UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

# Center For International Economics

## Working Paper Series

Working Paper No. 2012-01

# Great Expectations and Hard Times - The (Nontrivial) Impact of Education on Domestic Terrorism

Sarah Brockhoff, Tim Krieger, and Daniel Meierrieks

January 2012

CIE Center For International Economics

# Great Expectations and Hard Times —

# The (Nontrivial) Impact of Education on Domestic Terrorism*

Sarah Brockhoff (University of Freiburg), Tim Krieger** (University of Paderborn) and

Daniel Meierrieks (University of Paderborn)

January 2012

*Abstract:* This contribution investigates the role of education in domestic terrorism for 133 countries between 1984 and 2007. The findings point at a nontrivial effect of education on terrorism. Lower education (primary education) tends to promote terrorism in a cluster of countries where the socioeconomic, political and demographic conditions are unfavorable, while higher education (university education) reduces terrorism in a cluster of countries where conditions are more favorable. This suggests that country-specific circumstances mediate the effect of education on the (opportunity) costs and benefits of terrorism. For instance, the prevalence of poor structural conditions in combination with advances in education may explain past and present waves of terrorism and political instability in the Middle East. The results of this study imply that promoting education needs to be accompanied by sound structural change so that it can positively interact with (individual and social) development, thereby reducing terrorism.

*JEL Classification*: D74; I21; I25

*Keywords*: terrorism; education; negative binomial regression; revolution; conflict resolution

---

* We are thankful for very helpful comments from and discussions with Kathleen Gallagher Cunningham, Martin Gassebner and the panel and seminar participants at the ifo Workshop on Political Economy 2010 in Dresden, the APSA 2011 in Seattle, the BBQ 2011 in Awenne and the research seminars in Plymouth and Utrecht.

** Corresponding author: tim.krieger@uni-paderborn.de.

*"What is it that seduces some young people to terrorism? It simplifies things. The fanatic has no questions, only answers. Education is the way to eliminate terrorism."*

- Elie Wiesel (1986 Nobel Peace Prize laureate), cited in Jai (2001)

*"On the whole, there is little reason for optimism that [an] […] increase in educational attainment will lead to a meaningful reduction in […] terrorism."*

- Krueger and Maleckova (2003: 142)

## 1. Introduction

In the aftermath of the terrorist attacks on New York City's *World Trade Center* and the *Pentagon* in Washington, D.C. on September 11, 2001, policymakers, intellectuals, and the general public largely agreed that education needed to be strengthened to work as an 'antidote' to terrorism (cf. Jai 2001). This spoke to the idea that education is associated with less hatred and ignorance and fewer socioeconomic and political grievances, thus making terrorism less likely.

While intuitive, this *optimistic* view on the terrorism-education nexus is, however, called into question by anecdotal and academic evidence, which tends to be more *pessimistic* about the relationship between education and terrorism. For instance, the highly influential paper by Krueger and Maleckova (2003) finds that education does not matter to terrorism on a cross-country level, while—on an individual level—many terrorists tend to be rather well educated. Other studies point at a similar relationship (e.g., Berrebi 2007; Shafiq and Sinno 2010; Ganor 2011).

Why is there disagreement over the impact of educational attainment on terrorist activity? We argue that there is a *country-specific* dimension to the terrorism-education nexus which has been disregarded in previous empirical efforts. What is more, we argue that these very

country-specific factors determine whether education—and the type of education—reduces or fuels terrorism. When country-specific conditions are favorable (e.g., sound institutions, strong economic development), education helps to reduce terrorism. However, when country-specific conditions are poor, education may fuel terrorism. In other words, those very *'great expectations'* associated with the positive role of education in terrorism—e.g., induced by education-centered foreign aid (Azam and Thelen 2008, 2010)—may in fact turn into *'hard times'* when country-specific conditions are unfavorable.

We provide an in-depth assessment of the terrorism-education nexus using cross-sectional time-series data for 133 countries for the period 1984 to 2007. As a major innovation, we identify groups of countries that differ with respect to certain socioeconomic, political and demographic traits (e.g., economic growth, income, politico-institutional conditions) by means of a *cluster analysis* and then examine whether the dynamics of the nexus are *conditional upon cluster-specific circumstances*. We also add to the existing evidence by considering the relationship between education and *domestic terrorism*. Previous studies only consider the effect of education on *transnational terrorism*.[1] Domestic terrorism, however, accounts for the bulk of terrorist activity (e.g., Enders et al. 2011) and—as we will discuss below—is expected to have a closer relationship with education variables. Third, we use *several education indicators* to systematically cover different levels of education (e.g., primary school enrollment, university enrollment), unlike earlier studies that rely on one specific education proxy only. This ought to add to the robustness of our findings and simultaneously provides new insights as to whether specific forms of education matter more strongly in certain parts of the world. For instance, for demographic and economic reasons,

[1] Domestic terrorism involves only one country, whereas transnational terrorism involves at least two countries (e.g., when domestic groups attack international targets).

lower (i.e., primary) education may be more important for less developed countries, while developed countries may benefit more from higher (i.e., university) education.

To preview our empirical findings, we find evidence of a *'nontrivial'* effect of education on terrorism. Lower education levels tend to foster terrorism for a cluster of countries where poor conditions abound (e.g., slow growth, poor human and economic rights situation), while higher education levels tend to reduce terrorism for a cluster of countries where conditions are more favorable. These core findings are robust to a variety of sensitivity checks. Our findings call for a more nuanced analysis of the terrorism-education nexus, given that country-specific circumstances and the choice of adequate education proxies seem to matter to empirical inferences. Our results suggest that promoting education in less developed countries may actually foster terrorism when poor structural socioeconomic, politico-institutional and demographic issues (e.g., poor economic growth, poverty, inequality, repression, discrimination) are not addressed at the same time. Interestingly, our framework not only helps to better understand the role of education in terrorism. It also relates to other historic incidences of political violence such as the French Revolution of 1789 (e.g., Glaeser et al. 2007) or the 2011 popular uprisings during the Arab Spring (e.g., Campante and Chor 2011), which were characterized by a combination of educational advances and poor institutional, socioeconomic and demographic circumstances. Such linkages have been largely ignored in the study of the role of education in terrorism. However, they may account for the inconclusive evidence on the terrorism-education nexus on cross-national level as well as the positive correlation between education and terrorism on the micro level.

This paper is organized as follows. In Section 2 we discuss the literature on the relationship between education and terrorism. Section 3 introduces the data and empirical methodology. Section 4 presents and discusses our main empirical findings. Section 5 offers several robustness checks and extensions to our empirical efforts. Section 6 concludes.

## 2. The Terrorism-Education Nexus: Literature Review and Hypotheses

### *2.1 Great expectations: Why education should reduce terrorism*

Following the rational-choice approach, education is expected to determine the level of terrorist activity by influencing its (opportunity) costs and benefits. The optimistic view of the terrorism-education nexus suggests that education raises terrorism's opportunity costs by fostering individual socioeconomic success and political participation. For instance, higher education means higher personal human capital endowment and thus income, so that educated individuals ought to have more to lose (higher opportunity costs) when they choose to resort to terrorism. On the aggregate (national) level, higher levels of education are found to be positively related to economic growth and a reduction in poverty and income inequality (e.g., Temple 1999; Glaeser et al. 2004; Cohen and Soto 2007). This may additionally affect the terrorists' calculus by inducing higher opportunity and also higher recruitment costs, given that, e.g., the size of the pool of potential terrorist recruits ought to shrink with more favorable socioeconomic conditions (e.g., Bueno de Mesquita 2005).

Besides socioeconomic success, education is found to positively correlate with political participation. For instance, Dee (2004) finds that voter participation and support for free speech increase with individual education. Similarly, Barro (1999) and Glaeser et al. (2007) argue that education is among the determinants of democracy. Consequently, the positive effect of education on political participation may result in higher terrorism opportunity costs (due to the recognition and use of nonviolent means to foster political change) and thus less terrorist activity. What is more, the favorable interaction between education, economic development and democracy may lead to positive politico-institutional outcomes, e.g., as corruption is reduced or redistribution takes place in a more welfare-enhancing way (e.g., in the form of public spending on education), which may further reinforce the positive effect of education on economic growth (e.g., Saint-Paul and Verdier 1993; Glaeser et al. 2007).

Finally, education may also change personal attitudes towards extremist ideologies, the use of violence and its legitimization (Victoroff 2005). These effects may be reflected in lower (perceived) personal benefits from terrorism as well as higher recruitment costs for terrorist groups. For instance, educated individuals may evaluate the probability of terrorist success more realistically and therefore be less easy to recruit. Also, the educated may more easily see through the terrorists' propaganda, so that terrorist mobilization is constrained and popular support remains marginal. The latter mechanism can be understood as a representation of the popular—perhaps somewhat idealistic—idea that education counters hate and ignorance, and implies higher moral constraints associated with the use of violence (cf. Victoroff 2005).

In summary, the optimistic view of the terrorism-education nexus argues that education raises the (opportunity) costs and lowers the benefits of terrorism in such a way that the risk of terrorism is reduced. This leads to our first hypothesis (*H1*):

> *Hypothesis 1: Countries with higher levels of education will (ceteris paribus) experience lower levels of terrorism.*

Some empirical studies on the causes of terrorism *implicitly* back this hypothesis. They find that terrorism is positively related to poor institutions such as a deficient rule of law (e.g., Choi 2010; Walsh and Piazza 2011), socioeconomic underdevelopment (e.g., Blomberg and Hess 2008; Freytag et al. 2011) and inefficient means of redistribution and economic participation (e.g., Burgoon 2006; Krieger and Meierrieks 2010, Piazza 2011). If education positively interacts with economic and political development, as the previous discussion suggests, then education ought to be negatively related to terrorism since it removes the economic and institutional grievances that usually fuel terrorism. Likewise, studies on the causes of other forms of political violence (e.g., protests, rebellions, civil war) suggest that interactions—which are similar to those discussed above—between education, underdevelopment and conflict also matter to these conflicts. For example, they consistently

find that these conflicts are related to economic and political grievances (e.g., Fearon and Laitin 2003; Collier and Hoeffler 2004). What is more, the evidence suggests that education is negatively related to civil wars (e.g., Thyne 2006). If terrorism and other forms of conflict share similar roots—as suggested by, e.g., Gassebner and Luechinger (2011: 251)—then education may have a similar (dampening) effect on terrorism.

### *2.2 Education during good and hard times: An alternative view*

Although the previous discussion provides some evidence that education may reduce terrorism, skeptical views prevail. While most cross-national and global (large-*N*) studies on the causes of terrorism do not consider the effect of education on terrorism, a review of those studies that control for the impact of education on terrorism fails to produce a consistent picture (Table 1). For example, while Bravo and Dias (2006) find that education makes terrorism less likely, Testas (2004) comes to the opposite conclusion. Even more puzzlingly, studies that analyze the relationship between individual education and participation in terrorism often find that the two are positively related (e.g., Victoroff 2005; Berrebi 2007; Benmelech and Berrebi 2007; Krueger 2008). For example, in their highly influential contribution Krueger and Maleckova (2003) find that terrorist operatives who are engaged in the Arab-Israeli conflict (e.g., the Jewish underground, Hezbollah) are on average well educated.

**-Table 1 here -**

Why may education positively correlate with terrorism? Building on the existing literature, we argue that education may fuel terrorism when country-specific conditions are unfavorable. Such poor conditions may consist of a set of socioeconomic (e.g., poor growth, economic disenfranchisement), politico-institutional (e.g., discrimination, corruption, poor governance) or demographic (e.g., population growth) factors. Due to poor country-specific circumstances,

advances in education may not sufficiently increase the opportunity costs of terrorism because the relevant transmission channels (e.g., income, political participation, economic growth) do not work properly on individual and social levels, meaning that no nonviolent opportunities open up. For instance, slow economic growth and slack labor markets may cause individuals to take up jobs that do not match their qualification and thus their expected personal income. Also, institutional constraints (e.g., corruption, nepotism) may redirect the flow of educated labor into the public sector, consequently inhibiting economic growth by creating inefficiencies and constraining private economic activity (Pritchett 2001). Likewise, when political participation is constrained (e.g., due to poor democratic institutions), education cannot be easily linked to positive political development.

Other mechanisms may even promote the genesis of terrorism. First, education may make it easier for individuals to recognize those poor social conditions (e.g., socioeconomic and politico-institutional constraints) that limit the personal and social success that is expected from education. For instance, Shafiq and Sinno (2010) argue that increases in education coupled with political disenfranchisement lead to greater support for (suicide) terrorism, potentially because education helps individuals to contextualize political problems and possibly choose violence as a means of achieving political change. Second, education may increase the (perceived) benefits from terrorism, given that an eventual removal of existing social constraints ought to benefit the educated the most. In case of terrorist success, education may finally pay off (e.g., in terms of income, growth and political participation), particularly for the highly educated. Third, when the labor market fails to offer individuals an adequate return on their investment in education, it may become increasingly attractive for individuals to pursue a 'career' in terrorism. Terrorist organizations may offer their operatives wages and other incentives (e.g., reputation as a terrorist leader, martyrdom) that are closer to individual human capital endowments and associated aspirations than those offered by the

regular labor market (cf. Bueno de Mesquita 2005). Fourth, education may also lower the (perceived) costs of terrorism. Intuitively, education makes terrorist success (e.g., launching an attack, evading prosecution) likelier. Bueno de Mesquita (2005) argues that due to the positive effect of individual human capital endowment on terrorist success terrorist organizations are particularly interested in members with higher levels of education.[2]

To sum up, when poor country-specific conditions abound, education does not sufficiently translate into higher opportunity costs of terrorism. Instead, education may facilitate mobilization due to an increased attractiveness of terrorism for educated individuals, which reinforces the probability of terrorist success. This leads to the following hypothesis (*H2a*):

> *Hypothesis 2a: Countries with higher levels of education will (ceteris paribus) experience higher levels of terrorism when country-specific (socioeconomic, political, institutional, demographic etc.) circumstances are poor.*

This hypothesis is supported by a number of examples. For instance, Abeyratne (2004) argues that in Sri Lanka increases in education in combination with poor country-specific conditions (strong population growth, youth burden, ethnic discrimination, socioeconomic and political volatility and exclusion) led to armed insurgencies by the communist *Janathā Vimukthi Peramuna* and the separatist *Liberation Tigers of Tamil Eelam*. Similarly, Ganor (2011) argues that the expansion of education in Palestine in the 1970s was not met by adequate demand for highly-skilled labor, but instead led to increasing frustration, humiliation and radicalization among young Palestinians who eventually filled the ranks of radical groups active during the 1987 Intifada. Ganor (2011) also suggests that the interplay between

[2] Note that the preponderance of poor social conditions and the lack of nonviolent alternatives also ought to increase the pool of potential recruits from which terrorist organizations usually choose the most educated members, meaning lower recruitment costs that may also facilitate terrorist activity (Bueno de Mesquita 2005).

education, denied opportunities, alienation and frustration may contribute to the radicalization—and possibly, terrorist activity—among Muslim youth in Western European communities. The findings of Testas (2004), Kavanagh (2011), and Urdal (2006) also suggest that the reciprocity between advances in education and poor social conditions matters to the emergence of social conflicts. For instance, Urdal (2006) finds that an expansion in education that is coupled with demographic pressures makes civil conflict more likely. Finally, the recent revolutions and riots in Northern Africa and the Middle East—as well as other forms of political protest—can also be linked to the interaction between rising educational levels, which induce political activism, and socioeconomic underperformance (Campante and Chor 2011).[3]

Following this line of reasoning, the role of education in terrorism may be determined by the change in educational attainment relative to the change in politico-institutional and socio-demographic conditions. If the former dominates the latter at relatively low levels, terrorism becomes more likely. However, it seems reasonable to expect politico-institutional and socio-demographic factors to eventually catch up with educational quality, which ought to reverse the outcomes. Hence, as a corollary of hypothesis *H2a* we argue that education can be expected to exert a *dampening* effect on terrorism when social conditions are more favorable. Education ought to contribute to (individual and social) progress when the socioeconomic, demographic and politico-institutional barriers that govern employment, economic redistribution, political participation, etc. are low or nonexistent. In turn, this is expected to make terrorism less likely by sufficiently raising its opportunity costs (as outlined above), where these effects ought to outweigh those through which education may fuel terrorism (e.g., the improved recognition of disenfranchisement). This leads to the final hypothesis (*H2b*):

[3] See Glaeser et al. (2007) for further historic examples where increases in education contributed to political protest and revolutions.

*Hypothesis 2b: Countries with higher levels of education will (ceteris paribus) experience lower levels of terrorism when country-specific (socioeconomic, political, institutional, demographic etc.) circumstances are favorable.*

This does not, however, rule out the emergence of terrorism when favorable social conditions abound. In fact, the history of domestic terrorism in Western Europe and the US after the Second World War indicates that advances in education did not 'immunize' societies against terrorism. Rather, many terrorists from these countries had an academic background (e.g., Victoroff 2005).[4] However, domestic terrorist activity in Western countries was often perpetrated by isolated groups that failed to obtain popular support or achieve generational transition as they were not successful in recruiting younger followers (Cronin 2006). In accordance with our previous discussion, we may speculate that the beneficial interaction between advances in education and favorable country-specific conditions—besides other factors—minimized the pool of potential terrorists and supporters in these countries and raised terrorism opportunity costs, making it practically infeasible for a sustained terrorist campaign to enjoy broad popular support.

[4] As argued by Bueno de Mesquita (2005), the high educational level of Western terrorists can be explained by the screening of potential recruits for (educational) quality by terrorist groups.

## 3. Data and Methodology

We test which of the hypotheses discussed in the previous section are supported by the data for a panel of 133 countries for the period 1984 to 2007.[5] The summary statistics are reported in Table 2. A country list is given in the appendix.

**– Table 2 here –**

### *3.1 Dependent variable: Domestic terrorism*

Our dependent variable is the *number of domestic terrorist incidents* in a given year and country.[6] Previous studies have focused on the causes of transnational terrorism mainly due to data constraints (cf. Krieger and Meierrieks 2011). However, the relationship between education and domestic terrorism is unlikely to be identical to the interaction between education and transnational terrorism as different factors may matter. For instance, transnational terrorism seems to be more strongly motivated by international political factors (e.g., foreign policy) than domestic terrorism (Pape 2003; Dreher and Gassebner 2008; Savun and Phillips 2009).

The economic mechanisms from education to reduced terrorist activity—via an amelioration of grievances (*H1*) or via the interaction between education and country-specific conditions that (potentially) determines the effect of education on terrorism (*H2a* and *H2b*)—are intuitively expected to matter more strongly to the genesis of domestic terrorism. The fact that domestic terrorism is far more common than transnational terrorism (e.g., Enders et al. 2011)

[5] Our panel is unbalanced, given that some countries in the sample achieved independence only after 1991.

[6] As a robustness check we also consider alternative measures of terrorist activity (cf. Section 5).

further motivates our decision to study the effect of education on domestic terrorism. Finally, there is a lack of evidence on the causes of domestic terrorism in general (Krieger and Meierrieks 2011), and with respect to the role of education in domestic terrorism (cf. Table 1).

The data for our dependent variable are drawn from Enders et al. (2011), who use raw terrorism data provided by the *Global Terrorism Database* (*GTD*). While the *GTD* contains data on domestic and transnational terrorism, it does not differentiate between the two. Enders et al. (2011) decompose the data series into domestic and transnational terrorist events. They also deal with some methodological problems (e.g., coding issues) in the *GTD* series. As a result, the domestic terrorism data provided by Enders et al. (2011) are to date the most reliable count data measuring this kind of activity.[7]

### *3.2 Education variables*

As argued above, the large-*N* studies that analyze the determinants of terrorism and incorporate measures of education (cf. Table 1) may have failed to unveil a consistent relationship between the two for theoretical reasons (i.e., the failure to consider the moderating effect of country-specific conditions on the terrorism-education nexus). In addition, different analytical scopes (country samples, observation periods, education indicators etc.) may have contributed to empirical inconsistencies. In this study we use a uniform country sample to assess the influence of various education variables on the

[7] As a robustness check, we experiment with different approaches towards dealing with remaining data problems that are discussed by Enders et al. (2011). For instance, they argue that the *GTD* tends to overreport terrorism for some time periods, which should be accounted for by adjusting the data accordingly. However, this leads to findings similar to those obtained using the unadjusted data (results available upon request).

emergence of domestic terrorism. By doing so, we ought to examine, amongst others, whether the choice of a specific education proxy matters to statistical inferences.

We measure education by *primary school enrollment per capita* (*primary education*), *secondary school enrollment per capita* (*secondary education*), the *sum of primary and secondary school enrollment*, *university enrollment per capita* (*university enrollment*) and the *literacy rate* (i.e., the number of people aged 15 and over who are able to read or write over the total population).[8] All education data are drawn from the *Cross-National Time-Series Data Archive*.

These measures ought to reflect the size and quality of a country's human capital stock. That is, higher enrollment and literacy rates are expected to correspond to higher levels of education, where education may either reduce terrorism uniformly (*H1*) or affect terrorism depending on country-specific circumstances (*H2a* and *H2b*). Our education measures may also reflect public investment in education and the effectiveness of educational institutions (e.g., Thyne 2006). For instance, higher enrollment rates ought to mean more investment in education (teachers, school buildings etc.) and stronger institutions related to education (e.g., child labor laws, compulsory education). A stronger public commitment to education ought to result in higher levels of education, which in turn matter to terrorism. Finally, our education variables also reflect the 'supply' and 'demand' side of education. The 'supply' side of education relates to a country's demographic structure (i.e., population structure, growth and

[8] We also experimented with alternative measures of education as used by Thyne (2006). He employs data on primary, secondary and postsecondary enrollment and on literacy and government education spending, drawing on data from the World Development Indicators. While the results are not directly comparable due to data limitations (only the period 1994 to 2007 is available), the findings tend to support the results of our main analysis (results available upon request).

distribution). For instance, primary and secondary school enrollment may be more important to 'young' societies (less developed countries), while tertiary education matters more to 'older' societies (developed countries). The 'demand' side of education relates to, e.g., the global division of labor, national economic structures and labor markets demands. For example, primary and secondary education may be more important in countries that do not rely on human-capital-intensive production (less developed countries), whereas in other countries tertiary education may more prominently determine personal and social success due to corresponding production and employment demands (developed countries).

In short, we have good reason to believe that our education proxies correlate with education 'inputs' (public investment, quality of educational institutions) and 'outputs' (size and quality of an economy's human capital stock). Our explanatory variables are expected to indicate whether education truly matters to terrorism via the transmission channels discussed in Section 2. However, we can also expect that specific education variables matter more strongly to specific country groups, depending on factors such as state capacity, demographic structure and economic demands. For these reasons, we expect primary education to be the most adequate proxy of education in the less developed world, whereas tertiary education is expected to be most important in developed economies (cf. Barro and Lee 2010).

### *3.3 Controls*

We include a number of controls to avoid detecting only spurious correlations between education and terrorism. We control for the effect of variables that determine education and terrorism at the same time (to ensure that the *ceteris paribus* condition of our hypotheses holds) or which need to be included for obvious statistical reasons. Wherever possible, we exclude variables that reflect a potential transmission channel from education to terrorism, so as to better isolate and identify the aggregate impact of education on terrorism. For instance,

we do not control for economic growth, given that we expect education to influence terrorist activity—amongst other effects—via its beneficial impact on economic activity.[9] Additional information on all control variables (e.g., operationalization, measurement, data sources) is given in the appendix.

First, we consider the effect of *population size*. Larger populations may signal higher demographic stress that fuels conflict. Alternatively, the positive correlation between population size and terrorism may simply stem from the fact that more populous countries provide more targets, victims and terrorists. In any case, population size is consistently found to be a strong, positive predictor of terrorism (Krieger and Meierrieks 2011; Gassebner and Luechinger 2011). At the same time, larger populations lead to increased demand for investment in education and may affect enrollment (e.g., Busemeyer 2007).

Second, we control for the effect of *per capita military spending* on terrorism. Gassebner and Luechinger (2011) argue that military spending constrains the opportunities for open rebellion and therefore leads to terrorism (as an alternative form of insurgency). On the other hand, higher military spending may reflect a higher state capacity for hampering or even suppressing all forms of rebellion, meaning that a negative effect of military expenditures on terrorism also seems possible. Simultaneously, budget decisions in favor of more military

[9] Other potential determinants of terrorism that we do not include for this reason are, e.g., per capita income, the rule of law, measures of poverty and inequality, and the economic and human rights situation in a country. However, we control for these intervening variables in additional model specifications as part of our robustness analysis. As expected, their inclusion tends to reduce the overall effect of education on terrorism. Yet the general results of this study are robust to the inclusion of these variables (results available upon request). Also, note that we use several of these variables as conditioning variables when we create country groups by means of a cluster analysis (cf. Section 4).

spending may imply comparatively lower public spending on education and thus a lower level of education (e.g., Krieger and Meierrieks 2012).

Third, we control for the influence of various forms of *political instability*. Specifically, we account for the impact of *general strikes*, *state failure* and *religious tensions*. Political instability is expected to positively correlate with terrorism, given that instability, e.g., could exacerbate existing grievances and provide terrorists with opportunities to network, recruit and train, while undermining the ability of governments to counter terrorism effectively (e.g., Piazza 2008; Gassebner and Luechinger 2011). At the same time, these forms of instability may also affect education.

It is also necessary to control for the effect of *democracy*. Given that education may impact terrorism through its effect on political openness, the inclusion of a regime type variable may mask the effect of education on terrorism. However, as found by Drakos and Gofas (2006a), democracies are systematically more likely to report terrorism (given that the press is less restricted) than autocratic regimes. The existence of an underreporting bias in terrorism therefore calls for the inclusion of a control that reflects this bias.[10] What is more, we also expect an effect of democracy on the patterns of education, given that democratic institutions usually positively correlate with public education efforts (e.g., Stasavage 2005; Burgoon 2006).

We furthermore consider the effect of *trade openness*. As argued by Mirza and Verdier (2008), there are a number of channels through which economic integration may affect terrorism. For instance, integration may facilitate economic disruption through terrorism (e.g., as supply chains are more vulnerable) or increase media attention. While such effects make

[10] We try to minimize the influence of this variable by using a very rough measure of democracy (see appendix). As discussed below, we also run zero-inflated negative binomial models as a statistical method for dealing with the existence of an underreporting bias.

terrorism more likely by increasing its benefits, alternatively openness may reduce terrorist activity when it predominantly produces economic gains that make violence comparatively less attractive (Mirza and Verdier 2008). At the same time, economic integration is also expected to affect education. For instance, trade may carry risks against which the government needs to provide insurance (e.g., by boosting social security spending), which may come at the expense of public education policies and efforts, thereby negatively affecting education (e.g., Burgoon 2006).

Finally, we control for the effect of *external conflict* (i.e., international tensions and wars) on terrorism as a source of external instability. On the one hand, external conflict may make terrorism more likely by tying resources to this conflict, consequently reducing the capacity of a state to control its territory and effectively counter internal problems (Lai 2007). On the other hand, this very tying of government resources can also be expected to compromise education, potentially leading to lower educational outcomes.

### *3.4 Empirical methodology*

The dependent variable of our empirical model is a count variable (the number of domestic terrorist attacks) which only covers discrete and nonnegative values. Its variance is also larger than its mean (cf. Table 2). Therefore, we employ a *negative binomial model for* (pooled) *count data*. This model is the standard econometric method used in the study of the determinants of terrorism (Krieger and Meierrieks 2011; Gassebner and Luechinger 2011).

For all model specifications we let the independent (education) and control variables enter the model with *(t-1)* lagged values. This reflects the idea that any changes in these parameters should affect terrorism only after some time. Simultaneously, we avoid potential reverse causation and endogeneity problems, given that lagging all explanatory variables ought to reduce the correlation between these variables and the error term (e.g., Lai 2007). We include

year dummies in all specifications to factor in time and trending effects (e.g., Burgoon 2006). Regional dummies (for the West, the Middle East, Sub-Saharan Africa, and Latin America) are included to account for effects that matter to certain parts of the world. For all estimations we rely on standard errors that are clustered over cross-sections to account for heteroskedasticity and serial correlation, given that previous tests have indicated their presence and potential influence on statistical inferences.

## 4. Empirical Results

### *4.1 Full sample findings*

Our estimation results for the complete sample of 133 countries are reported in Table 3. The findings reject *H1*. We do not find that higher levels of education coincide with a reduction in domestic terrorism. Rather, the findings suggest that education tends to positively correlate with terrorist activity. In particular, there is a statistically significant association between lower levels of education (literacy rates, primary education) and domestic terrorism, while there is no correlation with higher education (university enrollment). These findings are more in line with *H2a* and the empirical mainstream.

**- Table 3 here -**

Table 3 also indicates that other factors influence terrorism. As expected, more populous countries are more prone to domestic terrorism. Internal political instability (strikes, incidents of state failure and religious tensions) and external threats (international conflict) make domestic terrorism more likely. Again, these findings mirror the empirical mainstream and suggest that instability lowers the operating costs of terrorism (e.g., by diverting government resources to other threats and creating political vacuums) and its opportunity costs by constraining nonviolent activities (e.g., Lai 2007; Piazza 2008). Also, we find that

democracies are more prone to domestic terrorism. As argued before, this positive correlation may indicate the presence of an underreporting bias. Finally, trade openness and military spending do not robustly influence terrorist activity.

### *4.2 Cluster analysis*

The purpose of this subsection is to create groups of countries that differ with respect to certain socioeconomic, political and demographic variables. By differentiating between countries with 'good' (favorable) and 'bad' (unfavorable) conditions we expect to better assess the validity of our hypotheses *H2a* and *H2b*.

We employ a *cluster analysis* to identify natural groupings within our dataset that would otherwise not be apparent. For the cluster analysis we collect data on socioeconomic development and performance (GDP per capita, inflation, economic growth), politico-institutional variables (rule of law, corruption, government size, human rights situation, economic freedom, female labor participation) and demographic factors (population density, population growth, urbanization). We then average each variable over the respective available observation period and run a two-step cluster analysis (e.g., Chiu et al. 2001). One advantage of this procedure is that it automatically chooses the optimal number of clusters. The results of the cluster analysis are reported in Table 4.

**- Table 4 here -**

Our analysis identifies two clusters. In comparison to Cluster 2, Cluster 1 exhibits 'poorer' conditions with a weaker rule of law, poorer protection of human and property rights, slower economic growth, and lower per capita income, female labor participation, urbanization and population density, but higher levels of corruption, population growth, inflation, and larger

governments.[11] According to the exact breakdown of the sample (cf. the country list in the appendix), Cluster 2 includes all OECD economies, some rich oil economies and some emerging markets ('developed countries' cluster), while Cluster 1 includes all Sub-Saharan African countries and most countries in Latin America, Asia and the Middle East ('less developed countries' cluster).

For the less developed countries we anticipate to find evidence in support of *H2a*. Here, increases in education are not expected to pay off because socioeconomic (e.g., high inflation, slow economic growth), politico-institutional (e.g., high levels of corruption and repression) and demographic (e.g., high population growth) conditions are unfavorable. Instead, education may fuel domestic terrorism, as outlined above. Given the demographic and economic structures in the less developed world, this relationship ought to be more pronounced for variables reflecting lower education. By contrast, for the developed countries we expect to find evidence supporting *H2b*. Education ought to reduce terrorism by interacting favorably with good country-specific conditions. Variables indicating higher education ought to matter most to this relationship.

[11] Other potential conditioning variables are not included due to a lack of data. For instance, we are not able to include data on youth burdens. However, we are confident that the two country groups are also similarly different with respect to these omitted variables. For instance, Cluster 1 ought to experience much stronger demographic pressure from youth burdens than Cluster 2. Note that we also experimented with other cluster specifications (e.g., by dropping certain variables used for the cluster identification) and re-ran our estimations. Here, our results were usually in line with those reported in the main text (results available upon request).

### *4.3 Results for a subsample of less developed countries*

Table 5 reports the estimation results for a subsample of less developed countries (Cluster 1). In short, the findings with respect to the effect of education on domestic terrorism strongly mirror those reported for the full sample (cf. Table 3). That is, we find that variables reflecting lower education (primary education, literacy rate) are positively associated with terrorism, while higher education (university enrollment) does not play a role.

**- Table 5 here -**

These findings support hypothesis *H2a*. Conditional upon the presence of poor country-specific conditions, education makes terrorism more likely. Presumably, education does not increase terrorism's opportunity costs. The beneficial individual and social effects of education (e.g., socioeconomic success, political participation, institutional improvements) do not seem to materialize due to the structural socioeconomic, political and demographic constraints that are endemic in these countries (cf. Table 4). Rather, education is positively correlated with terrorism because it may, e.g., facilitate mobilization because terrorism appears more attractive to educated individuals. In turn, this relationship reinforces the probability of terrorist success. Note that the findings with respect to controls are in line with those reported in Table 3.

### *4.4 Results for a subsample of developed countries*

We analyze the effect of education on domestic terrorism for the smaller sample of developed economies (Cluster 2). The findings are reported in Table 6.

**- Table 6 here -**

In contrast to the findings for the complete country sample (cf. Table 3) and the subsample of less developed countries (cf. Table 5), the results for the subsample of developed countries

reveal a different relationship between education and domestic terrorism. There is no positive association between lower education and terrorism. Instead, we find a *negative* and statistically significant effect of higher education (university enrollment) on domestic terrorism, which supports *H2b*. That is, in a favorable environment—characterized by, e.g., sufficient means of socioeconomic and political participation—education seems to exert a dampening influence on terrorism. On the one hand, there is good reason to believe that education can markedly improve personal and social living conditions (e.g., higher incomes, stronger economic growth, poverty reduction, democratization, institutional advances) when the barriers for socioeconomic and political participation are rather low. This ought to mean higher opportunity costs for terrorism and thus less terrorism. On the other hand, the availability of nonviolent opportunities and the lack of (apparent) disenfranchisement ought to undermine efforts by terrorist groups to mobilize and rally popular support. This is equivalent to higher operating costs of terrorist organizations which ought to generate less terrorism.

As argued before, this does not mean that the beneficial interaction between education and politico-economic development 'immunizes' against the terrorist threat. There may still be reasons to rebel. However, terrorist movements in the developed world have rarely become mass movements; rather, they have remained isolated groups within society. One contributing factor seems to be the appeasing effect of (advances in higher) education.

The findings with respect to controls mirror the previous ones with two exceptions. First, we find a weakly significant, negative effect of military spending on terrorism. Higher spending may indicate increased security and counterterrorism efforts that raise the operating costs of terrorism, thus making it less likely (e.g., Lai 2007).[12] Second, we also find that democracies

[12] The marginally positive effect of military spending on terrorism in Tables 3 and 5 can be interpreted as in Gassebner and Luechinger (2011), who argue that a positive correlation between spending and terrorism reflects the asymmetric nature of terrorist conflicts.

are less likely to see terrorism. While this may be a mere consequence of our country sample and model specification—as suggested by Gassebner and Luechinger (2011)—it may also indicate that political participation, in particular when coupled with a sound institutional framework and relatively high levels of education, makes terrorism less likely by offering nonviolent means of voicing dissent and achieving political change.

## 5. Robustness and Extensions

This section scrutinizes the robustness of the findings presented in the previous section and discusses some extensions to these efforts. We discuss our findings only briefly. The corresponding tables are reported in the supplementary material.

### *5.1 Reverse causality and endogeneity*

To the best of our knowledge, there is no empirical evidence of a causal relationship between an increase in terrorism and a reduction in education. Also, the socioeconomic consequences of terrorism tend to be small and short-lived, suggesting no strong adverse impact of terrorism on factors such as education (cf. Tavares 2004). However, it seems possible that terrorism impairs education by, e.g., diverting resources away from public spending on education and damaging the educational infrastructure, given that the civil war literature similarly suggests that conflict may compromise education (Thyne 2006). Furthermore, Dreher et al. (2011) find that terrorist activity causes emigration of the most talented due to the high opportunity costs of losing their human capital investment. Arguably, in terrorized economies there may be a lower demand for education for the same reasons.

We therefore run a series of regressions of various education measures on past terrorist activity to examine whether reverse causation is present, and also control for a number of

covariates (e.g., instability, population size, regional and time dummies). While preliminary, we find no evidence of a systematic effect of terrorism on education, implying that reverse causation is not a problem. Also, the Durbin-Wu-Hausman tests do not indicate that education is endogenous to terrorism. Finally, as in Azam and Thelen (2010), we control for endogeneity using a two-step Hausman test. In the first stage of this test, we regress our respective education variables on a set of exogenous controls (e.g., external conflict, democracy, economic and institutional development) and store the resulting residuals from these regressions. In the second test stage, the residuals are included in the respective count data models outlined above. Here, any significant residual indicates that endogeneity is present and biases our estimates. However, for various model specifications (Tables 3, 5 and 6) this is not the case. That is, this method, too, indicates that education is not endogenous to terrorism.

### *5.2 Alternative dependent variables*

Arguably, education and domestic terrorism ought to share the closest relationship. However, the strict coding rules of Enders et al. (2011) may lead to the omission of important information on terrorism (e.g., when a domestic group attacks international targets or when a domestic group does not claim responsibility for an attack). Thus, it seems reasonable to employ alternative measures of terrorist activity to examine the robustness of our findings. Thus, we also analyze the relationship between education and *total terrorist activity*. Here, *transnational* terrorist incidents together with *domestic* terrorism and attacks by *unknown perpetrators* sum up for total terrorist activity, with data drawn from the *GTD*.

We run a series of estimations using the same empirical setup as described before. In summary, we find that our previously reported results hold when we focus on total instead of domestic terrorism. In particular, while lower education increases the likelihood of total

terrorism in the less developed world, higher education correlates negatively with these indicators in developed economies. This supports our hypotheses *H2a* and *H2b* that education interacts beneficially (detrimentally) with a favorable (unfavorable) environment. The fact that the results for the controls are very much in line with our previously reported findings in Tables 3, 5 and 6 adds to the value of our findings.[13]

### *5.3 Alternative estimation techniques*

Next, we consider whether our findings are robust to alternative estimation methods. First, we run a series of *zero-inflated negative binomial regressions*, which is a method that accounts for the previously discussed reporting bias in terrorism. Drakos and Gofas (2006b) argue that autocracies tend to systematically underreport terrorism, so that the occurrence of excessive zeros is determined by a country's regime type. The zero-inflated estimations are modeled accordingly, where the control variable *democracy* is chosen as the variable governing the zero-always outcome which may result from an underreporting bias. Second, we estimate a series of *population-averaged negative binomial models* for panel data (or generalized estimation equation models). This statistical approach allows us to fully consider the panel structure of our dataset, while controlling for heterogeneity and autocorrelation by means of

[13] We also experiment with a different definition of domestic terrorism, where we code an attack as domestic when the attacking terrorist group is located in the country of the attack. The findings for this coding effort mirror those reported above. We also use the number of transnational terrorist incidents as an alternative dependent variable, employing the data provided by Enders et al. (2011). Here, our findings are once again in line with those reported in the main text (results available upon request).

panel-corrected standard errors and an AR(1) term.[14] Amongst others, Choi (2010) uses this empirical approach. In short, our results indicate that the zero-inflated estimation results closely mirror those presented beforehand. The findings from the population-averaged model also tend to support the findings of this study.

### *5.4 Long-run effects of education on terrorism*

Education changes slowly and therefore potentially needs some time to generate positive outcomes that in turn 'morph' into higher terrorism (opportunity) costs and less terrorist activity. Therefore, we take 6-year averages of our dependent, education and control variables and then regress terrorism on contemporary values of the controls (i.e., averages of the same period) and on past values of the education proxy (i.e., averages of the previous period). This ought to reflect a long-run causal effect of education on terrorism. Remarkably, we find that previous innovations in primary education positively sway terrorist activity for the full sample and for the subsample of less developed economies. We also find that past changes in university enrollment negatively correlate with present levels of terrorism in the developed world. That is, there indeed seems to be a causal effect of education on terrorism that depends on country-specific circumstances and emerges through the influence of education on the cost-benefit matrices of (potential) terrorists.

### *5.5 Education expansion and terrorism*

Next, we consider the effect of changes in education on terrorism, given that some studies analyze the effect of changes in education (instead of level data) on socioeconomic and

[14] Note, however, that the unbalanced nature of our dataset may affect our findings.

political variables (e.g., Temple 1999). An expansion in education may reflect, e.g., an increasing inflow of resources into the education system (e.g., public investment) and growth in a country's human capital, but also increasing demographic, economic and political pressures when the growth in education is not accompanied—due to poor structural conditions and related constraints—by sufficient means of socioeconomic and political participation.

In short, we find that an expansion in education tends to positively correlate with the emergence of terrorism in less developed countries, while it tends to reduce domestic terrorism in the developed world. Once more, these findings support our hypotheses *H2a* and *H2b*.

### *5.6 Transmission channels*

Finally, we attempt to identify the transmission channels through which education influences terrorism. Here, auxiliary regressions indicate that, as argued above, education positively correlates with economic growth, higher income levels, more political openness and a better human and economic rights situation. As one would expect, these correlations are more robust for the subsample of developed economies. While these findings come from ad hoc estimations and surely need further scrutiny, they are nevertheless in line with previous theoretical and empirical findings (cf. Section 2) and suggest that respective transmission channels from education to terrorism are indeed present.

## 6. Conclusion

This paper provides a reassessment of the terrorism-education nexus. Our study is motivated by conflicting hypotheses that relate a country's level of education to its level of terrorist

activity. The optimistic—perhaps somewhat *euro-americentric*—view argues that education makes terrorism less likely by inducing socioeconomic and political progress, thereby raising terrorism's opportunity costs. From this perspective education also reduces the risk of terrorism by raising its (perceived) costs and lowering its (perceived) benefits as, e.g., the well-educated are expected to be 'immune' to terrorist propaganda, to disapprove of hate, ignorance and the use of violence, and to be more realistic about the probability of terrorist success. In contrast to this, more skeptical and sometimes pessimistic voices argue that education tends to work in the opposite direction.

We propose a more nuanced perspective that takes both views into consideration. We argue that the true impact of education on terrorism is conditional upon socioeconomic, politico-institutional and demographic circumstances. When these circumstances are unfavorable, education may incite terrorism because advances in education do not sufficiently translate into higher opportunity costs of terrorism. Instead, education may amplify feelings of frustration, humiliation and disenfranchisement (as argued by the proponents of the pessimistic view). What is more, education may increase the attractiveness of terrorism as an 'occupation', given that it may pay wages and offer career paths that match one's expectations more closely than regular employment. Finally, education may increase the perceived benefits of terrorism (e.g., psychological and material rewards from eventual terrorist success), while lowering its perceived costs and increasing the probability of terrorist success (i.e., the 'productivity' of terrorism), which turns the educated into the preferred recruits for terrorist groups. Education can only be expected to have a beneficial (terrorism-reducing) effect when country-specific conditions are favorable.

We analyze the validity of the hypotheses on the terrorism-education nexus using data for 133 countries between 1984 and 2007. We find no evidence that education reduces terrorism across the board. Rather, we find that education at lower levels (primary education) leads to

more terrorism for a cluster of countries where poor conditions abound (e.g., slow growth, poor human and economic rights situation), while high-level education (university education) reduces domestic terrorism for a cluster of countries where conditions are more favorable. These core findings are robust to a variety of methodological changes and robustness checks. They also match recent and historic events where educational advances promoted instability due to poor structural conditions such as the French Revolution of 1789, as argued by Glaeser et al. (2007), the Middle Eastern experience with terrorism on which Krueger and Maleckova (2003) build their argument, and the recent series of revolutions and popular uprisings during the Arab Spring (Campante and Chor 2011).

What are the implications of this study? From a research perspective, we believe that scholars should more thoroughly take into account the potentially heterogeneous (i.e., country-specific) relationship between education and terrorism, accounting for conditional and interacting effects and testing their hypotheses using various education proxies, given that the careful identification of the terrorism-education nexus seems to crucially depend on these factors. Future research may benefit from the eventual advent of more consistent education data that may help to better understand the role of education content, quality and public spending in the terrorism-education nexus.[15] Although we already touch on these issues, future research may also more thoroughly consider the exact mechanisms that influence the interaction between education, development and terrorism and that correlate with country-specific conditions. Finally, future research may investigate the role of education in religious (Islamic) terrorism. For instance, education seems to play a major role in the very recent terrorist insurgency by the group *Boko Haram* (which roughly translates as *Western or non-*

[15] Also, future empirical studies may benefit from a further reduction in the measurement errors that can plague cross-national education data (e.g., Cohen and Soto 2007).

*Islamic education is a sin*) in Nigeria, where terrorist activity seems to have emerged partly as a response to Western influence making itself felt through education.

From a policy perspective, our findings indicate that advances in education produce great expectations and may result in hard times when those expectations are not met. That is, a sole strengthening of education in less developed countries—e.g., through foreign aid (Azam and Thelen 2008, 2010)—may not help in the war on terror. Rather, in line with broad strategies of 'state-building', the promotion of education should be accompanied by domestic and international efforts to ameliorate poor structural socioeconomic, politico-institutional and demographic conditions (poor economic growth, poverty, inequality, repression, discrimination, corruption, deficient legal institutions etc.).

**References**

Abeyratne, S. (2004). Economic roots of political conflict: The case of Sri Lanka. *The World Economy* 27, 1295-1314.

Azam, J.-P. & Thelen, V. (2008). The roles of foreign aid and education in the war on terror. *Public Choice* 135, 375-397.

Azam, J.-P. & Thelen, V. (2010). Foreign aid versus military intervention in the war on terror. *Journal of Conflict Resolution* 54, 237-261.

Barro, R. J. (1999). Determinants of democracy. *Journal of Political Economy* 107, 158-183.

Barro, R. J. & Lee, J.-W. (2010). A new data set of educational attainment in the world, 1950-2010. NBER Working Paper 15902.

Benmelech, E. & Berrebi, C. (2007). Human capital and the productivity of suicide bombers. *Journal of Economic Perspectives* 21, 223-238.

Berrebi, C. (2007). Evidence about the link between education, poverty and terrorism among Palestinians. *Peace Economics, Peace Science and Public Policy* 13, Article 2.

Blomberg, S. B. & Hess, G. D. (2008). The Lexus and the olive branch: Globalization, democratization and terrorism. In: Keefer, P. & Loayza, N. (Eds.), *Terrorism, Economic Development, and Political Openness*, Cambridge University Press: New York, pp. 116-147.

Bravo, A. B. S. & Dias, C. M. M. (2006). An empirical analysis of terrorism: Deprivation, Islamism and geopolitical factors. *Defence and Peace Economics* 17, 329-341.

Bueno de Mesquita, E. (2005). The quality of terror. *American Journal of Political Science* 49, 515-530.

Burgoon, B. (2006). On welfare and terror: Social welfare policies and political-economic roots of terrorism. *Journal of Conflict Resolution* 50, 176-203.

Busemeyer, M. R. (2007). Determinants of public education spending in 21 OECD democracies, 1980-2001. *Journal of European Public Policy* 14, 582-610.

Campante, F. R. & Chor, D. (2011). "The people want the fall of the regime": Schooling, political protest, and the economy. Mimeo, Harvard University.

Chiu, T., Fang, D., Chen, J., Wang, Y. & Jeris, C. (2001). A robust and scalable clustering algorithm for mixed type attributes in large database environment. In: Provost, R. & Srikant, R. (Eds.), *Proceedings of the Seventh ACM SIGKDD International Conference on Knowledge Discovery and Data Mining,* ACM: New York, pp. 263–268.

Choi, S.-W. (2010). Fighting terrorism through the rule of law? *Journal of Conflict Resolution* 54, 940-966.

Cohen, D. & Soto, M. (2007). Growth and human capital: Good data, good results. *Journal of Economic Growth* 12, 51-76.

Collier, P. & Hoeffler, A. (2004). Greed and grievances in civil war. *Oxford Economic Papers* 56, 563-595.

Cronin, A. K. (2006). How al-Qaida ends: The decline and demise of terrorist groups. *International Security* 31, 7-48.

Dee, T. S. (2004). Are there civic returns to education? *Journal of Public Economics* 88, 1697-1720.

Drakos, K. & Gofas, A. (2006a). The devil you know but are afraid to face: Underreporting bias and its distorting effects on the study of terrorism. *Journal of Conflict Resolution* 50, 714-735.

Drakos, K. & Gofas, A. (2006b). In search of the average transnational terrorist attack venue. *Defence and Peace Economics* 17, 73-93.

Dreher, A. & Gassebner, M. (2008). Does political proximity to the U.S. cause terror? *Economics Letters* 99, 27-29.

Dreher, A., Krieger, T. & Meierrieks, D. (2011). Hit and (they will) run: The impact of terrorism on migration. *Economics Letters* 113, 42-46.

Enders, W., Sandler, T. & Gaibulloev, K. (2011). Domestic versus transnational terrorism: Data, decomposition, and dynamics. *Journal of Peace Research* 48, 319-337.

Fearon, J. D. & Laitin, D. D. (2003). Ethnicity, insurgency, and civil war. *American Political Science Review* 97, 75-90.

Freytag, A., Krueger, J., Meierrieks, D. & Schneider, F. (2011). The origins of terrorism: Cross-country estimates on socio-economic determinants of terrorism. *European Journal of Political Economy* 27, 5-16.

Ganor, B. (2011). An Intifada in Europe? A comparative analysis of radicalization processes among Palestinians in the West Bank and Gaza versus Muslim immigrants in Europe. *Studies in Conflict & Terrorism* 34, 587-599.

Gassebner, M. & Luechinger, S. (2011). Lock, stock, and barrel: A comprehensive assessment of the determinants of terror. *Public Choice* 149, 235-261.

Glaeser, E. L., La Porta R., Lopez-de-Silanes, F. & Shleifer, A. (2004). Do institutions cause growth? *Journal of Economic Growth* 9, 271-303.

Glaeser, E. L., Ponzetto, G. A. M. & Shleifer, A. (2007). Why does democracy need education? *Journal of Economic Growth* 12, 77-99.

Jai, J. J. (2001). Getting at the roots of terrorism. *Christian Science Monitor* 10, December 2001.

Kavanagh, J. (2011). Selection, availability, and opportunity: The conditional effect of poverty on terrorist group participation. *Journal of Conflict Resolution* 55, 106-132.

Krieger, T. & Meierrieks, D. (2010). Terrorism in the worlds of welfare capitalism. *Journal of Conflict Resolution* 54, 902-939.

Krieger, T. & Meierrieks, D. (2011). What causes terrorism? *Public Choice* 147, 3-27.

Krieger, T. & Meierrieks, D. (2012). Does public spending affect domestic terrorism? Mimeo.

Krueger, A. B. (2008). What makes a homegrown terrorist? Human capital and participation in domestic Islamic terrorist groups in the U.S.A. *Economics Letters* 101, 293-296.

Krueger, A. B. & Maleckova, J. (2003). Education, poverty, and terrorism: Is there a causal connection? *Journal of Economic Perspectives* 17, 119-144.

Kurrild-Klitgaard, P., Justesen, M. K. & Klemmensen, R. (2006). The political economy of freedom, democracy and transnational terrorism. *Public Choice* 128, 289-315.

Lai, B. (2007). “Draining the swamp”: An empirical examination of the production of international terrorism, 1968-1998. *Conflict Management and Peace Science* 24, 297-310.

Mirza, D. & Verdier, T. (2008). International trade, security and transnational terrorism: Theory and a survey of empirics. *Journal of Comparative Economics* 36, 179-194.

Pape, R. A. (2003). The strategic logic of suicide terrorism. *American Political Science Review* 97, 343-361.

Piazza, J. A. (2008). Incubators of terror: Do failed and failing states promote transnational terrorism? *International Studies Quarterly* 52, 469-488.

Piazza, J. A. (2011). Poverty, minority economic discrimination, and domestic terrorism. *Journal of Peace Research* 48, 339-353.

Pritchett, L. (2001). Where has all the education gone? *World Bank Economic Review* 15, 367-391.

Saint-Paul, G. & Verdier, T. (1993). Education, democracy and growth. *Journal of Development Economics* 42, 399-407.

Savun, B. & Phillips, B. J. (2009). Democracy, foreign policy, and terrorism. *Journal of Conflict Resolution* 53, 878-904.

Shafiq, M. N. & Sinno, A. H. (2010). Education, income, and support for suicide bombings: Evidence from six Muslim countries. *Journal of Conflict Resolution* 54, 146-178.

Stasavage, D. (2005). Education spending and democracy in Africa. *American Journal of Political Science* 49, 343-358.

Tavares, J. (2004). The open society assesses its enemies: shocks, disasters and terrorist attacks. *Journal of Monetary Economics* 51, 1039-1070.

Temple, J. (1999). A positive effect of human capital on growth. *Economics Letters* 65, 131-134.

Testas, A. (2004). Determinants of terrorism in the Muslim world: An empirical cross-sectional analysis. *Terrorism and Political Violence* 16, 253-273.

Thyne, C. L. (2006). ABC's, 123's, and the Golden Rule: The pacifying effect of education on civil war, 1980-1999. *International Studies Quarterly* 50, 733-754.

Urdal, H. (2006). A clash of generations? Youth bulges and political violence. *International Studies Quarterly* 50, 607-629.

Victoroff, J. (2005). The mind of a terrorist: A review and critique of psychological approaches. *Journal of Conflict Resolution* 49, 3-42.

Walsh, J. I. & Piazza, J. A. (2010). Why respecting physical integrity rights reduces terrorism. *Comparative Political Studies* 43, 551-577.

**Table 1: Large-*N* Studies Controlling for the Effect of Education on Terrorism**

| *Study* | *Scope* | *Terrorism Variable* | *Education Proxy* | *Effect on Terrorism* |
|---|---|---|---|---|
| Azam and Thelen (2008) | 176 countries 1990-2004† | transnational terrorism (origin) | (gross) secondary school enrollment | (-)/significant |
| Azam and Thelen (2010) | 132 countries 1990-2004† | transnational terrorism (origin) | (gross) secondary school enrollment | (-)/significant |
| Bravo and Dias (2006) | 60-85 countries 1997-2004† | domestic and transnational terrorism (location) | literacy rate of adult population | (-)/significant |
| Drakos and Gofas (2006b) | 139 countries 1985-1999 | transnational terrorism (location) | secondary school enrollment index | (+)/not significant |
| Krueger and Maleckova (2003) | 148 countries 1997-2002† | transnational terrorism (origin) | illiteracy rate | (-)/not significant |
| Kurrild-Klitgaard et al. (2006) | 97-121 countries 1996-2002† | transnational terrorism (location and origin) | UNDP education index | largely (+)/not significant |
| Tavares (2004) | sample not reported 1987-2001 | transnational terrorism (location) | illiteracy of adult males | (-)/significant |
| Testas (2004) | 37 Muslim countries 1968-1991† | transnational terrorism (location) | university enrollment | (+)/significant |
| Urdal (2006) | 99-158 countries 1984-1995 | domestic and transnational terrorism (location) | tertiary education growth interacted with youth burden | (+)/significant |

*Note:* (†) indicates that the study is a pure cross-sectional analysis.

**Table 2: Summary Statistics [Full Sample]**

| Variable | N*T | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Domestic Terrorist Attacks | 3082 | 11.049 | 42.103 | 0 | 673 |
| Total Terrorist Attacks | 3076 | 18.737 | 64.190 | 0 | 1041 |
| Primary Enrollment | 3053 | 12.146 | 4.943 | 2.94 | 35.71 |
| Secondary Enrollment | 3053 | 6.667 | 3.255 | 0.33 | 16.6 |
| Prim. + Sec. Enrollment | 3053 | 18.81 | 5.281 | 3.63 | 38.91 |
| University Enrollment | 3078 | 0.620 | 1.705 | 0 | 20.454 |
| Literacy Rate | 3045 | 77.840 | 23.307 | 8.4 | 99.9 |
| Population Size | 3192 | 9.239 | 1.563 | 5.437 | 14.086 |
| Military Spending | 2973 | 4.087 | 1.680 | 0.032 | 9.923 |
| Strikes | 3070 | 0.159 | 0.570 | 0 | 7 |
| State Failure | 3078 | 0.604 | 1.649 | 0 | 13.5 |
| Religious Tensions | 2967 | 0.244 | 0.228 | 0 | 1 |
| Democracy | 3041 | 6.442 | 3.536 | 0 | 10 |
| Trade Openness | 3072 | 73.593 | 47.777 | 1.035 | 441.224 |
| External Conflict | 2967 | 0.201 | 0.197 | 0 | 1 |

**Table 3: Education and Domestic Terrorism Activity [Full Sample]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Primary Education $_{t-1}$ | 0.063 | | | | | 0.065 |
| | (2.85)*** | | | | | (2.94)*** |
| Secondary Education $_{t-1}$ | | 0.026 | | | | 0.030 |
| | | (0.72) | | | | (0.83) |
| Prim. + Sec. Education $_{t-1}$ | | | 0.052 | | | |
| | | | (2.95)*** | | | |
| University Enrollment $_{t-1}$ | | | | -0.812 | | -0.085 |
| | | | | (1.34) | | (1.08) |
| Literacy Rate $_{t-1}$ | | | | | 0.016 | |
| | | | | | (2.55)** | |
| Population Size $_{t-1}$ | 0.727 | 0.721 | 0.723 | 0.782 | 0.715 | 0.780 |
| | (7.40)*** | (7.26)*** | (7.37)*** | (7.43)*** | (7.27)*** | (7.29)*** |
| Military Spending p.c. $_{t-1}$ | 0.164 | 0.113 | 0.127 | 0.160 | 0.007 | 0.176 |
| | (1.82)* | (1.19) | (1.44) | (1.75)* | (0.07) | (1.75)* |
| General Strikes $_{t-1}$ | 0.330 | 0.352 | 0.346 | 0.336 | 0.367 | 0.321 |
| | (3.00)*** | (3.19)*** | (3.15)*** | (2.93)*** | (3.46)*** | (2.92)*** |
| State Failure $_{t-1}$ | 0.500 | 0.499 | 0.491 | 0.483 | 0.486 | 0.489 |
| | (4.62)*** | (4.55)*** | (4.72)*** | (4.41)*** | (4.72)*** | (4.68)*** |
| Religious Tensions $_{t-1}$ | 2.120 | 2.010 | 2.011 | 2.045 | 2.126 | 2.042 |
| | (4.13)*** | (3.73)*** | (3.86)*** | (3.90)*** | (4.07)*** | (3.87)*** |
| Democracy $_{t-1}$ | 0.124 | 0.121 | 0.118 | 0.124 | 0.109 | 0.121 |
| | (3.24)*** | (3.12)*** | (3.06)*** | (3.18)*** | (2.65)*** | (3.17)*** |
| Trade Openness $_{t-1}$ | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 | -0.03 |
| | (0.96) | (0.96) | (1.06) | (0.81) | (1.01) | (0.96) |
| External Conflict $_{t-1}$ | 1.716 | 1.726 | 1.848 | 1.744 | 1.969 | 1.898 |
| | (3.62)*** | (3.75)*** | (3.88)*** | (3.79)*** | (4.59)*** | (3.96)*** |
| Log Pseudolikelihood | -5463.60 | -5477.71 | -5464.66 | -5496.28 | -5472.10 | -5459.24 |
| N*T | 2692 | 2692 | 2692 | 2702 | 2686 | 2692 |

*Notes*: Dependent variable is the number of domestic terrorist incidents. Robust absolute z-values clustered on countries reported in parentheses. Constant not reported. All models include time and regional dummies (not reported). (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

**Table 4: Cluster Analysis**

| | *Cluster 1* | | *Cluster 2* | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Law and Order | -0.579 | 0.668 | 0.993 | 0.620 |
| Corruption | 0.507 | 0.579 | -0.869 | 0.974 |
| Government Size | 0.050 | 1.164 | -0.085 | 0.628 |
| Physical Integrity | -0.544 | 0.773 | 0.932 | 0.558 |
| Population Density | -0.127 | 0.217 | 0.218 | 1.610 |
| Population Growth | 0.288 | 0.826 | -0.493 | 1.085 |
| Urbanization | -0.474 | 0.876 | 0.813 | 0.596 |
| GDP per capita | -0.586 | 0.277 | 1.005 | 0.992 |
| Economic Growth | -0.229 | 1.115 | 0.393 | 0.593 |
| Property Rights Protection | -0.588 | 0.714 | 1.008 | 0.475 |
| Inflation | 0.160 | 1.229 | -0.275 | 0.134 |
| Female Labor Participation | -0.038 | 0.985 | 0.064 | 1.033 |
| Cluster Distribution | N=84 (63.2%) | | N=49 (36.8%) | |

*Notes*: Results of the two-step cluster analysis. Optimal number of clusters automatically chosen based on Schwarz's Bayesian Criterion. Variables were averaged over respective period of observation and standardized before analysis. See text for a discussion of variables.

**Table 5: Education and Domestic Terrorism [Subsample of Less Developed Countries]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Primary Education $_{t-1}$ | 0.068 | | | | | 0.069 |
| | (2.88)*** | | | | | (2.86)*** |
| Secondary Education $_{t-1}$ | | 0.039 | | | | 0.047 |
| | | (1.09) | | | | (1.31) |
| Prim. + Sec. Education $_{t-1}$ | | | 0.065 | | | |
| | | | (3.37)*** | | | |
| University Enrollment $_{t-1}$ | | | | -0.095 | | -0.020 |
| | | | | (0.72) | | (0.13) |
| Literacy Rate $_{t-1}$ | | | | | 0.011 | |
| | | | | | (1.81)* | |
| Population Size $_{t-1}$ | 0.585 | 0.552 | 0.573 | 0.624 | 0.546 | 0.589 |
| | (5.05)*** | (4.90)*** | (5.19)*** | (5.53)*** | (4.75)*** | (5.10)*** |
| Military Spending p.c. $_{t-1}$ | 0.167 | 0.108 | 0.103 | 0.188 | 0.067 | 0.130 |
| | (1.64)* | (1.05) | (1.00) | (1.59) | (0.60) | (1.01) |
| General Strikes $_{t-1}$ | 0.211 | 0.247 | 0.217 | 0.235 | 0.276 | 0.212 |
| | (1.99)** | (2.40)** | (2.15)** | (2.11)** | (2.68)*** | (2.00)** |
| State Failure $_{t-1}$ | 0.521 | 0.521 | 0.514 | 0.504 | 0.501 | 0.514 |
| | (4.67)*** | (4.58)*** | (4.94)*** | (4.33)*** | (4.55)*** | (4.85)*** |
| Religious Tensions $_{t-1}$ | 1.917 | 1.726 | 1.810 | 1.734 | 1.898 | 1.838 |
| | (3.62)*** | (3.16)*** | (3.38)*** | (3.26)*** | (3.42)*** | (3.43)*** |
| Democracy $_{t-1}$ | 0.209 | 0.207 | 0.212 | 0.204 | 0.196 | 0.211 |
| | (6.44)*** | (5.84)*** | (6.55)*** | (5.85)*** | (5.29)*** | (6.52)*** |
| Trade Openness $_{t-1}$ | -0.005 | -0.006 | -0.006 | -0.005 | -0.005 | -0.006 |
| | (1.46) | (1.50) | (1.70)* | (1.30) | (1.47) | (1.57) |
| External Conflict $_{t-1}$ | 2.155 | 2.124 | 2.377 | 1.987 | 2.199 | 2.329 |
| | (4.58)*** | (4.66)*** | (4.85)*** | (4.47)*** | (4.78)*** | (4.80)*** |
| Log Pseudolikelihood | -3672.92 | -3686.66 | -3670.66 | -3707.86 | -3700.90 | -3670.22 |
| N*T | 1700 | 1700 | 1700 | 1710 | 1703 | 1700 |

*Notes*: Dependent variable is the number of domestic terrorist incidents. Robust absolute z-values clustered on countries reported in parentheses. Constant not reported. All models include time and regional dummies (not reported). (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

**Table 6: Education and Domestic Terrorism [Subsample of Developed Countries]**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Primary Education $_{t-1}$ | 0.061 | | | | | 0.073 |
| | (0.89) | | | | | (1.11) |
| Secondary Education $_{t-1}$ | | -0.107 | | | | -0.091 |
| | | (1.17) | | | | (0.94) |
| Prim. + Sec. Education $_{t-1}$ | | | -0.003 | | | |
| | | | (0.05) | | | |
| University Enrollment $_{t-1}$ | | | | -0.132 | | -0.183 |
| | | | | (2.37)** | | (3.02)*** |
| Literacy Rate $_{t-1}$ | | | | | 0.041 | |
| | | | | | (1.13) | |
| Population Size $_{t-1}$ | 0.940 | 0.921 | 0.927 | 1.062 | 0.877 | 1.108 |
| | (4.30)*** | (4.42)*** | (4.32)*** | (4.66)*** | (4.21)*** | (5.07)*** |
| Military Spending p.c. $_{t-1}$ | -0.442 | -0.472 | -0.484 | -0.461 | -0.487 | -0.401 |
| | (1.77)* | (1.87)* | (1.95)* | (1.92)* | (1.98)** | (1.65)* |
| General Strikes $_{t-1}$ | 0.404 | 0.396 | 0.423 | 0.397 | 0.377 | 0.349 |
| | (2.29)** | (2.22)** | (2.17)** | (2.04)** | (2.14)** | (2.18)** |
| State Failure $_{t-1}$ | 1.397 | 1.517 | 1.420 | 1.361 | 1.363 | 1.406 |
| | (5.08)*** | (5.58)*** | (5.26)*** | (4.91)*** | (5.11)*** | (5.20)*** |
| Religious Tensions $_{t-1}$ | 2.302 | 2.731 | 2.420 | 2.525 | 2.446 | 2.694 |
| | (1.80)* | (2.07)** | (1.85)* | (1.98)** | (2.06)** | (1.93)* |
| Democracy $_{t-1}$ | -0.127 | -0.137 | -0.140 | -0.144 | -0.189 | -0.127 |
| | (1.97)** | (2.05)** | (2.13)** | (2.13)** | (3.09)*** | (1.86)* |
| Trade Openness $_{t-1}$ | -0.003 | -0.004 | -0.004 | -0.003 | -0.004 | -0.002 |
| | (0.73) | (1.03) | (0.88) | (0.74) | (0.99) | (0.57) |
| External Conflict $_{t-1}$ | 2.526 | 2.333 | 2.789 | 3.178 | 3.250 | 2.590 |
| | (2.35)** | (2.16) )** | (2.75)*** | (3.17)*** | (3.16)*** | (2.42)** |
| Log Pseudolikelihood | -1734.53 | -1733.23 | -1736.75 | -1731.52 | -1721.00 | -1724.02 |
| N*T | 992 | 992 | 992 | 992 | 983 | 992 |

*Notes*: Dependent variable is the number of domestic terrorist incidents. Robust absolute z-values clustered on countries reported in parentheses. Constant not reported. All models include time and regional dummies (not reported). (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

**Appendix A. List of Countries**

| | | | |
|---|---|---|---|
| Albania | Egypt | Lebanon | Saudi Arabia† |
| Algeria | El Salvador | Liberia | Senegal |
| Angola | Estonia† | Libya | Sierra Leone |
| Argentina | Ethiopia | Lithuania† | Singapore† |
| Armenia | Finland† | Luxembourg† | Slovak Republic† |
| Australia† | France† | Madagascar | Slovenia† |
| Austria† | Gabon | Malawi | Somalia |
| Azerbaijan | Gambia | Malaysia | South Africa |
| Bahamas† | Germany† | Mali | Spain† |
| Bahrain† | Ghana | Malta† | Sri Lanka |
| Bangladesh | Greece† | Mexico | Sudan |
| Belarus | Guatemala | Moldova | Sweden† |
| Belgium† | Guinea | Mongolia | Switzerland† |
| Bolivia | Guinea-Bissau | Morocco | Syria |
| Botswana† | Guyana | Mozambique | Tanzania |
| Brazil | Haiti | Namibia | Thailand |
| Bulgaria† | Honduras | Netherlands† | Togo |
| Burkina Faso | Hungary† | New Zealand† | Trinidad & Tobago |
| Cameroon | Iceland† | Nicaragua | Tunisia |
| Canada† | India | Niger | Turkey |
| Chile† | Indonesia | Nigeria | Uganda |
| China | Iran | Norway† | Ukraine |
| Colombia | Iraq | Oman† | United Arab Emirates† |
| Congo (Republic) | Ireland† | Pakistan | United Kingdom† |
| Congo (Zaire) | Israel† | Panama | United States† |
| Costa Rica† | Italy† | Papua New Guinea | Uruguay† |
| Cote d'Ivoire | Jamaica | Paraguay | Venezuela |
| Croatia† | Japan† | Peru | Vietnam |
| Cuba | Jordan | Philippines | Yemen |
| Cyprus† | Kazakhstan | Poland† | Zambia |
| Czech Republic† | Kenya | Portugal† | Zimbabwe |
| Denmark† | Korea (South) † | Qatar† | |
| Dominican Republic | Kuwait† | Romania | |
| Ecuador | Latvia† | Russia | |

*Notes:* (†) indicates that the country is included in the subsample of developed countries. The others are included in the subsample of less developed countries. See text for a further discussion.

**Appendix B. Control and Cluster Analysis Variables**

*Population Size* – Source: Penn World Table (http://pwt.econ.upenn.edu). Definition: Size of population. Unit: In thousands, logged.

*Per Capita Military Spending* – Source: National Material Capabilities Dataset (http://www.correlatesofwar.org/). Definition: Per capita military spending. Unit: Ratio, logged plus unity.

*General Strikes* – Source: Cross-National Time-Series Data Archive (http://www.databanksinternational.com). Definition: Any strike of 1,000 or more industrial or service workers that involves more than one employer and that is aimed at national government policies or authority. Unit: Number.

*State Failure* – Source: State Failure Task Force (http://globalpolicy.gmu.edu/pitf/pitfpset.htm). Definition: Additive index of intensity of ethnic and revolutionary wars, genocides/politicides and adverse regime changes. Unit: Index.

*Religious Tensions* – Source: International Country Risk Guide (http://www.prsgroup.com/ICRG.aspx). Definition: Assessment of the degree of tension within a country attributable to religious divisions. Unit: Score, rescaled to values in [0,1], with higher values indicating stronger tensions.

*Democracy* – Source: PolityIV Project (http://www.systemicpeace.org/polity/polity4.htm). Definition: Combined polity score of institutionalized democracy score minus institutionalized autocracy score with converted instances of 'standardized authority scores' to conventional polity scores. Unit: Score, rescaled to values in [0,10], with higher values indicating higher levels of democracy.

*Trade Openness* – Source: Penn World. Definition: Exports plus imports to real GDP per capita, i.e., total trade as percentage of GDP. Unit: Ratio.

*External Conflict* – Source: International Country Risk Guide. Definition: An assessment of the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). Unit: Score, rescaled to values in [0,1], with higher values indicating higher risk of external conflict.

*Law and Order* – Source: International Country Risk Guide. Definition: An assessment of the strength and impartiality of the legal system and of the popular observance of the law. Unit: Score, rescaled to values in [0,1], with higher values meaning a stronger rule of law.

*Corruption* – Source: International Country Risk Guide. Definition: Measures actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and close ties between politics and business. Unit: Score, rescaled to values in [0,1], with higher values indicating more corruption.

*Government Size* – Source: Penn World Table. Definition: Share of government consumption to real GDP. Unit: Ratio.

*Physical Integrity Index* – Source: CIRI Human Rights Data Project (http://ciri.binghamton.edu/). Definition: Additive index summarizing government respect for disappearance, extrajudicial killing, political imprisonment, and torture. Unit: Ratio, with higher values indicating a better human rights situation.

*Population Density* – Source: Cross-National Time-Series Data Archive. Definition: Population per area. Unit: Ratio.

*Population Growth* – Source: Penn World Table. Definition: Growth rate of population. Unit: Growth rate.

*Urbanization* – Source: World Development Indicators (http://data.worldbank.org/data-catalog/world-development-indicators). Definition: Share of population living in urban areas. Unit: Ratio.

*Per Capita Income* – Source: Penn World Table. Definition: Real GDP per capita in constant prices (Laspeyres). Unit: Income in constant 2005 International US Dollars.

*Economic Growth* – Source: Penn World Table. Definition: Growth rate of real GDP per capita in constant prices. Unit: Growth rate.

*Economic Rights* – Source: International Country Risk Guide. Definition: An assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. Risk rating assigned as the sum of three subcomponents (contract viability/expropriation, profits repatriation, payment delays). Unit: Score, rescaled to values in [0,1], with higher values indicating better property rights protection.

*Inflation* – Source: World Development Indicators. Definition: Inflation measured by the annual growth rate of the GDP implicit deflator, showing the rate of price change in the economy as a whole. Unit: Growth rate.

*Female Labor Participation* – Source: World Development Indicators. Definition: Shows the extent to which women are active in the labor force. Unit: Percentage of the total labor force.

**Supplementary Tables (FOR REFEREES' USE ONLY)**

**Table S1: Education and Total Terrorist Activity**

| *Model* | *Education Variable(s)* | *Full Sample* | *Developed Countries* | *Less Developed Countries* |
|---|---|---|---|---|
| (1) | Primary | 0.058 | 0.024 | 0.067 |
| | Education $_{t-1}$ | (2.74)*** | (0.40) | (3.00)*** |
| (2) | Secondary | 0.018 | -0.049 | 0.014 |
| | Education $_{t-1}$ | (0.51) | (0.59) | (0.39) |
| (3) | Prim. + Sec. | 0.045 | -0.009 | 0.056 |
| | Education $_{t-1}$ | (2.60)*** | (0.16) | (3.08)*** |
| (4) | University | -0.095 | -0.144 | -0.088 |
| | Enrollment $_{t-1}$ | (1.66)* | (3.15)*** | (0.72) |
| (5) | Literacy | 0.014 | 0.037 | 0.011 |
| | Rate $_{t-1}$ | (2.35)** | (1.15) | (1.78)* |
| (6) | Primary | 0.058 | 0.045 | 0.067 |
| | Education $_{t-1}$ | (2.78)*** | (0.81) | (2.93)*** |
| | Secondary | 0.018 | -0.045 | 0.019 |
| | Education $_{t-1}$ | (0.52) | (0.53) | (0.53) |
| | University | -0.099 | -0.175 | -0.024 |
| | Enrollment $_{t-1}$ | (1.36) | (3.33)*** | (0.17) |

*Notes*: Dependent variable is the total (i.e., domestic and transnational) number of terrorist incidents. Table reports only coefficient for respective education proxy from a pooled NB regression of total terrorism on lagged values of the controls and on the respective education variable. Other model specifications (inclusion of regional and time dummies, control variables) as in Table 3. Robust absolute z-values clustered on countries reported in parentheses. (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

**Table S2: Results from Alternative Estimation Techniques**

| *Model* | *Education Variable(s)* | *Full Sample* | *Developed Countries* | *Less Developed Countries* |
|---|---|---|---|---|
| *Panel A: Zero-Inflated Negative Binomial Regression* | | | | |
| (1) | Primary | 0.064 | 0.010 | 0.072 |
| | Education $_{t-1}$ | (2.89)*** | (0.14) | (3.06)*** |
| (2) | Secondary | 0.029 | -0.129 | 0.039 |
| | Education $_{t-1}$ | (0.77) | (1.30) | (1.09) |
| (3) | Prim. + Sec. | 0.054 | -0.057 | 0.068 |
| | Education $_{t-1}$ | (3.12)*** | (0.95) | (3.66)*** |
| (4) | University | -0.092 | -0.168 | -0.111 |
| | Enrollment $_{t-1}$ | (1.58) | (3.10)*** | (0.81) |
| (5) | Literacy | 0.015 | -0.013 | 0.011 |
| | Rate $_{t-1}$ | (2.39)** | (0.22) | (1.73)* |
| (6) | Primary | 0.066 | 0.016 | 0.073 |
| | Education $_{t-1}$ | (3.05)*** | (0.26) | (3.02)*** |
| | Secondary | 0.031 | -0.147 | 0.047 |
| | Education $_{t-1}$ | (0.85) | (1.48) | (1.31) |
| | University | -0.099 | -0.197 | -0.034 |
| | Enrollment $_{t-1}$ | (1.34) | (3.49)*** | (0.21) |
| *Panel B: Generalized Estimation Equation Regression with AR(1) term* | | | | |
| (1) | Primary | 0.050 | 0.109 | 0.054 |
| | Education $_{t-1}$ | (2.65)*** | (1.22) | (2.69)*** |
| (2) | Secondary | 0.041 | -0.012 | 0.037 |
| | Education $_{t-1}$ | (1.07) | (0.18) | (0.90) |
| (3) | Prim. + Sec. | 0.044 | 0.023 | 0.052 |
| | Education $_{t-1}$ | (2.50)** | (0.26) | (2.99)*** |
| (4) | University | -0.097 | -0.081 | -0.137 |
| | Enrollment $_{t-1}$ | (2.39)** | (1.49) | (1.68)* |
| (5) | Literacy | 0.012 | 0.054 | 0.011 |
| | Rate $_{t-1}$ | (1.95)* | (2.12)** | (1.77)* |
| (6) | Primary | 0.052 | 0.138 | 0.053 |
| | Education $_{t-1}$ | (2.64)*** | (1.42) | (2.55)** |
| | Secondary | 0.040 | 0.016 | 0.039 |
| | Education $_{t-1}$ | (1.12) | (0.23) | (1.04) |
| | University | -0.098 | -0.152 | -0.092 |
| | Enrollment $_{t-1}$ | (2.17)** | (1.99)** | (1.05) |

*Notes*: Dependent variable is the number of domestic terrorist incidents. Table reports only coefficient for respective education proxy from a pooled zero-inflated NB regression (Panel A) and a panel generalized estimation equation model (Panel B). Inflation variable in Panel A is democracy. In Panel B it is controlled for an AR(1) term. Other model specifications (inclusion of regional and time dummies, control variables) as in Table 3. Robust absolute z-values clustered on countries reported in parentheses. (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

**Table S3: Long-Run Effect of Education on Domestic Terrorism**

| *Model* | *Education Variable(s)* | *Full Sample* | *Developed Countries* | *Less Developed Countries* |
|---|---|---|---|---|
| (1) | Primary | 0.052 | 0.006 | 0.056 |
| | Education $_{t-1}$ | (2.41)** | (0.08) | (2.49)** |
| (2) | Secondary | 0.019 | -0.028 | 0.001 |
| | Education $_{t-1}$ | (0.47) | (0.30) | (0.02) |
| (3) | Prim. + Sec. | 0.044 | -0.019 | 0.044 |
| | Education $_{t-1}$ | (2.46)** | (0.27) | (2.32)** |
| (4) | University | -0.076 | -0.168 | -0.039 |
| | Enrollment $_{t-1}$ | (1.06) | (1.98)** | (0.19) |
| (5) | Literacy | 0.014 | 0.063 | 0.010 |
| | Rate $_{t-1}$ | (1.97)** | (1.19) | (1.29) |
| (6) | Primary | 0.053 | 0.034 | 0.056 |
| | Education $_{t-1}$ | (2.50)** | (0.43) | (2.38)** |
| | Secondary | 0.021 | -0.024 | 0.006 |
| | Education $_{t-1}$ | (0.54) | (0.232) | (0.13) |
| | University | -0.084 | -0.188 | 0.020 |
| | Enrollment $_{t-1}$ | (0.94) | (2.12)** | (0.08) |

*Notes*: Table reports only coefficient for respective education proxy from a pooled NB regression of six-year averages of terrorism on contemporaneous values of the controls and on lagged values (i.e., average values of education in the previous six-year period) of the respective education variable. Other model specifications (dependent variable, inclusion of regional and time dummies, control variables) as in Table 3. Robust absolute z-values clustered on countries reported in parentheses. (**) indicates significance at 5%.

**Table S4: Changes in Education and Domestic Terrorism**

| *Model* | *Education Variable(s)* | *Full Sample* | *Developed Countries* | *Less Developed Countries* |
|---|---|---|---|---|
| (1) | Δ Primary | 0.303 | -0.600 | 0.464 |
| | Education | (1.59) | (1.83)* | (2.33)** |
| (2) | Δ Secondary | 0.089 | -0.373 | 0.341 |
| | Education | (0.47) | (1.67)* | (1.57) |
| (3) | Δ Prim. + Sec. | 0.113 | -0.113 | 0.328 |
| | Education | (1.51) | (1.54) | (2.41)** |
| (4) | Δ University | -1.081 | -2.239 | -1.058 |
| | Enrollment | (1.26) | (2.16)** | (1.62) |
| (5) | Δ Literacy | -0.224 | -0.665 | -0.149 |
| | Rate | (2.42)** | (1.81)* | (1.81)* |
| (6) | Δ Primary | 0.292 | -0.831 | 0.439 |
| | Education | (1.51) | (2.33)** | (2.22)** |
| | Δ Secondary | 0.083 | -0.402 | 0.263 |
| | Education | (0.47) | (1.81)* | (1.37) |
| | Δ University | -0.940 | -2.003 | -0.692 |
| | Enrollment | (1.02) | (1.89)* | (0.82) |

*Notes*: Table reports only coefficient for respective education proxy from a pooled NB regression of domestic terrorism on lagged values of the controls and on changes in the respective education variable. Change (Δ) is defined as the difference between two periods. Other model specifications (inclusion of regional and time dummies, control variables) as in Table 3. Robust absolute z-values clustered on countries reported in parentheses. (*), (**) and (***) indicate significance at the 10%, 5% and 1% levels, respectively.

## Recent discussion papers

| | | |
|---|---|---|
| 2012-01 | Sarah Brockhoff<br>Tim Krieger<br>Daniel Meierriecks | Great Expectations and Hard Times -<br>The (Nontrivial) Impact of Education on Domestic Terrorism |
| 2011-13 | Tim Krieger<br>Jens Ruhose | “Honey, I shrunk the kids’ benefits!”—<br>Revisiting intergenerational conflict in OECD countries. |
| 2011-12 | Tim Krieger | 9/11's Legacy: How Abstract Fear and Collective Memory Lead to Real Economic Costs |
| 2011-11 | Yuanhua Feng | Data-driven estimation of diurnal duration patterns |
| 2011-10 | B. Michael Gilroy<br>Birke Thuy Duong Nguyen | Ist Fairer Handel Wirklich Fair? |
| 2011-09 | Yuanhua Feng<br>Zhichao Guo<br>Christian Peitz<br>Xiangyong Tan | A tree-form constant market share model for growth causes in international trade based on multi-level classification |
| 2011-08 | Tim Krieger<br>Daniel Meierriecks | Ökonomische Aspekte des neuen globalen Terrorismus |
| 2011-07 | Tim Krieger<br>Daniel Meierrieks | Terrorist Financing and Money Laundering |
| 2011-06 | Thomas Gries<br>Stefan Jungblut<br>Wim Naudé | New Firm Creation and Failure: A Matching Approach |
| 2011-05 | Daniel Kaimann | "To infinity and beyond!" - A genre-specific film analysis of movie success mechanisms |
| 2011-04 | Yuanhua Feng<br>Zhichao Guo<br>Christian Peitz<br>Xiangyong Tan | A tree-form constant market share analysis for modelling growth causes in international trade |
| 2011-03 | Zhichao Guo<br>Yuanhua Feng<br>Xiangyong Tan | Impact of China’s accession to WTO and the financial crisis on China’s exports to Germany |
| 2011-02 | Alexander Haupt<br>Tim Krieger<br>Thomas Lange | Competition for the International Pool of Talent: Education Policy and Student Mobility |
| 2011-01 | B. Michael Gilroy<br>Daniel Kruse | Die Prinzipal-Agent-Theorie als Erklärungsinstrumentarium von Korruption: Angewendet auf den Praxisfall „Siemens“ |
| 2010-09 | Yuanhua Feng | An iterative plug-in algorithm for decomposing seasonal time series using the Berlin Method |
| 2010-08 | Zhichao Guo<br>Yuanhua Feng<br>Xiangyong Tan | Short- and long-term impact of remarkable economic events on the growth causes of China-Germany trade in agri-food products<br>*[published in: Economic Modelling 28 (2011), 2359-2368]* |
| 2010-07 | B. Michael Gilroy<br>Elmar Lukas | Welchen Einfluss hat die Anwesenheit von ausländischen und multinationalen Unternehmungen |

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

| | | |
|---|---|---|
| 2008-08 | Thomas Gries,<br>Manfred Kraft,<br>Daniel Meierrieks | Linkages between Financial Deepening, Trade Openess and Economic Development: Causality Evidence from Sub-Saharan Africa<br>*[published in: World Development 37 (2009), 1849-1860.]* |
| 2008-07 | Tim Krieger,<br>Sven Stöwhase | Diskretionäre rentenpolitische Maßnahmen und die Entwicklung des Rentenwerts in Deutschland von 2003-2008<br>*[published in: Zeitschrift für Wirtschaftspolitik 58 (2009), 1, 36-54.]* |
| 2008-06 | Tim Krieger,<br>Stefan Traub | Back to Bismarck? Shifting Preferences for Intragenerational Redistribution in OECD Pension Systems |
| 2008-05 | Tim Krieger,<br>Daniel Meierrieks | What causes terrorism?<br>*[published in: Public Choice 147 (2010), 1-2, 3-27.]* |
| 2008-04 | Thomas Lange | Local public funding of higher education when students and skilled workers are mobile<br>*[published in: Finanzarchiv 65 (2009), 2, 178-199.]* |
| 2008-03 | Natasha Bilkic,<br>Thomas Gries,<br>Margarethe Pilichowski | Stay at school or start working? - Optimal timing of leaving school under uncertainty and irreversibility |
| 2008-02 | Thomas Gries,<br>Stefan Jungblut,<br>Tim Krieger,<br>Henning Meier | Statutory retirement age and lifelong learning |
| 2008-01 | Tim Krieger,<br>Thomas Lange | Education policy and tax competition with imperfect student and labor mobility<br>*[published in: International Tax and Public Finance 17 (2008), 6, 587-606.]* |
| 2007-05 | Wolfgang Eggert,<br>Tim Krieger,<br>Volker Meier | Education, unemployment and migration<br>*[published in: Journal of Public Economics 94 (2010), 5-6, 354-362.]* |
| 2007-04 | Tim Krieger,<br>Steffen Minter | Immigration amnesties in the southern EU member states - a challenge for the entire EU?<br>*[published in: Romanian Journal of European Studies 5-6/2007, 15-32.]* |
| 2007-03 | Axel Dreher,<br>Tim Krieger | Diesel price convergence and mineral oil taxation in Europe<br>*[published in: Applied Economics 42 (2010), 15, 1955-1961]* |
| 2007-02 | Michael Gorski,<br>Tim Krieger,<br>Thomas Lange | Pensions, education and life expectancy |
| 2007-01 | Wolfgang Eggert,<br>Max von Ehrlich,<br>Robert Fenge,<br>Günther König | Konvergenz- und Wachstumseffekte der europäischen Regionalpolitik in Deutschland<br>*[published in: Perspektiven der Wirtschaftspolitik 8 (2007), 130-146.]* |
| 2006-02 | Tim Krieger | Public pensions and return migration<br>*[published in: Public Choice 134 (2008), 3-4, 163-178.]* |
| 2006-01 | Jeremy S.S. Edwards,<br>Wolfgang Eggert, | The measurement of firm ownership and its effect on managerial pay |

Alfons J. Weichenrieder

*[published under the title "Corporate Governance and Pay for Performance: Evidence from Germany" in: Economics of Governance 10 (2009), 1, 1-26.]*