). Unequal access to economic resources increases resentment and a sense of grievance among the disadvantaged group. As a result, high horizontal inequalities among ethnic groups raises the risks associated with ethnic mobilization and collective violence (Cederman, et al., 2011). If the disadvantaged group has access to resources, or if the ruling group is weak, these grievances could trigger civil war or open rebellion. However, if the
resources are limited and the ruling group is powerful, the rebels may select terrorism as their tactic to express their grievance (Blomberg et al., 2004b).

Horizontal inequalities take several forms. As defined by Stewart (2011):

- **economic horizontal inequalities** include inequalities in access to, and ownership of, assets (financial, human, natural resource-based and social) and inequalities in income levels and employment opportunities, which depend on such assets and the general conditions of the economy;

- **social horizontal inequalities** include inequalities in access to a range of services, such as education, health care and housing, as well as to the benefits of educational and health care outcomes;

- **political horizontal inequalities** include inequalities in the distribution of political opportunities and power among groups, including control over the army, the cabinet, local and regional governments, parliamentary assemblies, the police and the presidency. They also encompass inequalities in people’s capabilities to participate politically and to express their needs; and

- **cultural horizontal inequalities** include disparities in the recognition and standing of different groups’ language, religion, customs, norms and practices.

The focus of this study is on economic horizontal inequalities. Few studies have addressed the effect of economic horizontal inequalities on terrorism. Of those that do, Piazza (2011) shows that there is a strong correlation between economic discrimination of minority groups and domestic terrorism, while Ezcurra and Palacios (2016) show that horizontal inequalities (measured as interregional income inequalities) are positively and significantly associated with the number of domestic terrorism events. We take a different approach to these earlier studies by focussing on economic horizontal inequalities among all ethnic groups, whereas Piazza (2011) considers only
minority groups and Ezcurra and Palacios (2016) focus exclusively on geographical regions.

7.3. Data and Variables

As a measure of ethnic inequality we use the between-ethnicity economic inequality index (from here on ‘the Index’) across countries, developed by Alesina, et al. (2016). To construct proxies of ethnic inequality for the largest possible set of countries, Alesina, et al. (2016) combine information from ethnographic-linguistic maps on the location of groups with satellite images of light density at night. Ethnic groups are identified and located via two datasets: the Geo-Referencing of Ethnic Groups (GREG), which is the digitized version of the Soviet Atlas Narodov Mira (Weidmann et al., 2010) and the 15th edition of the Ethnologue (Gordon, 2005). The GREG dataset depicts the homelands of 928 ethnic groups around the world using the political boundaries of 1964 to allocate groups to different countries. Alesina, et al. (2016) then project the ethnic homelands to the political boundaries of the 2000 Digital Chart of the World, yielding 2,129 ethnic homelands within contemporary countries. The Ethnologue dataset maps 7,581 language-country groups worldwide in the mid to late 1990s, using the political boundaries of 2000, providing a more refined linguistic aggregation than GREG. GREG, however, attempts to map major immigrant groups (while Ethnologue does not); and this is important for countries in the New World.

Noting that comparable data on income per capita at the ethnicity level are scarce, Alesina, et al. (2016) follow Henderson et al. (2012) and others by employing satellite image data on light density at night as a proxy. This has been shown (by Chen & Nordhaus, 2011; Henderson, et al., 2012; and Michalopoulos & Papaioannou, 2013) to be a strong correlate of development at various levels of aggregation (countries, regions, ethnic homelands). The luminosity data comes from the Defense
Meteorological Satellite Program’s Operational Linescan System, which reports images of the Earth at night (20:30 till 22:00) (NOAA National Centers for Environmental Information, 2015). To construct luminosity at the desired level of aggregation, Alesina, et al. (2016) average all observations falling within the boundaries of an ethnic group and then divide by the population of each area using data from the Gridded Population of the World (Center for International Earth Science Information Network – CIESIN – Columbia University, 2016).

The Index is measured as a Gini coefficient for each country as follows:

\[
G = \frac{1}{n} (n + 1 - 2 \sum_{i=1}^{n} \left( \frac{n+1-i}{\sum_{i=1}^{n} y_i} \right)) \tag{7.4}
\]

where \( n \) is the number of groups in each country and \( y_i \) is luminosity per capita for the historical homeland of group \( i \). The Index is calculated for both the GREG and Ethnologue maps in 1992, 2000, 2006 and 2012. As ethnic homeland, rather than individual level, data are employed, the ethnic inequality measures also reflect regional disparities in income or public goods provision that may not be related to ethnicity. Nevertheless, the Index provides us with measures of ethnic inequality for 152 countries in the years 1992, 2000, 2006 and 2012.

Data on the level of terrorism are obtained from the GTD which, as discussed in Chapter 3, defines terrorism as “the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation” (START, 2014, p. 9). The GTD includes both domestic and international terrorism but does not differentiate between them.\(^{29}\) This chapter is

\(^{29}\) “Domestic terrorism is home-grown with consequences for just the host country, its institutions, citizens, property, and policies. In a domestic terrorist attack, the victim and perpetrators are from the host country” (Enders & Sandler, 2008, p. 21). In contrast, transnational terrorism affects more than one country.
focussed on the effect of ethnic inequality on domestic terrorism, as this is by far the most common form of terrorism (Global Terrorism Database, 2014). Further, the relationship between ethnic inequality and international terrorism is complicated by the fact that ethnic inequality may be an issue in both the target and origin countries. This is beyond the scope of this paper and is the focus of future research. To isolate data on domestic terrorism, we employ the method developed by Enders et al. (2011) as well as data from Gaibulloev et al. (2012) to calculate the number of domestic terrorist attacks for all 152 countries for which data on ethnic inequality are available.

Figures 7.1 and 7.2 illustrate the global distribution of ethnic inequality for the Ethnologue and GREG measures respectively, for the year 2006. Figures 7.3 and 7.4 illustrate the logarithm of the total number of domestic terrorist attacks and total number of people killed in domestic terrorist attacks respectively, over the period 2007 to 2012.
Figure 7.1 Ethnic Inequality global distribution: Ethnologue measure (2006)

Data Source: Alesina, et al. (2016)

Figure 7.2 Ethnic Inequality global distribution: GREG measure (2006)

Data Source: Alesina, et al. (2016)
Figure 7.3. Logarithm of the total number of domestic terrorist attacks over the period 2007–2012

Figure 7.4 Logarithm of the total number of people killed in domestic terrorist attacks over the period 2007–2012

Data Source: Enders et al. (2011); Gaibulloev et al. (2012)
7.4. Method

7.4.1. Preliminary analysis

We begin by grouping countries according to their average between-ethnicity economic inequality index value over the four time periods. Groups are formed from both the median value (two-group separation) and the first and third quartiles (three-group separation). As shown in Figures 7.5 and 7.6, regardless of the dataset employed to identify ethnic group countries with higher ethnic inequality have on average more incidents of domestic terrorism.

Focussing first on the Ethnologue measure (two-group separation), the mean number of terrorism attacks in the lower half is 20.81, while in the upper half the corresponding number is 95.32. For the three-group separation using this measure, the mean number of terrorism attacks is 8.9, 81.4 and 83.7 for the first quartile, the second and third quartiles, and the fourth quartile respectively. When employing the GREG measure, the corresponding means are 27.69 and 88.42 (two-group separation) and 19.52, 50.09 and 104.35 (three-group separation).
Figure 7.5 Ethnic inequality and domestic terrorism: Ethnologue measure

Source: Author’s calculations

Figure 7.6 Ethnic inequality and domestic terrorism: GREG measure

Source: Author’s calculations
7.4.2. Estimation strategy

This study employs an adaption of the method used by Ezcurra and Palacios (2016), who examine the relationship between interregional inequality and the incidence of domestic terrorism in a panel of 48 countries over the period 1990–2010. In our case, the estimating equation for domestic terrorism is stated as follows:

\[ T_{i,t\rightarrow t+n} = \alpha + \beta I_{i,t-1} + \gamma' X_{i,t-1} + \lambda + \varepsilon_{it} \]  

(7.5)

where \( T_{i,t\rightarrow t+n} \) is the number of domestic terrorist attacks in country \( i \) between time \( t \) and time \( t+n \), \( I_{i,t-1} \) is the measure of ethnic inequality in time \( t-1 \), \( X_{i,t-1} \) is a vector of control variables in time \( t-1 \), \( \lambda \) denotes year fixed effects, and \( \varepsilon_{it} \) is the stochastic component.

Following Ezcurra and Palacios (2016), the control variables include GDP per capita; GDP per capita squared (to capture a potential non-linear relationship); a dummy variable indicating whether the country is ‘free’ or ‘not free’ as classified by Freedom House (2016); population (as countries with higher populations have a greater number of potential recruits for terrorist organizations and, hence, are most likely have a greater number of terrorist attacks (Gassebner & Luechinger, 2011; Krieger & Meierrieks, 2011; Krueger & Laitin, 2008; Krueger & Malečková, 2003)); degree of trade openness (the sum of exports and imports of goods and services expressed as percentage of GDP); a population-weighted terrain ruggedness index (as geographical barriers, such as rough and mountainous terrain, could affect the level of terrorist activity (Abadie, 2006), while mountainous terrain gives opportunity for terrorists to hide from the government forces (Fearon & Laitin, 2003)); and continent dummies.\(^ {30} \)

\(^ {30} \) As noted by Ezcurra and Palacios (2016), control variables included in vector \( X \) have been selected based on an examination of existing studies regarding the causes of terrorism. See for example, Krieger and Meierrieks (2011) and Gassebner and Luechinger (2011). Although the majority of the literature
The periods used to calculate the dependent variable are 1993–2000, 2001–2006, 2007–2012, whereas the time-varying regressors are measured in the year preceding the beginning of each period (i.e. 1992, 2000, and 2006). When examining the effect of ethnic inequality on the incidence of domestic terrorism, it should be noted that terrorist activity may influence the spatial distribution of income within a country (Abadie & Gardeazabal, 2003). This implies that ethnic inequality may affect the number of domestic terror attacks and, in turn, be affected by them, thus giving rise to a potential problem of reverse causality. In order to mitigate this concern, similarly to Ezcurra and Palacios (2016), the measure of ethnic inequality (like the remaining regressors in the model) is lagged by one year – that is, measured in the year preceding the beginning of each period.

Ideally the potential issue of reverse causality should be addressed by employing an instrumental variable. This approach, however, would require identification of an appropriate instrument for ethnic inequality. The instrument selected must not be correlated with the error term in the model, but account for the variation in ethnic inequality observed in the sample. Finding an instrument that fulfils these conditions in the context of our study is difficult because the potential determinants of ethnic inequality identified in the literature (e.g. GDP per capita, country size, trade openness, geographical factors) are expected to also be correlated with terrorist activity; hence our reliance on the use of lagged independent and control variables. This approach is consistent with other empirical studies on the determinants of terrorism (Ezcurra & Palacios, 2016; Freytag, et al., 2011; Kis-Katos, et al., 2011).

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31 focusses on international terrorism, in many cases the explanatory variables for international terrorism are also determinants of domestic terrorism (Kis-Katos, et al., 2011).

31 The latest year for which data on domestic terrorism are available is 2012. This restricts us from using data on ethnic inequality for 2012 due to possible reverse causality.
It should also be noted that inclusion of country fixed effects in the model could lead to biased results, since most of the variation in the independent variable occurs between countries rather than over time (Ezcurra & Palacios, 2016). For this reason, we do not control for country fixed effects.

We estimate Equation 7.5 as a negative binomial regression. This approach is considered appropriate to estimate over-dispersed (i.e. significant number of zeros) count variables (such as the number of domestic terrorist attacks) (Brockhoff et al., 2015; Krieger & Meierrieks, 2011). If count variables with over dispersion are estimated using ordinary least squares, the results could be inefficient, inconsistent and biased (Long, 1997). We employ the offset option to correct for exposure time, as the number of years over which terrorist attacks are observed differs for our three periods (one eight-year period 1993–2000 and two six-year periods 2001–2006, 2007–2012). To address both heteroscedasticity and serial correlation issues within countries, the standard errors are clustered on the country level. Finally, since the negative binomial regression assumes use of the natural logarithm of the dependent variable, for interpretation purposes we take natural logarithms of all independent and control variables except for dummies. This allows us to view the corresponding coefficient estimates as elasticities.

7.5. Presentation of Results

Results from the estimate of Equation 7.5 are presented in tables 7.1 (Ethnologue ethnic grouping) and 7.2 (GREG ethnic grouping). The dependent variable for Columns 1 and 2 in both tables is the total number of domestic terrorist attacks calculated over the three periods. Our estimates show that when we exclude additional controls (Column 1), ethnic inequality is positively and statistically significantly associated with the number of terrorist attacks. However, when controlling for other potential determinants of
terrorism (Column 2), the association remains positive but is no longer significant. This result is consistent for both the Ethnologue and GREG measures of ethnic inequality.

The total number of severe domestic terrorist attacks (i.e. one in which at least one person has been killed) is the dependent variable in Columns 3 and 4. In the absence of controls (Column 3), ethnic inequality is positively and significantly associated with the number of severe attacks, regardless of the ethnic grouping employed. With the inclusion of controls (Column 4), the result is significant only when employing GREG. We should note that when using severe terrorist attacks as the dependent variable, the association between ethnic inequality and terrorism becomes stronger. In particular, the coefficient when employing the Ethnologue measure increases from 3.509 (Table 7.1, Column 1) to 3.941 (Table 7.1, Column 3) when no additional controls are added, and from 0.211 (Table 7.1, Column 2) to 0.711 (Table 7.1, Column 4) with controls. Similarly, the coefficient when employing the GREG measure increases from 3.875 (Table 7.2, Column 1) to 1.414 (Table 7.2, Column 3) without additional controls, and from 0.477 (Table 7.2, Column 2) to 1.414 (Table 7.2, Column 4) with controls.

The total number of people killed by a domestic terrorist attack is the dependent variable in Columns 5 and 6. Ethnic inequality remains positively associated with the number of people killed, with and without additional controls, and regardless of whether the Ethnologue or GREG measures are employed. To put these results in context, the estimates from Column 6 suggest that a 10% increase in ethnic inequality leads to a 16.7% (Ethnologue) and a 23.3% (GREG) increase in the number of people killed in terrorist attacks. To put this further into context, in 2006 Greece had ethnic inequality indices of 0.26 (Ethnologue) and 0.33 (GREG). If Greece had ethnic inequalities similar to Germany (0.20 for Ethnologue and 0.22 for GREG), the total number of people killed in the following six years would decrease by approximately
38\% \text{ (or by 24 people)}^{32} \text{ and by approximately } 75\% \text{ (or by 49 people)} \text{ when employing the Ethnologue and GREG measures respectively. Due to the strength of the association between ethnic inequality and the number of people killed in a terrorist attack, from this point forward our focus will be on this dependent variable.}

Table 7.1 Main results: Ethnologue measure of ethnic inequality

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue)</td>
<td>3.509***</td>
<td>0.211</td>
<td>3.941***</td>
<td>0.711</td>
<td>4.528***</td>
<td>1.671**</td>
</tr>
<tr>
<td>(0.823)</td>
<td>(0.707)</td>
<td>(0.909)</td>
<td>(0.737)</td>
<td>(0.860)</td>
<td>(0.713)</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
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<td>Time dummies</td>
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<td>Observations</td>
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<td>435</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.049</td>
<td>0.108</td>
<td>0.057</td>
<td>0.122</td>
<td>0.043</td>
<td>0.087</td>
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</table>


Robust standard errors clustered at the country level are in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

---

$^{32} (1-0.203/0.262)*1.671=0.38$. 

185
Table 7.2 Main results: GREG measure of ethnic inequality

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1) Dependent variable</th>
<th>(2) Dependent variable</th>
<th>(3) Dependent variable</th>
<th>(4) Dependent variable</th>
<th>(5) Dependent variable</th>
<th>(6) Dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (GREG)</td>
<td>3.875***</td>
<td>0.477</td>
<td>5.191***</td>
<td>1.414*</td>
<td>6.096***</td>
<td>2.325***</td>
</tr>
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<td>(9.020)</td>
<td>(0.992)</td>
<td>(0.787)</td>
<td>(0.936)</td>
<td>(0.803)</td>
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<td></td>
</tr>
<tr>
<td>Controls</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
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<td>152</td>
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<td>Observations</td>
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<td>435</td>
<td>465</td>
<td>435</td>
<td>465</td>
<td>435</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.045</td>
<td>0.108</td>
<td>0.056</td>
<td>0.123</td>
<td>0.043</td>
<td>0.088</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Tables 7.3 and 7.4 present the effect of ethnic inequality on the total number of people killed, with the inclusion and exclusion of specific controls. Column 1 in Tables 7.3 and 7.4 presents the full results of the models reported in Column 6 in Tables 7.1 and 7.2. In these models, a country being classified as ‘Free’ is negatively associated with the total number of people killed (i.e. greater levels of freedom lead to fewer people being killed in terrorist attacks) for both the Ethnologue and GREG measures. In contrast, both population size and ruggedness are positively associated with the total number of people killed.

In Columns 2 and 3 of Tables 7.3 and 7.4 we exclude GDP per capita and GDP per capita squared, and ‘free’ and ‘not free’ respectively. In all cases the significance and direction of the control variables remain much the same. In Column 4 of these tables we exclude population size and find that the signs and significance of key control variables change. For example, GDP per capita and GDP per capita squared both become significant at the one per cent level, trade openness also becomes significant at the one per cent level, and ruggedness is no longer significant. This result could be due to omitted variable bias. Population is strongly associated with terrorism, so omitting
this variable can be argued to lead to biased and inconsistent results. The model effectively compensates for the omitted variable by over- or under-estimating the effect of the other factors. In Column 5 of Tables 7.3 and 7.4, we exclude trade openness and our results remain the same as in Columns 1 to 3 of these tables. In Column 6 of Tables 7.3 and 7.4, we exclude ruggedness and again results remain the same as in Columns 1 to 3.

Table 7.3 Main results: Ethnologue measure of ethnic inequality and the number of people killed in domestic terrorist attacks

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue)</td>
<td>1.671***</td>
<td>1.768***</td>
<td>1.802***</td>
<td>3.379***</td>
<td>1.635**</td>
<td>1.533***</td>
</tr>
<tr>
<td></td>
<td>(0.713)</td>
<td>(0.701)</td>
<td>(0.692)</td>
<td>(0.755)</td>
<td>(0.723)</td>
<td>(0.680)</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.508</td>
<td>0.815</td>
<td>3.114**</td>
<td>0.788</td>
<td>0.205</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.388)</td>
<td>(1.362)</td>
<td>(1.486)</td>
<td>(1.327)</td>
<td>(1.413)</td>
<td></td>
</tr>
<tr>
<td>GDP per capita squared</td>
<td>-0.0455</td>
<td>-0.0772</td>
<td>-0.229**</td>
<td>-0.0618</td>
<td>-0.0296</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0859)</td>
<td>(0.0840)</td>
<td>(0.0923)</td>
<td>(0.0817)</td>
<td>(0.0883)</td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td>-0.997***</td>
<td>-1.129***</td>
<td>-0.978***</td>
<td>-0.970***</td>
<td>-1.055***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.264)</td>
<td>(0.274)</td>
<td>(0.323)</td>
<td>(0.269)</td>
<td>(0.267)</td>
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<tr>
<td>Not free</td>
<td>0.254</td>
<td>0.447</td>
<td>-0.117</td>
<td>0.302</td>
<td>0.0847</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.310)</td>
<td>(0.289)</td>
<td>(0.382)</td>
<td>(0.288)</td>
<td>(0.297)</td>
<td></td>
</tr>
<tr>
<td>Population size</td>
<td>0.980***</td>
<td>1.048***</td>
<td>0.954***</td>
<td>1.005***</td>
<td>0.955***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.111)</td>
<td>(0.106)</td>
<td>(0.116)</td>
<td>(0.0952)</td>
<td>(0.114)</td>
<td></td>
</tr>
<tr>
<td>Trade openness</td>
<td>-0.123</td>
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<td>-0.263</td>
<td>-1.824***</td>
<td>-0.287</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.312)</td>
<td>(0.270)</td>
<td>(0.309)</td>
<td>(0.313)</td>
<td>(0.317)</td>
<td></td>
</tr>
<tr>
<td>Ruggedness</td>
<td>0.286*</td>
<td>0.360***</td>
<td>0.235*</td>
<td>0.0553</td>
<td>0.313**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.147)</td>
<td>(0.139)</td>
<td>(0.142)</td>
<td>(0.179)</td>
<td>(0.142)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-13.17***</td>
<td>-14.54***</td>
<td>-12.67***</td>
<td>1.220</td>
<td>-15.34***</td>
<td>-10.63**</td>
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<td>(5.046)</td>
<td>(2.366)</td>
<td>(4.819)</td>
<td>(6.075)</td>
<td>(5.118)</td>
<td>(5.065)</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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</tr>
<tr>
<td>Pseudo R²</td>
<td>0.087</td>
<td>0.086</td>
<td>0.083</td>
<td>0.066</td>
<td>0.088</td>
<td>0.086</td>
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</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1
### Table 7.4 Main results: GREG measure of ethnic inequality and the number of people killed in domestic terrorist attacks

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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</thead>
<tbody>
<tr>
<td>Ethnic inequality (GREG)</td>
<td>2.325***</td>
<td>2.395***</td>
<td>2.609***</td>
<td>4.380***</td>
<td>2.354***</td>
<td>2.207***</td>
</tr>
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<td></td>
<td>(0.803)</td>
<td>(0.732)</td>
<td>(0.804)</td>
<td>(0.934)</td>
<td>(0.805)</td>
<td>(0.809)</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>1.164</td>
<td>1.611***</td>
<td>4.361***</td>
<td>1.350</td>
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<td></td>
<td>(1.410)</td>
<td>(1.408)</td>
<td>(1.549)</td>
<td>(1.368)</td>
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</tr>
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<td>GDP per capita squared</td>
<td>-0.0816</td>
<td>-0.120</td>
<td>-0.295***</td>
<td>-0.0915</td>
<td>-0.0634</td>
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<td></td>
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<td>Free</td>
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<td></td>
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<td>Not free</td>
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<td>440</td>
<td>436</td>
<td>435</td>
<td>445</td>
<td>445</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.088</td>
<td>0.086</td>
<td>0.084</td>
<td>0.066</td>
<td>0.088</td>
<td>0.087</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

We analysed the robustness of our results by (1) omitting influential countries and regions from the data; (2) employing alternative ethnic inequality measures; (3) adding additional controls; and (4) employing an alternative (cross-sectional) estimation strategy.

**Omitting influential countries and regions**

As the first robustness test we estimate the impact of influential countries and regions. To do this we re-estimate Equation 7.5 excluding observations from the four countries with the largest number of people killed as a result of a terrorist attack (Iraq, Pakistan, Afghanistan and India). We then re-estimate Equation 7.5 excluding observations from the two highest conflict regions (Middle East and North Africa, and Central Asia). As
shown in Tables 7.5 and 7.6, removal of the four countries with the largest number of people killed and removal of the highest conflict regions makes very little difference to the size and significance of the ethnic inequality coefficients.

Table 7.5 Ethnic inequality and domestic terrorism: Robustness analysis – Influential countries excluded

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue)</td>
<td>4.106***</td>
<td>1.295*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.831)</td>
<td>(0.727)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic inequality (GREG)</td>
<td>4.929***</td>
<td>1.691**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.997)</td>
<td>(0.855)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>151</td>
<td>148</td>
<td>151</td>
<td>148</td>
</tr>
<tr>
<td>Observations</td>
<td>453</td>
<td>425</td>
<td>453</td>
<td>425</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.023</td>
<td>0.066</td>
<td>0.019</td>
<td>0.066</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7.6 Ethnic inequality and domestic terrorism: Robustness analysis – Influential regions excluded

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue)</td>
<td>4.273***</td>
<td>1.597**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.968)</td>
<td>(0.780)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic inequality (GREG)</td>
<td>5.563***</td>
<td>2.633***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.222)</td>
<td>(0.925)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>129</td>
<td>126</td>
<td>129</td>
<td>126</td>
</tr>
<tr>
<td>Observations</td>
<td>387</td>
<td>364</td>
<td>387</td>
<td>364</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.022</td>
<td>0.078</td>
<td>0.018</td>
<td>0.079</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Alternative ethnic inequality variables

We then re-estimate Equation 7.5 using two alternative measures of ethnic inequality. First, we use the Gini index without the inclusion of observations from capital cities. This allows us to account both for extreme values in luminosity and for population mixing, which is naturally higher in capitals. Second, we use the Gini index without the inclusion of observations from small ethnicities (defined as those representing less than
one per cent of a country’s population in the year 2000) (Alesina, et al., 2016). As shown in Tables 7.7 and 7.8, in all cases the exclusion of capital cities does not materially affect results (i.e. the association between ethnic inequality and the number of people killed remains positive and significant). When small ethnicities are excluded, however, the association between ethnic inequality and the number of people killed is no longer significant when the GREG measure is employed. This may be explained by the fact that when small ethnicities are excluded, the sample size used in calculations of the ethnic inequality index drops significantly. This, in turn, can be argued to decrease the accuracy of the ethnic inequality index.

**Table 7.7 Ethnic inequality and domestic terrorism: Robustness analysis – Alternative Ethnologue measures**

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue) capitals excluded</td>
<td>1.604***</td>
<td>0.844***</td>
<td>1.192***</td>
<td>0.277*</td>
</tr>
<tr>
<td>Ethnic inequality (Ethnologue) small area excluded</td>
<td>(0.192)</td>
<td>(0.189)</td>
<td>(0.184)</td>
<td>(0.155)</td>
</tr>
<tr>
<td>Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>123</td>
<td>120</td>
<td>124</td>
<td>121</td>
</tr>
<tr>
<td>Observations</td>
<td>368</td>
<td>351</td>
<td>372</td>
<td>352</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.047</td>
<td>0.081</td>
<td>0.041</td>
<td>0.086</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses, *** p<0.01, ** p<0.05, * p<0.1

**Table 7.8 Ethnic inequality and domestic terrorism: Robustness analysis – Alternative GREG measures**

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (GREG) capitals excluded</td>
<td>1.531***</td>
<td>0.832***</td>
<td>0.148 (0.160)</td>
<td>0.0801 (0.115)</td>
</tr>
<tr>
<td>Ethnic inequality (GREG) small areas excluded</td>
<td>(0.269)</td>
<td>(0.261)</td>
<td>(0.269)</td>
<td>(0.261)</td>
</tr>
<tr>
<td>Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>132</td>
<td>129</td>
<td>124</td>
<td>121</td>
</tr>
<tr>
<td>Observations</td>
<td>394</td>
<td>369</td>
<td>372</td>
<td>346</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.040</td>
<td>0.082</td>
<td>0.034</td>
<td>0.090</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Additional control variables

As a third robustness check we add a number of additional controls. Specifically, we add (1) the spatial inequality index designed by Alesina, et al. (2016) to control for regional differences in income that are not related to ethnicity; (2) a traditional Gini Index as a measure of interpersonal inequality; (3) government consumption expenditures as a proxy for government size; (4) the proportion of the total population living in urban areas; (5) the Polity IV index (Marshall, 2011) as a proxy for societal conflicts and grievances; and (6) civil liberties and political rights indices (Freedom House, 2016). In all cases, with the exception of the inclusion of the spatial inequality index, the association between ethnic inequality and the number of people killed in terrorist attacks remains positive and significant. When the spatial inequality index is included and the Ethnologue measure is employed, this association becomes not significant (although remains positive). This may be explained by the high correlation between ethnic and spatial inequality in the Ethnologue measure (0.7046). In all, the inclusion of additional controls adds confidence to the robustness of our base model estimates.
Table 7.9 Ethnic inequality and domestic terrorism: Robustness analysis – Additional controls (Ethnologue)

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (Ethnologue)</td>
<td>1.411</td>
<td>3.300***</td>
<td>1.992**</td>
<td>2.164***</td>
<td>1.623**</td>
<td>1.654**</td>
</tr>
<tr>
<td>Spatial inequality</td>
<td>0.471</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gini index</td>
<td></td>
<td>-1.071</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial inequality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government size</td>
<td></td>
<td></td>
<td>0.436</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population</td>
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<td></td>
<td>-0.748**</td>
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<td></td>
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<tr>
<td>Polity IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.245</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>1.027*</td>
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<td>0.231</td>
</tr>
<tr>
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<td>Yes</td>
<td>Yes</td>
<td>Yes^</td>
<td>Yes^</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>152</td>
<td>86</td>
<td>131</td>
<td>152</td>
<td>144</td>
<td>152</td>
</tr>
<tr>
<td>Observations</td>
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<td>133</td>
<td>359</td>
<td>435</td>
<td>409</td>
<td>435</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.087</td>
<td>0.087</td>
<td>0.079</td>
<td>0.089</td>
<td>0.074</td>
<td>0.087</td>
</tr>
</tbody>
</table>

^Excludes dummies for “free” and “not free” countries.

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Table 7.10 Ethnic inequality and domestic terrorism: Robustness analysis – Additional controls (GREG)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of people killed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic inequality (GREG)</td>
<td>2.098**</td>
<td>3.607***</td>
<td>2.478**</td>
<td>2.725***</td>
<td>2.080**</td>
<td>2.126**</td>
</tr>
<tr>
<td></td>
<td>(1.060)</td>
<td>(1.275)</td>
<td>(1.099)</td>
<td>(0.781)</td>
<td>(0.861)</td>
<td>(0.837)</td>
</tr>
<tr>
<td>Spatial inequality</td>
<td>0.331</td>
<td></td>
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<td></td>
<td>(1.058)</td>
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<td></td>
</tr>
<tr>
<td>Gini index</td>
<td>-1.370</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>(1.331)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Government size</td>
<td>0.384</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(0.321)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Urban population</td>
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<td></td>
<td>-0.642**</td>
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<td></td>
<td>(0.308)</td>
<td></td>
</tr>
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<td></td>
<td>-0.0843</td>
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<td></td>
<td></td>
<td>(0.242)</td>
<td></td>
</tr>
<tr>
<td>Civil liberties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.086*</td>
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</tr>
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<td></td>
<td></td>
<td>(0.599)</td>
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</tr>
<tr>
<td>Political rights</td>
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<td>0.0950</td>
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<td></td>
<td></td>
<td></td>
<td>(0.386)</td>
<td></td>
</tr>
<tr>
<td>Controls</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes^</td>
<td>Yes^</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>152</td>
<td>86</td>
<td>131</td>
<td>152</td>
<td>144</td>
<td>152</td>
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<tr>
<td>Observations</td>
<td>435</td>
<td>133</td>
<td>359</td>
<td>435</td>
<td>409</td>
<td>435</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.088</td>
<td>0.086</td>
<td>0.079</td>
<td>0.089</td>
<td>0.073</td>
<td>0.087</td>
</tr>
</tbody>
</table>

^Excludes dummies for “free” and “not free” countries.

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Alternative estimation strategy

To this point we have employed a panel approach for our analysis. Given most of the variation in ethnic inequality occurs between countries rather than over time, we apply an additional robustness test using a cross-sectional approach. Following Ezcurra and Palacios (2016), to modify our panel data into a cross-section, we use data for the total number of people killed over the period of 2007–2012 as the dependent variable, whereas the data of all of the time-varying regressors are the average values over the period 1992–2006. This implies that the number of observations decreases considerably in comparison with our previous analyses, thus increasing the degree of multicollinearity among the explanatory variables.
As shown in Table 7.11, despite the low number of observations, the association between ethnic inequality and the number of people killed in terrorist attacks remains positive and significant, confirming again the robustness of our original results.

Table 7.11 Ethnic inequality and domestic terrorism: Robustness analysis – Cross-section

<table>
<thead>
<tr>
<th>Dependent variable: Number of people killed</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic inequality (GREG) capitals excluded</td>
<td>2.327***</td>
<td>1.453***</td>
<td>2.203***</td>
<td>1.488***</td>
</tr>
<tr>
<td>Ethnic inequality (GREG) small areas excluded</td>
<td>(0.383)</td>
<td>(0.417)</td>
<td>(0.434)</td>
<td>(0.454)</td>
</tr>
<tr>
<td>Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Regional dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Countries</td>
<td>137</td>
<td>134</td>
<td>145</td>
<td>142</td>
</tr>
<tr>
<td>Observations</td>
<td>137</td>
<td>134</td>
<td>145</td>
<td>142</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.069</td>
<td>0.119</td>
<td>0.060</td>
<td>0.125</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the country level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

7.6. Discussion of Results

Terrorism has substantial costs: economic (Abadie & Gardeazabal, 2008; Blomberg et al., 2004a; Gaibulloev & Sandler, 2008; Llussá & Tavares, 2011), political (Gassebner et al., 2008; Gassebner et al., 2011) and psychic (Rubin et al., 2005; Salguero et al., 2011; Schuster et al., 2001; Silver et al., 2002; Vorsina et al., forthcoming). Therefore, the fight against terrorism is emerging as one of the most important priorities on the global political agenda. Two different strategies can be pursued to counter terrorism. One is to address the root causes of terrorism; another is to treat the symptoms. Scientific evidence can guide decision makers in both cases. In this chapter we have focussed on the former. Specifically, data from a panel of 152 countries covering the period 1993–2012 have been used to examine the association between ethnic inequality and domestic terrorism. To the best of our knowledge, this is the first study to comprehensively assess the association between terrorism and any type of horizontal inequality (i.e. inequality among groups).
Our results indicate that ethnic inequality is robustly, positively and significantly associated with domestic terrorism, in particular with the number of people killed in terrorist attacks. For example, in our base model with controls, a 10% increase in ethnic inequality (Ethnologue measure) is associated with a 16% increase in the total number of people killed from terrorist attacks. The comparable figure when the GREG measure is employed is 23%.

Given that our results suggest a strong positive association between ethnic inequality and domestic terrorism, the obvious question is: what should governments be doing to promote equality among ethnic groups?

Arasaratnam (2013) suggests two most tangible strategies to deal with the tension between majority and minority groups: (1) the implementation of intercultural experiential education in the curriculum; and (2) the development of community programs that emphasise common goals and similarities between ethnic groups. The United Nations Department of Economic and Social Affairs (2009) identifies five steps to promoting social inclusion:

1. **Visibility**: people need to be noticed, recognised, and have their own voices;
2. **Consideration**: the concerns and need of individuals and groups must be taken into account by policy-makers;
3. **Access to social interactions**: people must be able to engage in society’s activities and social networks in their daily life;
4. **Rights**: people must have rights to act and claim, rights to be different, legal rights, rights to access social services, the right to work and the right to participate in social, cultural and political life; and
5. **Resources**: resources to fully participate in all aspects of societal activities are the ultimate step for successful social inclusion.
In a similar vein, the European Commission (2005) identifies three precursors necessary to make a decisive impact on the eradication of poverty and social exclusion:

1. **Access** for all to the resources, rights and services needed for participation in society, preventing and addressing exclusion, and fighting all forms of discrimination leading to exclusion;

2. **Social inclusion** of all, both by promoting participation in the labour market and by fighting poverty and exclusion; and

3. **Well-coordinated policies** that involve all levels of government and relevant actors, including people experiencing poverty.

The focus of this study is on economic horizontal inequalities among ethnic groups. Other horizontal inequalities (e.g. social, political or cultural) may also influence the incidence of domestic terrorism. This is a potentially worthwhile area for future research. Future research could also focus on inequality among religious (as opposed to ethnic) groups, although our study may partially capture this effect due to the correlation between ethnicity and religion. In addition, the relationship between ethnic inequality and international terrorism is also an important phenomenon that requires further examination. Finally, future research may also use other econometric techniques (e.g. zero-inflated negative binomial regression model) as an additional robustness test for the results of this study.
References


### Table 7.12 Ethnic inequality and domestic terrorism: Description and sources of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Ethnologue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(GREG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe terrorist attacks</td>
<td>Number of domestic terrorist attacks where at least 1 person was killed over a 6-year period for 2001–2006 and 2007–2012, and over an 8-year period for 1993–2000.</td>
<td>(Enders, Sandler, and Gaibulloev 2011, Gaibulloev, Sandler, and Santifort 2012)</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>GDP per capita (current US$) for the years 1992, 2000 and 2006.</td>
<td>(The World Bank 2016)</td>
</tr>
<tr>
<td>Free¹</td>
<td>Dummy variable that takes the value ‘1’ if the country is classified as ‘Free’ by Freedom House, and ‘0’ otherwise for the years 1992, 2000 and 2006.</td>
<td>(Freedom House 2016a)</td>
</tr>
<tr>
<td>Not free</td>
<td>Dummy variable that takes the value ‘1’ if the country is classified as ‘Not Free’ by Freedom House, and ‘0’ otherwise for the years 1992, 2000 and 2006.</td>
<td>(Freedom House 2016a)</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Source</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Trade openness</td>
<td>The sum of exports and imports of goods and services expressed as percentage of GDP.</td>
<td>(The World Bank 2016)</td>
</tr>
<tr>
<td>Ruggedness</td>
<td>Topographic heterogeneity; the average across all grid cells in the country not covered by water.</td>
<td>(Alesina, Michalopoulos, and Papaioannou 2016)</td>
</tr>
<tr>
<td>Spatial inequality</td>
<td>Gini Index based on luminosity per capita and mapping based on boxes/pixels of approximately 2.5 by 2.5 degrees for the years 1992, 2000 and 2006.</td>
<td>(Alesina, Michalopoulos, and Papaioannou 2016)</td>
</tr>
<tr>
<td>Gini Index</td>
<td>GINI coefficient (World Bank estimate).</td>
<td>(The World Bank 2016)</td>
</tr>
<tr>
<td>Urban population</td>
<td>Proportion of the total population living in urban areas as defined by national statistical offices.</td>
<td>(The World Bank 2016)</td>
</tr>
<tr>
<td>Civil liberties</td>
<td>Civil liberties index for the years 1992, 2000 and 2006.</td>
<td>(Freedom House 2016a)</td>
</tr>
<tr>
<td>Political rights</td>
<td>Political rights index for the years 1992, 2000 and 2006.</td>
<td>(Freedom House 2016a)</td>
</tr>
<tr>
<td>Polity IV</td>
<td>Polity IV index for the years 1992, 2000 and 2006. Rescaled from 1 (full autocracy) to 10 (full democracy).</td>
<td>(Marshall 2011)</td>
</tr>
<tr>
<td>Continent dummies</td>
<td>East Asia and the Pacific, Eastern Europe and Central Asia, Western Europe, North American countries, Sub-Saharan African countries, Latin America and Caribbean countries,</td>
<td></td>
</tr>
</tbody>
</table>

1 Freedom in the World is based on 25 indicators, which are grouped into two categories: Political Rights (10 indicators) and Civil Liberties (15 indicators). For each indicator a country/territory is awarded a score from 0 (smallest degree of freedom) to 4 (greatest degree of freedom). The average of the Political Rights and Civil Liberties ratings gives the Freedom Rating, where countries are classified as ‘Free’ (1.0 to 2.5), ‘Partly Free’ (3.0 to 5.0), or ‘Not Free’ (5.5 to 7.0) (Freedom House 2016b). Note that ‘Partly Free’ countries are taken out from regression to avoid multicollinearity.
Appendix 7B

List of countries included in analysis

Afghanistan; Albania; Algeria; Antigua & Barbuda; Argentina; Armenia; Australia; Austria; Azerbaijan; The Bahamas; Bahrain; Bangladesh; Belarus; Belgium; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Brunei; Bulgaria; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Comoros; Dem. Rep. Congo; Rep. Congo; Costa Rica; Cote d'Ivoire; Croatia; Cuba; Cyprus; Czech Republic; Denmark; Djibouti; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Estonia; Fiji; Finland; France; Gabon; The Gambia; Georgia; Germany; Ghana; Greece; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; Iceland; India; Indonesia; Islamic Rep. Iran; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kuwait; Rep. Korea; Kyrgyz Republic; Lao PDR; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Luxembourg; Macedonia FYR; Madagascar; Malawi; Malaysia; Mali; Malta; Mauritania; Mexico; Moldova; Morocco; Mozambique; Namibia; Nepal; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; Norway; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Romania; Russian Federation; Rwanda; Saudi Arabia; Senegal; Sierra Leone; Slovak Republic; Slovenia; South Africa; Spain; Sri Lanka; Sudan; Suriname; Swaziland; Sweden; Switzerland; Syrian Arab Republic; Tajikistan; Tanzania; Thailand; Togo; Trinidad and Tobago; Tunisia; Turkey; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States; Uruguay; Uzbekistan; Venezuela; Vietnam; Zambia; Zimbabwe.
8. Conclusion

This research investigates the socio-economic determinants of terrorism and the effect of terrorism on subjective wellbeing. Alarmingly, the number of terrorist attacks has grown significantly over the past fifteen years. Since 2000 the number of deaths from terrorism has increased nine-fold. In 2014 the number of terrorist attacks and death from terrorist activity reached its highest recorded level. The year 2015 showed a ten per cent decline in both attacks and death from terrorism – the first decline since 2010. This improvement was achieved due to military operations against ISIL and Boko Haram in Iraq and Nigeria respectively. Although this decline is encouraging, 2015 remains the second deadliest year since 2000 (The Institute for Economics and Peace (IEP), 2016).

Numerous studies have explored both the reasons for, and the consequences of, terrorism. Economists have investigated the connection between terrorist attacks and a number of variables including, but not limited to, GDP per capita, national income, foreign direct investments, the rule of law, corruption and the level of democracy. Nevertheless, empirical findings show contradictory results for most of these variables. For example, some researchers identify a negative relationship between democracy and terrorism (Li, 2005; Reynal-Querol, 2002), others show a positive link (Kis-Katos, Liebert, & Schulze, 2011; Li, 2005; Li & Schaub, 2004), while a third group of scholars claim a non-linear relationship between democracy and terrorism (Abadie, 2006; Eyerman, 1998; Kurrild-Klitgaard, Justesen, & Klemmensen, 2006). A similar pattern can be found when the connection between terrorism and GDP per capita or income inequality is explored.

As described in the earlier literature review (Chapter 2), this research contributes to four sets of literature: (1) the literature on the effects of terrorist attacks on subjective
wellbeing; (2) the literature on post-traumatic growth resulted after a terrorist event; (3) the literature on socio-psychological and socio-demographic characteristics of attitudes towards terrorism; and (4) the literature on economic determinants of terrorism.

The literature on the effects of terrorist attacks on subjective wellbeing is scarce with most of the studies focused on a single country or region (Frey et al., 2009; Metcalfe et al., 2011; Romanov et al., 2012). To the best of our knowledge no research has been carried out on the link between life satisfaction and terrorism using a large cross-national sample – and in this regard this thesis makes a substantial and original contribution to the literature. The results we have reported highlighting this link, also, have very important implications in counter-terrorism policy evaluation, specifically, in the accurate estimation of terrorism costs.

In addition, recent studies have identified a possibility of positive psychological changes after stressful events (e.g. Zoellner & Maercker, 2006). The theory of post-traumatic growth, which takes the form of increased appreciation of life or positive spiritual change experienced as a result of adversity, has been applied by several scholars to estimate the psychological effects of terrorist attacks. These studies, however, are mostly focussed on short-term effects and direct impacts on victims of the attacks (e.g. Fredrickson, et al., 2003; Ai, et al., 2005). To the best of our concerns no study has applied longitudinal data to study the long-term effects of terror on the general population. We make a substantial and original contribution to this literature and the results reported in this thesis may help policymakers to develop better responses to terrorist attacks and to support people which are more vulnerable to terrorist threats.

This research also contributes in a substantial and original manner to the literature on socio-psychological and socio-demographic characteristics of attitudes towards terrorism and mainly focuses on one of the characteristics – social dominance.
orientation, i.e. an individual’s preference for inter-group hierarchies within a social system or group-based discrimination. Previous studies show that high social dominance orientation predicts prejudice against different groups of people - ethnic minorities (Thomsen et al., 2010), women (Heaven, 1999), homosexuals (Licciardello, Castiglione, Rampullo, & Scolla, 2014), immigrants (Costello & Hodson, 2011) and refugees (Esses, Veenvliet, Hodson, & Mihic, 2008). With regard to terrorist attacks social dominance orientation is associated with positive attitudes towards using torture in the war on terrorism (Lindén et al., 2016) and higher likelihood of justification of a terrorist attack (Lemieux and Asal, 2010). This research represents the first empirical study of the effects of social dominance orientation on attitudes towards both the fear of and the policy responses to terrorist attacks. The results of this study also address the popular trade-off between individual liberties and security and may be used to predict support for counter-terrorism policies.

Finally, the literature on determinants of terrorism is very broad and covers the association between terrorism and such variables as GDP per capita (e.g. Li and Schaub, 2004; Krueger & Laitin, 2008), democracy (e.g. Li, 2005), civil war (e.g. Krieger & Meierrieks, 2011), population size (e.g. Lai, 2007), trade openness (e.g. Krieger & Meierrieks, 2011), geographical barriers (e.g. Abadie, 2006), education (e.g. Kurrild-Klitgaard et al., 2006), and income inequality (cf. Koch & Cranmer, 2007; Li & Schaub, 2004). These studies, however, have mixed empirical findings, and deeper investigation of economic reasons for terrorism should be made. This thesis addresses the effect of a newly developed measure of inequality, namely, horizontal ethnic inequality, on terrorism. To the best of our knowledge no previous study has primarily focused on ethnic the effect of ethnic inequality on domestic terrorism. The results of our research
in this area may be useful in the development of policies promoting social and economic inclusion of ethnic minorities.

This research has addressed the gaps in the literature by a series of connected essays presented in Chapters 4–7. The next section of this chapter summarises the main empirical findings of our research.

8.1. Summary

8.1.1. The welfare cost of terrorism

Chapter 4 of this thesis is devoted to examining the impact of terrorism on life satisfaction across a large sample of countries. Data for 117 countries covering the period 2006 to 2011 are employed to estimate the association between life satisfaction and terrorism using a seemingly unrelated regression model. The results indicate a significant and negative association between terrorism and life satisfaction, while no such association is found between terrorism and real GDP per worker. For OECD members, terrorism has a pronounced effect on life satisfaction, with a negative and statistically significant association found across all measures of terrorism at the 1% level. The results are robust to the exclusion of the control variables and the inclusion of the first order lag as an attempt to account for autocorrelation in the error terms.

These results contribute to the literature on the effects of terrorist attacks on subjective wellbeing and have implications for the evaluation of policy responses to terrorism, particularly when weighing up the benefits and costs of public expenditure. In particular, the results imply that a cost-benefit analysis of policy responses to terrorism should not underestimate the costs of terrorism and take into account any decrease in life satisfaction of the population. Policymakers should also strengthen the public health
system to address the short- and long-term negative psychological consequences of terrorism.

8.1.2. The effect of the Moscow theatre siege on expectations of wellbeing in the future

Chapter 5 of this thesis investigates the positive effects of terrorism on subjective wellbeing. Specifically, this Chapter uses RLMS-HSE data to estimate the effect of the Moscow theatre hostage siege on self-reported expectations of life in the future of the Russian population. Employing a difference-in-differences approach, this Chapter finds that the siege had a positive effect on expectations of life in the future for the Russian and Moscow region samples. The result can be explained by the theory of post-traumatic growth which suggests that adversity may result in the positive psychological change, and terrorism incidents unintentionally may indorse more meaningful interpersonal relationships, new views of the self and new views of the world. These results show that individuals have a lifelong plasticity and are able to recover from significant adversity. This also suggests that the primary objectives of terrorists are unlikely to be fully achieved in either the short- or long-term.

This Chapter aims to broaden the understanding of the social consequences of terrorism, which allows for the development of more refined policies that respond to both the prevention of and reaction to terrorist attacks. Policymakers should pay attention to the reasons for the development of coping strategies as well as identification of the groups of people with different resilience levels. Our research findings, for example, demonstrate that being younger, male and having lower socio-economic status are associated with a greater positive reaction after the terrorist attack. As such, policymakers should support programs that educate health care practitioners and the
public on how to identify and assist individuals who are psychologically more vulnerable to terrorism threats.

**8.1.3. Social dominance orientation, fear of terrorism, and support for counter-terrorism policies**

Chapter 6 investigates the role of social dominance orientation (SDO) in explaining individuals’ fear of experiencing a terrorist attack and support for counter-terrorism policies that infringe individual liberties in pursuit of defending community security. Using a probability-based sample of 1200 Australian adults, three main findings are obtained: (1) SDO positively predicts support for ‘defensive’ counter-terrorism policies; (2) SDO positively predicts fear of terrorism and Islamic extremism; and (3) the relationship between SDO and support for defensive policies is mediated by fear. Gender, education, and religious identification are also shown to predict individual fear of terrorism and Islamic extremism, and support for defensive counter-terrorism policies. These findings contribute to the literature on SDO and on threats to inter-group hierarchies generally, individuals’ willingness to forgo liberties to preserve inter-group hierarchies, and the conditions of support for liberty-infringing counter-terrorism policies.

The research results suggest that an individual’s characteristics determine their reaction to terrorist attacks and their support for counter-terrorism policies. The results also highlight the popular trade-off between community-wide security and individual-level liberties, and demonstrate that high-SDO citizens are ready to sacrifice their individual liberties to maintain inter-group hierarchies. Policymakers may use these results to better evaluate support for counter-terrorism and border control policies and frame policy programs in this domain in a way that appeals to the majority of the population. Pratto and Lemieux (2001) discovered that the group-inclusive policy frame is
preferred by low-SDO individuals, while the group threat frame is preferred by high-SDO people. However, any proposal to use the group threat frame to promote counter-terrorism policies should be used with caution, as it may result in discrimination against minority groups.

8.1.4. Ethnic inequality and terrorism

Chapter 7 addresses the relationship between ethnic economic inequality and domestic terrorism. Using data from a panel of 152 countries covering the period 1993–2012 the analysis shows that ethnic inequality is robustly, positively and significantly associated with domestic terrorism, in particular with the number of people killed in terrorist attacks. Specifically, a 10% increase in ethnic inequality is associated with a 16% to 23% increase in the total number of people killed as a result of domestic terrorist attacks, depending on the measure of inequality employed. This result is robust to the omission of influential countries and regions from the data, the use of alternative ethnic inequality measures, the inclusion of additional of controls, and the use of an alternative estimation strategy. This Chapter broadens the literature on economic determinants of terrorism. Under the assumption of a rational choice model, the research results reported show that socio-economic conditions (such as ethnic inequality) have an indirect impact on the number of terrorist attacks.

This Chapter proposes a possible reason for terrorism – ethnic inequality. This implies that policymakers should adopt policies that promote the economic and social inclusion of minority ethnic groups. It should be noted, that these policies may not have an instant effect. Nevertheless, targeting the root cause of terrorism should help to decrease the number of attacks dramatically in the long-term.
8.2. Contribution and policy implications

This research provides evidence on the link between the socio-economic conditions and terrorism and the effects of terrorism on subjective wellbeing. It demonstrates that the effect of terrorism on subjective wellbeing is a complicated phenomenon and supports the idea that wellbeing should be assessed using a variety of constructs. The results indicate that, in general, terrorism decreases the level of life satisfaction. However, under certain circumstances the population might develop a resilient strategy and show optimism in their views on life in the future. The research also investigates individual characteristics which determine the reaction to terrorist attacks. It shows the connection between socio-psychological and socio-demographic characteristics, attitudes towards fear of terrorism and support for counter-terrorism policies. Lastly, this research determines a possible socio-economic reason for terrorism – ethnic inequality.

This thesis contributes to the literature on the effects of terrorist attacks on psychological and emotional states, as well as the effect of terrorism on subjective wellbeing. It also extends the existing literature on threats to inter-group hierarchies, anxiety towards terrorism, and attitudes towards counter-terrorism responses. Lastly, it contributes to the literature on the determinants of terrorism.

The interdisciplinary approach of this thesis may represent a useful tool for policymakers in the calculation of more accurate costs of terrorist attacks. Application of economic methods to such areas as psychology and criminology may provide evidence based estimates for the effects of terrorism on the population in the context of existing policies. The results obtained in this thesis may also be applied to predict the reaction of various segments of the population to new border control policies. This is especially important in Australian context, as tighter immigration and citizenship rules were introduced in April 2017. Finally, the thesis argues for the implementation of
policies promoting political, economic and social inclusion of ethnic minority groups, and supports the idea of “leaving no one behind” proposed by the United Nations as part of the Sustainable Development Goals (United Nations, 2016).

8.3. Limitations and future research

There are a number of limitations of this thesis. The availability of data restricted to some degree the questions that could be investigated, the geographic and temporal scope of the study and the controls employed. As noted in Chapter 3, this thesis draws its data and the working definition of terrorist attacks from the Global Terrorism Database labelled GTD. Nevertheless, it should be remembered that the number of terrorist attacks reported in the GTD can be substantially different from other databases (Drakos, 2011). The reasons for such differences include potential distortion of information by various media outlets, government censorship, false responsibility taken by perpetrators, definitional problems or the simultaneous presence of other forms of violence (for example, civil war). This implies that the results of this thesis may differ when other databases or other definitions of terrorism are used to address the research questions posed.

This thesis uses life satisfaction and self-reported expectation of life in the future as proxies for such complicated concepts as subjective wellbeing or post-traumatic growth. Wellbeing, however, is a multifaceted phenomenon that can be assessed by measuring a wide array of subjective and objective constructs such as happiness, engagement, meaning and purpose, relationships and social support and accomplishment and competence (Seligman, Forgeard, Jayawickreme, & Kern, 2011). Similarly, post-traumatic growth may be expressed by not only changes in expectation of life in the future, but also changes in relationships with others, personal strength, spiritual changes or appreciation of life (Tedeschi & Calhoun, 1996). Thus, the thesis
is limited by the use of life satisfaction and self-reported expectation of life in the future as the basis for much of its analysis. Future research should also address the effect of terrorism on other domains of wellbeing or post-traumatic growth not explored in this study.

Furthermore, the time periods used in all Chapters are limited by data availability. This is especially noticeable in Chapter 7, since the available ethnic inequality data allowed only three time periods (1993–2000, 2001–2006, 2007–2012) to be investigated. Access to more data points on ethnic inequality would allow more robust results to be obtained. In addition, Chapter 6 estimates only the effect of SDO on fear of a terrorist attack or support for counter-terrorism policies for the year 2016. Future research may explore the changes over time in SDO and individuals’ fear of terrorism and Islamic extremism.

Moreover, Chapters 6 and 7 are limited in their focus to particular countries – Russia and Australia, respectively. As such, the results obtained in these Chapters may not be readily transferrable to other countries due to possible differences in societal norms, context and culture. A useful exercise may be to test whether the findings from this thesis can be replicated in other countries. In addition, special priority should be applied to extending the analysis to developing countries, where most of the world’s terrorist attacks take place.

Finally, Chapter 7 focusses only on the association between domestic terrorism and one particular type of horizontal inequality, namely economic horizontal inequality among ethnic groups. Further studies may explore the association between terrorism and other forms of horizontal inequality (e.g. social, political, cultural or religious) or the relationship between ethnic inequality and international terrorism.
Despite these limitations, exploring both the determinants and the effects of terrorism remains a fruitful area for further research. This thesis has addressed only briefly the implications of the studies included within it for more effective counter-terrorism policy formulation: this remains another area where more extensive research would be useful.
References


