

# Terrorism and the economics of trust

**S Brock Blomberg**

*Claremont McKenna College*

**Gregory D Hess**

*Claremont McKenna College*

**Daniel YJ Tan**

*Pomona College*

Journal of Peace Research

48(3) 383–398

© The Author(s) 2011

Reprints and permission:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/0022343311401641

jpr.sagepub.com



## Abstract

Previous research has shown that trust is an important component that encourages investment and capital formation which, in turn, enhances economic performance. This article investigates the effect of terrorism on income, including its indirect role through lowering trust. We consider terrorism as a factor that can increase the cost of investing in technology and capital formation due to its ability to diminish trust in an economy. We then develop a novel and rich dataset spanning 179 countries from 1968 to 2007 using associated community, social, cultural, political, and economic factors from the World Values Survey and international terrorism incidence data from ITERATE. Using empirical tests, we first show that terrorism has a negative and statistically significant impact on individual income. This impact is larger than what has previously been found, possibly due to aggregation effects and data selection. We then estimate the societal impact of terrorism on economic growth by examining the extent to which terrorism taxes trust and how this, in turn, hinders economic performance. Consequently, we develop a measure of the economic consequences of terrorism through sizing the magnitude of the ‘trust tax’ from terrorism. We find that the trust tax is relatively minor compared to the direct impact of terrorism on income.

## Keywords

growth, political economy, terrorism

## Introduction

Terrorism, in all its shapes and forms, has been an increasingly widespread and frequent occurrence in recent years. Since 11 September 2001, there have been numerous large-scale, coordinated attacks on civilian targets around the world similar in scale and impact to that of the World Trade Center attacks. This increasingly global phenomenon, as evidenced by the Madrid train bombings in 2004, the Bali bombings of 2005, and the Mumbai bombings of 2006, shows no signs of abating. Notwithstanding isolated terrorist attacks, many countries, such as the nations of Afghanistan, Iraq, and Pakistan, continue to face wave after wave of terrorist attacks. Given the ubiquity of terrorism, it is natural and important to ask: What effects do terrorist attacks have

on society? In particular, this article focuses on the effect terrorism has on income through its effect on trust levels. When a country is experiencing terrorism, should we expect changes in trust resulting from this terrorism and should we expect these changes in trust to in turn affect income?

In recent years, many articles have examined terrorism’s impact on economic growth and have generally concluded that terrorism has a tangible, if small, negative effect on economic growth. Gaibulloev & Sandler (2009) find that every additional terrorist incident per million people leads to a 1.5% decline in annual

**Corresponding author:**

bbloomberg@cmc.edu

economic growth. In a follow-up study focusing on the region of Africa (Gaibulloev & Sandler, 2011), they considered the impact of terrorism aggregated over the whole population. Under this framework, they find that every additional terrorist incident leads to a reduction in economic growth of 0.1%. Other studies similarly demonstrate terrorism's negative effect on growth. Blomberg, Hess & Orphanides (2004) find that every additional terrorist incident per million people reduces growth by 0.25 percentage points, while Abadie & Gardeazabal (2003) estimate that terrorism reduces economic growth by 10%.<sup>1</sup> While other articles have examined the role of trust in affecting economic growth (Knack & Keefer, 1997; Zak & Knack, 2001), no article has tried to combine all three together to explain income changes. Given this, our article makes two contributions to the existing literature: First, we analyze the impact of terrorism on individual income in various countries, unlike other articles which only examine the impact of terrorism on aggregate growth rates. This is important from a policy perspective, since accurately disaggregating economic impacts from terrorist attacks will help policymakers better identify populations more adversely affected by terrorism and better target recovery efforts. Second, we consider the extent to which social capital measures such as trust are associated with terrorism in order to examine if the overall effect of terrorism on income is significantly altered, when we consider the effect trust has on income under the terrorism–income framework.

### *Terrorism and growth*

Intuitively, a terrorist attack is detrimental to economic activity, with the extent of the economic damage depending on the scale and nature of the terrorist attack. Blomberg, Hess & Orphanides (2004) hypothesized that terrorism can reduce economic growth through destroying production inputs, diverting resources away from economic production to enhancing national security, and interrupting economic activity by disrupting household and business spending plans. In the broader literature, studies also examine indirect impacts of terrorism on growth by examining the effect of terrorism on tourism (Enders & Sandler, 1991; Enders, Sandler & Parise, 1992; Fleischer & Buccola, 2002; Sloboda, 2003; Drakos & Kutun, 2003; Ito & Lee, 2005), investment composition (Fielding, 2003b), savings and consumption behavior (Fielding, 2003a; Eckstein & Tsiddon,

2004) and other channels of economic growth. Berrebi & Klor (2010) also examine the effects of terrorism on firms in the defense or security industry, as opposed to firms in other industries. The literature is too vast to cover in detail in this introduction, so the reader is invited to refer to the cited articles to learn more about the different mechanisms through which terrorism impacts economic growth.

### *The measures and determinants of trust*

As one of the main goals of this article is to examine the relationship between terrorism and trust, it is important to clarify what we mean by trust and what its main determinants are. By 'trust', we mean the general feeling of how trustworthy a given person feels other strangers are. By trustworthy, we mean the propensity to 'do the right thing' in a general sense (for example a stranger returning a wallet he found on a street instead of keeping it for himself). Trust is inherently difficult to measure. It is not amenable to direct observation (like physical capital) and is hard to categorize. It also contains a lot of heterogeneity. The 'trust' that exists among family members is arguably different from the 'trust' that exist between people and their government, which is in turn different from the 'trust' an average person would have in his fellow citizens. Our concern with the macroeconomic implications of terrorism on income through trust levels lead us to favor the approach that most articles use in measuring trust, which consists of measuring responses to the following question from the World Values Survey (WVS): 'Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?'

There are problems associated with the use of the WVS measure of trust. Some scholars argue that questions like those found in the WVS are 'vague, abstract and hard to interpret' (Glaeser et al., 2000: 812). Schwarz (1999) points out that self-reported instruments in general are subject to distortion, mainly stemming from ambiguity in the wording and the type of format used in the questions. A person may interpret the phrase 'most people' as referring to the people that one interacts with on a regular basis, such as one's colleagues, family members or friends. This would result in upward bias in trust measures. People in a country torn by racial and ethnic conflict may interpret 'most people' to mean people not in their ethnic group. This would in turn result in downward bias. Bjørnskov (2007) points out that the question may mean different things in different cultures. There is substantial evidence, however, that indicates that these concerns ultimately do not discredit the WVS

<sup>1</sup> Abadie & Gardeazabal's (2003) result may be driven by the fact that they examine one region in particular.

question as a good measure of generalized trust. Using various experiments, Glaeser et al. (2000) conclude that although the questions in the WVS are not good measures of trusting behavior, they are relatively good measures of trustworthy behavior. Bjørnskov (2007) points out that ample behavioral evidence (Dufwenberg & Gneezy, 2000; Guerra & Zizzo, 2004) exists supporting the proposition that trust and trustworthiness are intricately linked together and tend to move in similar directions, not least because trusters tend to respond positively to trusting behavior. As for the type of trust the WVS captures, Knack & Keefer (1997) find that the WVS measure has very low correlation with within-family trust and is therefore unlikely to undermine the effectiveness of the WVS in measuring generalized trust.

What are the determinants of trust? Bjørnskov (2007) provides an excellent survey of the literature concerning this. One major determinant of trust, as outlined in several articles (Knack & Keefer, 1997; Zak & Knack, 2001; Knack & Zak, 2003; Uslaner, 2002) is income inequality. Another major determinant of trust is racial diversity (Knack & Keefer, 1997). The higher the levels of income inequality and racial diversity, the less individuals feel socially connected to one another and, consequently, the lower the level of general trust in society. Another major determinant of trust proposed by several scholars is education. Knack & Keefer (1997) and Knack & Zak (2003) argue that education helps to train people to interpret perceived information better and make them aware of consequences of actions both by themselves and others. Education is also said to have a significant socialization effect on people, thus making them more trusting of strangers. Others such as Coleman (1988), La Porta et al. (1997), and Putnam (2000) argue that trust helps people to achieve better educational outcomes, since higher trust levels will encourage the seeking of schooling assistance from family members and fellow students.

### *Terrorism and trust*

In this article, we are primarily concerned with the contemporaneous effects of terrorism on trust levels and the ensuing change in trust levels on income.<sup>2</sup> In an article

<sup>2</sup> The focus on short-run effects of terrorism on trust and economic effects is motivated by the broader literature, which has shown that the most substantial effects of terrorism tend to be felt in the short run. For instance, Bram, Orr & Rapaport (2002:5) report that the immediate economic costs of September 11 were enormous (33–36 billion dollars) but that ‘the attack’s effects on employment and consumer confidence had largely run their course by mid-2002’.

published in the *National Review Online* a year after the September 11 attacks, Brink Lindsey of the Cato Institute warned of the severe short-term consequences that terrorism could wreak on society at large:

Terrorism strikes at the foundation of the distinctive, Western form of civilization – namely, our unprecedented ability to trust one another ... Terrorism’s random acts of destruction, because they are targeted at nobody in particular, make everybody feel unsafe. Consequently, they make us apprehensive, wary – distrustful. Every Arab-looking passenger on your flight sets off personal alarm bells. So did every piece of mail from a stranger during the anthrax attacks. So did every white van in the D.C. area just recently ... Terrorism thus leverages its acts of physical destruction into larger contagions of economic and social disruption. (Lindsey, 2002)

Grim sounding words – but is there evidence that such effects actually occur?<sup>3</sup> Many scholars think so. They argue that the presence of a threatening situation increases authoritarian behavior in the affected population, and this increase in authoritarianism in turn leads to increased levels of conflict and distrust between groups differentiated along many aspects, in particular along racial lines.<sup>4</sup> Using case studies of the Great Depression and events in the 1960s, Sales (1973) demonstrates that environmental threats tend to increase the levels of authoritarianism in affected subjects.<sup>5</sup> A follow-up study conducted by Doty, Peterson & Winter (1991) using more recent time periods finds additional support for the link between threat and authoritarianism. In a more recent study, Echebarria & Fernández (2006) used questionnaires to gauge the attitudes of people from the Basque region of Spain towards a broad swathe of social topics. They found evidence supporting the hypothesis that the Madrid terrorist attacks led to

<sup>3</sup> An anonymous reviewer rightly points out that isolated acts of terrorism by individuals considered as outcasts from society (such as Timothy McVeigh) seem unlikely to reduce levels of generalized trust, since such events, though tragic, are considered extremely unusual and not indicative of any larger threat to society.

<sup>4</sup> Another anonymous reviewer made the excellent observation that in principle, the effect of terrorism on trust could go in any direction. For instance, if a racially and culturally homogenous population suffered a terrorist attack, it is possible that trust levels could increase among the population as they decide to unite together to face a common external threat.

<sup>5</sup> Sales (1973) measured authoritarianism through several indicators: (1) power and toughness, (2) cynicism, (3) superstition, (4) authoritarian submission, (5) anti-intracception, (6) authoritarian aggression, and (7) sex.

heightened levels of authoritarianism, political conservatism, and racial prejudice.

### *Trust and growth*

Following the pioneering study of social capital by Putnam (1994), there has been a steadily rising interest in relating the effects of 'social capital' on economic growth and income levels. In another seminal article, Knack & Keefer (1997) conducted cross-country analysis on the effect of 'social capital' on economic growth.<sup>6</sup> In particular, they parse social capital into two separate measures: civic norms and trust. They find that increased levels of social capital increased economic growth, controlling for other factors such as education. Other articles examine the proposition that trust has an indirect, rather than a direct, effect on economic growth. For instance, Zak & Knack (2001) create a transaction cost model comprising of consumers and brokers where the amount of trust is measured by the amount of time that the consumer spends on investigating the brokers to make sure they are not cheating. The authors argue that an increased level of trust in society reduces the costs of conducting economic activities, and these reductions in turn increase economic growth. Bjørnskov (2006) empirically investigates a sample of countries and finds that trust increases economic growth predominantly by raising schooling levels and improving the quality of government. He finds that the economic effects of schooling work primarily through complementing the stock of physical capital and argues that better government leads to increases in total factor productivity.

### **Preliminary data analysis**

Our data were obtained from several sources. For terrorism data, we used the latest version of the ITERATE (International Terrorism: Attributes of Terrorist Events) dataset, constructed by Mickolus et al. (2006), and for economic data we used the Penn World Table, an update from Summers & Heston (1991). Data on trust were obtained from the World Values Survey (WVS), which was conducted in four 'waves', in years 1990, 1995, 2000, and 2005.

The ITERATE dataset attempts to standardize and quantify the characteristics and activities of transnational terrorist groups. An international terrorist event is defined as:

the use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through the nationality or foreign ties of its perpetrators, its location, the nature of its institutional or human victims, or the mechanics of its resolution, its ramifications transcend national boundaries. (Mickolus et al., 2006: 2)

In short, an event is described as a 'terrorist event' if it is employed for political purposes to influence a wider target group on an international scale.<sup>7</sup>

ITERATE provides a rich micro-level dataset detailing more than 12,000 incidents of terrorism across 179 countries from 1968 to 2007. The dataset is grouped into four categories. First, there are incident characteristics which code the timing of each event. Second, the terrorist characteristics yield information about the number, makeup, and groups involved in the incidents. Third, victim characteristics describe analogous information on the victims involved in the attacks. Finally, life and property losses attempt to quantify the damage of the attack.

The Penn World Table contains data on about 30 variables for about 167 countries over some or all the years 1950 to 2007. It displays a set of national accounts economic time series covering many countries. Its expenditure entries are denominated in a common set of prices and in a common currency, so that real quantity comparisons can be made, both between countries and over time. It also provides information about relative prices within and between countries, as well as demographic data and capital stock estimates.

Finally, the World Values Surveys (WVS) contain survey data on thousands of respondents from 73 market economies. Following Knack & Keefer (1997), the question used to assess the level of trust in a society is: 'Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?'. The TRUST measure is the fraction of respondents in each country who replied that 'most people can be trusted'. The mean measure for TRUST is 0.27, with a low of 0.08 in Peru and a high of 0.66 in Sweden.

To develop the micro-level dataset on social and economic factors, we merged ITERATE with WVS and adjusted reported income using the Penn World Table

<sup>6</sup> They used the World Values Survey (WVS) to obtain data on trust, the same measure that was discussed earlier.

<sup>7</sup> This means that events such as 11 September 2001 are included in this dataset but some other terrorist events, such as the Oklahoma city bombings, are not deemed to meet all the relevant criteria.

in order to compare the economic impact across country, time, and income.<sup>8</sup> WVS provides coarse measures of income based on income deciles and the income brackets associated with each decile. In order to best compare these income measures across country, time, and income, we then convert these measures using the Penn World Table so that the income values can be better compared across time and country. We employed the local measures of income, the PPP-adjusted measures of income, and the raw decile measure of income in our analysis with little qualitative difference. We then merge this data with ITERATE to assess the extent to which individual income and trust are related to aggregate terrorist events in each country over time.

Table I provides summary statistics of income, trust, terrorism, age, education, children, and unemployment for the period 1990–2007 for the 73 countries in our sample. Column 1 lists the country name. Column 2 provides the income averaged across individuals and over time (2005 US dollars). Columns 3–8 provide the pooled average for the percentage who have trust, the percentage of terrorist attacks,<sup>9</sup> age, secondary education completion rates, number of children, and the percentage unemployed.<sup>10</sup> As expected, most high income countries, such as Canada, Finland, Switzerland, Australia, and Japan, had high trust levels. The United States, with income level at approximately \$55,000, had a trust level of .38. Conversely, least developed countries, such as Algeria, Colombia, Turkey, and Zimbabwe, had low trust levels (the highest was Turkey at .14). There were

outliers present in the data (for instance, India had a relatively low level of income at approximately \$1,600 but had a trust level of .36), but for the most part, a glance at the data suggests that high income levels strongly correspond to high trust levels. Strikingly, out of the 13 countries that reported the highest incidence of terrorism (at least one incident every year), four were high income countries and included both the United States and the United Kingdom, lending some support to studies that showed higher income countries tended to ‘attract’ more terrorism (Blomberg, Hess & Orphanides, 2004).<sup>11</sup>

These relationships are further explored by focusing on regions and income levels. When the data in Table I are aggregated into eight geographical regions, the relationship between income and trust levels becomes much weaker. High income regions still have high trust levels, but this time a few supposedly lower income regions such as the Middle East/North Africa and South Asia have trust levels on par with high income regions. In addition, the correlation between trust and terrorism is negligible. When the data are aggregated into eight income levels, any tangible relationship between income levels and trust levels disappear. The data show that contrary to expectations, the highest levels of trust occur at both the highest and lowest levels of income, while respondents from high income non-OECD countries had the lowest levels of trust.<sup>12</sup> The correlation between trust and terrorism is slightly stronger (in general, the higher the trust level, the lower the incidence of terrorism), but not entirely uniform. This suggests that there are other factors important in explaining the relationship between trust and income that cannot be understood through simple observation. We will therefore examine these issues in greater detail in the subsequent section.

To examine these differences across the distribution of income, we examine histograms and kernel estimates of the distribution (in log levels) of individuals in the various countries across time.<sup>13</sup> Regardless of whether countries have high trust levels in general or high trust levels only in peaceful times, countries that suffer terrorist attacks show a marked shift to the right of the income distribution. This result conforms

<sup>8</sup> We used the standard algorithm developed by Ligon (1989), who provides a more detailed description of the process. For each reported decile in each country at each time period, we associate the median income in each bracket. For the upper income bracket, we can estimate the median income, appealing to the fact that income should exhibit a Paretian distribution at the tail. In that case, we follow the Pareto-extrapolation procedure for the last open-ended category.

<sup>9</sup> Owing to the lack of data, a few countries which are at high risk of terrorism are reported in our dataset as having no terrorism, e.g. Egypt. This is a data issue concerning the measurement of terrorism, which is inherently imperfect and incomplete. Rather than remove Egypt from the sample and risk biasing our results, we err on the side of caution and keep these observations in the dataset.

<sup>10</sup> It is important to note that the micro-level dataset is an unbalanced panel of individuals in countries across time. Hence, in the time period 1990–2007, France had some years with terrorism and the United States did not. This may seem a bit at odds with Table I. However, the World Values Survey did not sample both of those countries over all of the wave years. The United States was sampled in years 1995, 1996, and 2006. France was only sampled in 2006.

<sup>11</sup> Finally, the correlation was quite high between these aggregated income measures and those reported in the Penn World table. The differences were negligible at 0.05 percent.

<sup>12</sup> The tables with the aggregated data by region and by income are available upon request.

<sup>13</sup> The histograms and kernel estimates of the income distributions are available upon request.

Table I. Basic statistics of those surveyed in World Value Survey

<i>Average annual values 1990–2007</i>							
<i>Country</i>	<i>Income</i>	<i>Trust</i>	<i>Terrorism</i>	<i>Age</i>	<i>Education</i>	<i>Children</i>	<i>Unemp.</i>
Albania	4,875	.23	0.00	41.1	.16	2.11	.15
Algeria	3,999	.11	0.00	35.4	.32	1.89	.11
Argentina	12,218	.15	1.00	42.0	.09	2.07	.11
Australia	47,119	.49	0.00	49.8	.57	1.93	.03
Bosnia and Herz.	3,092	.16	1.00	40.8	.20	1.44	.21
Brazil	3,292	.06	1.00	36.5	.14	1.99	.09
Canada	39,836	.39	0.49	47.1	.28	1.93	.09
Chile	6,541	.22	0.74	39.8	.53	2.07	.05
China	14,051	.53	1.00	40.4	.04	1.78	.04
Colombia	3,032	.13	0.52	36.7	.27	1.04	.10
Egypt, Arab Rep.	1,298	.38	0.00	38.4	.18	2.56	.09
El Salvador	6,212	.15	0.00	37.6	.19	2.44	.08
Finland	41,022	.58	0.00	47.3	.26	1.62	.08
France	30,873	.19	0.00	46.8	.25	1.85	.08
India	1,591	.36	0.45	37.8	.31	2.23	.09
Israel	21,711	.23	1.00	42.2	.32	0.00	.10
Italy	38,178	.31	0.00	46.1	.30	1.30	.06
Japan	54,596	.38	0.28	46.8	.47	1.67	.01
Jordan	3,934	.27	0.00	36.2	.22	3.10	.19
Korea, Rep.	26,731	.30	0.67	38.4	.40	1.65	.02
Macedonia, FYR	2,878	.14	0.00	42.5	.19	1.65	.23
Mexico	6,222	.23	0.65	36.6	.50	2.19	.04
Moldova	3,487	.14	0.00	42.9	.28	1.70	.16
Morocco	4,756	.22	0.00	33.1	.08	1.49	.09
Netherlands	28,624	.42	0.00	45.1	.20	1.48	.07
New Zealand	34,987	.49	0.00	47.0	.45	2.05	.04
Peru	5,104	.08	.40	35.2	.29	1.95	.09
Russian Fed.	3,251	.30	1.00	42.8	.65	1.42	.03
Saudi Arabia	22,449	.52	1.00	32.5	.27	2.16	.05
Singapore	28,775	.14	1.00	33.6	.10	1.23	.06
South Africa	10,209	.19	0.33	38.1	.15	2.03	.19
Spain	15,706	.31	1.00	45.8	.49	1.75	.09
Sweden	57,103	.66	0.00	47.8	.51	1.59	.03
Switzerland	59,781	.43	0.00	48.6	.22	1.55	.01
Taiwan, China	23,922	.37	0.00	41.5	.41	2.30	.03
Turkey	3,345	.14	1.00	36.7	.15	2.03	.08
Uganda	1,895	.08	0.00	31.3	.11	2.18	.07
United Kingdom	52,933	.32	1.00	45.6	.31	1.67	.06
United States	54,708	.38	1.00	45.2	.29	0.83	.05
Venezuela	7,408	.17	0.00	36.2	.20	2.12	.19
Zimbabwe	2,158	.12	1.00	35.5	.01	2.72	.26
Total	16,846	.27	0.51	40.2	.30	1.83	.09

All information in this table was obtained from ITERATE dataset and the World Values Survey.

to what one might expect given the positive association between both trust and peace with growth previously shown in the literature. We find, however, that the shapes of the distributions in both high-trust countries and low-trust countries are very similar. This suggests the effect of terrorism on income

through trust channels may be relatively small. We will see later that this hypothesis is borne out by our results discussed in the next section.<sup>14</sup>

<sup>14</sup> The simple pairwise correlation of the log of income and trust is .16.

The results from preliminary exploration of the data suggest that income levels are related to trust and terrorism. Indeed, it appears that incomes are higher in countries with more trust and more peace, though there are obvious caveats. It is therefore necessary to conduct a more intensive investigation into these relationships by examining the conditional relationships rather than the unconditional ones. The following section conducts such an exercise.

## Empirical results

We begin by estimating the determinants of trust following Knack & Keefer (1997) and Zak & Knack (2001). These authors were among the first to develop theoretical and empirical models of the relationship between trust and growth. We extend the analysis in two important ways: first, we investigate these relationships to investigate impacts on income distributions; and second, we incorporate the impact of terrorism into our analysis. We follow the literature by examining the determinants of trustfulness. Our main variable of interest TRUST is a discrete variable which is 1 when an individual is trustful and is otherwise 0. Our model estimates the probability that individual  $i$  in country  $j$  during year  $t$  is trustful,  $PROB(TRUST)_{ijt}$ . Trust is affected by a number of factors including terrorism  $T_{jt}$  in country  $j$  in year  $t$  and war  $W_{jt}$  in country  $j$  in year  $t$ . In addition, we include a vector  $X$  of covariates that influence trust, such as number of children, age, age<sup>2</sup>, birth year, and dummy variables for education, marriage, gender, and unemployment. Finally, we include measures of social capital  $Z$ , such as interest in politics and work, that will serve as instruments during the two-stage regression analysis. This will also be the first-stage of our two-stage system.

Our use of interest in politics and work as instruments for trust find their theoretical underpinnings in the political science literature. In the article ‘Trust, social capital, civil society and democracy’, Newton (2001) scrutinizes the classical assumption made in politics on the importance of trust among individuals in maintaining a burgeoning democracy and encouraging civil engagement in the wider community. He notes that ‘social trust does not correlate widely or strongly with the usual set of social, economic, and political variables (income, education, class, gender, age, race, left–right politics, employment status, membership of voluntary organizations), but there is a slight tendency for it to be found in some social types’ (Newton, 2001: 204). He states that people with higher social trust tend to be people who find

their jobs fulfilling and satisfying. Implicitly, it is reasonable to infer that these same people have a high level of interest in work. He also notes that another facet of trust, political trust, is not correlated with the socio-economic variables mentioned above. Instead, ‘political trust is rather more strongly associated with a set of political variables measuring interest in politics, pride in the national political system, a belief in open government, a low priority given to social order and the left–right scale’ (Newton 2001: 204).<sup>15</sup>

Our model is therefore:

$$PROB(TRUST)_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 Z_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt} \quad (1)$$

where  $\varepsilon$  is a random error term. We estimate this expression, alternatively, as linear probability, logit, probit models with and without country, and time fixed effects.

Table II provides the estimation results of Equation 1. The dependent variable in each regression is a dummy variable that is 1 if one believes most people can be trusted, and 0 otherwise.  $T$  and  $W$  are the dummy variables representing whether there was a terrorist attack or war in a country in that time period. WORK and POLITICS are measures of social capital that measure the importance of work and politics on a 1–4 scale. AGE is age of those surveyed, EDU is a dummy variable that is 1 if respondent had completed secondary school in each country, BIRTHYR is the birth year of the respondent, CHILDREN is the number of children, and MARRIED, FEMALE, and UNEMP are dummy variables that take the value of 1 if the respondent is married, female, or unemployed, respectively. Column I provides estimates of the equation using a linear probability model. Columns II and IV provide estimates of the equation using a probit model, and Columns III and V provide estimates of the equation using a logit model. Column IV includes country and time fixed effects while Column V provides estimates for a multi-level mixed effects logit model. Marginal effects, evaluated at the

<sup>15</sup> An anonymous reviewer makes the excellent observation that even though high level of interest in work may be highly correlated with trust levels, it is also intuitively highly correlated with income, which would make the instrument of work interest invalid. The reviewer further points out that unobserved characteristics which drive responses to questions of interests in work and politics may be correlated with the error term in the general model presented below. We recognize this but point out that our tests of over-identifying restrictions (identified by SARGAN in tables) give us little reason to believe that the instruments are invalid.

Table II. Factors influencing probability of trust

$$PROB(TRUST)_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 Z_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

Variables	(I) Linear	(II) Probit	(III) Logit	(IV) Probit f.e.	(V) Logit m.e.
T	-0.034*** [0.010]	-0.031*** [0.011]	-0.032*** [0.010]	-0.037*** [0.010]	-0.055*** [0.004]
W	-0.073*** [0.021]	-0.067*** [0.019]	-0.065*** [0.018]	-0.001 [0.023]	-0.021* [0.013]
Work	0.029*** [0.003]	0.029*** [0.003]	0.029*** [0.003]	0.023*** [0.002]	0.022*** [0.002]
Politics	-0.026*** [0.002]	-0.027*** [0.002]	-0.027*** [0.002]	-0.023*** [0.002]	-0.023*** [0.002]
Edu.	0.049*** [0.005]	0.050*** [0.005]	0.050*** [0.005]	0.056*** [0.005]	0.055*** [0.002]
Age	0.006*** [0.001]	0.006*** [0.001]	0.006*** [0.001]	0.004*** [0.001]	0.004*** [0.001]
Age <sup>2</sup>	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	0 [0.000]	-0.000** [0.000]
Birthyr	0.004*** [0.001]	0.004*** [0.001]	0.004*** [0.001]	0.003*** [0.001]	0.003*** [0.001]
Children	0 [0.001]	0 [0.001]	0 [0.001]	0.002** [0.001]	0.002** [0.001]
Married	0.007** [0.004]	0.007* [0.004]	0.007* [0.004]	0.007** [0.003]	0.007** [0.003]
Female	-0.003* [0.002]	-0.003* [0.003]	-0.003* [0.003]	-0.002* [0.002]	-0.002 [0.002]
Unemp.	-0.024*** [0.005]	-0.027*** [0.006]	-0.029*** [0.006]	-0.020*** [0.005]	-0.021*** [0.005]
Observations	188,296	188,296	188,296	188,296	188,296
R-squared	0.061				

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively. Regressions include individuals surveyed in countries for which data are available.

mean, are reported, as are their standard errors (in brackets).

Table II provides results that are broadly consistent with the literature. Trust is associated with higher levels of human capital such as age and education. Other factors typically associated with the attainment of human capital (e.g. marriage, gender, and number of children) are also included as explanatory variables. The results suggest parents, married individuals, men, and those with larger families exhibit greater trust. Not surprisingly, those who are unemployed are less trusting. The two measures of social capital (interest in politics and work) have two of the largest statistical influences on trust, with individual t-statistics ranging from 10 to 13 in magnitude.

Table II also finds that conflict harms trust, a result that is new to the literature. Table II shows that in periods when countries suffer from terrorism, the probability of trust generally falls by 0.03 to 0.05 percentage points

below the mean. These impacts, while modest, are all negative and are statistically significant at all conventional levels. Similarly, when countries experience war, the probability of trust also falls from 0.02 percentage points to 0.07 percentage points below the mean. Most of these estimates are significant at all conventional levels, with the exception that the negative effect of war is insignificant under the fixed effects probit model and is only significant at the .10 level under the mixed effects logit model. These deviations from our expected results may be due to insufficient observations, since it is difficult to measure warfare accurately, and including country and time fixed effects may end up capturing the characteristics of a country at war that are relevant in impacting the levels of trust. Nonetheless, the effect of terrorism on trust remains robustly negative.

Our next set of estimates consider the impact of trust and terrorism on income. In these regressions, we estimate the impact of the analogous set of factors, excluding



Table IIIa. Factors influencing income

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

Variables	(I) Basic	(II) No C.F.E.	(III) No T.F.E.	(IV) F.E.	(V) PPP Adj	(VI) Income decile	(VII) M.E.
Trust	0.097*** [0.008]	0.053*** [0.016]	0.053*** [0.008]	0.058*** [0.007]	0.058*** [0.007]	0.258*** [0.014]	0.061*** [0.007]
T	-0.167*** [0.013]	-0.212*** [0.062]	-0.140*** [0.011]	-0.195*** [0.012]	-0.070*** [0.012]	-0.141*** [0.015]	-0.140*** [0.024]
W		-0.213 [0.192]	-2.039*** [0.024]	-0.898*** [0.034]	-0.992*** [0.034]	-0.731*** [0.031]	-0.474*** [0.045]
Edu.		0.540*** [0.033]	0.445*** [0.008]	0.468*** [0.008]	0.470*** [0.008]	1.134*** [0.015]	0.537*** [0.008]
Age		-0.006 [0.011]	0.004*** [0.002]	0.018*** [0.003]	0.019*** [0.003]	0.055*** [0.006]	0.014*** [0.003]
Age <sup>2</sup>		-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.001*** [0.000]	-0.000*** [0.000]
Birthyr		-0.024** [0.011]	-0.011*** [0.001]	0.003 [0.003]	0.004 [0.003]	0.015*** [0.005]	-0.001 [0.003]
Children		-0.089*** [0.010]	-0.065*** [0.002]	-0.061*** [0.002]	-0.062*** [0.002]	-0.118*** [0.004]	-0.061*** [0.002]
Married		0.273*** [0.022]	0.219*** [0.008]	0.222*** [0.007]	0.218*** [0.007]	0.564*** [0.015]	0.263*** [0.007]
Female		-0.047*** [0.014]	-0.060*** [0.006]	-0.065*** [0.006]	-0.065*** [0.006]	-0.123*** [0.012]	-0.065*** [0.006]
Unemp.		-0.338*** [0.029]	-0.301*** [0.012]	-0.263*** [0.011]	-0.262*** [0.011]	-0.693*** [0.022]	-0.331*** [0.011]
Observations	84,547	74,386	84,463	84,463	84,463	84,605	74,386
R-squared	0.141	0.632	0.144	0.218	0.176		

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively.

the possibility of our measures of social capital that we will be employing as instruments shortly.<sup>16</sup> In these regressions, we estimate how income (measured in logs) for individual  $i$  in country  $j$  during year  $t$  ( $\ln y_{ijt}$ ) is impacted by a number of factors including terrorism in country  $j$  in year  $t$  ( $T_{jt}$ ) and war in country  $j$  in year  $t$  ( $W_{jt}$ ). In addition, we include a vector of covariates ( $X_{ijt}$ ) that influence human capital, such as number of children, age, age<sup>2</sup>, birth year, and dummy variables for education, marriage, gender, and unemployment.

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt} \quad (2)$$

Table IIIa provides the results from our estimation relating trust and terrorism to income. Column I provides

estimates of the basic equation without controls. Column II provides estimates of the equation without country fixed effects. Column III provides estimates of the equation without time fixed effects. Column IV provides estimates of the most general model with time and country fixed effects. Column V provides estimates with an alternative definition of income to adjust for differences due to purchasing power parity (PPP). Column VI provides estimates with an alternative definition of income, measured by the respondent's income decile (1–10) and is estimated using an ordered probit. Column VII provides estimates of the equation using a multi-level mixed effects linear regression.

Table IIIa provides results broadly consistent with the literature. Higher income is associated with higher levels of human capital such as age and education. Other factors typically associated with the attainment of human capital (e.g. marriage, gender, and number of children) are also included. Married individuals, men, and those with smaller families have higher income. Not surprisingly, those who

<sup>16</sup> It is worthwhile to note that these measures are not found to be statistically useful in the regression which is reported in Table VI.

Table IIIb. Factors influencing income with alternative measure of terror

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt}^* + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

Variables	(I) Basic	(II) No C.F.E.	(III) No T.F.E.	(IV) F.E.(1)	(V) F.E.(2)	(VI) PPP Adj	(VII) Income decile
Trust	0.096*** [0.008]	0.054*** [0.016]	0.051*** [0.008]	0.056*** [0.007]	0.085*** [0.010]	0.058*** [0.007]	0.258*** [0.014]
T*	-0.033*** [0.002]	-0.028*** [0.004]	-0.042*** [0.001]	-0.047*** [0.001]	-0.091*** [0.003]	-0.049*** [0.001]	-0.015*** [0.002]
W		-0.272 [0.194]	-2.087*** [0.024]	-1.108*** [0.034]	-0.328*** [0.049]	-1.210*** [0.034]	-0.796*** [0.026]
Edu.		0.547*** [0.033]	0.488*** [0.008]	0.484*** [0.008]	0.469*** [0.012]	0.490*** [0.008]	1.145*** [0.015]
Age		0.000 [0.000]	-0.000*** [0.000]	0.000*** [0.000]	0.000*** [0.000]	0.000*** [0.000]	0.001*** [0.000]
Age*		-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]
Birthy		-0.026** [0.010]	-0.024*** [0.001]	-0.002 [0.003]	-0.003 [0.003]	0 [0.003]	0.014** [0.006]
Children		-0.086*** [0.010]	-0.060*** [0.002]	-0.060*** [0.002]	-0.051*** [0.003]	-0.060*** [0.002]	-0.116*** [0.004]
Married		0.269*** [0.021]	0.221*** [0.008]	0.223*** [0.007]	0.123*** [0.010]	0.220*** [0.007]	0.560*** [0.015]
Female		-0.046*** [0.013]	-0.059*** [0.006]	-0.064*** [0.006]	-0.066*** [0.009]	-0.065*** [0.006]	-0.122*** [0.012]
Unemp.		-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.001*** [0.000]	-0.003*** [0.000]	-0.007*** [0.000]
Observations	84,547	74,386	84,463	84,463	43,299	84,463	84,605
R-squared	0.144	0.632	0.155	0.225	0.345	0.186	

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively.

are unemployed have lower income. Finally, consistent with Knack & Keefer (1997) and Zak & Knack (2001), trust has a strong and positive impact on income.

Table IIIa also provides estimates on the impact of conflict on income. As in Blomberg, Hess & Orphanides (2004), war has a significantly larger negative impact compared to terrorism in harming income. The impact from terrorism on income is negative and statistically significant. The magnitude is in fact larger than what was shown previously in Blomberg, Hess & Orphanides (2004). Column IV reports the results using analogous income measures. Table IIIa shows that a terrorist event reduces income by 7%, approximately 10 times the effect found previously. This impact is slightly smaller than that reported in Abadie & Gardeazabal (2003).

There are several explanations for the increase in the magnitude effect. First, this article examines the impact on the distribution of the level of income, whereas Blomberg, Hess & Orphanides (2004) examine the impact on growth. Effects may be larger on individual incomes as

they may be come 'washed out' as income is aggregated, due to influences associated with monetary and fiscal policy, for example. Second, the sample countries are different. Excluded from this sample are many sub-Saharan countries that do not experience a large number of terrorist events compared to the rest of the world. Finally, comparing the mean impact across the income distribution may not be the appropriate way to assess the impact of terrorism on income. Indeed, it may be more appropriate to analyze the impact of terrorism on the poor as compared to the rich, especially since poor individuals have less access to credit, less collateral, and potentially more fragile economic circumstances.

Table IIIb estimates the same equation as Table IIIa but considers two alternative measures of terrorism. Table IIIb reports the results from estimating the model that attempts to control for the intensity of terrorism by using the actual number of attacks and the number of victims as alternative measures of terrorism,  $T^*$ . The variable provides a measure of terrorism

that may better capture how much occurs in a typical year. We run two fixed effects models, each with one of the two different alternative measures of terrorism. Table IIIb shows that the results found in Table IIIa were not sensitive to different measures of terrorism. In this case, we find that terrorism continues to have a negative and statistically significant impact on income. The magnitude of the coefficient is smaller but this is likely due to the fact that the mean number of attacks in our sample is 3, with a maximum of 133.<sup>17</sup>

To consider the possibility that comparing means across the income distribution may be inappropriate, we estimate the above model using quantile estimation. Table IV repeats the exact same exercise as Tables IIIa and IIIb, estimating Equation 1, except that we estimate the model using quantile regression estimation techniques. Table IV is organized in the same fashion as Tables IIIa and IIIb with analogous variable definitions. The main difference is that the columns denote the specific quantile point at which the model is being estimated. Column I provides estimates of the basic equation using OLS. Column II provides estimates of the equation for the .1 quantile ( $Q = .1$ ). Column III provides estimates of the equation for the .25 quantile ( $Q = .25$ ). Column IV provides estimates of the equation for the median ( $Q = .5$ ). Column V provides estimates of the equation for the .75 quantile ( $Q = .75$ ). Column VI provides estimates of the equation for the .9 quantile ( $Q = .9$ ).

Table IV continues to show results consistent with the literature. Income is positively related to education and other factors typically associated with the attainment of human capital (e.g. marriage, gender, and number of children). As in Tables IIIa and IIIb, being married, male, employed, and having a smaller family are associated with higher income. These results are robust across each quantile. The one variable that switches sign at higher income quantiles is age, which becomes negative and significant. This may be a statistical artifact in that one cannot include country fixed effects in quantile

regressions, and we only include regional measures of geography.<sup>18</sup>

Table IV also reports the impact from our three variables of interest – trust, terrorism, and war. Peace and trust continue to be positively related to income: the table shows that the impact of war is negative and statistically significant, while the impact of trust is positive and statistically significant across each quantile. The economic significance of trust rises (tripling in magnitude) as we move from  $Q = .1$  to  $Q = .9$ , while the economic significance of war decreases (by 50%) as we move from  $Q = .1$  to  $Q = .9$ . The economic significance of terrorism also declines as we move from  $Q = .1$  to  $Q = .9$ . The impact is estimated to be  $-.218$  and statistically significant for  $Q = .1$  and decreases monotonically until  $Q = .9$ , when the impact is estimated to be  $.08$  and statistically significant. The positive sign of this estimate most likely reflects the extremely high variation in income of individuals in that quantile. As a result, the regressors in the model may not sufficiently control for other unobserved factors that account for the high variation in income. Looking across all quantiles, however, one may generally infer that poorer individuals are more sensitive to the negative shocks associated with terrorism. Richer individuals are more resilient and may even be able to insure against such shocks. It is important to note that the coefficient for  $W$  in  $Q = .9$  remains negative, suggesting that even individuals in the highest income quantile may not be able to insure against war, an event that traditionally affects the whole population regardless of income group. This stands in stark contrast to terrorism, which tends to be more localized and hence more easily insured against.

As a final exercise, we consider the joint impact of terrorism and trust on income in a two-equation system. In this case, we employ Equation 1 (from Table II) and include it with Equation 2 (from Tables IIIa and IIIb), such that we have:

$$PROB(TRUST)_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 Z_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

where the income equation is identified by the

<sup>17</sup> An anonymous reviewer makes the excellent comment that we run the risk of spuriously deflated standard errors in all of our econometric specifications, as we are comparing individuals in countries that have been affected by terrorism with individuals in countries that have not been affected by terrorism, thus failing to ensure that the observations within each country are independent. To correct this, we implement the suggestion by this reviewer to both run mixed effects models and cluster standard errors.

<sup>18</sup> However, time fixed effects are included.

Table IV. Factors influencing income using quantile estimation

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \varepsilon_{ijt}$$

Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
	OLS	Q = .1	Q = .25	Q = .5	Q = .75	Q = .9
Trust	0.058*** [0.007]	0.033*** [0.009]	0.051*** [0.010]	0.060*** [0.008]	0.084*** [0.009]	0.090*** [0.010]
T	-0.195*** [0.012]	-0.218*** [0.010]	-0.197*** [0.011]	-0.172*** [0.008]	-0.066*** [0.011]	0.083*** [0.012]
W	-0.898*** [0.034]	-1.416*** [0.020]	-1.557*** [0.022]	-1.501*** [0.017]	-1.308*** [0.021]	-0.842*** [0.021]
Edu.	0.468*** [0.008]	0.516*** [0.009]	0.482*** [0.010]	0.428*** [0.008]	0.388*** [0.010]	0.446*** [0.011]
Age	0.018*** [0.003]	-0.011** [0.004]	-0.006 [0.005]	-0.039*** [0.003]	-0.041*** [0.004]	-0.017*** [0.005]
Age <sup>2</sup>	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]
Birthyr	0.003 [0.003]	-0.026*** [0.004]	-0.028*** [0.004]	-0.057*** [0.003]	-0.059*** [0.004]	-0.036*** [0.005]
Children	-0.061*** [0.002]	-0.043*** [0.003]	-0.074*** [0.003]	-0.072*** [0.002]	-0.091*** [0.003]	-0.090*** [0.003]
Married	0.222*** [0.007]	0.238*** [0.009]	0.276*** [0.010]	0.249*** [0.008]	0.251*** [0.010]	0.181*** [0.010]
Female	-0.065*** [0.006]	-0.048*** [0.008]	-0.055*** [0.008]	-0.054*** [0.006]	-0.051*** [0.008]	-0.034*** [0.008]
Unemp.	-0.263*** [0.011]	-0.227*** [0.014]	-0.267*** [0.015]	-0.202*** [0.012]	-0.247*** [0.015]	-0.186*** [0.015]
Observations	84,463	84,463	84,463	84,463	84,463	84,463
R-squared	0.218					

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively.

vector  $Z$ . This has the added benefit of allowing us to test the over-identifying restriction. We estimate this system as a two-stage least squares model and provide the results for the second stage associated with income.

Table V provides the results from the second stage of our estimation assuming the structural relationship.<sup>19</sup> The instruments included in the first stage are WORK and POLITICS which are measures of social capital on the importance of work and politics on 1–4 scales. Column I provides estimates of the basic equation without fixed effects. Column II provides estimates of the equation with time and country fixed effects. Column III provides estimates with an alternative definition of income to adjust for differences due to purchasing power parity (PPP). Column IV provides estimates with an alternative definition of income

measured by the respondent's income decile (1 through 10) and is estimated using an ordered probit. Tests of over-identifying restrictions are labeled as SARGAN with the associated p-value ( $p$ ).

Table V provides results that are qualitatively equivalent to Table IV. Higher income is associated with age, education, parenthood, marriage, maleness, employment, and smaller families. War and terrorism continue to harm income across each specification. The impact of trust on income is significantly larger in magnitude as compared to the reduced form model. This may suggest that the instruments allow us to better estimate the impact of trust on income. This is supported by the tests of the over-identifying restrictions.

The final row in Table V provides the cumulative effect (TOTAL) of terrorism on income, obtained by adding the direct and indirect impacts together. It is instructive to see that including both the direct impact

<sup>19</sup> The first stage results are seen in Table II.

Table V. 2SLS: Factors influencing income

$$\ln y_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \epsilon_{ijt}$$

Variables	(I) Basic	(II) F.E.	(III) PPP Adj	(IV) Income decile
Trust	1.026*** [0.140]	0.622*** [0.129]	0.533*** [0.126]	2.199*** [0.302]
T	-0.293*** [0.010]	-0.217*** [0.010]	-0.158*** [0.009]	-0.160*** [0.022]
W		-1.243*** [0.022]	-1.502*** [0.022]	-0.877*** [0.042]
Edu.	0.372*** [0.016]	0.326*** [0.014]	0.320*** [0.014]	1.271*** [0.034]
Age	0.018*** [0.001]	-0.005 [0.004]	0.007** [0.003]	0.068*** [0.009]
Age <sup>2</sup>	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.001*** [0.000]
Birthy		-0.024*** [0.004]	-0.013*** [0.003]	0.011 [0.008]
Children		-0.084*** [0.003]	-0.087*** [0.003]	-0.183*** [0.006]
Married		0.216*** [0.009]	0.226*** [0.009]	0.683*** [0.021]
Female		-0.057*** [0.007]	-0.058*** [0.007]	-0.136*** [0.017]
Unemp.		-0.219*** [0.015]	-0.221*** [0.014]	-0.820*** [0.030]
Observations	78,165	78,165	78,165	78,234
R-squared	0.582	0.652	0.509	0.106
Sargan	1.404	0.372	0.87	0.342
p	0.236	0.542	0.351	0.558
Total	-0.318	-0.23	-0.17	-0.206

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively. Regressions include individuals surveyed in countries for which data are available.

of terrorism on income and the indirect impact of terrorism through trust reduction does increase the cumulative impact. However, it is important to see that the cumulative impact is only about 10% larger than the direct impact. This may suggest that the main economic impact of terrorism is direct and other channels are less economically significant.

Our last robustness check is to consider the two-equation system, allowing the income equation to be estimated as a quantile regression. Table VI repeats the exact same exercise as Table V except that we estimate the income equation using quantile regression estimation techniques. Table VI continues to show results consistent with what was found in Table IV. The results associated with the impact from our three variables of interest – trust, terrorism, and war – on income are slightly different, however. Peace and trust are positively related to income. The levels of economic significance of trust, war, and

terrorism do not exhibit as dramatic a shift as we move from  $Q = .1$  to  $Q = .9$ . The impact associated with trust doubles, and the impact associated with terrorism continues to be negative across each quantile.

## Conclusions

Our article makes two contributions to the literature. First, we analyze the impact of terrorism on individual income in various countries. By doing this, we investigate whether the effects previously reported using aggregate models are robust to a finer granularity of data. Second, we include measures of social capital such as trust to examine the extent to which terrorism is associated with trust and examine if the primary effect of terrorism on income is significantly altered when we consider the alternative channel.

Table VI. 2SLS: Factors influencing income using quantile estimation

$$lny_{ijt} = \alpha_0 + \alpha_1 T_{jt} + \alpha_2 W_{jt} + \alpha_3 TRUST_{ijt} + \alpha_4 X_{ijt} + \epsilon_{ijt}$$

Variables	(I) Q = .1	(II) Q = .25	(III) Q = .5	(IV) Q = .75	(V) Q = .9
Trust	0.195 [0.183]	0.511*** [0.158]	0.575*** [0.111]	1.052*** [0.151]	1.106*** [0.131]
T	-0.303*** [0.018]	-0.270*** [0.011]	-0.258*** [0.009]	-0.195*** [0.014]	-0.103*** [0.022]
W	-1.265*** [0.031]	-1.457*** [0.036]	-1.343*** [0.019]	-1.155*** [0.030]	-0.773*** [0.044]
Edu.	0.487*** [0.017]	0.410*** [0.014]	0.351*** [0.013]	0.269*** [0.018]	0.300*** [0.023]
Age	0.006** [0.002]	0.002 [0.005]	-0.016** [0.008]	-0.015** [0.008]	-0.011*** [0.004]
Age*Age	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]
Birthyr	-0.017*** [0.002]	-0.023*** [0.004]	-0.037*** [0.007]	-0.033*** [0.007]	-0.027*** [0.003]
Children	-0.059*** [0.005]	-0.083*** [0.003]	-0.079*** [0.003]	-0.080*** [0.002]	-0.071*** [0.004]
Married	0.240*** [0.018]	0.282*** [0.014]	0.219*** [0.008]	0.207*** [0.009]	0.129*** [0.016]
Female	-0.052*** [0.011]	-0.050*** [0.010]	-0.053*** [0.009]	-0.070*** [0.007]	-0.037*** [0.009]
Unemp.	-0.289*** [0.030]	-0.279*** [0.020]	-0.206*** [0.018]	-0.219*** [0.021]	-0.147*** [0.030]
Observations					78,165

Clustered standard errors are presented in brackets where appropriate. \*, \*\*, and \*\*\* represent statistical significance at the .10, .05, and .01 levels, respectively. Regressions include individuals surveyed in countries for which data are available.

We find that the general results found in the aggregate literature continue to hold using household data. Terrorism and war have negative and statistically significant impacts on income. These results continue to hold when we include various control variables, measures of income, and econometric techniques. If anything, the impacts appear to be larger when using individual data.

We also find that the impact of trust is positive and statistically significant in explaining income. When coupled with our finding that terrorism destroys trust, we can estimate the cumulative impact of terrorism on income. We do find that including this secondary impact increases the magnitude of the impact of terrorism. We do not, however, see a drastic change in the economic significance when including the secondary impact.

There are obviously many caveats to these results, as we have made several assumptions about the data and the underlying theoretical model. We are hopeful that this article serves as an initial gateway into including other

measures of social capital in the terrorism literature. We look forward to seeing future articles in the area.

### Data replication

The dataset and do-files for the empirical analysis in this article can be found at <http://www.prio.no/jpr/datasets>.

### Acknowledgements

The article was originally prepared for the Conference on Terrorism and Policy sponsored by the Center for Global Collective Action (Director: Todd Sandler), University of Texas at Dallas.

### Funding

This research was supported by the United States Department of Homeland Security through the National Center for Risk and Economic Analysis of Terrorism Events (CREATE) under grant number 2007-ST-061-000001. However, any opinions, findings, and

conclusions or recommendations in this document are those of the authors and do not necessarily reflect the views of the United States Department of Homeland Security.

## References

- Abadie, Alberto & Javier Gardeazabal (2003) The economic costs of conflict: A case study of the Basque country. *American Economic Review* 93(1): 113–132.
- Berrebi, Claude & Esteban F Klor (2010) The impact of terrorism on the defence industry. *Economica* 77(307): 518–543.
- Bjørnskov, Christian (2006) How does social trust affect economic growth? *Aarhus School of Business, Department of Economics*. Working paper 02-06.
- Bjørnskov, Christian (2007) Determinants of generalized trust: A cross-country comparison. *Public Choice* 130(1): 1–21.
- Blomberg, Stephen Brock; Gregory D Hess & Athanasios Orphanides (2004) The macroeconomic consequences of terrorism. *Journal of Monetary Economics* 51(5): 1007–1032.
- Bram, Jason; James Orr & Carol Rapaport (2002) Measuring the effects of the September 11 attack on New York City. *FRBNY Economic Policy Review* 8(2): 5–20.
- Coleman, James Samuel (1988) Social capital in the creation of human capital. *American Journal of Sociology* 94: S95–S120.
- Doty, Richard; Bill E Peterson & David G Winter (1991) Threat and authoritarianism in the United States, 1978–1987. *Journal of Personality and Social Psychology* 61(4): 629–640.
- Drakos, Konstantinos & Ali M Kutan (2003) Regional effects of terrorism on tourism in three Mediterranean countries. *Journal of Conflict Resolution* 47(5): 621–641.
- Dufwenberg, Martin & Uri Gneezy (2000) Measuring beliefs in an experimental lost wallet game. *Games and Economic Behavior* 30(2): 163–182.
- Echebarria-Echabe, Agustin & Emilia Fernández-Guede (2006) Effects of terrorism on attitudes and ideological orientation. *European Journal of Social Psychology* 36(2): 259–265.
- Eckstein, Zvi & Daniel Tsiddon (2004) Macroeconomic consequences of terror: Theory and the case of Israel. *Journal of Monetary Economics* 51(1): 971–1002.
- Enders, Walter & Todd Sandler (1991) Causality between transnational terrorism and tourism: The case of Spain. *Terrorism* 14(1): 49–58.
- Enders, Walter; Todd Sandler & Gerald F Parise (1992) An econometric analysis of the impact of terrorism on tourism. *KYKLOS* 45(4): 531–554.
- Fielding, David (2003a) Counting the cost of the Intifada: Consumption, saving and political instability in Israel. *Public Choice* 116(3–4): 297–312.
- Fielding, David (2003b) Modelling political instability and economic performance: Israeli investment during the Intifada. *Economica* 70(277): 159–186.
- Fleischer, Aliza & Steven Buccola (2002) War, terror, and the tourism market in Israel. *Applied Economics* 34(11): 1335–1343.
- Gaibulloev, Khusrav & Todd Sandler (2009) The impact of terrorism and conflicts on growth in Asia. *Economics and Politics* 21(3): 359–383.
- Gaibulloev, Khusrav & Todd Sandler (2011) The adverse effect of transnational and domestic terrorism on growth in Africa. *Journal of Peace Research* 48(3).
- Glaeser, Edward Ludwig; David I Laibson, José A Scheinkman & Christine L Soutter (2000) Measuring trust. *Quarterly Journal of Economics* 115(3): 811–846.
- Guerra, Gerardo & Daniel J Zizzo (2004) Trust responsiveness and beliefs. *Journal of Economic Behavior and Organization* 55(1): 25–30.
- Ito, Harumi & Darin Lee (2005) Assessing the impact of September 11th terrorist attacks on US airline demand. *Journal of Economics and Business* 57(1): 75–95.
- Knack, Stephen & Philip Keefer (1997) Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics* 112(4): 1251–1288.
- Knack, Stephen & Paul Zak (2003) Building trust: Public policy, interpersonal trust, and economic development. *Supreme Court Economic Review* 10: 91–107.
- La Porta, Rafael; Florencio Lopez-de-Silanes, Andrei Shleifer & Robert W Vishny (1997) Trust in large organizations. *American Economic Review* 87(2): 333–338.
- Ligon, Ethan (1989) The development and use of a consistent income measure for the General Social Survey. *GSS Methodological Report* 64.
- Lindsey, Brink (2002) Terrorism and trust (<http://old.nationalreview.com/comment/comment-lindsey112002.asp>).
- Mickolus, Edward Francis; Todd Sandler, Jean M Murdock & Peter A Flemming (2006) *International*

- Terrorism: Attributes of Terrorist Events (ITERATE)*. Dunn Loring, VA: Vinyard Software.
- Newton, Kenneth (2001) Trust, social capital, civic society, and democracy. *International Political Science Review* 22(2): 201–214.
- Putnam, Robert (with Robert Leonardi & Raffaella Y Nanetti) (1994) *Making Democracy Work*. Princeton, NJ: Princeton University Press.
- Putnam, Robert (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- Sales, Stephen (1973) Threat as a factor in authoritarianism: An analysis of archival data. *Journal of Personality and Social Psychology* 28(1): 44–57.
- Schwarz, Norbert (1999) Self-reports: How the questions shape the answers. *American Psychologist* 54(2): 93–105.
- Sloboda, Brian (2003) Assessing the effects of terrorism on tourism by use of time series methods. *Tourism Economics* 9(2): 179–190.
- Summers, Robert & Alan Heston (1991) The Penn World Table (Mark 5): An expanded set of international comparisons, 1950–1988. *Quarterly Journal of Economics* 106(2): 327–368.
- Uslaner, Eric (2002) *The Moral Foundations of Trust*. Cambridge: Cambridge University Press.
- Zak, Paul & Stephen Knack (2001) Trust and growth. *Economic Journal* 111(470): 295–321.
- S BROCK BLOMBERG, b. 1967, PhD in Economics (Johns Hopkins University, 1994); Professor, Claremont McKenna College (2003); various academic positions, including Wellesley College and Federal Reserve Bank of New York. Most recent article: On the duration and sustainability of terrorist organizations, *Journal of Conflict Resolution* with Roz Engel and Reid Sawyer, 2010.
- GREGORY D HESS, b. 1962, PhD in Economics (Johns Hopkins University, 1989); Professor, Claremont McKenna College (2002); various academic positions, including Cambridge University and Federal Reserve Board of Governors. Most recent article: It is the nominal exchange rate (stupid), *Journal of International Money and Finance*, forthcoming (co-authored with Kwanho Shin).
- DANIEL YJ TAN, b. 1986, BA in Economics (Pomona College, anticipated 2011); student, Pomona College.