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What Spurs Terrorism in Developing Nations?

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Abstract

Understanding the causes of terrorism is important in predicting it and in developing an effective counterterrorism strategy. Data on the incidence of terrorist attacks and casualties suggest that domestic terrorism poses a substantially larger threat than transnational terrorism in developing countries. In spite of this fact, research has focused mostly on the latter. In analyzing both types, we find that political rights and civil liberties affect domestic terrorism in a non-monotonic way. Countries with either authoritarian regimes or with mature democratic systems experience less terrorism. This result has important policy implications: It suggests that one needs to be patient in the path to democracy, because the transition is likely to be associated with more violence. Interestingly, more religious diversity and “rule of law” seem to discourage both domestic and transnational terrorism, while ethnic fractionalization raises domestic terrorism. However, poverty and illiteracy do not appear to be directly linked with either.

JEL classifications: D74; H56

Keywords: Domestic/transnational terrorism; Political rights and civil liberties; Rule of law

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Abstract

Understanding the causes of terrorism is important in predicting it and in developing an effective counterterrorism strategy. Data on the incidence of terrorist attacks and casualties suggest that domestic terrorism poses a substantially larger threat than transnational terrorism in developing countries. In spite of this fact, research has focused mostly on the latter. In analyzing both types, we find that political rights and civil liberties affect domestic terrorism in a non-monotonic way. Countries with either authoritarian regimes or with mature democratic systems experience less terrorism. This result has important policy implications: It suggests that one needs to be patient in the path to democracy, because the transition is likely to be associated with more violence. Interestingly, more religious diversity and “rule of law” seem to discourage both domestic and transnational terrorism, while ethnic fractionalization raises domestic terrorism. However, poverty and illiteracy do not appear to be directly linked with either.

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1. Introduction

Terrorism harms economic and social development: it results in the destruction of human and physical capital, and increased security measures divert scarce resources from production to counterterrorism efforts. It induces a high level of uncertainty and creates a climate of fear, directly affecting well-being in a society (Frey and Luechinger, 2007). The direct economic effects are also being documented. For example, Abadie and Gardeazabal (2008) conclude that a higher risk of terrorism depresses net foreign investment to a country.

Despite the fact that terrorism poses a serious threat to human and physical development, studies analyzing its root causes are sparse. Is terrorism a form of expressing political discontent, or does it emerge from poverty or ignorance? Are chauvinistic ideologies associated with religion, ethnicities, and regions the main motivations for terrorism? Do societies that respect the political and civil freedom of their citizens experience less terrorism than those that suppress them? Unfortunately, not much research has sought to answer these legitimate questions, and a lack of such research undermines nations' capacity to formulate effective long-term counterterrorism strategies.

One drawback of the existing empirical literature is that it focuses mainly on factors that trigger transnational terrorism, which accounts for only a small fraction of total terrorism. Another shortcoming is the use of pooled data from developed and developing countries. This is problematic because economic, political, and social conditions are quite different at various levels of development, suggesting that structural characteristics driving terrorism cannot be readily compared between these groups of nations.¹

¹ See Temple (1999) for a related discussion.

The data in existing empirical studies come primarily from three sources: (i) U.S. State Department Pattern of Global Terrorism (Krueger and Maleckova, 2003; Krueger and Laitin, 2007); (ii) International Terrorism: Attribute of Terrorist Events – *ITERATE* (Mickolous, Sandler and Murdock, 2003; Enders and Sandler, 2004); and, (iii) Global Terrorism Index of World Market Research Center (Abadie, 2006; Abadie and Gardeazabal, 2008). The limitation of the first two is that they contain information about incidents of transnational terrorism only, while the third is an index of overall threat perception for the year 2003-04, not the actual number of terrorist incidents for the two types of terrorism. The actual number, however, is more important for our analysis, where the focus is on factors that cause terrorism to reveal itself. For example, regimes that allow greater freedoms will perhaps see some latent terrorism to manifest itself. This is important for us to pick up in the data, because a central objective of this paper is to see how changes in institutions describing nations may affect the level of terrorism itself.

Abadie (2006) uses a terrorism index for the year 2003-04, and finds that political rights has a non-monotonic effect on terrorism, suggesting that countries in some intermediate range of political rights are more prone to terrorism. While our central findings complement his work, there are several important differences. First, as we mention above, we use *terrorism incidents* data, rather than the index, which is perhaps more appropriate for risk assessment purposes (very relevant to foreign direct investment (FDI) decisions, the focus of their 2008 contribution). Second, we analyze the causes of domestic and transnational terrorism separately, with an exclusive focus on developing countries. Third, we find civil liberties, in addition to political rights, to be an important predictor of terrorism. Indeed, when we separate the two out, we find both to be significant, with the coefficient on civil liberties somewhat larger in magnitude.

These new considerations and findings complement Abadie (2006) and also support some of his important findings linking terrorism to political institutions.

We use the *Rand-MIPT* knowledge-based terrorism dataset, which provides information about domestic and transnational terrorism.² Data for the former, however, are available only from 1998 onwards. The *Rand-MIPT* dataset does not suffer from selection bias because it collects information about terrorist incidents regardless of their intensity.³ We look at 125 developing countries over the period 1997-2006. Among other findings, a striking result is that political rights and civil liberties impact domestic terrorism in a non-monotonic way. Countries with authoritarian regimes or those having relatively mature democratic systems experience less terrorism than countries in between, implying that violence may increase during a transition from an authoritarian regime to a mature democracy. Some other interesting results are that rule of law and religious diversity both reduce domestic and transnational terrorism, while ethnic fractionalization increases domestic terrorism, but has no significant effect on transnational terrorism. On the other hand, poverty and lack of education do not appear to be directly linked with either. These findings are robust even in the post 9/11 period.

The next section discusses some descriptive statistics regarding terrorism and its relation to poverty and political repression. Section 3 describes the empirical methodology, model, and data. Section 4 presents the results, and section 5 concludes.

² *Rand-MIPT Terrorism Database* defines transnational/international terrorism as “incidents in which the perpetrators go abroad to strike their targets, select domestic targets associated with a foreign state, or create international incidents by attacking airline passengers or equipments.” On the other hand, “domestic terrorism is defined as incidents perpetrated by local nationals against a purely domestic target.”

³ For example, Enders and Sandler (2004) note that the *ITERATE* dataset suffers from some drawbacks of selection bias because it picks up only “newsworthy” incidents of transnational terrorism.

2. Terrorism, Poverty, and Political Repression: Some Descriptive Statistics

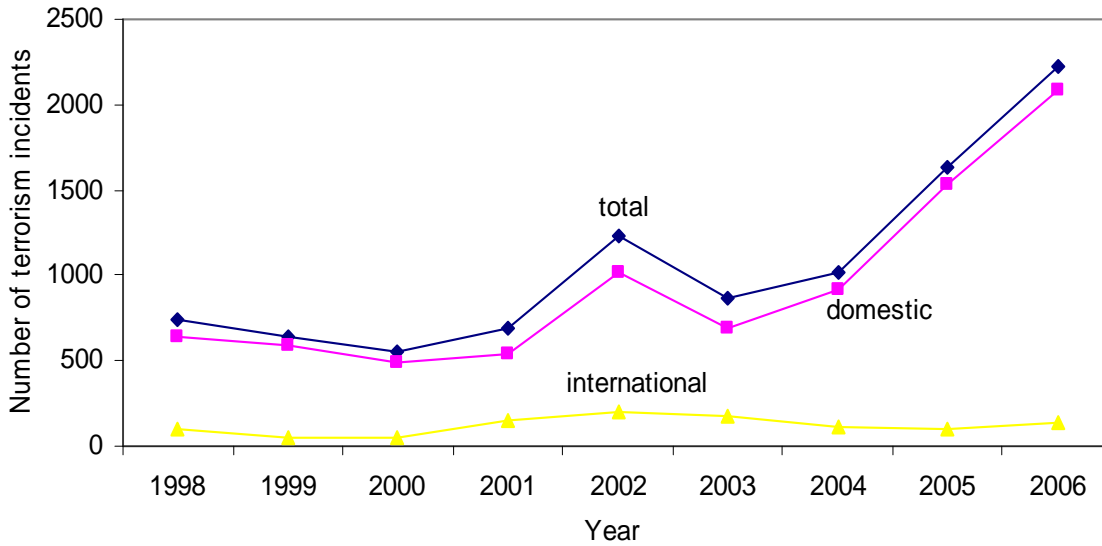
Figure 1 shows terrorism incidents for the sample of 125 developing countries in our study over the period 1998-2006.⁴ There is a clear upward trend in both overall and domestic terrorism after 2003. Domestic terrorism decreased briefly between 2002 and 2003, but sharply increased after that. On the other hand, transnational terrorism decreased after year 2002 and has remained steady at a lower level since that time. Clearly, the upward trend in overall terrorism is driven by increasing incidents of domestic terrorism. Table 1 indicates the annual number of terrorism incidents and associated deaths and injuries. Transnational terrorism makes up about 11 percent of the total incidents of terrorism, while the remaining 89 percent can be attributed to domestic terrorism. There were 8,509 incidents of the latter, resulting in 11,059 deaths and 26,502 injuries. In comparison, there were 1,083 incidents of transnational terrorism, with 2,299 deaths and 11,283 injuries.

A number of observations are in order. First, domestic terrorism poses a much bigger challenge for developing countries than transnational terrorism. Second, an increase in overall terrorism (particularly domestic terrorism) after 2002 in developing countries can be a consequence of higher enforcement against terrorism in developed countries, resulting in “deflection” of terrorism to developing nations (for example, see Enders and Sandler, 2006).⁵ With the developed nations making potential targets more difficult to impact, it is cost effective for terrorist organizations to choose “soft targets” in developing countries. Often, these same developing nations are also the source nations for terrorism; that is terrorist organizations may have their “command and control” operations largely based in these nations.

⁴ We did not include in our sample three outliers: Iraq, Palestine, and Western Gaza.

⁵ For an analytical treatment of this issue (and its implications for counterterrorism policy), see Sandler and Siqueira (2006), and Bandyopadhyay and Sandler (2009), among others.

Figure 1: Terrorism trends in developing countries 1998-2006



Data source: *Rand-MIPT Knowledge Base Terrorism Incidents (2007)*

Table1: Terrorism and casualties in developing countries

Year	<u>Total Terrorism</u>			<u>Domestic Terrorism</u>			<u>International Terrorism</u>		
	Incidents	Injuries	Fatalities	Incidents	Injuries	Fatalities	Incidents	Injuries	Fatalities
1998	745	7306	1721	641	1994	1361	104	5312	360
1999	640	2235	753	587	2122	695	53	113	58
2000	547	1707	506	491	1662	479	56	45	27
2001	692	3074	1263	545	2112	1112	147	962	151
2002	1229	5977	1821	1022	3128	920	207	2849	901
2003	871	4105	1357	695	2768	1061	176	1337	296
2004	1019	5171	2128	911	4233	1937	108	938	191
2005	1630	4499	1562	1533	4047	1354	97	452	208
2006	2219	4711	2247	2084	4436	2140	135	275	107

Data source: *Rand-MIPT Knowledge Base Terrorism Incidents (2007)*. Being outliers, Iraq, Palestine and Western Gaza are excluded from the sample.

2.1 Poverty and Terrorism

The notion that poverty generates terrorism has received widespread attention (Kahn and Weiner, 2002; Weiner, 2002). At the United Nations' Monterrey conference in March 2002, President Bush remarked that, "we fight against poverty because hope is an answer to terror," which draws a similar connection. He revisited this issue in a somewhat different light in a New York Times editorial:

"Poverty does not transform poor people into terrorists and murderers. Yet poverty, corruption and repression are a toxic combination in many societies, leading to weak governments that are unable to enforce order or patrol their borders and are vulnerable to terrorist networks and drug cartels." (Bush, 2002)

Economists weighing in on this find that neither poverty nor illiteracy are good predictors of terrorism (Krueger and Maleckova, 2003; Abadie, 2006; Krueger and Laitin, 2007).⁶ Indeed, perpetrators of the 9/11 attack were mostly well-educated middle class Saudis and the members of the ETA in Basque region of Spain typically come from middle class families, as well.⁷ The same is true for the Hamas in Palestine, and many other international terrorist organizations.

To get a crude idea of the poverty-terror relation, we run a regression of per capita income and its squared term on the incidents of domestic terrorism.⁸ Although they are not statistically significant, the estimated coefficients suggest a non-monotonic relationship between domestic terrorism and per capita income (Figure 2). The coefficients for transnational terrorism are not statistically significant either. Figure 3 maps that relationship.

⁶ In related work, economists find that poor economic conditions and low economic growth increases the probability of political coups (Alesina et al., 1996; Miguel, Satyanath and Sergent, 2004). Collier and Hoeffler (2004) state that societies with one ethnic group being a majority have a higher risk of conflict as those groups can use power to exploit other minorities.

⁷ See Abadie and Gardeazabal (2003) for a detailed discussion on terrorist conflicts in the Basque region.

⁸ This is for initial exploratory purpose only. Section 3 presents a fully specified model.

Figure 2: Domestic terrorism incidents and per capita income

$$\text{Domestic terrorism} = -6.566 + 2.399 \ln(\text{per capita income}) - 0.158 [\ln(\text{per capita income})]^2$$

absolute t-values (0.89) (1.22) (1.21)

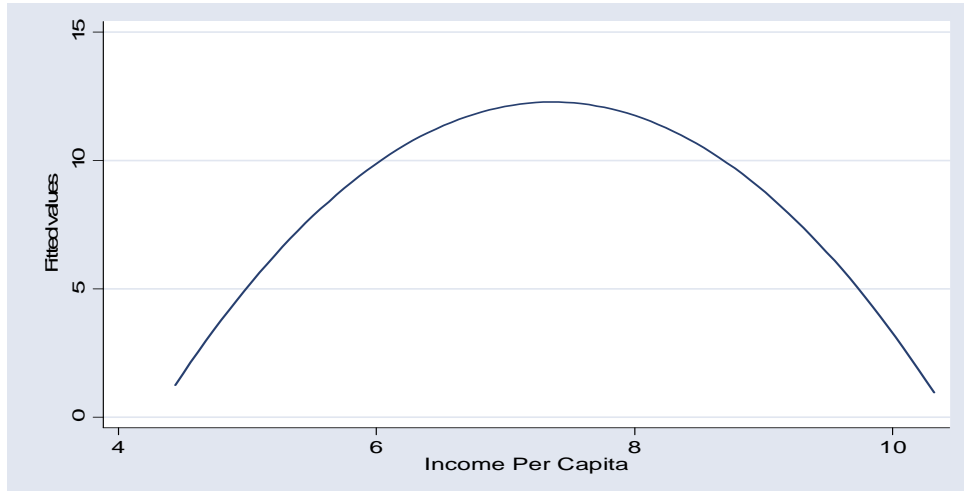
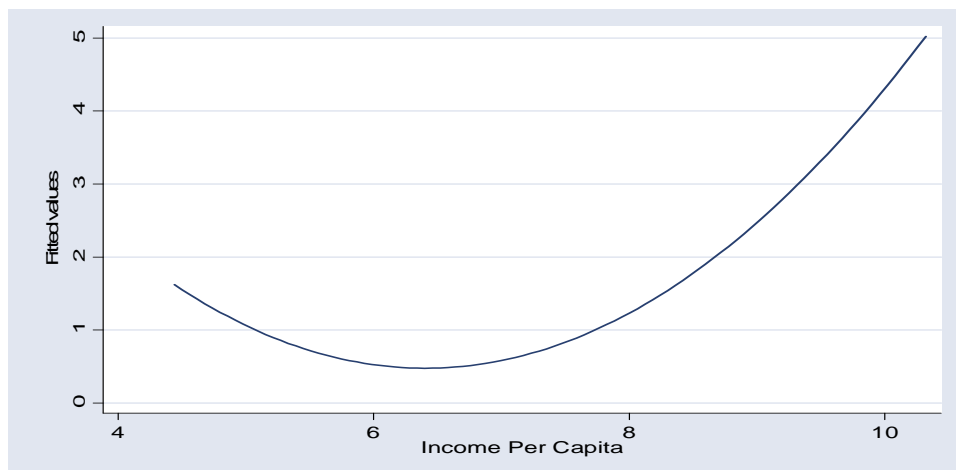


Figure 3: Transnational terrorism incidents and per capita income

$$\text{International terrorism} = 0.612 - 0.513 \ln(\text{per capita income}) + 0.058 [\ln(\text{per capita income})]^2$$

absolute t-values (0.09) (0.29) (0.51)



2.2 Democracy, Rights and Terrorism

It is often conjectured that democracy helps prevent terrorism because political disputes can be solved through the voting system and through political activism. It results in peaceful reconciliation of grievances and can help address the underlying conditions that might otherwise instigate individuals to resort to violent political action. On the other hand, Blomberg and Rosendorff (2006) state that recruitment and organization of terrorists can become easier in environments with civil liberties and freedom of religion, association, and movement -- all characteristics of democracy. Furthermore, terrorists' aim of creating panic and fear through publicity of their actions is also facilitated by freedom of speech, a free press, and other media that are not heavily censored.⁹ Along similar lines, Abadie (2006) uses a terrorism risk index for the year 2003-04, and finds that political rights have a non-monotonic effect on terrorism. He suggests that countries in some intermediate range of political freedom are more prone to terrorism. Figure 4 seems to support these concerns and shows a significant and non-monotonic effect of political rights and civil liberties. The corresponding coefficients for transnational terrorism in Figure 5 are, however, not statistically significant. Section 3 below presents the full model, controlling for other explanatory variables to find their independent effects on terrorism.

⁹ Democracy is also often associated with terrorism because terrorist organizations are explicitly targeting it (see Kurrild-Klitgaard and Justesen, 2006). Former prime minister of Pakistan Benazir Bhutto was a target of terrorist attacks in October 2007 and was assassinated in December 2007 before the general elections – which is indicative of the anti-democratic nature of these terrorist organizations.

Figure 4: Domestic terrorism incidents and political & civil rights

$$\text{Domestic terrorism} = -8.277 + 4.571 \text{ political and civil rights} - 1.509 (\text{political and civil rights})^2$$

absolute t-values (3.11)^{***} (3.92)^{***} (3.90)^{***}

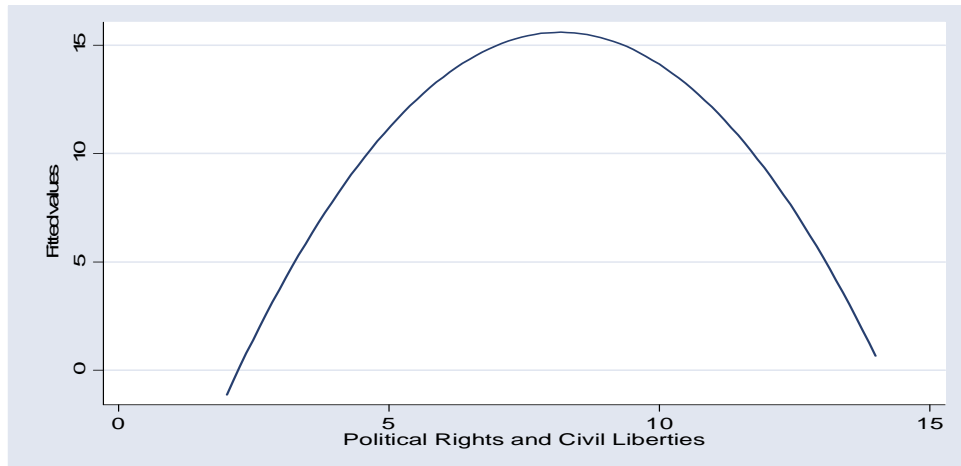
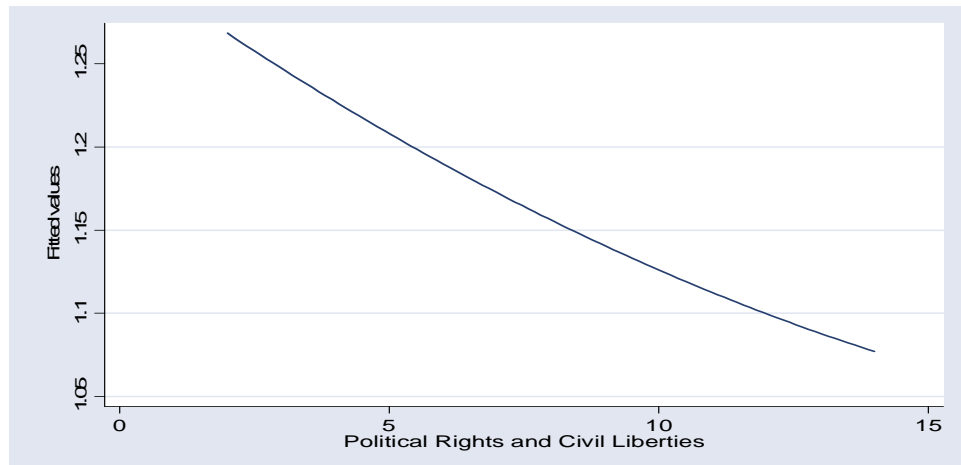


Figure 5: Transnational terrorism incidents and political & civil rights

$$\text{International terrorism} = -0.512 + 0.326 \text{ political and civil rights} - 0.112 (\text{political and civil rights})^2$$

absolute t-values (0.23) (0.33) (0.35)



3. The Empirical Model, Methodology, and Data

Given that the dependent variable is a count variable, ordinary least square analysis (OLS) would be inappropriate for deriving estimation results. Terrorism data exhibits

overdispersion, therefore a Poisson count model, which assumes that the conditional mean and standard deviation are roughly equal, is also not feasible. A negative binomial model appears to be most appropriate in this context. A few considerations suggest that the negative binomial regression works better than the alternative specification of running a zero-inflated negative binomial model. First, although several observations for our dependent variables assume zero values, their proportion is not high enough to make the zero-inflated model an obvious choice. Second, we also employed the Vuong test of negative versus zero-inflated binomial regression model. The test either prefers the former model, or remains ambiguous over the choice. Finally, several important papers in this literature have relied on the negative binomial model (for example, see Krueger and Maleckova, 2003; Burgoon, 2006; Krueger and Laitin, 2007).

Our econometric models (regarding domestic and transnational terrorism incidents in 125 developing countries over the period 1997-2006) for cross-sectional analysis take the following form¹⁰:

$$\begin{aligned}
(\text{Domestic terrorisms})_i = & \beta_0 + \beta_1 \ln(\text{Per capita income})_i + \beta_2 [\ln(\text{Per capita income})_i]^2 \\
& + \beta_3 (\text{Political \& civil rights})_i + \beta_4 [(\text{Political \& civil rights})_i]^2 + \beta_5 \ln(\text{Literacy})_i \\
& + \beta_6 \ln(\text{Mortality})_i + \beta_7 \ln(\text{Population})_i + \beta_8 (\text{Rule of law})_i + \mathbf{X}'_i \boldsymbol{\gamma} + \mu_i
\end{aligned} \tag{1}$$

$$\begin{aligned}
(\text{Transnational terrorisms})_i = & \alpha_0 + \alpha_1 \ln(\text{Per capita income})_i + \alpha_2 [\ln(\text{Per capita income})_i]^2 \\
& + \alpha_3 (\text{Political \& civil rights})_i + \alpha_4 [(\text{Political \& civil rights})_i]^2 + \alpha_5 \ln(\text{Literacy})_i \\
& + \alpha_6 \ln(\text{Mortality})_i + \alpha_7 \ln(\text{Population})_i + \alpha_8 (\text{Rule of law})_i + \mathbf{X}'_i \boldsymbol{\gamma} + \nu_i
\end{aligned} \tag{2}$$

We introduce squared terms of both per capita income and political and civil rights variables to examine their nonlinear relation with terrorism. Data for GDP per capita (constant 2000\$) comes from World Development Indicators (WDI, 2007), while we use indices for

¹⁰ The data for cross-sectional analysis is averaged over the sample period.

political rights and civil liberties produced by Freedom House (2007). Political rights refer to the freedom of people to participate in the political process by exercising rights to vote, organize political parties to compete for public office, and form an effective opposition to elect representatives who devise public policies and are accountable for their actions. Civil liberties entail freedom of expression and religious belief, the prevalence of the rule of law, right to form unions, freedom to marry, and freedom to travel. It also signifies the autonomy of people without interference from the state. These two indicators provided on an annual basis are derived from cross-country surveys. Each of these indices is measured on a scale of 1 (best) to 7 (worst) points. Following Trumbull and Wall (1994) and Younas (2008), we have constructed a combined freedom index by adding indices of political rights and civil liberties and then inverting that index, such that it ranges from 2 (worst) to 14 (best).

Although education increases the opportunity cost of participating in terrorism, the existing literature offers conflicting views on how it may affect terrorism. Krueger and Maleckova (2003) find some evidence that terrorism is more critically dependent on the relative pay of skilled and unskilled individuals in terrorist organizations in comparison with workers in standard jobs. Furthermore, terrorist organizations may prefer to select individuals with higher education and provide them with better benefits and a leadership role. In an *ex ante* sense, the argument can run either way, and only careful econometric analysis can throw some light on it.

Per capita income may provide an inadequate reflection of economic well-being because of high income inequalities in developing countries. Therefore, we also include the infant mortality rate in our model to capture the extent of deprivation and acute poverty in a country.¹¹ Such environments may create helplessness and frustration, spurring terrorism; or they may

¹¹ The World Bank Indicators (WDI-2007) define infant mortality rates as the number of infants dying before reaching one year of age per 1,000 live births in a given year.

reduce it because a minimal level of physical strength is necessary to engage in it. We also include population, because past studies consistently show that larger countries experience more terrorism. This is perhaps due to more heterogeneity in larger nations, which may subject them to more internal tensions (Krueger and Maleckova, 2003; Burgoon, 2004; Krueger and Laitin, 2007).¹²

Our measure of the rule of law is from the World Bank's Governance Indicators compiled by Kaufmann, Kraay, and Mastruzzi (2008) with scores between -2.5 and 2.5 , with a higher value indicating a stronger legal system. The rule of law measure assesses the strength and impartiality of the legal system, and also an assessment of whether citizens are law abiding. The vector X includes other factors that can influence terrorism, such as fractionalization, geographic variables, and proportion of religious groups by population. The reason for including these factors is to check the robustness of our findings for main variables of interest. In addition, all specifications include an exhaustive set of regional dummy variables, and all models are estimated using heteroskedastic-robust standard errors.¹³

Before proceeding to estimation, we address the possibility of potential simultaneous causation between terrorism and per capita income. One may argue that per capita income may be endogenous in a country, as it may not only affect an individual's decision for participation in terrorism, but may also be affected by terrorism itself.¹⁴ Some other variables can also pose a potential problem of simultaneous causation. Wooldridge (2003) states that if we assume that

¹² Data for the adult literacy rate, infant mortality rate, and population are taken from WDI (2007) CD Rom. There are some missing data values for some countries for the adult literacy rate and infant mortality rate. Since their values change slowly over time, values for missing observations are interpolated by calculating averages from available values.

¹³ All specifications include an exhaustive set of regional dummies for Eastern Europe, Latin America and the Caribbean, Middle East and North Africa, Central Asia, South Asia, East Asia and the Pacific and Sub-Saharan Africa.

¹⁴ However, Becker and Murphy (2001) argue that terrorism should not have a large effect on economic activity as a terrorist attack destroys only a small fraction of capital stock.

the error term μ_{it} is uncorrelated (a standard assumption) with all past endogenous and exogenous variables, then lagged endogenous variables in simultaneous models are treated as predetermined variables and they are uncorrelated with μ_{it} . Following this technique, we use one-year-lagged values for all independent variables.¹⁵ Intuitively, this makes sense because economic, social, and political conditions may take some time to influence an individual's decision to resort to violence. Moreover, this technique also overcomes any likely problem of contemporaneous correlation. Consequently, data on incidents of terrorism are averaged over the period 1998 to 2006, while the data for all independent variables are averaged from 1997 to 2005. Accordingly, our econometric specifications in equations 1 and 2 take the following forms, respectively:

$$\begin{aligned}
(\text{Domestic terrorisms})_i = & \beta_0 + \beta_1 \ln(\text{Per capita income})_{i,-1} + \beta_2 [\ln(\text{Per capita income})_{i,-1}]^2 \\
& + \beta_3 (\text{Political \& civil rights})_{i,-1} + \beta_4 [(\text{Political \& civil rights})_{i,-1}]^2 + \beta_5 \ln(\text{Literacy})_{i,-1} \\
& + \beta_6 \ln(\text{Mortality})_{i,-1} + \beta_7 \ln(\text{Population})_{i,-1} + \beta_8 (\text{Rule of law})_{i,-1} + \mathbf{X}'_{i,-1} \boldsymbol{\gamma} + \mu_i
\end{aligned} \tag{3}$$

$$\begin{aligned}
(\text{Transnational terrorisms})_i = & \alpha_0 + \alpha_1 \ln(\text{Per capita income})_{i,-1} + \alpha_2 [\ln(\text{Per capita income})_{i,-1}]^2 \\
& + \alpha_3 (\text{Political \& civil rights})_{i,-1} + \alpha_4 [(\text{Political \& civil rights})_{i,-1}]^2 + \alpha_5 \ln(\text{Literacy})_{i,-1} \\
& + \alpha_6 \ln(\text{Mortality})_{i,-1} + \alpha_7 \ln(\text{Population})_{i,-1} + \alpha_8 (\text{Rule of law})_{i,-1} + \mathbf{X}'_{i,-1} \boldsymbol{\gamma} + \nu_i
\end{aligned} \tag{4}$$

As a final robustness check, we use panel data regressions for deriving estimation results. In particular, we want to verify whether the results of our main variable of interest, i.e., political rights and civil liberties, are sensitive to a change in econometric technique. An obvious advantage of using panel data is the availability of a larger degree of freedoms in our

¹⁵ An alternative approach to deal with any potential endogeneity is to use a simultaneous estimation technique such as two-stage least squares (2SLS). However, the problems with 2SLS are the non-availability of valid instruments and their data for developing countries. Moreover, employing weak instruments can contaminate estimation results.

specifications. This allows us to control for all unobserved country-specific time-invariant predictors by using fixed effects. Thus, our panel econometric models for yearly data take the following form:

$$\begin{aligned}
(\text{Domestic terrorisms})_{it} = & \beta_0 + \beta_1 \ln(\text{Per capita income})_{i,t-1} + \beta_2 [\ln(\text{Per capita income})_{i,t-1}]^2 \\
& + \beta_3 (\text{Political \& civil rights})_{i,t-1} + \beta_4 [(\text{Political \& civil rights})_{i,t-1}]^2 + \beta_5 \ln(\text{Literacy})_{i,t-1} \\
& + \beta_6 \ln(\text{Mortality})_{i,t-1} + \beta_7 \ln(\text{Population})_{i,t-1} + \beta_8 (\text{Rule of law})_{i,t-1} + \beta_i + \lambda_t + \mu_{it}
\end{aligned} \tag{5}$$

$$\begin{aligned}
(\text{Transnational terrorisms})_{it} = & \alpha_0 + \alpha_1 \ln(\text{Per capita income})_{i,t-1} + \alpha_2 [\ln(\text{Per capita income})_{i,t-1}]^2 \\
& + \alpha_3 (\text{Political \& civil rights})_{i,t-1} + \alpha_4 [(\text{Political \& civil rights})_{i,t-1}]^2 + \alpha_5 \ln(\text{Literacy})_{i,t-1} \\
& + \alpha_6 \ln(\text{Mortality})_{i,t-1} + \alpha_7 \ln(\text{Population})_{i,t-1} + \alpha_8 (\text{Rule of law})_{i,t-1} + \alpha_i + \eta_t + \nu_{it}
\end{aligned} \tag{6}$$

The intercept, β_0 (α_0), includes a component that is common to all countries, while β_i (α_i) are countries' fixed effects, specific to each country, but fixed over time. Time dummy variable λ_t (η_t) is common to all countries within a given year but varies over time.¹⁶

4. Empirical Results

4.1 Domestic Terrorism

Table 2 presents the results where the dependent variable is the number of domestic incidents of terrorism in a country. First, we include only variables of log per capita income, political & civil rights, log adult literacy rate, log population and rule of law (column 2). Only political & civil rights, population, and rule of law have statistically significant effects. The positive sign of the rights variable suggests that an increase in democratic values leads to more terrorism. This result is very relevant to the discussion of how political institutions may affect

¹⁶ Inclusion of time-specific dummy variables allows each time period to have its own intercept for aggregate time effects affecting all countries. Also, one time-specific and one country-specific dummy variable must be dropped in order to avoid perfect collinearity.

terrorism. A positive sign for the population coefficient suggests that larger nations are more vulnerable to terrorism. These findings are consistent with the contributions of Krueger and Maleckova (2003) and Krueger and Laitin (2007), among others.

A relatively large and negative coefficient of the rule of law variable suggests that countries that have strong judicial and legal systems experience substantially fewer incidents of domestic terrorism. Rule of law creates order and predictability regarding how a country functions, which can encourage individuals to express their frustrations in a non-violent way. It also keeps a check on the abusive use of government power against citizens. In such a context, grievances are more likely to be addressed through the legal/judicial system. Poverty and lack of education do not appear to be directly linked to domestic terrorism. This supports the findings of Krueger and Maleckova (2003) and Kurrild-Klitgaard and Justesen (2006), among others.

When we include squared terms of per capita income and political & civil rights variables to examine their nonlinear relation to domestic terrorism (column 2), we get the following results. The coefficients on both per capita income and its squared terms are statistically insignificant, again suggesting that the level of poverty is not a motivating factor in spurring terrorism. The same appears to be true for lack of education and infant mortality, both of which reflect human deprivation. On the other hand, the coefficients of political & civil rights and its squared term are statistically significant at the 1 percent level. Their signs suggest that political & civil rights have a non-monotonic effect on terrorism. The two extremes, authoritarian regimes on the one hand and mature democracies on the other, experience less terrorism. Countries in the intermediate range suffer from more terrorism. In the context of development policy, the implication is that a country transitioning from an authoritarian regime to a democratic one can expect a temporary bump in terrorism. This transition cost has to be

recognized by developing nation policy makers, as well as by developed donor nations (who provide foreign aid). To make such a transition feasible (where short-run costs may deter change), greater humanitarian and development assistance from developed nations is perhaps warranted.

To investigate whether our results have a causal relation to terrorism, we control for the effects of other potential predictors of terrorism. Following Abadie (2006), we include a dummy for landlock and the log of total country area to see whether geographic factors affect terrorism.¹⁷ The results suggest that landlocked countries experience more terrorism, while those having larger area face less terrorism (column 3). The results for all other variables remain robust to this new specification. Next we include indices of ethnic, linguistic, and religious fractionalization (column 4). These range between zero and one, with a higher index indicating a higher probability that two randomly chosen individuals from the same country belong to different ethnic and religious groups.¹⁸ This suggests that ethnically diverse societies experience more domestic terrorism, while religiously fractionalized societies tend to face less. On the other hand, linguistic fractionalization has no significant effect. Finally, we add controls for the proportion of population in countries belonging to four major religious faiths: Islam, Christianity, Hinduism, and Buddhism (column 5).¹⁹ The coefficient of Buddhist population is positive and significant, while the impacts of all others are statistically insignificant. Moreover, religious fractionalization now becomes insignificant. However, the sign and significance of all other variables remain about the same. We note that according to likelihood ratio test and the pseudo R-square, the econometric models in columns 4 and 5 are the preferred specifications.

¹⁷ Information about the landlock and land size of a country in square kilometers is taken from the CIA World Factbook (2007).

¹⁸ Fractionalization data are taken from Alesina et al (2003).

¹⁹ Information about the population by religious groups is taken from the various issues the CIA World Factbooks.

4.2 Transnational Terrorism

Now we examine whether the patterns that we found for domestic terrorism also hold for transnational terrorism. We follow the same strategy of including potential predictors of transnational terrorism in the sequence that we adopted above. The results are presented in Table 3. In contrast to domestic terrorism, the coefficients of per capita income turn out to be significant in column 1. Interestingly, the coefficient is also positive, suggesting that poverty discourages terrorism. However, with the inclusion of a dummy for landlock, log of country area, and ethnic, linguistic, and religious fractionalization, the effect of per capita income becomes statistically insignificant.

The most interesting contrast between domestic and transnational terrorism is in the political & civil rights variable. For transnational terrorism, the political & civil rights variable is not significant in any specification other than the one presented in column 1. However, it is significant for every domestic terrorism specification. As before, we consistently find that larger population is associated with more transnational terrorism, while a strong rule of law discourages it. The only other variables which are significant in columns 4 and 5 are the landlock dummy, land area, and religious fractionalization. Landlocked nations experience more domestic and transnational terrorism, while those having larger land area face less. Religiously diverse countries (i.e., ones having greater religious fractionalization) are subject to less transnational terrorism. Likelihood ratio test and pseudo R-square indicate that econometric models in columns 4 and 5 are the preferred specifications.²⁰

²⁰ We also tried a number of other specifications to see whether our findings are robust. For example, we excluded Afghanistan, Colombia, and India from the data as they experienced relatively large numbers of terrorism incidents. However, our findings remain qualitatively unchanged. We also tested whether income inequality generates terrorism and found that there is no significant impact of the Gini coefficient on either type of terrorism.

4.3 Disaggregating Political Rights and Civil Liberties

Political rights include the right to participate in the political process, right of free access to information, freedom of speech, and freedom to form an effective political opposition. Civil liberties relate to fundamental individual rights that are protected by law against coercion and interference by the state. To maintain the distinction, we disaggregate our rights variable into political rights and civil liberties components, to examine their independent effects on terrorism. The findings in Table 4 show a non-monotonic relation between rights variables and domestic terrorism. The magnitude of the coefficients suggests that civil liberties have a larger impact than political rights. On the other hand, there is no significant effect of rights variables on transnational terrorism. The results for all other variables remain about the same as in the specification with the combined political rights and civil liberties variables.

4.4 The Post 9/11 Period

We also examine whether the intensity and significance of factors spurring terrorism in developing countries changed in the post 9/11 period. We averaged our data for domestic and transnational terrorism over the period 2002-2006, while the data for all independent variables is averaged over the period 2001-2005. The findings for the post 9/11 period are similar to what we had before. Both political rights and civil liberties have a non-monotonic effect on domestic terrorism, while they have no significant relation to transnational terrorism. More populated countries experience more of both types of terrorism, while larger land size, religious diversity, and a strong rule of law are all associated with less terrorism.

4.5 Results for Panel Data Fixed- Effects Regressions

We also check whether the results of our main variables of interest, i.e., political rights and civil liberties, are sensitive to changes in econometric technique. Therefore, we use fixed effects in a panel framework to control for all unobserved time-invariant factors affecting terrorism. This gives unbiased and consistent estimates.

The results are presented in Table 6, and they continue to support our earlier findings that political rights and civil liberties have a non-monotonic effect on domestic terrorism, while their effect on transnational terrorism is insignificant.²¹ Interestingly, adult literacy appears to have a positive and significant effect on domestic terrorism, which is somewhat surprising. Since almost all cross-section regressions indicate that the adult literacy rate has no significant link with terrorism, this result is not conclusive.

5. Conclusion

Understanding the causes of terrorism is important in predicting terrorist activity and in developing an effective counterterrorism strategy. Terrorism incidence and casualties data suggest that domestic terrorism poses a substantially larger threat than transnational terrorism in developing countries. Past studies have examined the determinants of transnational terrorism, which accounts for only a small fraction of total terrorism incidents. Another caveat is that these studies pool data for developed and developing countries. Such heterogeneity can be problematic as political-economic conditions spawning terrorism may be radically different between these two groups of nations.

²¹ For comparison, we also obtained estimation results by imposing the restriction that fixed effects do not matter, i.e., $[\beta_i(\alpha_i)=0\forall_i]$. However, the log likelihood ratio test clearly suggests that the fixed-effects model is the preferred specification.

Using the *Rand-MIPT* terrorism incidents database, which provides data on both domestic and transnational terrorism, we compare the effects of different variables on these two distinct types of terrorism in 125 developing countries. A striking finding is that political rights and civil liberties affect domestic terrorism in a non-monotonic way. In particular, we find that more rights initially raise terrorism (i.e., when we compare extremely autocratic regimes with ones that afford somewhat greater rights), although this pattern reverses for mature democracies. Clearly, there are transition costs when a nation moves from extreme autocracy to a more democratic regime. However, this is only a temporary hindrance, and recognition of this fact is important in striving for feasible democratization. Perhaps developed nations should provide terrorism related aid to these vulnerable developing countries to overcome such transition costs. It is also worthwhile to note the robust finding that the rule of law reduces terrorism. Therefore, instituting a strong and fair civil/judicial system is central to containing terrorism in developing nations. Finally, we note that religious diversity seems to discourage terrorism, while ethnic fractionalization appears to raise domestic terrorism. On the other hand, poverty or lack of education does not seem to be directly linked to its incidence.

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Table 2: Negative binomial maximum likelihood estimations
 Dependent variable: Number of domestic terrorism incidents (average 1998-2006)

Independent variables	(1)	(2)	(3)	(4)	(5)
<i>Ln (Per capita income)</i>	0.064 (0.22)	-2.226 (1.21)	-0.933 (0.50)	-1.146 (0.61)	-1.502 (0.70)
<i>[Ln (Per capita income)]²</i>		0.172 (1.25)	0.107 (0.79)	0.140 (1.03)	0.166 (1.09)
<i>Political and civil rights</i>	0.287 (2.60) ^{***}	0.325 (2.98) ^{***}	0.391 (3.93) ^{***}	0.370 (3.80) ^{***}	0.393 (3.78) ^{***}
<i>(Political and civil rights)²</i>		-0.012 (2.50) ^{**}	-0.018 (3.30) ^{***}	-0.011 (1.98) ^{**}	-0.011 (2.01) ^{**}
<i>Ln (Adult literacy)</i>	1.006 (1.01)	1.405 (1.38)	1.553 (1.58)	1.927 (1.83) [*]	1.310 (1.21)
<i>Ln (Infant mortality)</i>	-1.236 (1.66)	-0.780 (1.01)	-0.478 (0.66)	0.229 (0.36)	-0.143 (0.20)
<i>Ln (Population)</i>	0.860 (5.19) ^{***}	0.951 (5.10) ^{***}	1.340 (5.28) ^{***}	1.554 (6.61) ^{***}	1.590 (6.27) ^{***}
<i>Rule of law</i>	-2.516 (4.35) ^{***}	-2.560 (4.34) ^{***}	-2.801 (5.08) ^{***}	-2.744 (5.14) ^{***}	-3.041 (5.17) ^{***}
<i>Dummy land lock</i>			1.393 (2.75) ^{***}	1.397 (3.29) ^{***}	1.289 (3.27) ^{***}
<i>Ln (Country area)</i>			-0.325 (1.92) [*]	-0.708 (4.31) ^{***}	-0.625 (3.12) ^{***}
<i>Ethnic fractionalization</i>				4.148 (3.76) ^{***}	3.610 (3.12) ^{***}
<i>Linguistic fractionalization</i>				-0.600 (0.67)	-0.483 (0.53)
<i>Religious fractionalization</i>				-2.047 (1.87) [*]	-1.018 (0.79)
<i>Proportion Muslim</i>					0.006 (0.73)
<i>Proportion Christian</i>					0.011 (1.48)
<i>Proportion Hindu</i>					0.017 (1.20)
<i>Proportion Buddhist</i>					0.030 (2.55) ^{**}
<i>Regional dummies included</i>	Yes	Yes	Yes	Yes	Yes
Log likelihood	-218.42	-217.46	-213.77	-204.90	-202.13
Pseudo-R ²	0.19	0.19	0.20	0.24	0.25
Sample size (# of countries)	125	125	125	125	125

Note: All regressions estimated with heteroscedasticity-robust standard errors. Iraq, Palestine and Gaza Strips are outliers and, therefore, not included in the regressions. The values of independent variables are averaged over the period 1997-2005. Absolute t-values are shown in parentheses. ***, ** and * indicate significance at 1, 5 10 percent levels, respectively.

Table 3: Negative binomial maximum likelihood estimations
 Dependent variable: Number of transnational terrorism incidents (average 1998-2006)

Independent variables	(1)	(2)	(3)	(4)	(5)
<i>Ln (Per capita income)</i>	0.848 (3.54) ^{***}	-1.590 (1.23)	-1.149 (0.98)	-0.768 (0.60)	-0.624 (0.46)
<i>[Ln (Per capita income)]²</i>		0.171 (1.91) [*]	0.148 (1.80) [*]	0.123 (1.36)	0.113 (1.19)
<i>Political and civil rights</i>	0.224 (2.95) ^{***}	0.762 (1.39)	0.655 (1.17)	0.440 (0.74)	0.677 (0.98)
<i>(Political and civil rights)²</i>		-0.186 (1.01)	-0.150 (0.79)	-0.092 (0.47)	-0.186 (0.82)
<i>Ln (Adult literacy)</i>	-0.322 (0.52)	-0.246 (0.40)	-0.137 (0.24)	0.141 (0.22)	0.112 (0.02)
<i>Ln (Infant mortality)</i>	-0.626 (1.26)	-0.392 (0.75)	-0.314 (0.59)	-0.260 (0.47)	0.011 (0.02)
<i>Ln (Population)</i>	0.441 (4.64) ^{***}	0.495 (4.93) ^{***}	0.678 (3.97) ^{***}	0.752 (4.35) ^{***}	0.769 (4.54) ^{***}
<i>Rule of law</i>	-2.096 (4.65) ^{***}	-2.098 (4.74) ^{***}	-2.139 (5.11) ^{***}	-1.987 (4.37) ^{***}	-1.645 (3.43) ^{***}
<i>Dummy land lock</i>			0.688 (1.74) [*]	0.658 (1.80) [*]	0.680 (1.93) [*]
<i>Ln (Country area)</i>			-0.139 (1.25)	-0.250 (1.86) [*]	-0.233 (1.73) [*]
<i>Ethnic fractionalization</i>				1.019 (0.96)	1.267 (1.14)
<i>Linguistic fractionalization</i>				0.985 (1.08)	0.893 (1.00)
<i>Religious fractionalization</i>				-1.195 (1.45)	-1.649 (1.56)
<i>Proportion Muslim</i>					-0.011 (1.35)
<i>Proportion Christian</i>					-0.001 (0.13)
<i>Proportion Hindu</i>					-0.023 (1.80) [*]
<i>Proportion Buddhist</i>					-0.005 (0.49)
<i>Regional dummies included</i>	Yes	Yes	Yes	Yes	Yes
Log likelihood	-114.18	-111.97	-110.88	-108.07	-106.75
Pseudo-R ²	0.27	0.28	0.29	0.31	0.32
Sample size (# of countries)	125	125	125	125	125

Note: All regressions estimated with heteroscedasticity-robust standard errors. Iraq, Palestine and Gaza Strips are outliers and, therefore, not included in the regressions. The values of independent variables are averaged over the period 1997-2005. Absolute t-values are shown in parentheses. ***, ** and * indicate significance at 1, 5 10 percent levels, respectively.

Table 4: Negative binomial maximum likelihood estimations
Disaggregating Political Rights and Civil Liberties

Dependent variable→	Domestic terrorism incidents		Transnational terrorism incidents	
Independent variables↓	(1)	(2)	(3)	(4)
<i>Ln (Per capita income)</i>	-0.943 (0.50)	-1.242 (0.58)	-0.806 (0.68)	-0.750 (0.55)
<i>[Ln (Per capita income)]²</i>	0.135 (0.96)	0.162 (1.05)	0.121 (1.41)	0.125 (1.30)
<i>Political rights</i>	1.488 (3.29) ^{***}	–	0.285 (0.73)	–
<i>(Political rights)²</i>	-0.128 (2.19) ^{**}	–	-0.001 (0.01)	–
<i>Civil liberties</i>	–	2.288 (3.40) ^{***}	–	0.804 (1.34)
<i>(Civil liberties)²</i>	–	-0.208 (2.27) ^{**}	–	-0.064 (0.89)
<i>Ln (Adult literacy)</i>	1.878 (1.91) [*]	1.460 (1.44)	0.234 (0.39)	0.051 (0.08)
<i>Ln (Infant mortality)</i>	0.144 (0.21)	0.103 (0.15)	-0.196 (0.37)	0.347 (0.59)
<i>Ln (Population)</i>	1.409 (6.11) ^{***}	1.398 (5.66) ^{***}	0.748 (4.30) ^{***}	0.741 (4.34) ^{***}
<i>Rule of law</i>	-2.487 (4.89) ^{***}	-2.674 (3.93) ^{***}	-1.928 (4.65) ^{***}	-2.011 (4.02) ^{***}
<i>Dummy land lock</i>	1.246 (3.29) ^{***}	1.196 (3.27) ^{**}	0.593 (1.68) [*]	0.639 (1.73) [*]
<i>Ln (Country area)</i>	-0.613 (3.55) ^{***}	-0.597 (3.21) ^{***}	-0.263 (1.90) [*]	-0.245 (1.84) [*]
<i>Ethnic fractionalization</i>	3.192 (2.73) ^{***}	3.571 (3.03) ^{***}	1.062 (1.01)	0.918 (0.86)
<i>Linguistic fractionalization</i>	-0.008 (0.01)	-0.382 (0.41)	1.037 (1.17)	1.085 (1.16)
<i>Religious fractionalization</i>	-1.975 (1.84) [*]	-2.630 (2.61) ^{***}	-1.079 (1.27)	-1.461 (1.85) [*]
<i>Regional dummies included</i>	Yes	Yes	Yes	Yes
Log likelihood	-204.24	-202.77	-108.18	-108.46
Pseudo-R ²	0.24	0.24	0.31	0.30
Sample size (# of countries)	125	125	125	125

Note: All regressions estimated with heteroscedasticity-robust standard errors. Iraq, Palestine and Gaza Strips are outliers and, therefore, not included in the regressions. The values of independent variables are averaged over the period 1997-2005. Absolute t-values are shown in parentheses. ***, ** and * indicate significance at 1, 5 10 percent levels, respectively.

**Table 5: Negative binomial maximum likelihood estimations
The Post 9/11 Period** (terrorism data averaged over 2002-2006)

Dependent variable→	<u>Domestic terrorism incidents</u>		<u>Transnational terrorism incidents</u>	
Independent variables↓	(1)	(2)	(3)	(4)
<i>Ln (Per capita income)</i>	-2.116 (0.89)	-1.541 (0.64)	-0.305 (0.23)	-0.153 (0.11)
<i>[Ln (Per capita income)]²</i>	0.212 (1.20)	0.180 (1.03)	0.083 (0.93)	0.083 (0.87)
<i>Political rights</i>	1.462 (2.72) ^{***}	-	0.049 (0.11)	-
<i>(Political rights)²</i>	-0.148 (1.90) [*]	-	0.027 (0.50)	-
<i>Civil liberties</i>	-	2.438 (3.44) ^{***}	-	0.631 (1.01)
<i>(Civil liberties)²</i>	-	-0.267 (2.46) ^{**}	-	-0.040 (0.50)
<i>Ln (Adult literacy)</i>	1.426 (1.39)	0.749 (0.72)	-0.100 (0.15)	-0.376 (0.51)
<i>Ln (Infant mortality)</i>	-0.077 (0.10)	-0.264 (0.36)	-0.527 (1.08)	-0.743 (1.37)
<i>Ln (Population)</i>	1.401 (5.46) ^{***}	1.314 (5.27) ^{***}	0.629 (3.40) ^{***}	0.653 (3.47) ^{***}
<i>Rule of law</i>	-1.987 (3.30) ^{***}	-2.105 (3.16) ^{***}	-1.956 (4.92) ^{***}	-2.102 (4.59) ^{***}
<i>Dummy land lock</i>	1.123 (2.38) ^{**}	1.077 (2.32) ^{**}	0.498 (1.30)	0.611 (1.50)
<i>Ln (Country area)</i>	-0.569 (2.85) ^{***}	-0.498 (2.46) ^{**}	-0.162 (1.16)	-0.155 (1.14)
<i>Ethnic fractionalization</i>	3.911 (3.05) ^{***}	3.776 (2.98) ^{***}	1.298 (1.12)	1.256 (1.11)
<i>Linguistic fractionalization</i>	0.349 (0.33)	-0.052 (0.05)	0.346 (0.36)	0.421 (0.43)
<i>Religious fractionalization</i>	-2.001 (1.72) [*]	-2.636 (2.37) ^{**}	-0.869 (1.03)	-1.179 (1.48)
<i>Regional dummies included</i>	Yes	Yes	Yes	Yes
Log likelihood	-204.36	-202.55	-105.90	-106.09
Pseudo-R ²	0.23	0.23	0.32	0.32
Sample size (# of countries)	125	125	125	125

Note: All regressions estimated with heteroscedasticity-robust standard errors. Iraq, Palestine and Gaza Strips are outliers and, therefore, not included in the regressions. The values of independent variables are averaged over the period 2001-2005. Absolute t-values are shown in parentheses. ***, ** and * indicate significance at 1, 5 10 percent levels, respectively.

Table 6: Negative binomial maximum likelihood estimations
Panel data regressions with fixed effects (yearly terrorism data for the period 1998-2006)

<i>Dependent variable</i> → <i>Independent variables</i> ↓	<i>Domestic terrorism incidents</i>			<i>Transnational terrorism incidents</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Ln (Per capita income)</i>	-4.062 (1.29)	-3.123 (1.02)	-3.745 (1.12)	-6.669 (1.83)*	-6.629 (1.80)*	-6.827 (1.86)*
<i>[Ln (Per capita income)]²</i>	0.091 (0.38)	0.033 (0.14)	1.071 (0.26)	0.251 (0.95)	0.249 (0.94)	0.261 (0.99)
<i>Political and civil rights</i>	2.181 (4.40)***	-	-	0.631 (0.98)	-	-
<i>(Political and civil rights)²</i>	-0.743 (4.55)***	-	-	-0.207 (0.93)	-	-
<i>Political rights</i>	-	1.037 (3.54)***	-	-	0.356 (1.02)	-
<i>(Political rights)²</i>	-	-0.146 (4.08)***	-	-	-0.046 (0.93)	-
<i>Civil liberties</i>	-	-	1.071 (2.47)**	-	-	-0.022 (0.05)
<i>(Civil liberties)²</i>	-	-	-0.138 (2.65)***	-	-	0.014 (0.21)
<i>Ln (Adult literacy)</i>	3.631 (2.38)**	4.522 (3.02)***	3.988 (2.55)**	0.426 (0.23)	0.708 (0.41)	1.040 (0.58)
<i>Ln (Infant mortality)</i>	-0.245 (0.40)	-0.181 (0.30)	-1.31 (0.20)	-0.742 (1.04)	-0.764 (1.07)	-0.682 (0.95)
<i>Ln (Population)</i>	1.877 (1.23)	2.113 (1.41)	2.358 (1.52)	3.869 (2.32)**	3.950 (2.38)**	4.154 (2.48)**
<i>Rule of law</i>	-0.191 (0.48)	-0.126 (0.33)	-0.241 (0.57)	-0.453 (1.13)	-0.383 (0.96)	-0.446 (1.05)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Estimated coefficients	141	141	141	141	141	141
Log likelihood	-1275.41	-1275.91	-1280.14	-734.48	-734.53	-734.80
Pseudo-R ²	0.33	0.33	0.33	0.33	0.33	0.33
Number of observations	1125	1125	1125	1125	1125	1125

Note: All regressions estimated with heteroscedasticity-robust standard errors. Iraq, Palestine and Gaza Strips are outliers and, therefore, not included in the regressions. The values of independent variables are for the period 1997-2005. Absolute t-values are shown in parentheses. ***, ** and * indicate significance at 1, 5 10 percent levels, respectively.