Proposal for Conference Presentation

The effect of terrorism risk perception on savings behavior

February 15, 2019

Abstract

Terror attacks are a subject of growing concern in many places around the world. Given the increasing intensity of terrorism, behavioral changes may become visible. Using microeconomic panel data of the elderly population from 13 European countries and Israel, this study analyzes the effect of terrorism risk perception on the savings behavior of households. The savings variable consists of real assets and net financial assets including the sum of life insurance holdings. We differentiate between two risk variables – number of terrorist attacks and number of fatalities – to address the potentially different reactions in the aftermath of terrorism. While number of attacks measures the uncertainty in the environment, number of fatalities refers to a personal insecurity due to fear of death. We find that the effect of number of terrorist attacks on savings is negative. However, savings is positively influenced by number of fatalities due to terrorist attacks. Both effects are statistically significant and economically meaningful. A possible explanation for this pattern could be that individuals change their risk perception as soon as people die in a terrorist attack. Our analysis contributes to the literature by focusing on a vital part of the overall economic influence of terrorism on the economy.

Keywords: risk perception, terrorism, terrorist attacks, savings behavior

1 Introduction

The economic consequences of terrorism have received considerable attention in the literature over recent years, especially since the attacks of September 11, 2001 (henceforth 9/11). The events of 9/11 destroyed the Americans' sense of security and led to a higher perceived terror risk in the United States (U.S.) (Huddy et al., 2002b). Terrorist incidents constitute significant shocks for a country's economy that are beyond control of economic agents. They can have severe consequences both at the macro and the micro level. As terror attacks are becoming more frequent in many places around the world, behavioral changes may be observed. Although the probability of being harmed by terrorism is negligible, the fear created by

terrorist attacks has large effects on individuals' behavior (Becker and Rubinstein, 2011). "Given the intensity of worry concerning terrorism, it is reasonable to assume that behavioral manifestations may occur when consumers perceive terror threats" (Herzenstein et al., 2015, p. 228).

Much attention has been focused on evaluating the causal effect of terror on economic and political outcomes.[1] Economic consequences of terrorism can be both direct, in terms of lost lives and damaged property, and indirect, in terms of economic costs and overall consequences for society (Frey et al., 2007). Macroeconomic studies provide empirical evidence for large effects of terrorist attacks on the economy (e.g., Fielding, 2003a; 2003b; Eldor and Melnick, 2004; Abadie and Gardeazabal, 2008). Changes in economic indicators, such as stock prices and aggregate savings, and the awareness of human cost associated with terrorism are expected to be motivated by the perceived risks related to possible future terrorist events (Blomberg et al., 2004).

Terrorism creates fear, anger and sadness (Lerner et al., 2003). These emotions drive behavior, such that traditional models of decision making under risk, like expected utility theory, are no longer sufficient to explain responses to terrorism (Loewenstein et al., 2001). Behavioral explanations, including bounded rationality, consider disproportionate responses to terrorism (Becker and Rubinstein, 2011). People tend to overvalue terror-related risks meaning that the subjective probability of terrorism exceeds objective probabilities. In this way, the distortive effects of fear on human behavior can help explaining people's irrational responses to terrorism (Kahneman and Tversky, 1973; 1979; Tversky and Kahneman, 1974). Probability neglect is highly likely in the aftermath of terrorism, especially when strong emotions are involved (Sunstein, 2003; Loewenstein et al., 2001).[2] Availability heuristics and a disproportionate fear of unfamiliar risks further explain behavioral patterns after the occurrence of terrorist events (Sunstein, 2003).

Our research aims at better understanding the macroeconomic effects of terrorism on the economy through empirical evaluation of its influence on a vital part of it. As savings constitute an important part of the economy, it is crucial to understand how the effect of terrorism on households' savings behavior manifests. Terrorist attacks increase the agents' insecurity leading to adjustments in consumption and private investment (Eckstein and Tsiddon, 2004). People change their savings patterns to avoid exposure to risk situations (Schneider et al., 2010). While microeconomic studies mostly investigate economic sectors, such as tourism (Enders and Sandler, 1991; Enders et al., 1992; Fleischer and Buccola, 2002; Ito and Lee, 2005; Sloboda, 2003; Eckstein and Tsiddon, 2004) and gastronomy (Yechiam et

[1] See Frey et al. (2007) for an extensive review.
[2] Probability neglect is the tendency to focus on the badness of the outcome rather than on its likelihood (Sunstein, 2003).

al., 2005), households' savings reactions to terrorism have largely been ignored in previous research. Yet, there is no reason why the microeconomic roots of macroeconomic consequences should be limited to specific sectors. Terrorist incidents can alter behavior on a more fundamental level. Studying household savings could lead to a first indicator of this.

This article analyzes the role of terrorism in household savings behavior using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) and the Global Terrorism Database (GTD) for 14 countries. While other studies focus on the overall effect of terrorism on aggregate savings, we use panel data to analyze the channels through which terrorism alters savings. Previous research on the effects of terrorism on savings emphasizes either personal or collective threat. To our knowledge we are the first to differentiate between both types of threat. Terrorism represents a threat on the personal and collective level (Asbrock and Fritsche, 2013). While the personal level refers to the likelihood of personally becoming a victim of a terrorist event without the country being affected, the collective level concerns the occurrence of a terrorist event in the country without direct personal involvement (Asbrock and Fritsche, 2013). Terrorist threat constitutes a suitable vehicle for investigating decision making under risk as it triggers a higher degree of fear and risk perception than most other risks do. A closer look at personal and collective elements in terrorist threat can shed light on the particular contributions of both kinds of threat to savings reactions.

Prior studies on the savings effects of terrorism are rare. Moreover, they merely focus on aggregate and time series data as well as on countries that are frequently confronted with terrorist attacks. Research on the effect of terrorism on economic variables is mostly limited to areas with ongoing terror, such as the Basque country and Israel. Using quarterly data for Israel, Fielding (2003a) and Eckstein and Tsiddon (2004) identify a negative effect of terrorism on aggregate savings. According to a Postbank survey in 2016, however, Germans tend to increase their savings in spite of the low-interest environment (Frankfurter Allgemeine Zeitung, 2016). This finding can be in part explained by the more consciously perceived fear of terrorism and insecurity in Germany (Frankfurter Allgemeine Zeitung, 2016). Contrary results for Israel and Germany may result from different levels of anxiety as people in Israel are more frequently confronted with terrorism. Israeli households may be used to terrorist threat and therefore cope with it in a different manner. While macroeconomic data improves understanding of economic implications of terrorism, it does not shed light on the effect of the fear of terrorism on choices at the household level. However, households' economic choices under the shadow of terrorism can have important implications for aggregate economic outcomes and thus improve our understanding of the economic effects. In this way, this study can be seen as a complement to macroeconomic research.

Our analysis may have implications for public policy. The savings rate is of central importance to both fiscal and monetary policy. If there is an indirect effect of terrorism on the savings

behavior of households, government policymakers should know and understand this. A comprehensive analysis of the savings effects of terrorism could provide guidance for governments to adjust defense spending accordingly in order to increase security in the aftermath of terrorist incidents. When the costs imposed on people are known, the government can make better decisions on how many resources should be allocated to cope with terrorism (Frey et al., 2009). This could offset the effect of terrorism on savings at least to some extent (Eckstein and Tsiddon, 2004). Furthermore, the government should work on reducing – unjustified – public fear if the benefits of the response outweigh the identified costs (Sunstein, 2003). This study helps to better understand savings decisions of an ageing society in which terrorism is part of life. As the elderly population controls a large share of society's resources, its economic choices can significantly influence the relevant markets (Christelis and Georgarakos, 2009).

We proceed as follows. The next section presents related literature. Section 3 introduces our hypotheses and Section 4 describes our data. Section 5 presents the methodology and regression results. The last section discusses the results, outlines the next steps of the analysis and concludes.

2 Related Literature

The indirect consequences of terrorism on economic variables have received considerable attention in the literature over the past few years. Savings behavior is an important part of the economy and has been extensively studied theoretically and empirically. In the theoretical literature, the effect of terrorism on savings is found to be ambiguous.

A terrorist act in one's vicinity can increase the subjectively felt insecurity even if there is little change objectively (Sunstein, 2003). Such an increase in insecurity may lead to precautionary savings (Kimball, 1990), which would speak for increased savings after terrorist attacks. Keynes (1936) lists the precautionary saving motive (i.e., building up a reserve against unforeseen contingencies) as one of eight motives for household saving. Kimball (1990) gave the analytical explanation for uncertainty about future income resulting in a decrease in current consumption and an increase in current saving. If consumers are prudent (i.e., the third derivative of the utility function is positive), they have a precautionary demand for saving (Kimball, 1990). A recent paper by Younas (2015) supports the precautionary saving motive due to terrorism empirically by focusing on 123 developing countries from 1976 to 2008 and interacting the savings rate with domestic and international terrorist incidents. He finds that both types of terrorism have an effect on investment directly and through their interaction with savings. The direct effect is strongly negative showing that terrorism discourages investment.

The interaction between terrorism and savings is positive and modest in size[3], which points to a slight increase in the savings rate in the aftermath of terrorism.[4] The author explains the latter finding as being the result of an increase in the precautionary saving motive (Younas, 2015). However, this could also be the result of a decline in consumption after terrorist attacks take place.

The frequent danger of terrorism influences individuals' behavior, such that they avoid or reduce leisure activities that increase the possibility to become a victim of a terrorist attack (e.g., Herzenstein et al., 2015; Enders et al., 1992; Enders and Sandler, 1991). For instance, an individual may cancel a trip to a terror-prone country if a terrorist attack took place in this area. Similarly, he or she might change the travel destination and prefer countries that are less terror-prone.[5] The former situation may arise from a generalization effect, meaning that a terror incident in one country causes losses of tourists in its neighbor countries. This negative externality results in a situation in which some European countries face losses in tourist revenues using time series data in the 1980s (Enders et al., 1992). Herzenstein et al. (2015) show that people avoid situations in which they might become terror attack victims by conducting two experiments in Israel and one experiment in the USA. Participants in the United States were, for instance, asked to read a one-page article about Israel, which described the situation of frequent terror attacks from 2001 to 2004, the history of terrorism and statistics about terrorist incidents in Israel. Two types of articles were presented differing in the presented controllability Israelis had. Then participants named the frequency in which they engage in several leisure activities on a scale from 1 (never) to 5 (always). The authors' results imply that concerns with frequent danger may lead to avoidant behavior and a desire for control (Herzenstein et al., 2015). One potential explanation for these findings could be that people concentrate on the badness of an outcome rather than on the likelihood that it will occur (Sunstein, 2003). The expected adverse responses to terrorism make terrorism in tourist areas attractive for terrorists to cause harm to the respective economy. In the aftermath of the 2005 terror attacks on the transportation system in London, for example, there was a 30 % decline in metro passengers at weekends, while especially visitors and weekend shoppers changed their behavior because they wanted to avoid unnecessary risks (BBC News, 2005). Recently, tourists have become a frequent target of terrorism due to tighter security measures for government and military facilities (Im et al., 1987; Frey et al., 2007). As a result, avoidant

[3] Note that savings positively influences investment in Younas (2015).

[4] However, as openness increases in a country, this effect is offset lowering the propensity to use domestic savings for investment. In an open economy, capital is mobile and domestic savings can flow to the country where it earns the highest marginal return. Similarly, domestic investment does not need to be financed by domestic savings as investors can borrow from international markets. This implies that the correlation between domestic savings and domestic investment should be low. See Feldstein and Horioka (1980) and Younas (2015) for details.

[5] Destinations can be easily substituted and potential host countries are substantially negatively affected by terrorism (Frey et al., 2007).

behavior may lead to a decrease in consumption level, which implies a higher savings rate. However, the savings rate only increases if the demand for products and services that facilitate avoidance, such as food delivery services and streaming services, does not prevail (Herzenstein et al., 2015).

In the aftermath of terrorist attacks, government spending on defense provides security, which can boost private savings (Gupta et al., 2004). Counter-terrorism activities by governments signal commitment and safety to investors (Mancuso et al., 2010), which might offset the negative savings effect of terrorism due to a perceived riskiness of savings. This positive savings effect of terrorism is likely to be nonlinear, such that defense spending increases savings up to a certain point, but diminishes savings after this threshold is passed (Gupta et al., 2004). Real resources from private sector are necessary to produce security (Eckstein and Tsiddon, 2004). Governmental expenditures increase taxes leading to a lower net income of households and a lower level of consumption.

In contrast, terrorism may lead to a decline in savings. Terror increases uncertainty about life and decreases subjective survival probability leading to a decrease in optimal savings (Eckstein and Tsiddon, 2004). As terror increases, life is expected to be shorter and the value of the future relative to the present lowers, which reduces an individual's incentive to save. Eckstein and Tsiddon (2004) use the vector autoregression methodology with quarterly data for the Israeli economy from 1950 to 2003 to investigate the effect of terrorism on consumption empirically. The authors find that ongoing terror decreases annual consumption per capita by about 5 % in the long run and a decline in current savings. As a reaction to a risen insecurity, governments increase defense expenditures to offset this negative effect (Eckstein and Tsiddon, 2004).[6]

An increase in violence or in political instability due to terrorism increases the perceived risks related to savings (Fielding, 2003a). People, therefore, reduce their level of savings in the aftermath of terrorist events. Fielding (2003a) investigates the impact of political instability on aggregate consumption and aggregate savings by using quarterly data for Israel from 1989 to 1999. He finds that a decline in the number of fatalities by its average level leads to a decrease in consumption by more than 7 %. In contrast, the "savings ratio in Israel would almost double as a result of a complete cessation of violence" (Fielding, 2003a, p. 309). Thus, Israelis are less prone to save as perceived probability of terrorism increases.

Another explanation for a negative effect of terrorism on savings in the literature is the terror management theory. The fear of becoming a victim of a terrorist attack reminds an individual

[6] Governments are seen as the main provider of security (Eckstein and Tsiddon, 2004). Thus, they should spend real resources to increase security. The amount of defense spending depends on a comparison between the social costs of resources and the benefits of providing a safer and longer life to its people (Eckstein and Tsiddon, 2004).

of one's own death leading to an increase in materialistic spending as a way to enhance self-esteem (e.g., Greenberg et al., 1986; Burke et al., 2010). The increase in materialistic spending functions as coping strategy facing existential fears (Arndt et al., 2004). The act of buying itself shows the consumer that he or she does not expect to die in near future. Burke et al. (2010) perform a meta-analysis including 164 papers with 277 experiments to test the mortality salience hypothesis (i.e., an individual's awareness that his or her death is inevitable) of the terror management theory. They find that the mortality salience hypothesis is robust and produces moderate to large effects. Choi et al. (2007) examine the impact of mortality salience on consumers' behavior by using data from a survey of the U.S. adult population. People increase materialistic spending as the fear of becoming a victim of a terrorist attack increases. This fear might even result in overconsumption and a particular desire to consume (Mandel and Smeesters, 2008).

The possible positive and negative predicted effects mentioned above stem from a wide range of literature on the effect of terrorism on savings behavior. Theoretical explanations are ambiguous. The overall effect of terrorism on savings can thus not only be evaluated theoretically but remains an empirical question.

So far, the effect of terrorism on savings has only been empirically studied at the macro level. The impact of terrorism on aggregate savings and aggregate consumption is crucial as it affects investment and thus economic growth (Frey et al., 2007). Political stability is one of the factors that determine the investment level but also the composition of investments in an economy (Collier, 1999). Risky investments are more likely to be reduced than investments in machinery and equipment as political instability increases (Frey et al., 2007). Fielding (2003b) studies the effect of political instability on investment level and compostion. Using quarterly data for Israel from 1988 to 1998, the author finds both the number of Israeli fatalities and the rate of growth of Jewish settlements to have a significantly negative impact on investment. According to Fielding (2003b), if the number of fatalities decreased to zero, construction investment would rise by 27.9% while machinery and equipment investment would rise by 14.6% in the steady state. The differing magnitude of the two effects shows that composition of investment is influenced by political instability. Effects for the political instability indicator rate of growth of Jewish settlements are identical in sign but smaller.

Personal threats, especially those posing a physical danger, are likely to be very affectively arousing and to elicit fear to a greater degree than more remote threats to the nation (Huddy et al., 2002). As a result, different savings responses can be expected for both personal and national threat. Although the general effects of terrorism or insecurity are well-known, there have been only two attempts to distinguish between the differing effects of personal and national threat (Asbrock and Fritsche, 2013; Huddy et al., 2002). Thus, the role of terrorist threat might not have been fully captured in prior studies.

3 Hypothesis Development

The purpose of this study is to analyze the effect of terrorism, in particular perceived personal and national threat, on household savings choices. We base our approach on Huddy et al. (2002a) and Asbrock and Fritsche (2013), who differentiate between personal and national threats in order to better understand each one's contribution to threat-related responses.[7] In particular, we aim to clarify the roles of personal and collective elements in terrorist threat for household savings responses. As prior research mostly focused on explaining the effects of *one* type of terrorist threat, we argue that the role of terrorist threat might not have been fully captured.

As perceived personal and national threat are distinct but related (Huddy et al., 2002a), we involve both types of threat in our analyses. "Personal threats – especially threats that pose a physical danger – are likely to be very affectively arousing and to elicit fear to a greater degree than more remote threats to the nation" (Huddy et al., 2002a, p. 486).[8] Research on threats that have a potential for physical harm, like crime and natural disasters, shows that personal threat and fear result in changes in personal behavior to minimize risk exposure (e.g., Warr, 1990; Sattler et al., 2000). As a result, different savings responses can be expected for perceived personal and national threat. We posit the following null hypothesis:

H0 The effect of perceived personal threat on savings is significantly different from perceived national threat due to terrorism.

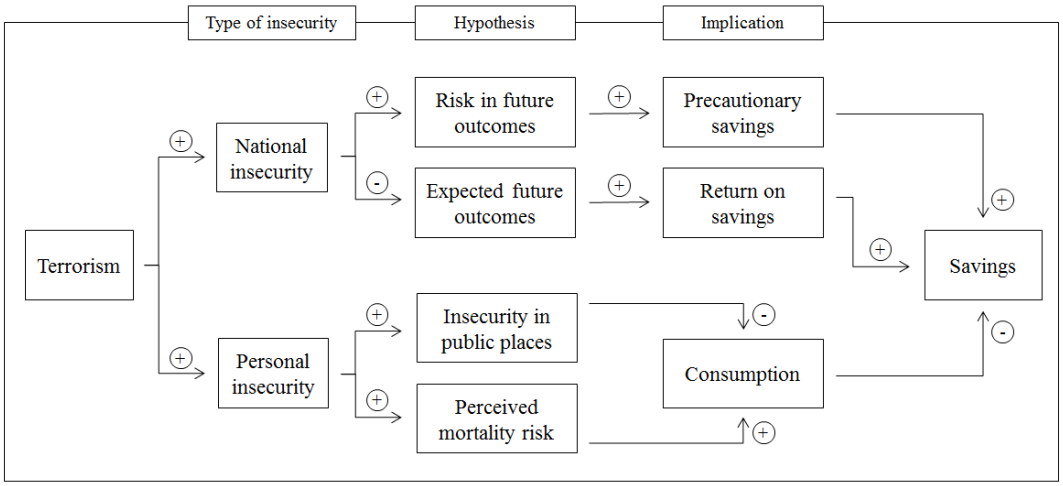

Figure 1: Predicted effects of terrorism on savings derived from the literature

[7] Although the general effects of terrorism or insecurity are well-known, there have been few attempts to distinguish between the differing effects of personal and national threat. Thus, it is not clear whether an effect identified in literature is a response to perceptions of personal or collective threat. While Asbrock and Fritsche (2013) investigate authoritarian reactions of Germans to terrorist threat, Huddy et al. (2002a) study the perceived risk of terrorism in the U.S. after 9/11.

[8] Personal threats are more likely than collective threats to elicit fear, anxiety and somatic symptoms like depression and insomnia (Huddy et al., 2002b).

We base our hypotheses on the predicted effects illustrated in Figure 1, which stem from a wide range of literature presented in Section 2. The sign of the overall effect of terrorism on savings is a priori ambiguous. It is unclear whether the effect of terror, both personal and national insecurity, on savings is positive or negative. Both directions are possible depending on which of the opposing effects prevails for personal and national threat, respectively.

We derive four possible paths through which terror can influence savings decisions. Perceived national threat can either cause an increase or a decline in the level of savings. Following Fielding (2003a), political instability in a state either decreases savings due to lower expected returns or increases saving due to a precautionary saving motive. Both a positive and a negative correlation between risk and savings are consistent with a utility-maximizing representative agent (see, e.g., Levhari and Srinivasan, 1969). On the one hand, national insecurity due to terrorism can increase the perceived risk in future outcomes leading to precautionary savings. On the other hand, expected future outcomes may decrease in the aftermath of terrorism. Thus, returns on savings become more uncertain, which lowers individuals' incentive to save. This is summarized in H1a and H1b:

H1a Terrorism in the form of perceived national threat increases precautionary savings through increased expected risk in future outcomes.

H1b Terrorism in the form of perceived national threat decreases return on savings through decreased expected future outcomes.

Regarding perceived personal threat, the desire to provide for a longer life together with the desire for more certainty by consuming now pull in opposite directions (Levhari and Mirman, 1977). If people avoid public places, such as cafés and restaurants, in the aftermath of terrorist events, the impact of terrorism on savings is positive through lower levels of consumption. In contrast, perceived mortality risk is expected to rise when people are confronted with terrorism. Higher mortality increases consumption through two channels. First, consumption today is preferred to consumption in the future as the value of the future relative to the present lowers. Second, TMT refers to consumption as a coping strategy facing existential fears. Both theories explain a decline in savings through higher levels of consumption. Thus, we propose the following hypotheses:

H2a Terrorism in the form of perceived personal threat increases consumption through increased mortality risk.

H2b Terrorism in the form of perceived personal threat decreases consumption through avoidance of public places.

Consequently, our hypotheses refer to the partial effects for perceived personal and national insecurity derived from the literature. However, it is unclear which of the predicted effects prevails for both forms of threat. The overall effect of terrorism on savings can thus not only be evaluated theoretically but remains an empirical question.

We assume the decision maker to be emotional in a first step. Terrorism elicits fear such that subjective beliefs about danger deviate from objective risk assessment (Becker and Rubinstein, 2011). Behavioral explanations including bounded rationality address disproportionate responses to terrorism. In a second step, the decision maker is likely to be rational when it comes to savings choices in the context of national threat, in particular precautionary savings and return on savings. Regarding the precautionary saving motive, Kimball (1990) refers to a rational agent who maximizes expected utility. However, this is only the case if forecasts about future outcomes are based on rationality.[9] Collective threat thus consists of an emotional assessment of terrorist risk and a rational decision in the year following the attacks based on this biased risk assessment. For personal threat, people are likely to involve emotions regarding perceived mortality risk. The share of fatalities in public places depends on total fatalities and points at expectations about possible future terrorist attacks, in particular in public places. Therefore, emotions also play a role.

4 Data and Variables

4.1 Data

Our empirical analysis is based on a rich unbalanced panel dataset with observations on 14 countries from 2004 to 2015, which brings together information from the SHARE database and the GTD for terrorist events. Data on economic indicators is provided by the World Bank and Thomson Reuters Datastream.[10] Economic indicators on the country level are incorporated to control for country characteristics that change over time. Moreover, we use average household size from the OECD to construct the denominator of our dependent variable.[11]

SHARE is a multidisciplinary and international panel dataset that includes data on the elderly population aged 50 and over. It is published by the Munich Institute for the Economics of Ageing, a department of the Max Planck Institute for Social Law and Social Policy, and provides information on more than 120,000 individuals from 20 European countries and Israel. Data is collected in six waves from 2004 to 2015 using a computer-assisted personal interviewing program.[12] The SHARE dataset includes microeconomic data on three main research areas, namely economics, sociology and health (Börsch-Supan et al., 2005). Spouses and partners of persons aged 50 and above living in the same household are also interviewed regardless of their age. We include information about household members to account for

[9] the forecasts are based on expert judgement and model-based analyses, it is highly likely that people include rational aspects in their decision making processes. However, decision making may depend on biased risk assessments.
[10] See http://data.worldbank.org/indicator/ and https://financial.thomsonreuters.com/en/products/data-analytics/economic-data.html for more information.
[11] See http://www.oecd.org/els/family/database.htm for more information.
[12] SHARE covers six waves. However, wave 3 is neglected due to its focus on life history data.

household information that is necessary to answer our research questions, such as net income or net worth.[13] However, households in which all persons are younger than 50 are excluded. By focusing on the elderly population, this international panel dataset allows us to study demographics with the most voluminous savings decisions just before and after retirement (Börsch-Supan et al., 2005).

We merge the SHARE dataset with the GTD to add data on terrorist events, in particular on the number of deaths caused by terrorism and the number of terrorist attacks. The GTD is an open source database that relies on reports about terrorism from the print or electronic media, including government reporting.[14] It involves information on more than 170,000 domestic and international terrorist attacks from 1970 to 2016. The GTD is maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism at the University of Maryland and has been used in a number of recent studies on terrorism (e.g., Argomaniz and Vidal-Diez, 2015; Huber et al., 2017). It is seen as the most comprehensive source of data on terrorism today and its coding techniques and overall reliability make it one of the most utilized databases in the field (LaFree and Dugan, 2007; LaFree, 2010; Argomaniz and Vidal-Diez, 2015). The merged data comprise of 56,540 native households and 136,265 observations from 13 European countries and Israel ranging from 2004 to 2015. We exclude countries for which we only have information at one point in time or for which only one or none of the datasets provides relevant information. On average, each household generates 2.1 data points in our sample.

Wave / Country	1	2	4	5	6
Austria	2004	2006/2007	2011	2013	2015
Belgium	2004/2005	2006/2007	2011	2013	2015
Czech Republic	-	2006/2007	2011	2013	2015
Denmark	2004	2006/2007	2011	2013	2015
Estonia	-	-	-	2013	2015
France	2004/2005	2006/2007	2011	2013	2015
Germany	2004	2006/2007	2011/2012	2013	2015
Greece	2004/2005	2007	-	-	2015
Israel	2005/2006	2009/2010	-	2013	2015
Italy	2004	2006/2007	2011	2013	2015
Portugal	-	-	2011	-	2015
Spain	2004	2006/2007	2011	2013	2015
Sweden	2004	2006/2007	2011	2013	2015
Switzerland	2004	2006/2007	2011	2013	2015

Table 1: Countries and years for which information is available in SHARE[15]

[13] In order to make variables, e.g. household net income or household net worth, comparable among countries, we use the appropriate average exchange rates for each year between 2004 and 2015 to reflect Euro values.

[14] The GTD is periodically updated and revised so that data contents may vary depending on the access date. We downloaded data in June 2017. See LaFree and Dugan (2007) and LaFree (2010) for more information on the GTD.

[15] Note that we focus on the year in which the interview took place.

Table 1 provides an overview of countries and the respective years for which information is available in the SHARE dataset. Since the GTD provides terror information in all years from 1970 to 2016, we focus on the years for which data is provided by the SHARE. The latter gives information for at most five years from 2004 to 2015.

4.2 Terror Variables

The GTD defines a terrorist attack 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" (LaFree and Dugan, 2007, p. 184).[16] It includes assassinations, airplane hijackings, kidnappings, barricade incidents, bombings, armed and unarmed assaults as well as facility or infrastructure attacks. In order to analyze the effect of terrorism on savings, we use the number of persons killed besides terrorists[17] (*#Killed*) and the number of attacks (*#Attacks*) in a given year and country as lagged independent variables. By using one-year-lagged variables, we rule out a correlated, contemporaneous response across countries to new information. To make the effects of the terror variables easily comparable in our regression analyses, we normalize both the number of attacks and the number of fatalities by their respective standard deviations.

We use information about fatalities in one's country as proxy for personal threat, while national threat is based on preceding terrorist events in one's country. We measure perceived personal threat with the number of fatalities due to terrorism in a given country and year, excluding all perpetrators of the attacks. When people perceive themselves to be in real danger due to fatalities, there likely will be an increase in subjective probability of additional attacks that might lead to death. Thus, the perceived severity of the attack may depend on whether people die in a terrorist incident or not. Perceived national threat, in contrast, describes the terror situation in a country. Terrorist attacks in general pose major shocks for a nation and the environment in which an individual lives.

We base our choice of variables on Huddy et al. (2002a) and Asbrock and Fritsche (2013). Both studies differentiate between perceived personal and national threat. Huddy et al. (2002a) measure personal threat due to terrorism by asking how concerned respondents personally are about themselves or a family member being the victim of a future terrorist attack in the U.S. National threat refers to the question how concerned respondents are that there will be another major terrorist attack on U.S. soil in the near future. Similarly, Asbrock and Fritsche (2013) refer to a German citizen that can either anticipate becoming a victim of terrorism on the

[16] However, there is no widely accepted definition for terrorism. Different agencies or departments of the same government often even use different definitions, as is the case in the U.S. (Hoffman, 2006).
[17] The number of total confirmed fatalities for the incident includes all victims and attackers who died as a direct result of the incident. We exclude all terrorists from this number to only account for victims that unintentionally become part of the attack.

personal level or anticipate that a terrorist incident strikes Germany without direct personal involvement on the collective level.

In Figures 2 and 3, the distributions for the two variables are displayed.

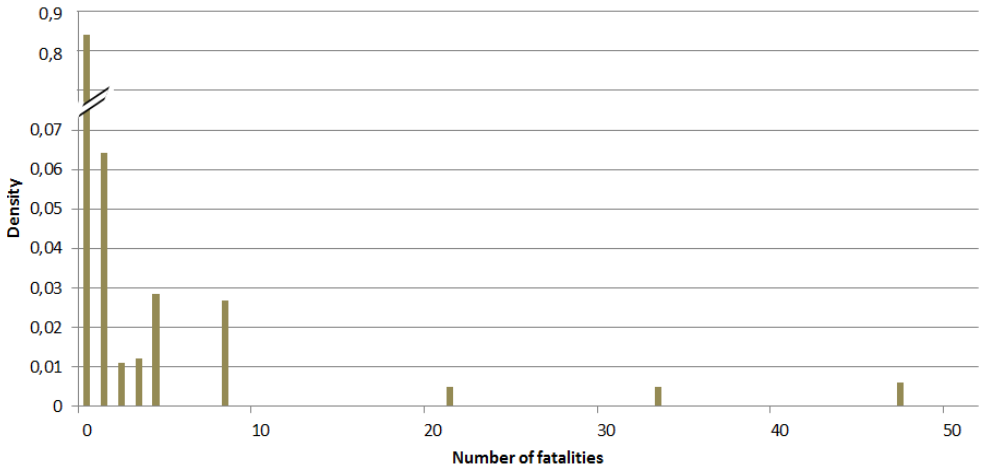

Figure 2: Distribution of the variable number of fatalities per country and year

We can see that the variable number of terrorist attacks lies between zero and 293, while approximately 38% of all households did not face terrorism within national borders in the year preceding the survey wave. This leaves us with approximately 62% of household-year observations confronted with terrorism.

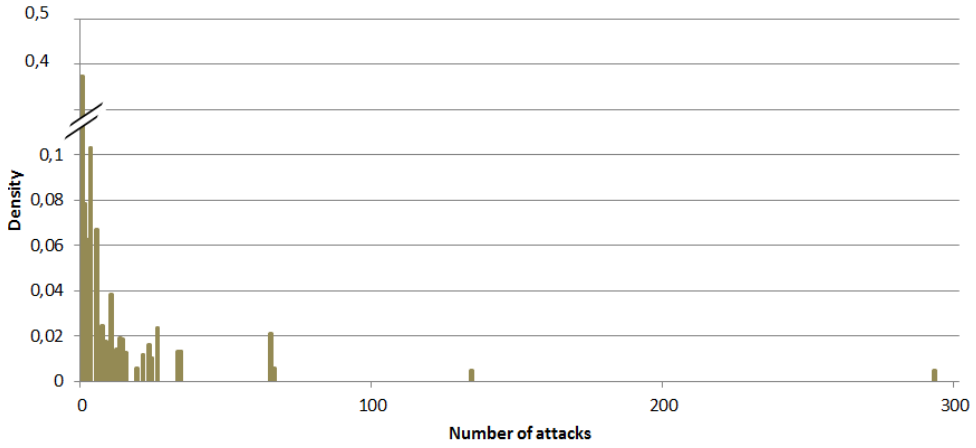

Figure 3: Distribution of the variable number of attacks per country and year

Furthermore, significant terrorist events with a large number of deaths are only rarely observed in the dataset. This shows that the two terror variables are substantially different in their definition of terrorism. People are less often confronted with a deathly attack than with an attack per se, which implies a difference in the level of escalation of violence.[18] Fatalities are

[18] Note than a terrorist act is not always accompanied by fatalities.

rarer than acts of terrorism per se and thus may lead to an emotionally motivated, different reaction to the outbreak of terror.

The impact of terrorism on savings is likely to differ depending on whether uncertainty in the environment or personal uncertainty is considered. Potential differences in the results could also be driven by the differing intensity of terrorism. As personal threat is more likely than national threat to elicit fear (see Huddy et al., 2002a), we expect number of fatalities to have a larger influence on an individual's perception of risk and thus on his or her savings pattern. Media coverage of terrorism increases fear and perception of the possibility of future attacks (Mandel, 2005), which may be higher for terrorist attacks that are accompanied by fatalities (Rohner and Frey, 2007).[19]

4.3 Savings Variable

A wide range of studies uses household net worth to account for the level of savings (e.g., Guiso et al., 1992; Carroll and Samwick, 1997; De Nardi et al., 2009; Chen, 2013).[20] In particular, Chen (2013) defines a savings ratio that equals household net worth divided by average national disposable income. Accounting for average net disposable income in a country enables a comparison of net worth across households living in different countries. While Chen (2013) uses net disposable income as denominator, we divide household net worth by average GDP per household since OECD data on Israelis' net disposable income for all relevant years is not available.[21] Thus, the dependent variable is defined by

$$y = \frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}. \qquad [1]$$

$HHNetWorth_{i,t}$ is the estimated value of a household i's net worth in year t. The variable is based on the SHARE definition of household net worth. It includes all real assets (i.e., value of homes, businesses and cars) plus gross financial assets (i.e., sum of bank accounts, corporate and government bonds, stocks and mutual funds and savings for long-term investments) minus any financial liabilities.[22] Savings for long-term investments involve the sum of household

[19] However, there is also evidence for people's judgments of personal risk and their avoidance behaviors being relatively uninfluenced by media reports in the case of crime (Tyler, 1984).

[20] We refer to *past* savings behavior determined by accumulated wealth. Savings and wealth are linked through the intertemporal budget constraint (Guiso et al., 1992). Thus, the impact of terrorism on saving or net worth should be equivalent. However, differences in net worth may vary from saving flows due to capital gains. While saving is the difference between disposable income and consumption, net worth refers to the aggregation of a household's worth (Guiso et al., 1992). In order to make sure that capital gains do not drive changes in the level of savings, we control for the one-year lagged interest rate and stock market performance on the country level.

[21] Alternatively, a representative sample in the SHARE dataset is needed to derive the average net income. Yet, by focusing on the elderly population, the dataset may not be sufficient to calculate representative averages. Younas (2015), for instance, also uses the savings-to-GDP ratio. However, in contrast to our dependent variable, both variables are provided on the country level.

[22] As the SHARE suffers from the problem of item non-response (e.g., due to the length of the questionnaire), it provides imputed values for the aggregate household variables $HHNetWorth$ and

retirement accounts, contractual savings[23] and life insurance holdings[24]. We divide household net worth by national GDP per household to make net worth comparable across households living in different countries. This allows us to account for the average productivity of households.

$GDPPerHousehold_{c,t}$ is GDP per household for country c in year t. It equals GDP per capita multiplied by the average household size in 2015 for a given country and year. Following Chen (2013), we allow for zero net worth as well as negative values by applying the inverse hyperbolic-sine transformation

$$IHS(y) = \log\left(y + (y^2 + 1)^{\frac{1}{2}}\right). \quad [2]$$

This ensures that the regressions are not driven by outliers (Chen, 2013). Except for small values of y, this transformation approximately equals $\log(2y)$ or $\log(2) + \log(y)$. Coefficients therefore can be interpreted in exactly the same way as with a standard logarithmic transformation (Chen, 2013).

Figure 4 shows the distribution of the dependent variable described above with the majority of observations lying between 0 and 4.

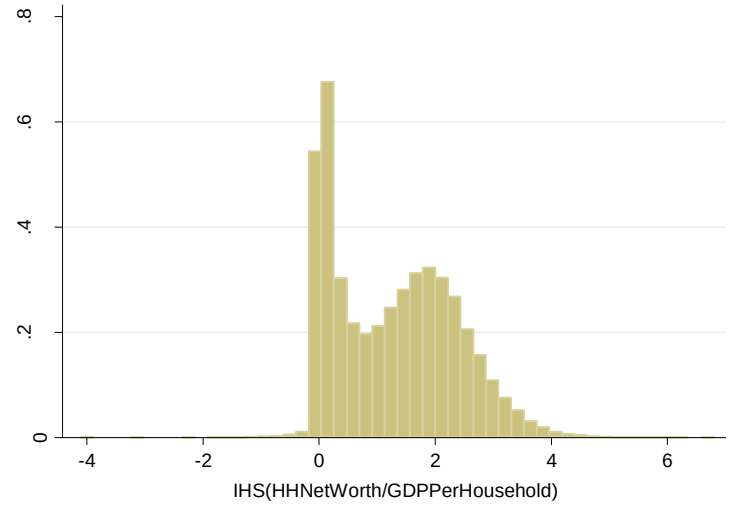

Figure 4: Distribution of the dependent variable

HHIncome (i.e., household net income). It contains imputations only for a subset of aggregated variables, but not for their specific components.

[23] Contractual savings refer to savings in the form of regular payments into long-term investments (e.g., pension schemes).

24 The SHARE differentiates between term and whole life policies and in savings for long-term investments only includes whole life policies. Following SHARE´s definition of savings for long-term investments, term life insurance products thus are not included in the variable household net worth. Respondents are asked to name the face value of the whole life policies owned by themselves and their husband, wife or partner. According to the interviewer instruction to the SHARE questionnaire, term life insurance provides coverage for a fixed period of time and pays a predetermined amount only if the policyholder dies within this period. On the other hand, whole life insurance (i.e., endowment insurance) has a savings component that increases in value over time and can be paid back in many installments over time or all at once.

4.4 Hypothesis Variables

In the following, we introduce the variables that are intended to test our hypotheses introduced in Section 4.3.[25] The opposing effects of national perceived insecurity are tested by using data on the country level. In order to capture national expected future outcomes and risk of future outcomes, we plan to incorporate the stock price index and its volatility, respectively. Regarding the stock market, return and volatility forecasts of investors are likely to be higher after 9/11 (Glaser and Weber, 2005).[26] Investors' volatility forecasts are expected to be higher after 9/11 because of rational anticipation of an increased uncertainty in the economy (Glaser and Weber, 2005). As we do not have information about individual forecasting on the country level, we use forecasts that assess the economic climate in the world economy and in specific countries using the stock price index.

The contrary effects described for personal perceived threat refer to avoidance of public places and perceived mortality risk. We measure the avoidance of public places by incorporating GTD information on those fatalities that fall victim to an attack in a public place. The higher the number of people that die in public places, such as cafés and restaurants, the higher the likelihood that a person avoids activities that take place in public. We involve the share of private fatalities $SharePrivate_{c,t}$ for country c in year t that is defined by the number of private fatalities $\#PrivateKilled_{c,t}$ divided by the number of fatalities $\#Killed_{c,t}$ in the same year and country,

$$SharePrivate_{c,t} = \frac{\#PrivateKilled_{c,t}}{\#Killed_{c,t}}. \quad [3]$$

The share of private fatalities is constructed using all fatalities that refer to the target or victim types business, private citizens and property or tourists. The target or victim type in the GTD reflects the motive of the attack. The higher the number of people killed in public places, the higher the share of private fatalities. Business include any attack on a business or private citizens patronizing a business such as a restaurant, gas station, music store, bar, café etc. Private citizens and property involves attacks on individuals, the public in general or attacks in public areas including markets and pedestrian malls. The type tourists refers to attacks that clearly target tourists, including tour buses and tours.[27] According to the GTD, tourists travel primarily for the purposes of amusement or leisure.

[25] See Figure 1 for an overview of the hypothesis variables.
[26] Glaser and Weber (2005) conduct a survey using internet questionnaires of German investors before and after 9/11. The authors find that return forecasts are significantly larger after the attacks. Actual returns are overestimated from the respective survey day until the end of 2001 by both groups. Volatility forecasts are in two out of four cases higher after 9/11 such that people overestimate historical volatilities. Before 9/11, historical volatilities are underestimated. Thus, investors are not always overconfident by underestimating the stock return variance (Glaser and Weber, 2005).
[27] Note that attacks on the transportation system used by tourists are excluded.

We use SHARE data on subjective survival expectation forecasts to assess individuals' perceived mortality risk.[28] While life expectancy on the country level accounts for differences in life cycles among countries, subjective survival probabilities make savings choices comparable across households. In the aftermath of terrorism, people adjust their life cycle and hence their subjectively felt survival probability as uncertainty about life increases, leading to a decrease in optimal savings (Eckstein and Tsiddon, 2004). The SHARE survey contains subjective point forecasts of individuals' survival probabilities in %. It asks individuals for the chance that they will live to age x or more, while x depends on the respondent's current age.[29] We use the minimal subjective survival probability of household members to receive a household value.[30]

4.5 Control Variables

Besides our variables of interest, we control for a wide range of household and country characteristics that are potentially associated with savings choices and perceived threat of terrorism. Household characteristics that may change over time include household size, number of children, years of education, marital status, retirement, age, health and income.

Controlling for marital status and household size is necessary because income and net worth are reported as household-level aggregates (Post and Hanewald, 2013). Therefore, individuals living in a relationship appear wealthier because both parties contribute to these combined wealth amounts. We add the number of children because it is expected to have an impact on saving behavior and perceived threat.

We further include household net income since aggregate private sector consumption is found to depend significantly on income (Fielding, 2003a). Increased income alters an individual's budget that limits consumption and savings. Besides income, health and age are likely to have an impact on savings decisions. Permanent income, age and health are crucial when it comes to medical expenditures that, in turn, influence savings of the elderly (De Nardi et al., 2009; De Nardi et al., 2010). Permanent income and health positively affect life expectancy, which results in differences in saving behavior (De Nardi et al., 2009). As the SHARE dataset does

[28] The forecast dispersion in subjective survival estimates is positively related to the objective longevity risk, which shows that people are to some extent aware of longevity risk (Post and Hanewald, 2013). However, this positive relationship is expected to result from disagreement effects between individuals and not from an actual awareness of the uncertainty (Post and Hanewald, 2013).

[29] For instance, x is 75 if the respondent is 65 or younger and 80 if the respondent's age lies between 65 and 69. The older the respondent's current age, the higher the hypothetical survival age x. The maximal difference between current age and the potential survival age x is 15 years if respondents are older than 65 and the minimal difference is 6 years.

[30] As household health, for instance, is based on the worst health situation of household members, we use the survival probability of the person with the worst forecast (i.e., the minimum). The average could also be used to include information on all household members.

not provide information on medical expenditures or life expectancy, we account for age, health and income to capture these variables indirectly.

Furthermore, changes in consumption and savings may be observed for persons that get retired. As life changes with retirement, the saving and consumption behavior has to be reconsidered. People have more time to consume and to spend money on leisure activities, while income adjusts. We account for age and age squared because we expect the influence of age on savings to be nonlinear.[31] As people get older, they are likely to increase their level of savings because more income is available. As soon as a particular age is achieved (e.g., the retirement age), however, they rather dissave. The elderly population tends to be far more risk averse than the younger generation, which makes this generation sensitive to terrorist events (see Halek and Eisenhauer, 2001). Differences in perceived threat of terrorism according to age are likely. Years of education are incorporated in the analysis because education is likely to have an influence on an individual's knowledge about investment possibilities and thus on where to get the highest return on savings. Furthermore, education may help to assess terrorist threat more accurately.

The variables age, education, health and retirement are given on the individual level such that differences among household members are possible. As we focus on households, we have to find appropriate values for those variables. Other variables on the household level are unique since values are the same for all members. Following Chen (2013), we use the maximum value of all household members to receive *HHAge* and *HHEdu*. *HHHealth* is a dummy variable that is 1 if at least one individual in the household self-perceives health worse than the median value.[32] The dummy variable *HHRetired* is 1 if at least one household member is retired. The latter variable accounts for households that include persons for which income may be lower due to retirement.

Furthermore, we include inflation measured by the consumer price index (CPI), annual GDP per capita growth, the unemployment rate as percentage of total labor force and life expectancy at birth. Changes in inflation alter the opportunity cost of holding money, which can influence the consumption level (see, e.g., Jovanovic and Ueda, 1997). Inflation is found to be associated with consumption and thus with savings (Fielding, 2003a). Furthermore, GDP per capita growth, the unemployment rate and life expectancy in a given country are likely to have an influence on household savings.

In addition, it could be possible that savings change due to capital gains rather than individual decision making. We consider these unintended changes in the level of savings mechanically

[31] The dataset gives us justification for this assumption.
[32] Respondents are asked to self-assess their health on a scale from 1 (i.e., excellent) to 5 (i.e., poor). The median value of self-perceived health is 3.

driven by the stock market or the interest rate by including appropriate control variables. First, we involve the one-year lagged stock market performance. To account for changes in the stock prices, we take the one-year lagged MSCI total return indices on the country level provided by Thomson Reuters Datastream.[33] Second, we incorporate the one-year lagged interest rate on three-month securities for each country.[34]

4.6 Summary Statistics

Table 2 presents descriptive statistics for the variables used in our analyses. We report the dependent variable, its single components as well as the savings ratio without the inverse hyperbolic-sine transformation. The variable $HHNetWorth$ exhibits strong variation. Some households even face negative net worth resulting from high amounts of financial liabilities. However, household net worth is on average positive with the majority of observations lying between 0 and 4.

Furthermore, the two terror variables number of fatalities and number of attacks within a state are presented. The variables are reported times their respective standard deviations.[35] The variables differ in their mean value and in their respective standard deviations. The variable $\#Attacks$ exhibits higher variation than $\#Killed$. Only some terrorist attacks are accompanied by fatalities. Based on our dataset, we observe at most 47 deaths per country and year, which is the case for Israel in 2004.[36] While Germany and Spain face, on average, approximately 0.5 victims of terrorism per year, Israel is confronted with 29 fatalities. Hypothesis and control variables introduced in Sections 4.4 and 4.5 are further reported.

[33] See https://financial.thomsonreuters.com/en/products/data-analytics/economic-data.html for details. The MSCI is maintained by MSCI Inc. including information on stocks from the respective country.
[34] See https://data.oecd.org/interest/short-term-interest-rates.htm for details. Short-term interest rates are averages of daily rates, measured as a percentage. We use the lagged variable to account for the average interest rate for the whole year in which terror attacks are regarded.
[35] Note that we normalize number of attacks and number of fatalities by their respective standard deviations to make the effects of the terror variables easily comparable in our analyses.
[36] The 2004 value for Israel is part of the regression in 2005 because lagged terror variables are used.

Variable	Definition	Mean	Std. Dev.	Min	Max
Dependent variable					
$\mathbf{IHS}\left(\frac{\mathbf{HHNetWorth}}{\mathbf{GDPPerHousehold}}\right)$	Inverse hyperbolic-sine transformation of household net worth over GDP per household in a given year	1.293	1.069	-4.012	6.814
$\frac{\mathbf{HHNetWorth}}{\mathbf{GDPPerHousehold}}$	Household net worth over GDP per household in a given year	3.170	5.800	-27.630	455.120
HHNetWorth	Household net worth in a given year (in Euros)	206,292.8	416,174	-1,819,678	3.57e+07
Independent variables					
Terror variables					
#Attacks	Number of terrorist attacks in a given country and preceding year	7.719	21.381	0	293
#Killed	Number of fatalities in a given country and preceding year	0.736	3.442	0	47
Hypothesis variables					
ForecastExp	Stock price index in a given country and year	102.217	84.872	10.273	657.822
ForecastVol	Volatility of stock price index in a given country and year (in %)	18.887	5.774	8.927	42.413
SharePrivate	Share of private fatalities in a given country and preceding year	0.072	0.254	0	1
HHSurvival	Subjective survival probability of household in a given year (in %)	56.982	29.893	0	100
Control variables					
HHAge	Age of oldest household member in a given year	67.111	10.169	50	102
HHAge_squared	Squared age of oldest household member in a given year	4,607.336	1,408.46	2,500	10,404
HHIncome	Total household net income in a given year (in Euros)	26,716.19	54,465.23	0	1.00e+07
HHSize	Household size in a given year	2.032	0.993	1	12
HHNumChild	Number of children in household in a given year	2.087	1.362	0	17
HHEdu	Average years of education in household in a given year (in years)	11.409	4.466	0	25
HHMarried	(1): individuals in household are married in a given year	0.613	0.487	0	1
HHHealth	(1): at least one individual in household self-perceives health worse as median in a given year	0.429	0.495	0	1
HHRetired	(1): at least one individual in household is retired in a given year	0.612	0.487	0	1
Inflation	Inflation measured by the CPI in a given country and year (in %)	1.341	1.345	-1.74	4.98
GDPGrowth	GDP per capita growth in a given country and year (in %)	1.379	1.906	-2.86	7.92
lnGDPPerHousehold	Natural logarithm of GDP per household in a given country and year	11.042	0.380	10.098	11.752
UnempRate	Unemployment rate in a given country and year (% of total labor force)	8.960	5.061	3.65	26.09
LifeExp	Life expectancy at birth in a given country and year (in years)	80.573	1.889	75.43	83.49
MSCI	MSCI total return index in a given country and preceding year	5,742.997	8,161.31	271.254	40,645.72
Interest	Interest rate on 3 month securities in a given country and preceding year (in %)	1.119	1.030	0.01	5.93

Table 2: Summary statistics (time period: 2004-2015)

5 Methodology and Regression Results

We perform an empirical investigation of the microeconomic consequences of terrorism using ordinary least squares (OLS) regressions. The Hausman test gives justification for using a fixed effects approach. We include household fixed effects to control for observable and unobservable household characteristics that are fixed over time. Year dummies account for potential time-specific, aggregate trends that affect all relevant countries over time (e.g., the financial crisis in 2008). Not considering year-specific effects may lead to significantly distorted results. In addition, we add lagged terror variables because households' responses to terrorist attacks might even emerge with some delay. Temporal precedence makes sure that terrorism causes changes in savings behavior (see Cohen et al., 2003).[37]

Since we only incorporate information on native households living in the same country over all sample years, we do not include country fixed effects. The household fixed effects also control for time-invariant country characteristics and given differences among countries. For instance, as people have no control about the state-given retirement system, household fixed effects also account for differences in retirement systems. Furthermore, differences among countries regarding their political situations are captured. We control for several household and state characteristics, summarized by $X_{i,t}$, $X_{c,t}$ and $X_{c,t-1}$.[38] To account for potential within-country error correlation, we use clustered standard errors on the country level.[39]

In order to evaluate the overall effect of terrorism on household saving behavior, we run OLS regressions. First, we include the number of attacks and number of fatalities separately,

$$\boldsymbol{IHS\left(\frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}\right) = \beta_0 + \beta_1 * \#Attacks_{c,t-1} + \beta_2 * X_{i,t} + \beta_3 * X_{c,t} + \beta_4 * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t},} \quad \textbf{[4]}$$

$$\boldsymbol{IHS\left(\frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}\right) = \beta_0 + \beta_1 * \#Killed_{c,t-1} + \beta_2 * X_{i,t} + \beta_3 * X_{c,t} + \beta_4 * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t},} \quad \textbf{[5]}$$

with $i \in \{1,2,3,\dots,N\}$ and $t \in \{1,2,3,\dots,T\}$ where N is the number of households and T is the number of years.

[37] Note that we assume terrorist attacks to increase the threat of terror exogenously. Following previous research, preceding attacks are likely to reflect expectations about possible future terrorist attacks (e.g., Eckstein and Tsiddon, 2004). Perceived terrorist threat, however, depends on the handling with threat and household characteristics for which we control.

[38] $X_{c,t-1}$ refers to the one-year lagged variables for stock market performance and interest rate.

[39] It can be expected that households living in the same country also share unobservable characteristics, which lead to correlated error terms (Moulton, 1990). Observations might be related with each other within countries but not across countries. Following Wooldridge (2015), we cluster at the highest level of aggregation. Thus, we cluster at the country level and use fixed effects at the household level.

As personal and national threat are distinct but related (Huddy et al., 2002a), we expect the two terror variables to be correlated with each other.[40] Therefore, we include both variables in a third regression model to avoid any omitted variable bias,

$$\boldsymbol{IHS\left(\frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}\right) = \beta_0 + \beta_1 * \#Attacks_{c,t-1} + \beta_2 * \#Killed_{c,t-1} + \beta_3 * X_{i,t} + \beta_4 * X_{c,t} + \beta_5 * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t}.} \quad \textbf{[6]}$$

The coefficient β_1 (β_2) of this log-linear model can be interpreted in the following manner: Increasing the number of attacks (fatalities) by one standard deviation changes the savings rate by β_1 (β_2) $* 100$ %, ceteris paribus.

Psychological theories often hypothesize that a relationship between two variables depends on a third variable, referred to as mediator or moderator (Baron and Kenny, 1986). While mediators are used as control variables in order to capture the indirect effect, moderators are characterized statistically in terms of interactions (see Pearl, 2012b). As we expect the effects of $\#Attacks$ and $\#Killed$ to be strengthened or weakened by the hypothesis variables introduced in Section 4.4, we perform Equations 4 and 5 including the respective interaction terms for both types of threat as well as the single hypothesis variables. We receive the following two regression models,

$$\boldsymbol{IHS\left(\frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}\right) = \beta_0 + \beta_1 * \#Attacks_{c,t-1} + \beta_2 * ForecastExp_{c,t} + \beta_3 * \#Attacks_{c,t-1} * ForecastExp_{c,t} + \beta_4 * ForecastVol_{c,t} + \beta_5 * \#Attacks_{c,t-1} * ForecastVol_{c,t} + \beta_6 * X_{i,t} + \beta_7 * X_{c,t} + \beta_8 * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t},} \quad \textbf{[7]}$$

$$\boldsymbol{IHS\left(\frac{HHNetWorth_{i,t}}{GDPPerHousehold_{c,t}}\right) = \beta_0 + \beta_1 * \#Killed_{c,t-1} + \beta_2 * SharePrivate_{c,t-1} + \beta_3 * \#Killed_{c,t-1} * SharePrivate_{c,t-1} + \beta_4 * HHSurvival_{i,t} + \beta_5 * \#Killed_{c,t-1} * HHSurvival_{i,t} + \beta_6 * X_{i,t} + \beta_7 * X_{c,t} + \beta_8 * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t}.} \quad \textbf{[8]}$$

For forecasts, we use information in year t because relevant forecasts take some time being based on preceding terror information. In the aftermath of terrorist attacks, people reflect about their lives and reconsider risk and savings choices accordingly. As expert forecasting measures individuals' assessment of future outcomes, we account for a time lag between terrorist attacks and forecasts. Regarding subjective survival probabilities, we also involve data the year following the attacks. This makes sure that all terrorist events in prior year could at least have the potential to influence perceived mortality. In contrast, the share of private fatalities is incorporated as lagged variable. Both private and total fatalities should refer to the same year because they are directly connected.[41] This makes sure that avoidant behavior due to terrorism in public places gradually changes consumption and thus savings.

[40] The correlation between the two terror variables number of fatalities and number of attacks is 0.61.
[41] The effect of $\#Killed$ can be strengthened by $SharePrivate$ through the interaction term.

By including interactions of terror variables and the respective hypothesis variables as well as the single hypothesis variables, we receive the following regression model,

$$IHS(HHNetWorthNormalized_{i,t}) = \beta_0 + \beta_1 * \#Attacks_{c,t-1} + \beta_2 * ForecastExp_{c,t} + \beta_3 * \#Attacks_{c,t-1} * ForecastExp_{c,t} + \beta_4 * ForecastVol_{c,t} + \beta_5 * \#Attacks_{c,t-1} * ForecastVol_{c,t} + \beta_6 * \#Killed_{c,t-1} + \beta_7 * SharePrivate_{c,t-1} + \beta_8 * \#Killed_{c,t-1} * SharePrivate_{c,t-1} + \beta_9 * HHSurvival_{i,t} + \beta_{10} * \#Killed_{c,t-1} * HHSurvival_{i,t} + \beta_{11} * X_{i,t} + \beta_{12} * X_{c,t} + \beta_{13} * X_{c,t-1} + \alpha_i + \delta_t + \epsilon_{i,t}. \quad \textbf{[9]}$$

Equation 9 is the focus of our analysis. It helps to disentangle the overall effect of terrorism on savings by considering relevant interactions.[42] We test our hypotheses presented in Section 3 by determining whether the respective interaction terms are significantly different from zero. If we reject the null hypothesis $H_0: \beta_j = 0$ for $j = 3,5,8,10$ at the 5 % significance level, the respective hypothesis H1a, H1b, H2a or H2b can be confirmed. For instance, the role of $HHSurvival$ as a moderating variable is accomplished by evaluating the coefficient β_{10}. If this interaction term is positive, the effect of terrorism on savings is expected to be weakened by an increase in perceived mortality risk, which supports hypothesis H2b.[43]

As Equation 9 involves interaction terms, it does not allow us to directly investigate differences in the savings reactions to personal and national threat. Thus, the Wald test, that examines the equality of two coefficients, cannot be conducted without bias. When interactions are involved, one coefficient alone is no longer sufficient to identify the effect of personal and national threat on savings, respectively. Equation 6 enables us to test for the equality of coefficients ($H_0: \beta_1 = \beta_2$). A comparison of coefficients of both forms of threat, however, can only be made by neglecting interactions, which may also lead to biases. As personal threat is more likely to elicit fear than national threat, it is expected to have a larger influence on risk perception and thus on savings. Our analysis could at least improve understanding of this prediction.

The current study aims at both evaluating the overall effect of terrorism on savings and disentangling the involved partial effects empirically. Equation 6 gives a first hint on the overall effects by showing which of the predicted effects may prevail for both forms of perceived threat. However, more work is required to decompose the effect of terrorism on savings into components attributable to the hypothesis variables.

Tables 3 and 4 summarize the results for equation 6. In the models 1-3 in Table 3, we take a look at the effect of terrorist attacks on savings for all 13 European countries and Israel. In the models 4-6, Israel is excluded from the analysis since Israel may be structurally different from

[42] However, this does not allow us to directly identify the moderating effects.

[43] A higher subjective survival probability implies a lower perceived mortality risk. Note that the coefficient β_9 indicates the effect of subjective survival probability on savings, holding the level of terrorism and other variables constant.

the rest, implying a (potential) effect within the data. The experience of terrorism in Israel is substantially different from that in other Western countries because Israelis are constantly confronted with the fear of becoming a victim of a terrorist attack (Herzenstein et al., 2015). To make sure that the results are not solely driven by Israeli households, we neglect households in Israel facing a sample of 55,566 households and 133,865 observations.

VARIABLES Dep. variable: IHS$\left(\frac{HHNetWorth}{GDPPerHousehold}\right)$	All countries			Israel excluded		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of attacks (1 year lagged)	0.008*** (0.002)		-0.025*** (0.006)	-0.010** (0.005)		-0.047*** (0.008)
Number of fatalities (1 year lagged)		0.022*** (0.004)	0.056*** (0.010)		0.017*** (0.006)	0.058*** (0.010)
Control variables	YES	YES	YES	YES	YES	YES
Household fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
Number of households	56,540	56,540	56,540	55,566	55,566	55,566
Number of observations	136,265	136,265	136,265	133,865	133,865	133,865
Adj. R-squared	0.778	0.778	0.778	0.778	0.778	0.778

Notes: Only individuals older than 50 are considered. Standard errors (in parentheses) are clustered at the country level. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 3: Regression results

As can be seen from Table 3, the effect of number of deaths caused by terrorism on the savings rate in all 13 European countries and Israel is positive and significant at the 1% level. Increasing the number of victims by one standard deviation increases the savings rate by 5.6%.When Israel is excluded from the regression, this effect persists. The effect of number of terrorist attacks on savings, however, is negative and significant. Increasing the number of attacks by one standard deviation thus decreases the savings rate by 2.5%. When both terror variables are included in the regression, excluding Israel from the sample does not change the effect in sign. Both findings demonstrate that the identified effects are not solely driven by the surveyed Israeli households. Excluding households that are constantly reminded of the possibility of becoming a terror victim thus does not significantly change the results. The negative effect of number of attacks on savings is nearly double if Israel is excluded from the sample implying that the influence of a terrorist attack on Israeli households is larger (i.e., less negative) than for European households. A possible explanation for this finding could be that Israelis are used to violence being confronted with terror in everyday life. This situation may lead to a lower absolute size of the coefficient for Israel compared with the 13 European countries. However, the coefficient of number of fatalities does only marginally change when Israel is excluded from the sample. This shows that, as soon as people die in the home country, households in Europe and Israel may react to terrorism similarly. Risk perception may vary

between both hypothesis variables and thus lead to different savings reactions in the aftermath of a terrorist attack. When individuals perceive their control to be low (i.e., if people observe others dying in a terrorist attack in one's own country), they react differently by, for example, consuming less and in turn increasing savings (Herzenstein et al., 2015). The impact of terrorism differs depending on whether uncertainty in the environment or personal uncertainty of surviving is considered. Individuals' general desire for control through savings may increase when they are confronted with deaths compared with terror in general. Intensity of terrorism, however, does not seem to drive the differing results for number of attacks and number of fatalities.

Table 4 shows the results for model 3 in detail. As soon as year dummies are included in the regression, the signs for both number of attacks and number of fatalities change. This implies that not accounting for year-specific effects may lead to significantly distorted results.

VARIABLES Dep. variable: IHS$\left(\frac{HHNetWorth}{GDPPerHousehold}\right)$	All countries			
	(3.1)	(3.2)	(3.3)	(3.4)
Number of attacks (1 year lagged)	0.039*** (0.002)	0.026*** (0.003)	-0.077*** (0.006)	-0.025*** (0.006)
Number of fatalities (1 year lagged)	-0.039*** (0.002)	-0.060*** (0.003)	0.095*** (0.010)	0.056*** (0.010)
Control variables	NO	YES	YES	YES
Household fixed effects	NO	NO	NO	YES
Year fixed effects	NO	NO	YES	YES
Number of households	56,622	56,540	56,540	56,540
Number of observations	136,818	136,265	136,265	136,265
Adj. R-squared	0.774	0.777	0.778	0.778

Notes: Only individuals older than 50 are considered. Standard errors (in parentheses) are clustered at the country level. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 4: Regression results for model 3

6 Conclusion and Outlook

Using microeconomic panel data of the elderly population from 13 European countries and Israel, this thesis analyzes the households' savings effects of terrorism that are mostly driven by fear and subjective risk perception. People adjust their expectations about possible future events when being confronted with terrorism. Although the probability of terror is negligible, responses to terrorist attacks are found to be large and sometimes even lasting. However, the consequences of terrorism on savings have not been analyzed at the microeconomic level focusing on more than one country.

We differentiate between two risk variables – number of terrorist attacks and number of fatalities – to address the potentially different reactions in the aftermath of terrorism. Our preliminary results from equation 6 indicate that results are contrary for both forms of terrorist threat. While number of attacks measures the uncertainty in the environment, number of fatalities refers to a personal insecurity due to fear of death. We find that the effect of number of terrorist attacks on savings is negative. However, savings is positively influenced by number of fatalities due to terrorist attacks. Both effects are statistically significant and economically meaningful. A possible explanation for this pattern could be that individuals change their risk perception as soon as people die in a terrorist attack.

However, we also plan to run the other regressions that study the paths through which terrorism alters savings. Our empirical identification strategy presented in Section 5 allows us to disentangle the overall effect of perceived national and personal threat, respectively. Terrorism in the form of perceived national threat is expected to increase precautionary savings through increased expected risk in future outcomes, and to decrease return on savings through decreased expected future outcomes. We expect terrorism in the form of perceived personal threat to increase consumption through increased mortality risk. Consumption, in contrast, decreases through avoidance of public places. Overall, different saving responses can be expected for perceived personal and national threat because personal threats are likely to elicit fear to a higher degree than more remote threats to the collective.

This study contributes to prior literature by adding to the general literature on decision making under risk in financial markets and helping better understand the macroeconomic effects of terrorism on the economy through an empirical evaluation of the influence on a vital part of it. Furthermore, it improves our understanding of the savings decisions of an ageing society in which terrorism is part of life. As the elderly controls a large share of society's resources, its economic decisions can significantly affect the relevant markets. Consequently, we help to improve governmental decision making on how many resources should be allocated to public security to deal with terrorism.

The next steps will be the extension of the proposed research methodology and a comprehensive discussion of the results. More work is required to decompose the effect of terrorism on savings into components attributable to the hypothesis variables. We intend to develop a more refined empirical framework to test the robustness of our results. Besides our main panel data regression, we will conduct several other analyses that help to ensure the reliability of our findings. For instance, political instability will be incorporated in the regression to test the robustness of the impact of perceived national threat on savings. An MTurk experiment shall provide evidence for the relationship between fatalities and personal threat as well as between terrorist attacks and national threat. We plan to define the lagged terror variables as attacks or fatalities that occurred exactly one year prior to the SHARE

interview day. Further lagged terror variables shall capture medium-term effects as we expect a longer interval of influence. Additionally, a control variable that accounts for governmental expenditures for security shall enrich our analysis. Furthermore, we plan to conduct sub-analyses that concentrate on the impact of terrorism on single elements of household net worth. This will enable us to identify in more detail the savings components that are mostly driven by terrorism.

References

Abadie, A. and Gardeazabal, J., 2003. The economic costs of conflict: A case study of the Basque Country. *American Economic Review*, 93(1)**,** 113-132.

Abadie, A. and Gardeazabal, J., 2008. Terrorism and the world economy. *European Economic Review*, 52(1)**,** 1-27.

Argomaniz, J. and Vidal-Diez, A., 2015. Examining deterrence and backlash effects in counter-terrorism: The case of ETA. *Terrorism and Political Violence*, 27(1)**,** 160-181.

Arndt, J., Solomon, S., Kasser, T. and Sheldon, K. M., 2004. The urge to splurge: A terror management account of materialism and consumer behavior. *Journal of Consumer Psychology*, 14(3)**,** 198-212.

Asbrock, F. and Fritsche, I., 2013. Authoritarian reactions to terrorist threat: Who is being threatened, the Me or the We? *International Journal of Psychology*, 48(1)**,** 35-49.

Averill, J. D., Mileti, D. S., Peacock, R. D., Kuligowski, E. D., Groner, N., Proulx, G., Reneke, P. A. and Nelson, H. E., 2005. Occupant behavior, egress, and emergency communication, Federal building and fire safety investigation of the World Trade Center disaster (NIST NCSTAR 1-7) [Online]. http://ws680.nist.gov/publication/get_pdf.cfm?pub_id=101046 [Accessed 03/03/2018].

Baron, R. M. and Kenny, D. A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51(6)**,** 1173-1182.

BBC News, 2005. Tube passenger numbers drop 30 % [Online]. http://news.bbc.co.uk/2/hi/uk_news/4744139.stm [Accessed 02/19/2018].

Becker, G. S. and Murphy, K., 2001. Prosperity will rise out of the ashes [Online]. https://www.wsj.com/articles/SB100430580598371160 [Accessed 03/03/2018].

Becker, G. S. and Rubinstein, Y., 2011. Fear and the response to terrorism: An economic analysis. *Working Paper, University of Chicago*.

Berrebi, C. and Klor, E. F., 2010. The impact of terrorism on the defence industry. *Economica*, 77(307)**,** 518-543.

Berrebi, C. and Guedalia-Ephrat, S., 2017. The effect of terrorism on life satisfaction: The case of the religious and secular population in Israel. *Working Paper*.

Blalock, G., Kadiyali, V. and Simon, D. H., 2007. The impact of post-9/11 airport security measures on the demand for air travel. *The Journal of Law and Economics*, 50(4)**,** 731-755.

Blanchard, O. J. and Fischer, S., 1989. *Lectures On Macroeconomics.* New York: MIT Press.

Blomberg, S. B., Hess, G. D. and Orphanides, A., 2004. The macroeconomic consequences of terrorism. *Journal of Monetary Economics*, 51(5)**,** 1007-1032.

Blomberg, S. B. and Hess, G. D., 2006. How much does violence tax trade? *The Review of Economics and Statistics*, 88(4)**,** 599-612.

Börsch-Supan, A., Hank, K. and Jürges, H., 2005. A new comprehensive and international view on ageing: Introducing the 'Survey of Health, Ageing and Retirement in Europe'. *European Journal of Ageing*, 2(4)**,** 245-253.

Burke, B. L., Martens, A. and Faucher, E. H., 2010. Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, 14(2)**,** 155-195.

Caballero, R. J., 1990. Consumption puzzles and precautionary savings. *Journal of Monetary Economics*, 25(1)**,** 113-136.

Camacho, A., 2008. Stress and birth weight: Evidence from terrorist attacks. *American Economic Review*, 98(2)**,** 511-515.

Carroll, C. D. and Samwick, A. A. 1992. The nature and magnitude of precautionary wealth. Board of Governors of the Federal Reserve System (US).

Carroll, C. D. and Samwick, A. A., 1997. The nature of precautionary wealth. *Journal of Monetary Economics*, 1(40)**,** 41-71.

Carroll, C. D. and Samwick, A. A., 1998. How important is precautionary saving? *Review of Economics and Statistics*, 80(3)**,** 410-419.

Chen, A. H. and Siems, T. F., 2004. The effects of terrorism on global capital markets. *European Journal of Political Economy*, 20(2)**,** 349-366.

Chen, M. K., 2013. The effect of language on economic behavior: Evidence from savings rates, health behaviors, and retirement assets. *American Economic Review*, 103(2)**,** 690-731.

Choi, J., Kwon, K.-N. and Lee, M., 2007. Understanding materialistic consumption: A terror management perspective. *Journal of Research for Consumers*, (13)**,** 1.

Christelis, D. and Georgarakos, D., 2009. Household economic decisions under the shadow of terrorism. *CFS Working Paper, No. 2008/56*.

Cocco, J. F. and Gomes, F. J., 2012. Longevity risk, retirement savings, and financial innovation. *Journal of Financial Economics*, 103(3)**,** 507-529.

Cohen, J., Cohen, P., West, S. G. and Aiken, L. S., 2003. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences.* New Jersey: Routledge.

Collier, P., 1999. On the economic consequences of civil war. *Oxford Economic Papers*, 51(1)**,** 168-183.

Cosgrove, J. 2001. What-the-hell consumption. *Business Week*, 10/29/2001.

Couzin, J., 2002. Quirks of fetal environment felt decades later. *Science*, 296(5576)**,** 2167-2169.

Dardanoni, V., 1991. Precautionary savings under income uncertainty: A cross-sectional analysis. *Applied Economics*, 23(1)**,** 153-160.

De Nardi, M., French, E. and Jones, J. B., 2009. Life expectancy and old age savings. *American Economic Review*, 99(2)**,** 110-15.

De Nardi, M., French, E. and Jones, J. B., 2010. Why do the elderly save? The role of medical expenses. *Journal of Political Economy*, 118(1)**,** 39-75.

Downes-Le Guin, T. and Hoffman, B., 1993. *The Impact of Terrorism on Public Opinion.* Santa Monica: RAND Corporation.

Drakos, K. and Kutan, A. M., 2003. Regional effects of terrorism on tourism in three Mediterranean countries. *Journal of Conflict Resolution*, 47(5)**,** 621-641.

Dynan, K. E., 1993. How prudent are consumers? *Journal of Political Economy*, 101(6)**,** 1104-1113.

Eckstein, Z. and Tsiddon, D., 2004. Macroeconomic consequences of terror: Theory and the case of Israel. *Journal of Monetary Economics*, 51(5)**,** 971-1002.

Eldor, R. and Melnick, R., 2004. Financial markets and terrorism. *European Journal of Political Economy*, 20(2)**,** 367-386.

Enders, W. and Sandler, T., 1991. Causality between transnational terrorism and tourism: The case of Spain. *Studies in Conflict & Terrorism*, 14(1)**,** 49-58.

Enders, W., Sandler, T. and Parise, G. F., 1992. An econometric analysis of the impact of terrorism on tourism. *Kyklos*, 45(4)**,** 531-554.

Enders, W. and Sandler, T., 1996. Terrorism and foreign direct investment in Spain and Greece. *Kyklos*, 49(3)**,** 331-352.

Ferraro, R., Shiv, B. and Bettman, J. R., 2005. Let us eat and drink, for tomorrow we shall die: Effects of mortality salience and self-esteem on self-regulation in consumer choice. *Journal of Consumer Research*, 32(1)**,** 65-75.

Fielding, D., 2003a. Counting the cost of the Intifada: Consumption, saving and political instability in Israel. *Public Choice*, 116(3-4)**,** 297-312.

Fielding, D., 2003b. Modelling political instability and economic performance: Israeli investment during the Intifada. *Economica*, 70(277)**,** 159-186.

Fleischer, A. and Buccola, S., 2002. War, terror, and the tourism market in Israel. *Applied Economics*, 34(11)**,** 1335-1343.

Frankfurter Allgemeine Zeitung, 2016. Die Deutschen sparen wieder mehr [Online]. http://www.faz.net/aktuell/finanzen/geldanlage-trotz-niedrigzinsen/eine-umfrage-der-postbank-zeigt-die-deutschen-sparen-wieder-mehr-14479997.html [Accessed 03/23/2018].

Frey, B. S., Luechinger, S. and Stutzer, A., 2007. Calculating tragedy: Assessing the costs of terrorism. *Journal of Economic Surveys*, 21(1)**,** 1-24.

Frey, B. S., Luechinger, S. and Stutzer, A., 2009. The life satisfaction approach to valuing public goods: The case of terrorism. *Public Choice*, 138(3-4)**,** 317-345.

Gassebner, M., Jong-A-Pin, R. and Mierau, J. O., 2011. Terrorism and cabinet duration. *International Economic Review*, 52(4)**,** 1253-1270.

Glaser, M. and Weber, M., 2005. September 11 and stock return expectations of individual investors. *Review of Finance*, 9(2)**,** 243-279.

Greenberg, J., Pyszczynski, T. and Solomon, S., 1986. The causes and consequences of a need for self-esteem: A terror management theory. In: Baumeister, R. F. (Ed.), *Public Self and Private Self*. New York: Springer.

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S. and Lyon, D., 1990. Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology*, 58(2)**,** 308-318.

Greenberg, J., Pyszczynski, T. and Solomon, S., 1997. Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. In: Zanna, M. P. (Ed.), *Advances in Experimental Social Psychology*. San Diego: Academic Press.

Greenberg, J. and Arndt, J., 2011. Terror management theory. In: van Lange, P., Kruglanski, A. and Higgins, E. T. (Eds.), *Handbook of Theories of Social Psychology*. London: Sage.

Grimm, A., Hulse, L. and Schmidt, S., 2009. Risikowahrnehmung und psychologische Reaktionen in öffentlichen Krisensituationen am Beispiel von Terrorattentaten. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz*, 52(12)**,** 1129-1140.

Guiso, L., Jappelli, T. and Terlizzese, D., 1992. Earnings uncertainty and precautionary saving. *Journal of Monetary Economics*, 30(2)**,** 307-337.

Gupta, S., Clements, B., Bhattacharya, R. and Chakravarti, S., 2004. Fiscal consequences of armed conflict and terrorism in low-and middle-income countries. *European Journal of Political Economy*, 20(2)**,** 403-421.

Hahm, J.-H. and Steigerwald, D. G., 1999. Consumption adjustment under time-varying income uncertainty. *Review of Economics and Statistics*, 81(1)**,** 32-40.

Halek, M. and Eisenhauer, J. G., 2001. Demography of risk aversion. *Journal of Risk and Insurance*, 68(1)**,** 1-24.

Harville, D. A., 1977. Maximum likelihood approaches to variance component estimation and to related problems. *Journal of the American Statistical Association*, 72(358)**,** 320-338.

Heckman, J., Pinto, R. and Savelyev, P., 2013. Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *American Economic Review*, 103(6)**,** 2052-2086.

Herzenstein, M., Horsky, S. and Posavac, S. S., 2015. Living with terrorism or withdrawing in terror: Perceived control and consumer avoidance. *Journal of Consumer Behaviour*, 14(4)**,** 228-236.

Hoffman, B., 2006. *Inside Terrorism.* New York: Columbia University Press.

Holman, E. A., Silver, R. C., Poulin, M., Andersen, J., Gil-Rivas, V. and McIntosh, D. N., 2008. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. *Archives of General Psychiatry*, 65(1)**,** 73-80.

Huber, M., Jaspersen, J. G. and Richter, A., 2017. On the welfare effect of large terrorism events. *Working Paper, Munich Risk and Insurance Center*.

Huber, P., 1983. The old-new division in risk regulation. *Virginia Law Review*, 69(6)**,** 1025-1107.

Huddy, L., Feldman, S., Capelos, T. and Provost, C., 2002a. The consequences of terrorism: Disentangling the effects of personal and national threat. *Political Psychology*, 23(3)**,** 485-509.

Huddy, L., Khatib, N. and Capelos, T., 2002b. The polls-trends: Reactions to the terrorist attacks of September 11, 2001. *The Public Opinion Quarterly*, 66(3)**,** 418-450.

Im, E. I., Cauley, J. and Sandler, T., 1987. Cycles and substitutions in terrorist activities: A spectral approach. *Kyklos*, 40(2)**,** 238-255.

Ito, H. and Lee, D., 2005. Assessing the impact of the September 11 terrorist attacks on US airline demand. *Journal of Economics and Business*, 57(1)**,** 75-95.

Jonas, E. and Fischer, P., 2006. Terror management and religion: Evidence that intrinsic religiousness mitigates worldview defense following mortality salience. *Journal of Personality and Social Psychology*, 91(3)**,** 553-567.

Jovanovic, B. and Ueda, M., 1997. Contracts and money. *Journal of Political Economy*, 105(4)**,** 700-708.

Kahneman, D. and Tversky, A., 1973. On the psychology of prediction. *Psychological Review*, 80(4)**,** 237-251.

Kahneman, D. and Tversky, A., 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2)**,** 263-292.

Kariya, T. and Kurata, H., 2004. *Generalized Least Squares.* New Jersey: John Wiley and Sons.

Karolyi, G. A. and Martell, R., 2010. Terrorism and the stock market. *International Review of Applied Financial Issues and Economics*, 2(2)**,** 285-314.

Kasser, T. and Sheldon, K. M., 2000. Of wealth and death: Materialism, mortality salience, and consumption behavior. *Psychological Science*, 11(4)**,** 348-351.

Keller, C., Siegrist, M. and Gutscher, H., 2006. The role of the affect and availability heuristics in risk communication. *Risk Analysis*, 26(3)**,** 631-639.

Keynes, J. M., 1936. *The General Theory of Employment, Interest and Money*. London: MacMillan.

Kimball, M. S., 1990. Precautionary Saving in the Small and in the Large. *Econometrica*, 58(1)**,** 53-73.

Kollias, C., Papadamou, S. and Stagiannis, A., 2011. Terrorism and capital markets: The effects of the Madrid and London bomb attacks. *International Review of Economics and Finance*, 20(4)**,** 532-541.

Kuran, T. and Sunstein, C. R., 1999. Availability cascades and risk regulation. *Stanford Law Review*, 51(4)**,** 683-768.

LaFree, G. and Dugan, L., 2007. Introducing the global terrorism database. *Terrorism and Political Violence*, 19(2)**,** 181-204.

LaFree, G., 2010. The global terrorism database: Accomplishments and challenges. *Perspectives on Terrorism*, 4(1)**,** 24-46.

Landau, M. J., Solomon, S., Greenberg, J., Cohen, F., Pyszczynski, T., Arndt, J., Miller, C. H., Ogilvie, D. M. and Cook, A., 2004. Deliver us from evil: The effects of mortality salience and reminders of 9/11 on support for President George W. Bush. *Personality and Social Psychology Bulletin*, 30(9)**,** 1136-1150.

Lerner, J. S. and Keltner, D., 2001. Fear, anger and risk. *Journal of Personality and Social Psychology*, 81(1)**,** 146-159.

Lerner, J. S., Gonzalez, R. M., Small, D. A. and Fischhoff, B., 2003. Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological Science*, 14(2)**,** 144-150.

Levhari, D. and Srinivasan, T. N., 1969. Optimal savings under uncertainty. *The Review of Economic Studies*, 36(2)**,** 153-163.

Levhari, D. and Mirman, L. J., 1977. Savings and consumption with an uncertain horizon. *Journal of Political Economy*, 85(2)**,** 265-281.

Lichtenstein, S., Slovic, P., Fischhoff, B., Layman, M. and Combs, B., 1978. Judged frequency of lethal events. *Journal of Experimental Psychology: Human Learning and Memory*, 4(6)**,** 551-578.

Loewenstein, G. and Lerner, J. S., 2002. The role of affect in decision making. In: Davidson, R., Scherer, K. and Goldsmith, H. (Eds.), *Handbook of Affective Science.* New York: Oxford University Press.

Loewenstein, G. F., Weber, E. U., Hsee, C. K. and Welch, N., 2001. Risk as feelings. *Psychological Bulletin*, 127(2)**,** 267-286.

Lum, C., Kennedy, L. W. and Sherley, A., 2006. Are counter-terrorism strategies effective? The results of the Campbell systematic review on counter-terrorism evaluation research. *Journal of Experimental Criminology*, 2(4)**,** 489-516.

Mancuso, A. J., Dirienzo, C. E. and Das, J., 2010. Assessing terrorist risk and FDI using relative information measures. *Applied Economics Letters*, 17(8)**,** 787-790.

Mandel, D. R., 2005. Are risk assessments of a terrorist attack coherent? *Journal of Experimental Psychology: Applied*, 11(4)**,** 277-288.

Mandel, N. and Heine, S. J., 1999. Terror management and marketing: He who dies with the most toys wins. *Advances in Consumer Research*, 26**,** 527-532.

Mandel, N. and Smeesters, D., 2008. The sweet escape: Effects of mortality salience on consumption quantities for high- and low-self-esteem consumers. *Journal of Consumer Research*, 35(2)**,** 309-323.

McClelland, G. H., Schulze, W. D. and Coursey, D. L., 1993. Insurance for low-probability hazards: A bimodal response to unlikely events. *Journal of Risk and Uncertainty*, 7**,** 95-116.

Montalvo, J. G., 2011. Voting after the bombings: A natural experiment on the effect of terrorist attacks on democratic elections. *Review of Economics and Statistics*, 93(4)**,** 1146-1154.

Moulton, B. R., 1986. Random group effects and the precision of regression estimates. *Journal of Econometrics*, 32(3)**,** 385-397.

Moulton, B. R. and Randolph, W. C., 1989. Alternative tests of the error components model. *Econometrica: Journal of the Econometric Society*, 57(3)**,** 685-693.

Moulton, B. R., 1990. An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *The Review of Economics and Statistics***,** 334-338.

Naor, Z., 2015. Why a small probability of terror generates a large macroeconomic impact. *Defence and Peace Economics*, 26(6)**,** 583-599.

Navarro, P. and Spencer, A., 2001. September 11, 2001: Assessing the costs of terrorism. *Milken Institute Review*, 3**,** 16-31.

Nitsch, V. and Schumacher, D., 2004. Terrorism and international trade: An empirical investigation. *European Journal of Political Economy*, 20(2)**,** 423-433.

Noll, R. G. and Krier, J. E., 1990. Some implications of cognitive psychology for risk regulation. *The Journal of Legal Studies*, 19(S2)**,** 747-779.

Pearl, J., 2012a. The causal mediation formula - A guide to the assessment of pathways and mechanisms. *Prevention Science*, 13(4)**,** 426-436.

Pearl, J., 2012b. The mediation formula: A guide to the assessment of causal pathways in nonlinear models. In: Berzuini, P. D. and Bernardinelli, L. (Eds.), *Causality: Statistical Perspectives and Applications* New Jersey: John Wiley and Sons

Post, T. and Hanewald, K., 2013. Longevity risk, subjective survival expectations, and individual saving behavior. *Journal of Economic Behavior and Organization*, 86**,** 200-220.

Rohner, D. and Frey, B. S., 2007. Blood and ink! The common-interest-game between terrorists and the media. *Public Choice*, 133(1-2)**,** 129-145.

Russett, B. and Slemrod, J., 1993. Diminished expectations of nuclear war and increased personal savings: Evidence from individual survey data. *The American Economic Review*, 83(4)**,** 1022-1033.

Sandler, T. and Enders, W., 2008. Economic consequences of terrorism in developed and developing countries. In: Keefer, P. and Loayza, N. (Eds.), *Terrorism, Economic Development, and Political Openness.* Cambridge: Cambridge University Press.

Sattler, D. N., Kaiser, C. F. and Hittner, J. B., 2000. Disaster preparedness: Relationships among prior experience, personal characteristics and distress. *Journal of Applied Social Psychology*, 30(7)**,** 1396-1420.

Schlenger, W. E., Caddell, J. M., Ebert, L., Jordan, B. K., Rourke, K. M., Wilson, D., Thalji, L., Dennis, J. M., Fairbank, J. A. and Kulka, R. A., 2002. Psychological reactions to terrorist attacks: Findings from the National Study of Americans' Reactions to September 11. *Journal of the American Medical Association*, 288(5)**,** 581-588.

Schneider, F., Brück, T. and Meierrieks, D., 2010. The economics of terrorism and counter-terrorism: A survey (Part II). *CESifo Working Paper Public Finance, No. 3012*.

Schuster, M. A., Stein, B. D., Jaycox, L. H., Collins, R. L., Marshall, G. N., Elliott, M. N., Zhou, A. J., Kanouse, D. E., Morrison, J. L. and Berry, S. H., 2001. A national survey of stress reactions after the September 11, 2001, terrorist attacks. *New England Journal of Medicine*, 345(20)**,** 1507-1512.

Shiller, R. J., 2003. From efficient markets theory to behavioral finance. *Journal of Economic Perspectives*, 17(1)**,** 83-104.

Skinner, J., 1988. Risky income, life cycle consumption, and precautionary savings. *Journal of Monetary Economics*, 22(2)**,** 237-255.

Slemrod, J., 1990. Fear of nuclear war and intercountry differences in the rate of saving. *Economic Inquiry*, 28(4)**,** 647-657.

Sloboda, B. W., 2003. Assessing the effects of terrorism on tourism by use of time series methods. *Tourism Economics*, 9(2)**,** 179-190.

Slone, M., 2000. Responses to media coverage of terrorism. *Journal of Conflict Resolution*, 44(4)**,** 508-522.

Slovic, P., 2000. *The Perception of Risk.* London: Earthscan Publications.

Solomon, S., Greenberg, J. and Pyszczynski, T., 1991. A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. In: Zanna, M. P. (Ed.), *Advances in Experimental Social Psychology*. San Diego: Academic Press.

Spencer, J. and Crossen, C. 2003. Fear factors: Why do Americans feel that danger lurks everywhere. *Wall Street Journal*, 04/24/2003.

Sunstein, C. R., 2003. Terrorism and probability neglect. *Journal of Risk and Uncertainty*, 26(2-3)**,** 121-136.

Tversky, A. and Kahneman, D., 1974. Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157)**,** 1124-1131.

Tyler, T. R., 1984. Assessing the risk of crime victimization: The integration of personal victimization experience and socially transmitted information. *Journal of Social Issues*, 40(1)**,** 27-38.

Warr, M., 1990. Dangerous situations: Social context and fear of victimization. *Social Forces*, 68(3)**,** 891-907.

Wooldridge, J. M., 2015. *Introductory Econometrics: A Modern Approach.* Scarborough: Nelson Education.

Yechiam, E., Barron, G. and Erev, I., 2005. The role of personal experience in contributing to different patterns of response to rare terrorist attacks. *Journal of Conflict Resolution*, 49(3)**,** 430-439.

Yehuda, R., 2002. Post-traumatic stress disorder. *New England Journal of Medicine*, 346(2)**,** 108-114.

Younas, J., 2015. Terrorism, openness and the Feldstein–Horioka paradox. *European Journal of Political Economy*, 38**,** 1-11.

Zeldes, S. P., 1989. Optimal consumption with stochastic income: Deviations from certainty equivalence. *The Quarterly Journal of Economics*, 104(2)**,** 275-298.

Zuckerman, S., 2002. 9-11-01 / Impact on business / American consumers kept economy going / Consumer spending kept economy going [Online]. https://www.sfgate.com/business/article/9-11-01-Impact-on-Business-American-consumers-2773356.php [Accessed 03/03/2018].