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DISTRIBUTION OF TRANSNATIONAL TERRORISM AMONG COUNTRIES BY INCOME CLASSES AND GEOGRAPHY AFTER 9/11

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Abstract

This article applies an autoregressive intervention model for the 1968-2003 period to identify either income-based or geographical transference of transnational terrorist events in reaction to the rise of fundamentalist terrorism, the end to the Cold War, and 9/11. Our time-series study investigates the changing pattern of transnational terrorism for all incidents and those involving U.S. people and property. Contrary to expectation, there is no evidence of an income-based post-9/11 transfer of attacks to low-income countries except for attacks with U.S. casualties, but there is a significant transference to the Middle East and Asia where U.S. interests are, at times, attacked. We also find that the rise of fundamentalist terrorism has most impacted those regions – the Middle East and Asia – with the largest Islamic population. The end to the Cold War brought a "terrorism peace dividend" that varies by income and geography among countries. Based on the empirical findings, we draw policy recommendations regarding defensive counterterrorism measures.

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DISTRIBUTION OF TRANSNATIONAL TERRORISM AMONG COUNTRIES BY INCOME CLASSES AND GEOGRAPHY AFTER 9/11

The terrorist hijackings of September 11, 2001, (henceforth, 9/11) and their fiery aftermath changed the way that the global community views its major security threats. There is now a realization that a terrorist incident can result in large-scale casualties, huge property losses, and long-lasting ramifications. Prior to 9/11, no terrorist event had caused more than $2.9 billion in damages (Wolgast, 2002)[1] or killed over 500 people (Quillen, 2002). The incidents on 9/11 murdered almost 3,000 and caused over $80 billion in losses (Kunreuther and Michel-Kerjan, 2004). In terrorists' future attempts to outdo past atrocities, there is real anxiety among authorities about the magnitude of the next large-scale attack. The March 11, 2004 commuter train bombings in Madrid (henceforth, 3/11) underscore the vulnerabilities of all countries to terrorist attacks. As antiterrorism efforts are bolstered, governments are beginning to recognize that there is no foolproof defense that can eliminate the terrorist threat. Post-9/11 actions to augment security in wealthy nations may have unintended negative consequences by inducing terrorists to stage their attacks in countries less able to afford widespread defensive measures. Thus, the new emphasis on homeland security in the United States and throughout the European Union (EU) may merely displace terrorist attacks to softer venues where people and property from prime-target countries are attacked abroad (Enders and Sandler, 1993, 1995; Sandler and Enders, 2004).

This transference of attacks may be income-based or geographically founded. When transference is income based, attacks are anticipated to be displaced from high-income countries (HICs) to low-income countries (LICs) as some HICs deploy enhanced security measures that make attacks more difficult and costly for terrorists to accomplish. At a minimum, these defenses imply that the terrorists may be forced to choose targets of lower value in the rich

country. For example, current actions to secure the monuments, the U.S. Capitol building, the White House, and other terrorist-prized targets mean that a Washington DC-based attack would be deflected to a lower-valued venue. If the transference is geographically based, then the displacement may be from a rich region (e.g., Europe) to a poorer region (e.g., the Middle East or Eurasia). A geographical shift may also be motivated by the ability of the terrorists to blend in and establish a support system, especially for religious fundamentalist terrorists. If terrorists attack foreign interests nearer to home, then they do not have to cross borders that are more guarded in some regions after 9/11. In the 1980s, there was a significant "spillover" of Middle East terrorism throughout Europe – e.g., there were 43 terrorist incidents of Middle East origin in Europe in 1987 (U.S. Department of State, 1988:16, 18). Given the increased scrutiny given to Middle Easterners in Europe following 9/11, there is anticipated to be more incidents staged in the Middle East now.

After 9/11, casual empiricism gives an impression that terrorist events are being displaced from rich to poor countries, perhaps in light of defensive measures in the former. There have been many recent high-profile transnational terrorist attacks in low-income and middle-income countries (MICs) – e.g., Morocco, Turkey, Indonesia, India, Malaysia, Kenya, the Philippines, Pakistan, and Afghanistan. Casual empiricism may not, however, withstand careful statistical scrutiny. The primary purpose of this paper is to empirically evaluate with time-series methods (i.e., autoregressive intervention analysis) whether terrorists have shifted their venue based on target countries' income or regional location in reaction to the rise of fundamentalist terrorism, the end to the Cold War, or 9/11. To accomplish this task, we partition countries into income categories based on two alternative schemes. We also apply a standard regional classification to pigeonhole countries geographically. Additionally, we analyze four different time series of transnational terrorist events: all incidents, incidents with casualties,

incidents with a U.S. target; and casualty incidents with a U.S. target. A secondary purpose is to draw policy conclusions from the empirical findings.

Our aim is *not* to establish that income or political systems (constraints) are explanatory variables for transnational terrorism. Such variables are already related to transnational terrorism in important recent studies by Li and Schaub (2004), Li (2005), and others. We are, instead, concerned with the changing venue patterns of terrorist attacks. Events following 9/11, such as the invasion of Afghanistan and the ongoing "war on terror," surely have motivated grievances and attacks against the "coalition of the willing." Moreover, upgrades in homeland security may have changed terrorist venues.[2]

Among other things, we find that the rise of fundamentalist terrorism, starting in late 1979, concentrated the distribution of transnational terrorism over time in LICs and those regions with a large Islamic population. At the time of 9/11, LICs had been experiencing the lion's share of transnational terrorism with relatively few incidents in HICs. After 9/11, there has been a gradual escalation of attacks with some increase in incidents involving a U.S. target in all three income classes. These attacks have, however, not occurred on U.S. soil, so that U.S. homeland security has secured America, but not necessarily Americans. We uncover no clear evidence of a general transference of attacks from HICs to LICs following 9/11. This is due, in part, to the low level of terrorism in HICs and the high level in LICs at the time of 9/11; thus, even a small increase in HIC attacks will appear proportionately large. There is more convincing evidence of a regional shift in the post-9/11 era with incidents being displaced from Europe and Africa to the Middle East and Asia, especially when U.S. targets are involved.

Preliminaries

Terrorism is the premeditated use or threat of use of violence by individuals or subnational

groups to obtain a political or social objective through intimidation of a large audience beyond that of the immediate victims. This standard definition rules out state terror, but does not eliminate state-sponsored terrorism in which a country aids a terrorist group through logistical support, training, a safe haven, financing, or other assistance (Mickolus, 1989). Terrorists typically unleash their attacks against a general audience that does not directly make the decisions that they want to affect. By making attacks appear to be random, terrorists intimidate a wider audience and create a general anxiety in the targeted country. In response, the country may expend huge amounts of resources to protect a wide range of vulnerabilities. As a society becomes more aware of the terrorist threat, homeland security efforts may increase dramatically.

Terrorism falls into two categories: domestic and transnational. Domestic terrorism involves only the host country so that the perpetrators, victims, financing, and logistical support are all homegrown. More important, domestic incidents generate implications for just the host country or its interests. In contrast, terrorist attacks that include perpetrators, victims, targets, or interests from two or more countries constitute *transnational terrorism.* The 3/11 bombings are transnational because they involved Moroccan terrorists on Spanish soil and killed or maimed victims from a number of countries. The kidnappings of foreign workers in Iraq in 2004 are transnational terrorist events intended to pressure foreign governments to pull out their troops, workers, and diplomats. These acts are also meant to keep other governments from assisting the U.S.-backed fledgling Iraqi government. Clearly, terrorist incidents whose ramifications transcend the venue country are transnational.

We are particularly interested in investigating transnational terrorism before and after 9/11, insofar as this type of terrorism poses the greatest concern for the global community. At an earlier time, we would have said that it presented the greatest security challenge to developed countries, but with security upgrades in the United States and some other rich countries,

transnational terrorism is a potential exigency for all countries owing to attack transference. The dispersed al-Qaida network of affiliated groups heightens the interest in transnational terrorism. Actions by countries to implement defensive countermeasures is anticipated to influence the distribution of transnational terrorist attacks across countries. Hence, our focus is solely on this form of terrorism.

We follow the pioneering studies on applying theoretical and empirical tools to analyze terrorism by assuming that terrorists weigh the costs, risks, and benefits when choosing the venue for an attack.[3] If, for example, two potential targets offer the *same expected benefits* for the terrorists, then they will pick the one with the smaller expected costs. Actions by the authorities to harden targets may merely shift the attack planned by determined terrorists to a softer target. By responding to such changes in their constraints, terrorist behavior is predictable and, thus, rational even though they are willing to go to extremes and even sacrifice their lives in an attack. When, however, the attack venues imply the same expected costs (adjusted for risks), the terrorists will choose the location with the greater expected benefits. Because terrorists must trade off expected benefits *and* expected costs when deciding attack locations, action by a country to secure homeland targets *may fail to displace the attack abroad if the terrorists sufficiently value the benefits to offset the greater expected costs*. This is an essential insight in understanding the pattern of attacks under investigation, because it implies that even massive increases in homeland security may not deter nor deflect an attack at home when the terrorists sufficiently prize a target. Futhermore, an attack displacement may not occur despite security upgrades if rich countries offer more targets than poor countries. Clearly, al-Qaida would dearly love to execute another attack on U.S. soil even if it does not rival 9/11. Given these trade-offs of costs and benefits, the distribution of terrorist attacks based on wealth or enhanced security is truly an empirical question, dependent upon the terrorists' perceived benefits and costs. Thus,

redoubled efforts by some rich countries to appear impregnable may merely increase the expected benefits of the terrorists so that attacks may still occur in fortified countries. In contrast, support networks in the terrorists' home regions may reduce expected costs enough that some attacks hit foreign targets closer to the home of the terrorists following security upgrades in the United States and elsewhere.

There are two significant developments prior to 9/11 that have influenced the pattern of transnational terrorism and that must be taken into account in our post-9/11 investigation. The first is the rise in fundamentalist-based terrorism. Hoffman (1998) places this rise at the fourth quarter of 1979 (i.e., 1979:4) owing to the November 4, 1979 takeover of the U.S. embassy in Tehran and the December 25, 1979 Soviet invasion of Afghanistan. Since 1980, the number of religious-based terrorist groups has increased as a proportion of active terrorist groups: 2 of 64 in 1980; 11 of 48 in 1992; 16 of 49 in 1994; and 25 of 58 in 1995 (Hoffman, 1997:3). The proportion of incidents with deaths or injuries increased by 17 percentage points after the onset of fundamentalist terrorism (Enders and Sandler, 2000). Unlike the left-wing terrorists who were the dominant influence until the 1990s, the fundamentalist terrorists have resorted to suicide missions, which are on average over thirteen times more deadly than other terrorist attacks (Pape, 2003).[4] The rise of fundamentalist terrorism is anticipated to increase incidents with casualties after 1979:4. This increase is anticipated to be unevenly distributed among countries with the greatest impact on LICs. When geographical considerations are also taken into account, we expect that fundamentalist terrorism will impact those regions – i.e., the Middle East, Eurasia, and Asia – with large Moslem populations.

The second pre-9/11 development is the end of the Cold War at 1991:4 with the demise of the Soviet Union and communist regimes in Eastern Europe. Their demise removed some of the avid state-sponsors of terrorism (Wilkinson, 1992), because these countries no longer had a

reason to destabilize Western countries. In the late 1980s and early 1990s, a number of European countries (e.g., France, Belgium, Germany, Spain, and the United Kingdom) captured and brought to justice left-wing terrorists (Alexander and Pluchinsky, 1992; Clutterbuck, 1992). In the early 1990s, there was also a collective initiative by the EU to take a united front against terrorism (Chalk, 1994; Wilkinson, 1992). These events coming around 1991:4 have been shown to decrease the amount of transnational terrorism (Enders and Sandler, 1999, 2000). Thus, any analysis of post-9/11 terrorism must account for this structural shift at the start of the post-Cold War era.

Data

The data on transnational terrorist incidents are drawn from *International Terrorism: Attributes of Terrorist Events* (ITERATE), which records the incident date, its location, number of deaths, number of injured, and other variables (Mickolus et al., 2004). For location, ITERATE records the starting *country* location of the terrorist attack – only 47 out of 12,569 transnational incidents had no start location listed and these 47 events are excluded from our statistical analysis. Variable 28 of ITERATE indicates the type of U.S. target (i.e., commercial property, military installation, diplomatic, U.S. government, and nonofficial), while variables 34 and 39 denote the number of Americans wounded or killed, respectively. Thus, we can distinguish not only attacks against U.S. interests but also U.S. attacks with casualties. ITERATE data are derived from the world's newsprint and electronic media with a heavy reliance until 1996 on the Foreign Broadcast Information Service (FBIS) *Daily Reports*, which survey a couple hundred of the world's major newspapers and related sources. By splicing together previous ITERATE data sets, ITERATE 5's "common" file contains over 40 key variables common to all transnational incidents from 1968:1 to 2003:4. ITERATE excludes actions involving insurgencies, declared

wars, or an occupying force. Thus, roadside bombs against coalition forces in Iraq after the end of the Iraq War in 2003 are not recorded as transnational terrorism, but the kidnappings of foreign workers in Iraq are included. ITERATE coding conventions are nearly identical to those of the U.S. Department of State.

In total, we extract four *quarterly* time series from ITERATE. We use a quarterly, rather than a more disaggregated time interval, to minimize periods with zero or near-zero observations, which would violate the underlying normality assumption upon which our inferential techniques rest. The ALL incident time series includes the quarterly totals for all types of terrorist incidents for the 1968:1-2003:4 sample period. A second time series is the "casualty" series, which contains all incidents with either a death *or* injury. We include two series involving all targeted countries because the rise of fundamentalist terrorism and the other shocks analyzed may result in non-U.S. targets being attacked. For example, coalition-of-the-willing countries are prone to al-Qaida attacks after 9/11. Moreover, fundamentalist terrorists have grievances with a host of countries, including the United Kingdom, Spain, France, and Israel. Approximately 60% of all transnational terrorist attacks is directed at non-U.S. targets. Incidents with a U.S. target (i.e., U.S. person or property) are a subset of the ALL series, while casualty incidents with a U.S. target are a subset of either the casualty series or the U.S. target series. The two U.S. series can be "thin" in terms of zero or near-zero quarterly totals for some income classes or geographical regions. The zero problem is then a concern that we address with appropriate econometric procedures.

To examine the distribution of terrorism across countries' income classes, we first use the World Bank's classification of countries into low, middle, and high per-capita income nations. Although income groupings are described in detail in each issue of World Bank's (various years) *World Development Report*,[5] we must mention some of the key features of the classification

scheme. All World Bank member countries and others with populations in excess of 30,000 are divided into three primary income groups – LICs, MICs, and HICs. For 2000, LICs had per-capita Gross National Income (GNI) of $755 or less, MICs had per-capita GNI greater than $756 and less than or equal to $9,265 and HICs had per-capita GNI in excess of $9,265. These dollar figures are adjusted annually to account for changes in a number of economic circumstances including inflation, overall living standards, and exchange rates. Country codes from ITERATE for location start of incidents allow us to associate terrorist events' location to the country's income classification. Similarly, we can match terrorist events to other country taxonomies described below.

In constructing our time series, we take account of the fact that individual nations may switch among the three income groups. As a result of economic growth, the number of nations included in the HIC group has generally increased, thereby working against a possible transnational terrorism substitution from HICs to LICs. For instance, Algeria and Mexico moved from the LIC group to the MIC group, whereas, Israel, Portugal, and Spain switched from the MIC group to the HIC group owing to high per-capita income growth. In the late 1980s, Poland moved in the opposite direction from the class of MICs to LICs when it was a transition economy, but returned to the MIC group in the mid 1990s.

When matching countries to terrorist attacks and income classes, we also had to adjust for changes in the political map of Eastern Europe, Africa, and elsewhere over the entire sample period. Prior to its division, ITERATE records terrorist incidents occurring in Czechoslovakia; after its split, ITERATE separately keeps track of terrorist events in the Czech Republic and the Slovak Republic. With respect to the Soviet Union, incidents before the breakup are attributed to the U.S.S.R, while after the breakup they are assigned to the relevant new nations (e.g., Ukraine). The U.S.S.R presents a potential concern because early issues of the *World Development Report*

recorded the per-capita GNI of the U.S.S.R as greater than that of Hong Kong, Greece, and Spain. The accuracy of Soviet GNI data is doubtful, because it was artificially inflated as a political tool in the Cold War. This does not present a real problem for our study, because much of the focus is on the post-Cold War period. Moreover, throughout the sample period, there were very few transnational terrorist incidents in the U.S.S.R – for example, just four during 1980-87.

For geographical groupings, we apply the six regional classifications given in the U.S. Department of State (2003) *Patterns of Global Terrorism.* These regions are the Western Hemisphere (North, Central, and South America), Africa (excluding North Africa), Asia (South and East Asia, Australia, and New Zealand), Eurasia (Central Asia, Russia, and the Ukraine), Europe (West and East Europe), and the Middle East (including North Africa). This partition of countries puts most of the Islamic population into the Middle East, Eurasia, and Asia. This geographical division *does not correlate* with the income taxonomy, so that geography is likely to display different substitution possibilities before and after 9/11. The lack of correlation will become apparent in the graphs displayed in the subsequent sections.

Distribution of Terrorist Incidents by Income Classes

Figure 1 displays four panels for the location of terrorist incidents by income groups for the sample period, 1968:1-2003:4. In each panel, the quarterly number of incidents is measured on the vertical axis, whose scale may differ between panels. Panel 1 depicts the quarterly total of all incidents, while panels 2-4 show quarterly incident counts occurring in LICs, MICs, and HICs, respectively. All four time paths indicate a decline around the start of 1992, consistent with the start of the post-Cold War era (Enders and Sandler, 2000). The panels also show an increase in incidents following 9/11, with LICs and MICs displaying a more marked increase. In Figure 2, we display the quarterly time series for terrorist incidents with one or more casualties for the

entire sample and the three income groups. For LICs, casualty incidents rose since the start of fundamentalist terrorism in 1979:4 until 1992 when it started to decline. Following 9/11, there was an upward trend in casualty incidents, especially in LICs. The four panels of Figure 2 display that LICs experienced the largest number of casualty incidents by far among the three income classes.

In Figure 3, the four quarterly time series are depicted by income group for terrorist incidents against a U.S. target. Panel 2 shows that LICs generally suffered the largest number of such attacks. There is also a somewhat more pronounced increase in these incidents in LICs after 9/11 compared with the other income groups. When the time series for casualty incidents against a U.S. target are plotted (not shown), there is a marked upward trend of such attacks in LICs.

A useful way to simplify the long-run movements in these time series is to examine the proportion of incidents staged in the LIC group. Figure 4 presents the proportion of each incident type occurring in this income class. Because the proportions can be quite erratic, we smoothe each series using a one-period lead and lag. If, for example, x_t denotes the total number of incidents of a particular type that occurs in period *t*, and y_t represents the number of incidents of that type that takes place in the LIC group in period *t*, the proportion of that incident type in the LIC group (p_t) in period *t* is constructed as:

$$p_t = (y_{t+1} + y_t + y_{t-1}) / (x_{t+1} + x_t + x_{t-1}). \quad (1)$$

In Figure 4, panels 1-3 indicate a clear upward trend in the proportion of all incidents, casualty incidents, and incidents with a U.S. target taking place in the LIC group.[6] Although there are now more casualty incidents with a U.S. target in LICs compared with earlier periods, there is no clear upward trend for this series since 1979 (see panel 4). An interesting feature of

all four proportion series is that all experienced a sharp decline around 1999 and a sharp rise following 9/11. The magnitude of the rebound is, however, smaller than the 1999 decline; thus, the proportion of terrorist incidents in LICs is greater in the late 1990s than after 9/11.

Table 1 reports four descriptive statistics for the four quarterly time series for several essential time periods. For example, the mean number of ALL incidents is 66.4 per quarter from 1992:2 through 2001:2. Over the same time period, the quarterly means for the LIC, MIC, and HIC groups are 42.9, 5.7, and 17.8 incidents, respectively. We also list four descriptive statistics for each of the four time series in the nine quarters prior to 9/11 and the nine quarters following 9/11. Table 1 reports the proportion of terrorist incidents occurring in LICs. Prior to 9/11, 74.3% of these incidents took place in LICs, while following 9/11, only 57.0% occurred in LICs.

In contrast to the visual impressions of Figures 1-4, there appears to be only modest differences in the pre-9/11 and post-9/11 series. The mean of the ALL incident series rises from 42.3 to 46.6 incidents per quarter following 9/11; thus, the overall level of terrorism rises by 10%. There is an interesting and unexpected change in the composition of incidents by income categories. After 9/11, the mean number of incidents in LICs falls by 6.8 per quarter, while this mean in HICs rises by 7.3 per quarter. A more pronounced increase characterizes incidents with casualties where the world's mean rises from 12.9 incidents per quarter before 9/11 to 20.6 incidents per quarter after 9/11. Although the overall level of terrorism increases, the proportion of incidents with casualties in the LICs falls from 72.2% to 67.9%. There is a 44% increase worldwide in the mean number of incidents with a U.S. target (24.1/16.7 = 1.44) following 9/11, and more than a threefold increase in the mean number of casualty incidents with a U.S. target (2.6 versus 9.4 incidents per quarter) following 9/11. Because these incidents are not occurring in the United States, Americans may be safer at home but not abroad in the aftermath of 9/11 and its security increases. About half of this increase – 4.8 incidents per quarter – occurred in LICs.

Statistical Analysis

Visual impressions and simple descriptive statistics do not replace formal inferential statistics. Consider the increase in the number of casualty incidents in LICs that took place after 9/11. Because this series is characterized by a number of increases and decreases, we must ascertain whether this particular increase is statistically significant or just a random occurrence. To determine whether the various incident series behaved differently following 9/11, we first estimate each time series as an autoregressive (AR) process. Consider the AR(*p*) model:

$$y_t = c + \sum_{i=1}^{p} a_i y_{t-i} + \alpha_1 FUND + \alpha_2 POST + \alpha_3 D_P + \alpha_4 D_L + \varepsilon_t, \quad (2)$$

where *p* is the number of lags, y_t is the number of incidents of a particular type in period *t*, *c* is a constant, the $a_i s$ and $\alpha_i s$ are undetermined coefficients, and ε is an error term. Equation (2) is a standard autoregressive model augmented by four dummy variables. D_P and D_L are dummy (intervention) variables representing potential impacts of 9/11. D_P is a pulse dummy that equals 1 if *t* = 2001:3 and 0 otherwise. A pulse intervention variable is appropriate if the 9/11 attack induced a temporary change in the $\{y_t\}$ series. The magnitude of α_3 indicates the initial effect of 9/11 on the time series and the rate of decay of this impact, if any, is determined by the characteristic roots of equation (2). To allow 9/11 to have had a permanent effect on y_t, we include a level dummy variable such that D_L is 0 for $t < 2001{:}3$ and is 1 for $t \geq 2001{:}3$. The immediate impact of 9/11 on $\{y_t\}$ is given by α_4, and the long-run effect is given by $\alpha_4 / \left(1 - \sum a_i\right)$. We also include dummy intervention variables to control for the rise of religious fundamentalism (*FUND*) and the post-Cold War era (*POST*). As identified by Enders and Sandler (2000), *FUND* is a dummy variable taking a value of 1 beginning in 1979:4, and *POST*

is a dummy variable taking a value of 1 beginning in 1991:4. For each series, the lag length is selected by the Schwartz Bayesian Criterion (SBC). We perform the tests without including time as a regressor, because there is no evidence of a deterministic trend in any of the incident series.

Because we use count data and some of the time series are thin, we also obtain the maximum likelihood estimates for thin series using a Poisson distribution. The latter is often used to model discrete variables that possess a reasonable number of observations near the lower zero bound. For a given set of regressors x_t, the Poisson model assumes that y_t is distributed with a probability density function:

$$f\left(y_t \middle| x_t\right) = e^{-\mu_t}\mu_t / (y_t!). \tag{3}$$

A Poisson distribution rules out negative realizations of y_t. As is easily demonstrated, the conditional mean $E\left[y_t \middle| x_t\right]$ is μ_t. We model this mean as:

$$\mu_t = \exp\left[c + \sum_{i=1}^{p} a_i \ln\left(y_{t-i} + bI_{t-i}\right) + \alpha_1 FUND + \alpha_2 POST + \alpha_3 D_P + \alpha_4 D_L\right], \tag{4}$$

where I_{t-i} is an indicator function that equals 0 if $y_{t-i} > 0$ and 1 if $y_{t-i} = 0$. The indicator's parameter is estimated using a grid search over the interval $0.1 \le b \le 0.9$.

Equations (2) and (4) are similar in that *FUND*, *POST*, D_P, and D_L can all affect the mean of y_t. Unlike equation (2), we permit the mean to be influenced by $\ln(y_{t-i})$ instead of the level of y_{t-i}. The rationale for this specification is to prevent the $\{y_t\}$ sequence from becoming explosive. The logarithmic specification, however, mandates replacing zero values of y_{t-i} with some positive number *b*. Another way to understand the issue is to rewrite equation (4) in the multiplicative form,

$$\mu_t = \prod_{i=1}^{p}\left(y_{t-i}^{*}\right)^{a^i} \bullet \exp\left[c + \alpha_1 FUND + \alpha_2 POST + \alpha_3 D_P + \alpha_4 D_L\right]. \tag{4'}$$

In equation (4′), $y^*_{t-i} = 0$ is an absorbing state. For $i \leq p$, the expected value of y_t is zero when any value of y^*_{t-i} is zero. Insofar as the y_t cannot be negative, the probability of a positive value of y_t is then zero. To rule out such an undesirable implication of the model, a small positive value (i.e., *b*) is added to zero values of y^*_{t-i} by equation (4).

Although we do not provide a complete discussion of the alternative models, some comparison of the ordinary least squares (OLS) and Poisson estimation methodologies is in order. Given that equation (2) contains the appropriate specification of the mean, the coefficient estimate using OLS can be consistent, but any confidence interval constructed using a *t*-distribution may be severely distorted if the time series has zero or near-zero values. To assist making appropriate inference, we report *t*-statistics based on robust standard errors. As shown in equation (4) or (4′), the Poisson model is nonlinear so that the coefficients do not have a straightforward interpretation. Moreover, the specification in equation (4) and the need to add *b* to zero values of y^*_{t-i} seem ad hoc. In a related point, the mean and variance of a Poisson-distributed variable are identical. When the variance of y_t is substantially greater than the mean, some researchers replace the Poisson distribution with a negative binomial. As shown in Table 1, most of the series exhibit no evidence of excess volatility in terms of their variance.

Given the limitation of the Poisson model, we typically report the OLS estimates with robust standard errors. When, however, a time series is especially thin, we report the Poisson estimate. If there are important differences between the OLS and the Poisson estimates, we report the results of both.

Results

For each sample of countries, the results of the estimations for the four different incident types

are displayed in Table 2 below the corresponding series' name. Our four samples include all countries (WORLD) and the countries in the three designated income classes of the World Bank (various years). The entries for WORLD are the sums of the associated incidents occurring in the countries within the three income classes. Column 2 indicates the estimation method; column 3 reports the number of lags; column 4 displays the pre-intervention intercept, *c*; and columns 5 through 8 list α_1 through α_4 estimates. Column 9 reports the estimated long-run (LR) value of the effect of D_L as $\alpha_4 / \left(1 - a_1 - a_2 - ... - a_p\right)$, and column 10 indicates the prob-value of the *F*-test for the joint hypothesis that $\alpha_3 = \alpha_4 = 0$. Finally, column 11 displays the prob-value of the Ljung-Box *Q*-statistic using 4 lags of the residuals. The coefficients' *t*-statistics, calculated using robust standard errors, are depicted in parentheses beneath each estimated coefficient.

To explain Table 2's entries, we first consider the estimates for the worldwide sample for the ALL incident series. Because this series is quite thick (see panel 1 in Figure 1 where no quarterly total approaches zero), we report only the OLS results using a lag length such that *p* = 1. The rise of fundamentalism increases the series' intercept by 25.68 incidents per quarter, while *POST* decreases its intercept by 37.35 incidents per quarter. Both of the *t*-statistics (2.98 and −3.49) exceed 1.96 in absolute value so that these two dummies are statistically significant at the 5% level. The estimated coefficients on D_P and D_L are −30.13 and −13.26, respectively, with *t*-statistics for α_3 and α_4 of −3.34 and −1.18. Moreover, the *F*-statistic for the joint restriction that $\alpha_3 = \alpha_4 = 0$ has a prob-value of 0.00; thus, we can conclude that the decline in the number of incidents following 9/11 had a statistically significant temporary, but not permanent, component. Diagnostic checks indicate that the model is adequate; for example, the reported prob-value for the Ljung-Box *Q*-statistic using 4 lags of the residuals is 0.20.

For the ALL incident series, the OLS estimates for the three income classes indicate that *FUND* caused a significant increase in transnational terrorism of 27.56 incidents per quarter for LICs, a significant decrease of 4.75 incidents per quarter for MICs, and no significant change for HICs. Clearly, the influence of *FUND* is income sensitive, probably given the distribution of fundamentalist populations. All three income classes experienced a significant decline in transnational terrorism in the post-Cold War period: 14.24 fewer incidents per quarter for LICs, 8.03 fewer incidents per quarter for MICs, and 13.80 fewer incidents per quarter for HICs. There *is no evidence of a substitution in overall transnational terrorism from HICs to LICs following 9/11*. In fact, the coefficients for *both* D_P and D_L are negative and significant for only LICs. Any long-run impact of the post-9/11 worldwide decline in terrorist attacks was concentrated in LICs. The MIC sample experienced a temporary fall in transnational terrorism, while the HIC sample did not register any significant effect as a result of 9/11.[7]

For the casualty series, there is little measurable influence of *FUND* or *POST* on the income-based distribution of incidents. The sole exception is the statistically significant 1.16 incident per quarter decrease in the MICs as a result of *FUND*. A key finding is that there is *no long-run impact* of 9/11 on any of the four samples. The two statistically significant coefficients of D_P are −6.78 and 4.38 for LICs and HICs, respectively. This result suggests an immediate and temporary switch in the composition of casualty incidents from LICs to HICs, perhaps as groups sympathetic to al-Qaida tried to raise anxiety in HICs in the wake of 9/11.

Next, we turn to incidents with a U.S. target. For the OLS results, *FUND* had little influence except for a marginally significant increase in LICs, while *POST* resulted in significant decreases for all four samples with the largest decrease occurring in HICs. There was a significant temporary decline in terrorism following 9/11 of 17.44 incidents per quarter associated with the WORLD sample, where most of this decrease (i.e., 12.54 fewer incidents per

quarter) was concentrated in LICs. For the OLS estimates, D_L is only significant for the HIC sample. The Poisson estimates for the thin MICs and HICs series reflect a small, but significant, positive coefficients for D_L.

The casualty series with a U.S. target is particularly thin for the three income classes; thus, the Poisson estimates are reported. For LICs, we also display the OLS estimates since the OLS and Poisson results differ for D_P and D_L. The primary finding concerns the long-run impact of 9/11. The OLS estimate of α_4 for WORLD is 4.58 additional incidents per quarter with a *t*-statistic of 2.26. The value of α_4 for LICs is 3.45 additional incidents per quarter and the *t*-statistic is 2.21. Most of the OLS-identified increase in attacks involving U.S. casualties was in LICs, consistent with the greater concentration of U.S. targeted incidents in LICs. The Poisson estimates of α_4 is, however, positive and significant for *all* income groups.

Alternative Search for Income-Based Substitution

To show the robustness of our income-based results, we apply an alternative partition of countries into income classes that does not rely on the World Bank tripartite classification based on cutoff per-capita GNI levels. We assign the 31 countries with the highest per-capita GNI according to World Bank (2000) to the HIC group and all others to the LIC group. These 31 HICs include most Organization of Economic Cooperation and Development (OECD) countries plus some other countries.[8] Table 3 displays summary statistics for the LICs, HICs, and LICs/WORLD based on the new partition for the four time series. Most transnational terrorism had been staged in LICs during the 1990s. Prior to 9/11, HICs experienced just 5.6 incidents per quarter on average, while LICs suffered 37.3 incidents per quarter on average. During the nine quarters following 9/11, the quarterly mean rose in HICs and fell slightly in LICs. Incidents with

casualties are associated with an increase in their quarterly means in both LICs and HICs. A similar pattern holds for the two time series involving a U.S. target, with a large apparent substitution to LICs for casualty incidents with a U.S. target. These impressions are now tested with an AR intervention model represented in equations (2) and (4).

Table 4 indicates the empirical results. When countries are partitioned in this new fashion, the rise of fundamentalism had virtually all of its impact in LICs for ALL incidents and those involving casualties. *FUND* is associated with a large increase in transnational terrorism attacks in LICs of 24.38 incidents per quarter. Casualty incidents rose by 3.24 per quarter in LICs. A similar finding holds for casualty incidents with a U.S. target: *FUND* is positive and significant for the Poisson test, and positive and marginally insignificant for OLS. Thus, our new partition shows that the impact of *FUND* was entirely based in LICs. A different pattern emerges with respect to the decline in transnational terrorism in the post-Cold War period. For the ALL incident series, the decline was virtually evenly split between LICs and HICs. The only significant *POST* decline for incidents with casualties holds for HICs. Following the Cold War, there was a significant decline in incidents with a U.S. target for both income classes, with the biggest drop characterizing HICs. This was also the case for casualty incidents with a U.S. target. Thus, the world's richest countries experienced the largest decline in deadly transnational terrorism following *POST*, prior to 9/11.

A mixed picture emerges with respect to the influence of 9/11. Immediately following 9/11, the ALL series fell by 27.79 incidents per quarter in LICs, but displayed no significant change in HICs. Moreoever, neither income class experienced a permanent impact in total terrorism after 9/11 − i.e., the coefficient on D_L is not significant. For incidents with casualties, there was an immediate decrease of 8.45 incidents per quarter in LICs and an increase of 4.30 incidents per quarter in HICs , almost equal to the four hijackings on 9/11. There was again no

permanent 9/11 influence. Both series involving U.S. targets fell in LICs temporarily after 9/11. However, incidents with a U.S. target increased permanently by 3.92 incidents per quarter in HICs following 9/11. The Poisson result reinforces this finding. For casualty incidents with a U.S. target, most of the worldwide increase of 4.59 incidents per quarter was in LICs where such incidents rose by 3.56 incidents per quarter. Although there was also an increase in such incidents in HICs, this increase was more modest, judging from the OLS results. Thus, there was a greater concentration of deadly post-9/11 incidents involving a U.S. target in LICs, consistent with the earlier findings. *There is an increased risk for American interests in LICs following 9/11.*

The Distribution of Terrorism across Regions

The six panels of Figure 5 depict the ALL incident series for the six designated regions. Panel 1 and 2 show a sustained decrease in transnational terrorism beginning in the early 1990s for the West Hemisphere and Europe, respectively. In panel 3, the Middle East displays an increase in transnational terrorism for the start of the 1990s, followed by a fall around 1993 and then an increase around 9/11. A similar increase occurs for Asia following 9/11 in panel 4. In panel 5 and 6, there is a jump in transnational terrorism in Africa and Eurasia at the start of the 1990s, followed by decreases and increases over the ensuing years. There are regional incident patterns in Figure 5 (see, especially, Africa, Eurasia, and the Middle East) that do not match those in Figure 1 when countries are partitioned by income classes. Hence, the geographical identification provides new insights on attack patterns.

Figure 6 depicts the casualty series for the six geographical regions. The most striking feature is the sharp upward trend in these terrorist incidents in the Middle East starting in 2000, with a pronounced increase following 9/11. Much smaller increases characterize the other

regions. In Asia (panel 4), the increase in terrorist incidents after 9/11 is followed by a decrease. Some of the series, especially that of Eurasia, may be too thin to conduct meaningful statistical analysis.

Table 5 reports that the descriptive statistics for three periods for the four incident series and the six geographical regions.[9] We focus our remarks on the ALL incident series. For the 1992:2-2001:2 period, Europe's mean of 19.27 incidents per quarter exceeds that of the other regions. The quarterly mean number of terrorist incidents in the Western Hemisphere (11.84), Africa (10.05), the Middle East (12.92), and Asia (9.76) are all quite similar; there are, however, some contrasting regional changes for the two time intervals surrounding 9/11. In the nine pre-9/11 quarters, the Western Hemisphere and Africa experienced an average of 12.33 and 9.44 incidents per quarter, respectively; in the nine post-9/11 quarters, the Western Hemisphere and Africa experienced an average of 5.33 and 2.44 incidents per quarter, respectively. These are rather drastic declines. In sharp contrast, the Middle East and Asia had incident means that rose very sharply from 4.78 and 7.78 to 15.00 and 13.00 incidents per quarter, respectively, for the same comparison intervals. The mean number of European incidents showed a modest rise from 6.33 to 10.78 incidents per quarter.

In the casualty series, the Middle East displayed the largest change on either side of 9/11 – a rise of almost 8.5 incidents per quarter. In contrast, Africa's casualty series fell by 2.78 incidents per quarter. For incidents with a U.S. target, the Western Hemisphere experienced a reduction of 5.89 incidents per quarter when the periods on either side of 9/11 are compared. Europe, the Middle East, and Asia, however, attracted more U.S.-targeted events following 9/11. This same pattern held for the Middle East and Asia for casualty incidents with a U.S. target.

To formalize these impressions, we again conduct an AR intervention analysis for each incident type in each region.[10] The empirical results are summarized in Table 6. For ALL

incidents, the rise of fundamentalism was associated with a significant increase in terrorism in Africa, Asia, and the Middle East, but not in the other three regions. This increase is greatest in the Middle East. The post-Cold War period is associated with less transnational terrorism in the Western Hemisphere, Europe, the Middle East, and Asia, which is due, in part, to the reduced sponsorship by the Soviet-bloc countries and the demise of many left-wing Europe groups (Enders and Sandler, 1999). In contrast, Eurasia had more terrorism during the post-Cold War period, a result characteristic of fledgling democracies (Eubank and Weinberg, 1994). Africa, the Middle East, and Asia experienced a significant immediate decline in terrorism following 9/11 as shown by the estimate of the D_P coefficient. The Western Hemisphere, Eurasia, and Africa had a significant *long-term* decrease in terrorism after 9/11. Asia showed a significant but small increase. When these results are evaluated in conjunction with Table 5, there is strong evidence that all regions experienced on balance a post-9/11 decline in terrorism.

The empirical results for the casualty series are similar to those for the ALL incident series. The increase in fundamentalism was associated with a significant increase in casualty incidents in Africa, the Middle East, and Asia. For the latter two regions, there are strong fundamentalist populations and influences. The post-Cold War era experienced a significant fall in casualty incidents in the Western Hemisphere and a significant rise in Eurasia. The various results for Europe are ambiguous since the OLS and Poisson estimates have some marked differences: e.g., *POST* is negative and insignificant for OLS, but negative and significant for Poisson. The Western Hemisphere displays a positive and significant temporary increase in terrorism during the post-9/11 period. The Middle East and Asia experienced a temporary drop in casualty events after 9/11. The OLS estimates show that no region displayed a permanent and significant change (at the 0.05 level) in casualty incidents following 9/11. The decline for Europe is only significant for the Poisson estimation. Overall, there is less evidence of a

permanent 9/11-induced fall of casualty events compared with ALL events. This finding is consistent with transnational terrorist incidents remaining deadly in the post-Cold War era.

Interestingly, the rise of fundamentalism is not associated with a significant effect on the number of incidents against U.S. interests in any region but Eurasia, where there is a negative and significant impact. The positive *FUND* influence in Asia is almost significant at the 0.05 level. *POST* resulted in region-specific differences: there is a negative and significant impact in the Western Hemisphere, Europe, the Middle East, and Asia. These findings can be partly explained by reduced state-sponsorship of terrorism and the demise of many left-wing groups in Europe. In contrast, *POST* is tied to a rise in U.S.-targeted incidents in Eurasia and Africa, where there is greater political instability in the 1990s. The pulse dummy for 9/11 indicates a negative and significant fall in U.S.-targeted events in Europe, the Middle East, and Asia. During the post-9/11 period, there are marginally significant permanent declines in U.S.-targeted incidents in the Western Hemisphere and Africa. There is, however, a significant positive increase in the coefficient for D_L in the Middle East. This result is strongly suggestive of a transfer of U.S.-targeted events from North America and other venues to targets in the Middle East, in keeping with the terrorists responding to augmentations in U.S. homeland security.

Finally, we turn to the regional effects tied to casualty incidents with a U.S. target. In Table 6, the rise in fundamentalism is not associated with any significant changes in these incidents. In contrast, *POST* leads to significant drops in these events in the Western Hemisphere and Europe. The so-called peace dividend derived from the end of the Cold War involved not only reduced military spending but also a decrease in terrorism directed at U.S. interests owing to less state-sponsorship. There is, however, a significant *POST* increase in such events in Africa. The 9/11 pulse coefficient reflects a temporary but significant rise in casualty incidents with a U.S. target in the Western Hemisphere and a significant decrease in the Middle

East and Asia after 9/11. More important, the level impact of 9/11 is quite different: both the Middle East and Asia experienced a significant increase in these events, while Africa experienced a marginally significant decrease. For the Middle East and Asia, we again see a geographical switch of venue following 9/11 possibly coinciding with increases in security in the wealthy countries.

Concluding Remarks

We apply time-series methods to identify shifting patterns of transnational terrorism across countries' income classes or geography in response to three defining events. Intuition and eyeballing of data may give different impressions than careful statistical analysis that controls for important interventions such as the rise of fundamentalism, the start of the post-Cold War era, and 9/11. Although intuition suggests a substitution of terrorist events from rich to poor countries in response to 9/11-motivated increases in homeland security in some rich countries (especially the United States and the EU) and the terrorists' hunt for soft targets, we find no convincing evidence of this shift except for incidents with U.S. casualties. Our failure may be due to offsetting factors (e.g., more targets in HICs) or the rather low beginning GNI per-capita level for designating HICs and MICs. To address the latter concern, we reclassify HICs as those with the 31 highest per-capita GNIs and look for a transference of terrorist events after 9/11 from LICs to HICs. Again, we find no evidence of an income-based transfer in the anticipated direction except for incidents with U.S. casualties, so that our results are robust to an alternative income taxonomy.

When countries are classified into six regional groups, there is evidence of shifting venues based on geography. For terrorist incidents with a U.S. target, a clear transference away from the Western Hemisphere and Africa to the Middle East and Asia is uncovered. In addition,

the augmenting influence of the rise of fundamentalism on transnational terrorists was greatest in the Middle East and Asia, where there are large Islamic populations. The end to the Cold War and the breakup of the Soviet Union reduced transnational terrorism in most regions except Eurasia, where it has increased with enhanced political instability. The effects of fundamentalism and the post-Cold War on terrorism differed markedly between income-based and geography-based partitions of countries.

While Americans are safer at home owing to enhanced homeland security, the vulnerability U.S. people and property has increased following 9/11. This vulnerability also applies to other prime-target countries, particularly those identified as assisting the U.S. agenda in the Middle East. The U.S. policy to assist LICs that request help[11] does not go far enough given the changing post-9/11 pattern of the transnational terrorism aimed at U.S. targets. Soft targets can exist anywhere and our analysis identifies increased post-9/11 pattern of transnational terrorism aimed at U.S. targets. Soft targets can exist anywhere and our analysis identifies increased post-9/11 attacks not only in HICs but also in the Middle East and Asia. Thus, U.S. assistance must account for changing patterns of attacks against U.S. and other interests. Our study shows that this pattern may go against intuition and be more geographically based. For example, post-9/11 attacks in Saudi Arabia have involved a wealthy Middle East country. Today's fundamentalist terrorism is shifting to the Middle East and Asia, where large support populations exist and terrorists do not have to transcend fortified borders to attack U.S. and Western interests. Thus, regions that once experienced greater spillover terrorism *from* the Middle East and Africa (e.g., Europe in the 1980s) may want to reallocate some homeland security spending to these regions to protect their interests.

Our time-series analysis identifies where the United States and the international community need to direct their security efforts in light of recent events. In a globalized world

with transnational terrorism, countries must realize that terrorists will react to homeland security upgrades by identifying weakest links abroad. The ability to shore up weakest links worldwide requires collective action beyond efforts observed to date. Such actions are prone to free riding as countries wait for the prime-target countries to act. Past events – the rise of fundamentalist terrorism and the end to the Cold War – demonstrate that transnational terrorism patterns can change rather drastically. Both events have had a greater influence on patterns than 9/11. Moreover, this change in terrorism patterns may be geographically, rather than income, driven. There is clearly a need to keep track of such changes if defenses are to be appropriately deployed.

Footnotes

1. The April 10, 1992 bombing of the London financial district by the Irish Republican Army caused $2.9 billion of losses, making it the most costly terrorist incident prior to 9/11.

2. In the United States, homeland security involves securing targets *at home* (Enders and Sandler, 2006:Chapter 10). Upgrades to U.S. embassies and military installations abroad started in 1976 and 1985, well before 9/11 (Enders and Sandler, 1993). Except for a few years for the United States, there is no homeland security expenditure data; thus, we cannot explicitly add this variable. We can, however, infer that rich countries are more able to afford homeland security. Moreover, some wealthy nations (e.g., Israel, Spain, the United Kingdom, and the United States) are motivated to augment security because their interests are prime targets of terrorists.

3. Pioneering studies include Landes (1978), Sandler, Tschirhart, and Cauley (1983), and Atkinson, Sandler, and Tschirhart (1987).

4. The average terrorist incident kills one person, while a suicide mission murders thirteen.

5. We used the 1978, 1980, 1990, 1995, and 2000 volumes of *World Development Report* to track changes in the countries' income classifications.

6. We use smoothed proportions in Figure 4 only; the actual proportions are utilized in our statistical analysis.

7. We also ran a three-variable vector-autoregressive (VAR) model with separate estimating equations for LICs, MICs, and HICs. For each equation, current variables of incidents in each income class are regressed against past values of incidents in each of the three income classes and the four intervention dummies. The results for the ALL series is virtually identical to the single-equation estimates. These results are available from either authors upon request.

8. The 31 countries are: Luxembourg, Norway, United States, Switzerland, Denmark, Iceland, Austria, the Netherlands, Canada, Belgium, Hong Kong, Japan, Ireland, Germany, France, Australia, United Arab Emirates, United Kingdom, Finland, Italy, Sweden, Singapore, Spain, Israel, Macao, New Zealand, Kuwait, Malta, Cyprus, Portugal, and Greece.

9. Figures 5 and 6 display the pattern of the time series for the entire period and show whether a series is thin in terms of zero values. Table 5 gives a more focused characterization of the series for the post-Cold War and 9/11 periods.

10. A spatial econometric specification requires a nonlinear estimator that conflicts with our linear time-series approach. Spatial estimation is reserved for another paper.

11. This assistance is one of the four pillars of U.S. antiterrorism policy (U.S. Department of State, 2003).

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Figure 1: Location of Incidents by Income Group

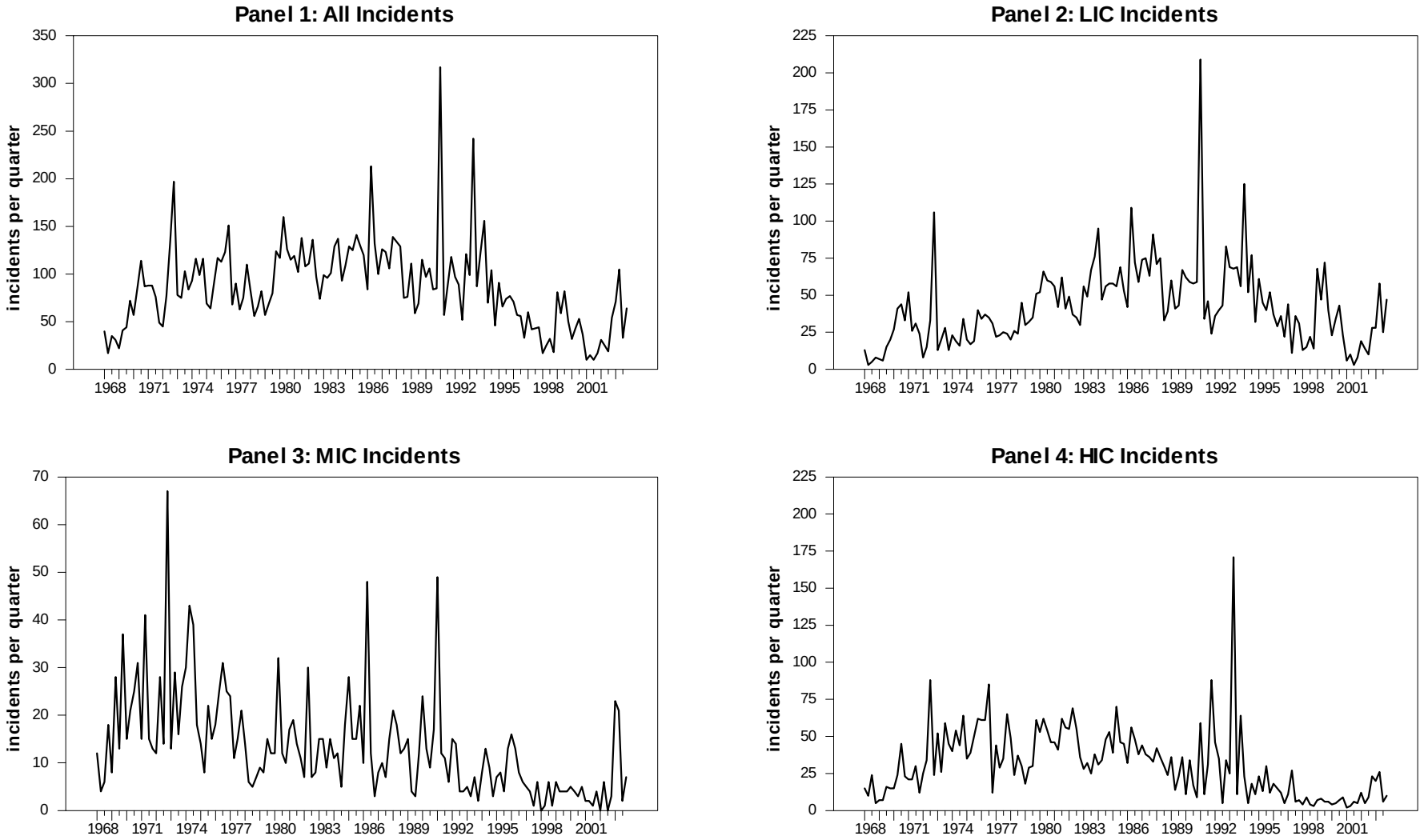


Figure 2: Location of Casualty Incidents by Income Group

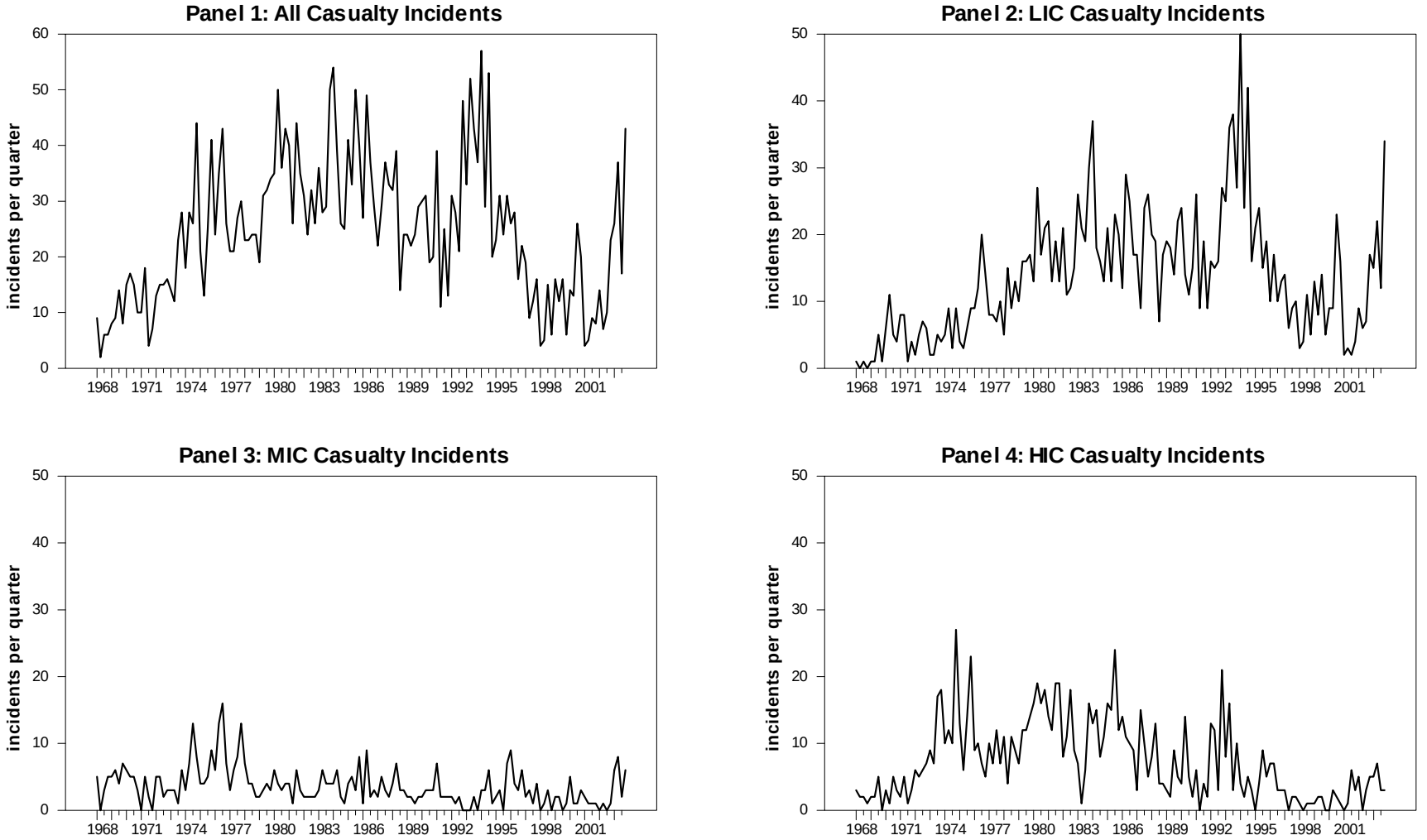


Figure 3: Incidents with a U.S. Target by Income Group

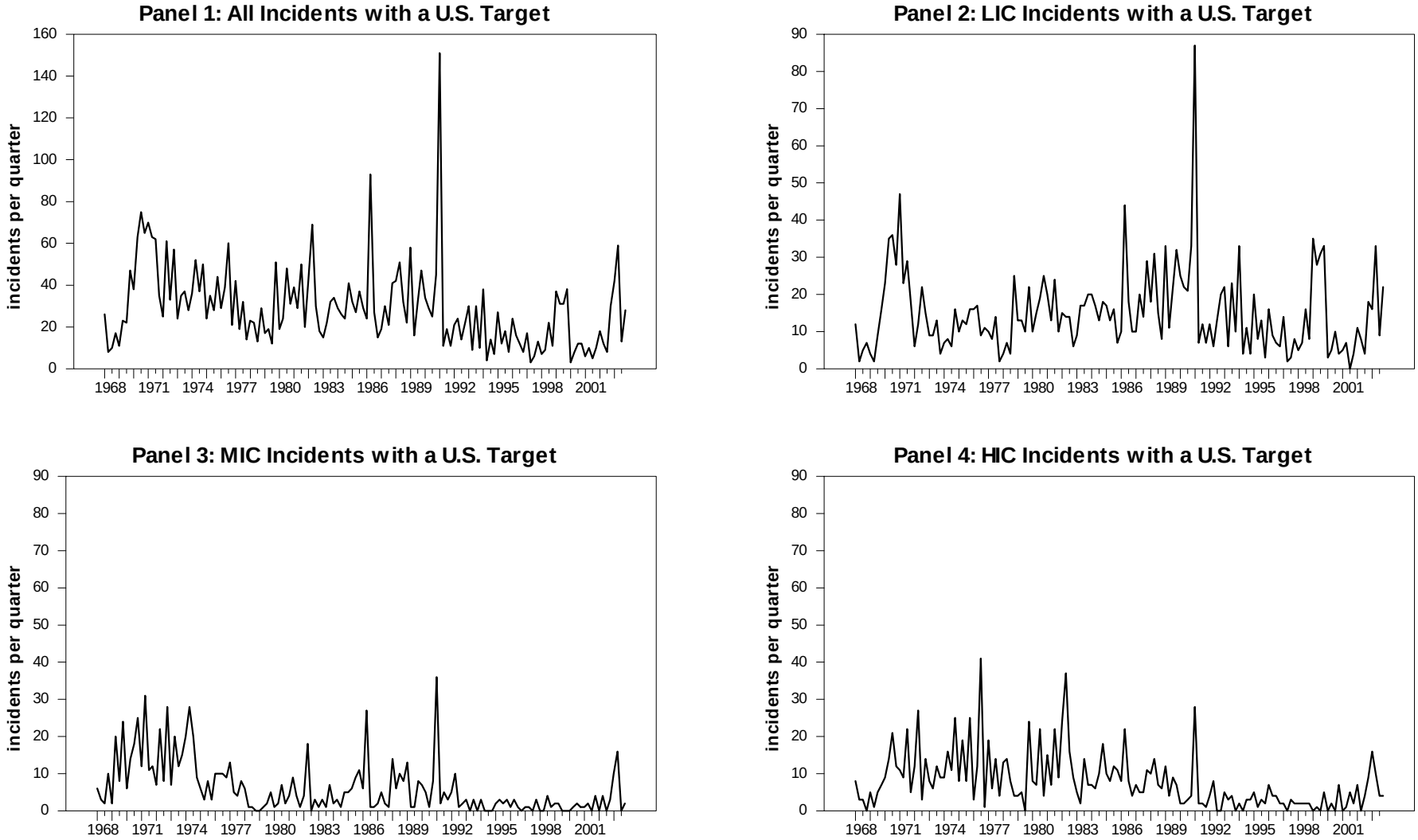
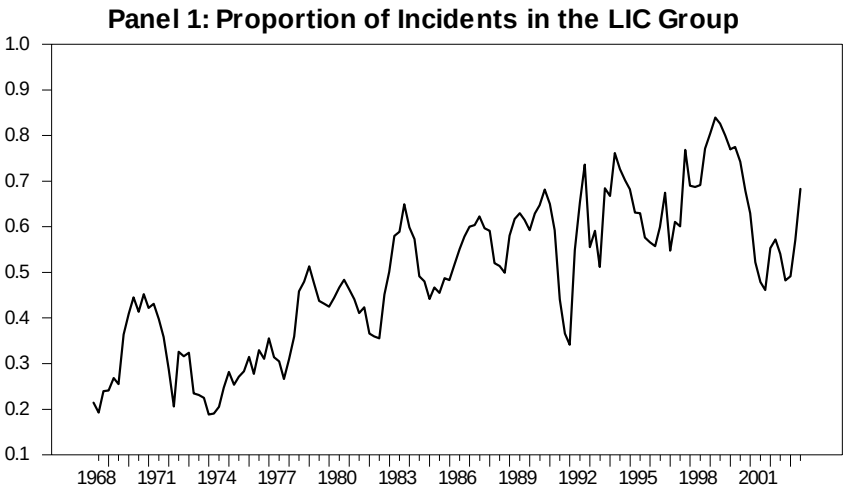
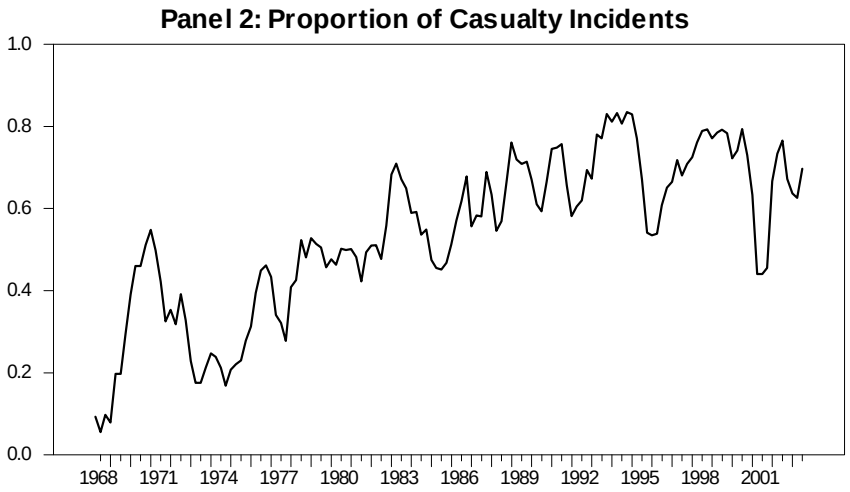
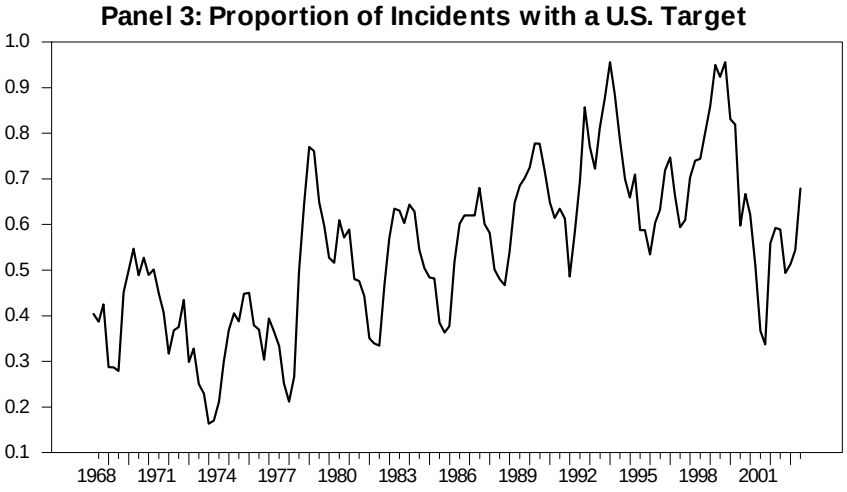


Figure 4: Proportion of Incident Types in the LIC Group







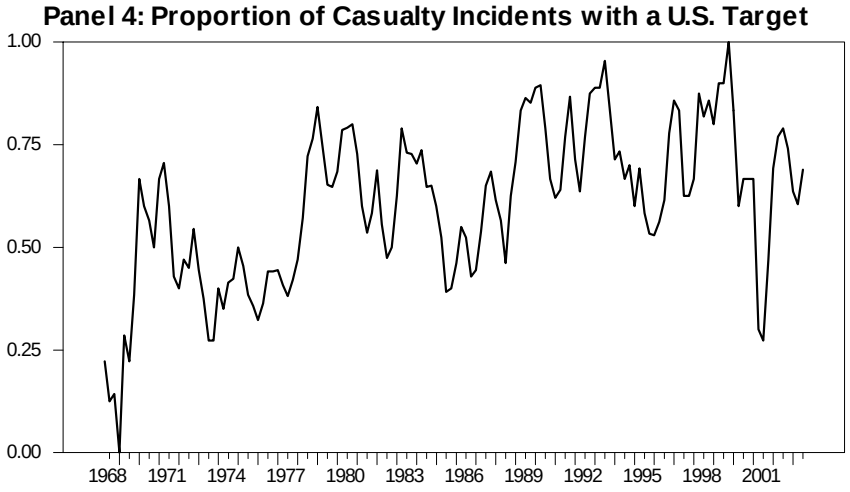


Figure 5: Incidents by Region

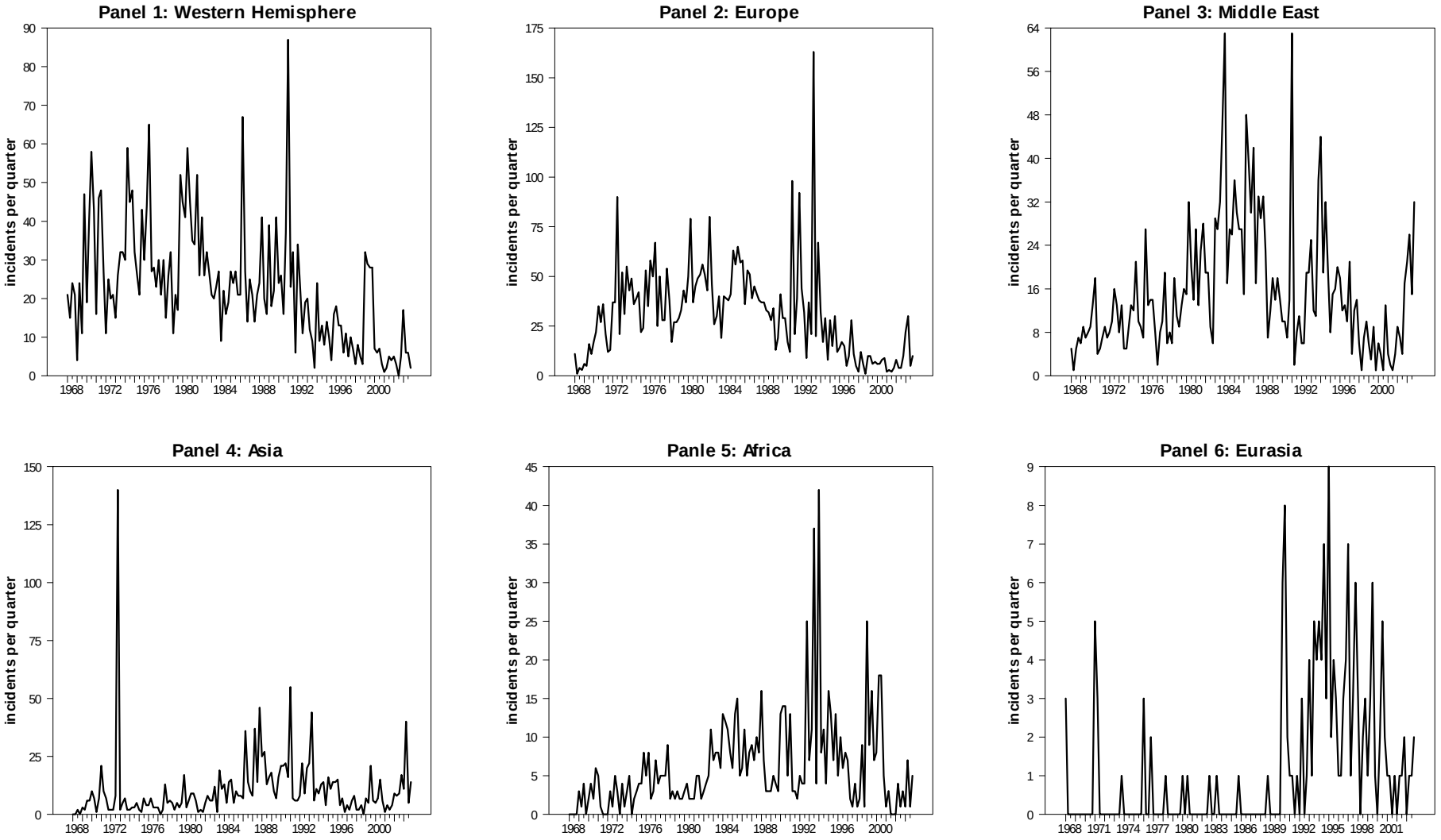


Figure 6: Casualty Incidents by Region

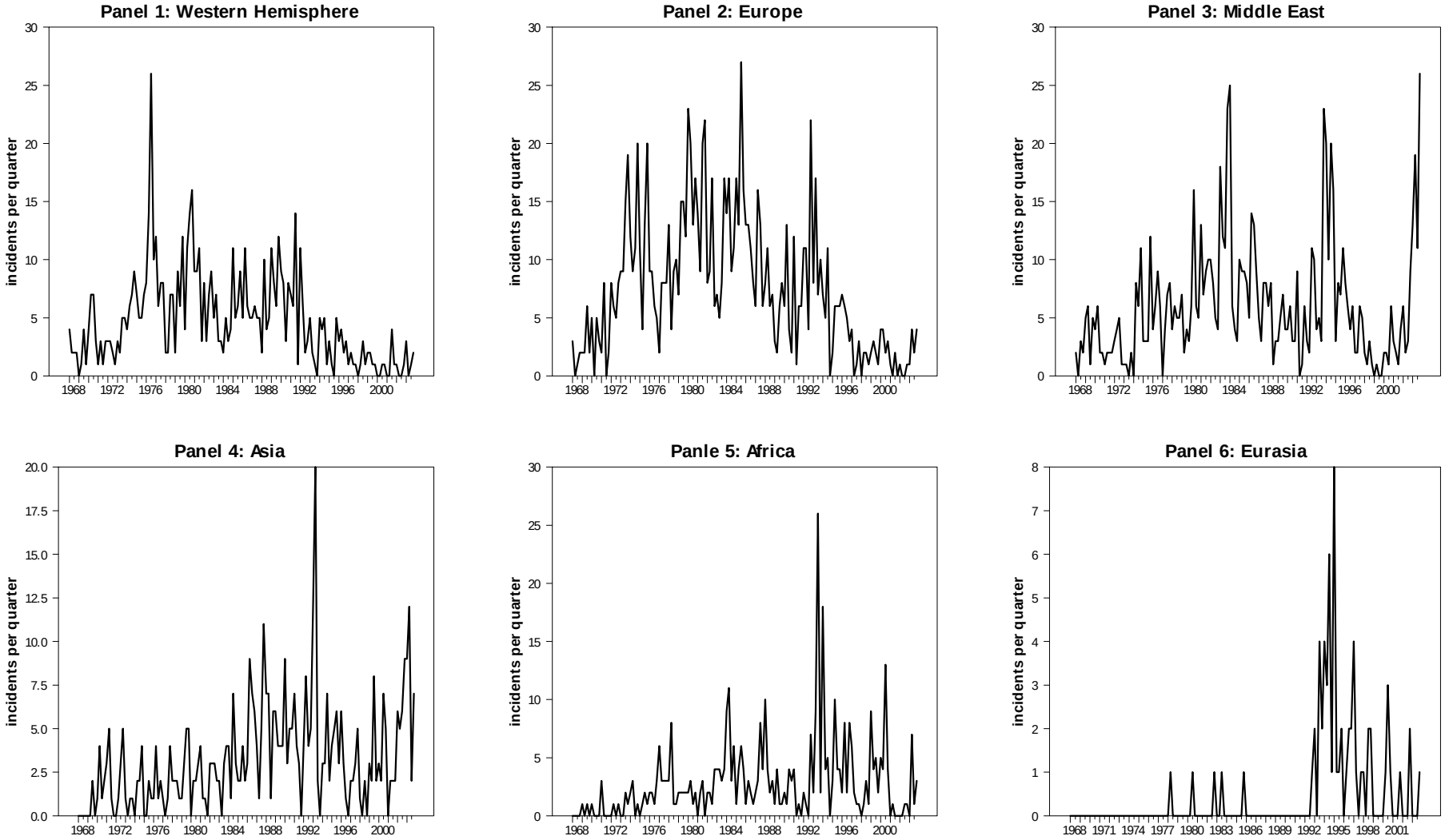


TABLE 1. Summary Statistics of the Various Incident Types by Income Group

Series	Start	End	Mean	Variance	Min	Max	Mean	Variance	Min	Max
			ALL Incident Types				*Incidents with Casualties*			
WORLD	1992:2	2001:2	66.4	44.0	10	242	22.7	14.3	4	57
	1999:2	2001:2	42.3	22.2	10	82	12.9	7.3	4	26
	2001:4	2003:4	46.6	29.4	17	105	20.6	12.8	7	43
LICs	1992:2	2001:2	42.9	24.7	6	125	16.5	11.3	2	50
	1999:2	2001:2	33.1	20.4	6	72	9.9	6.8	2	23
	2001:4	2003:4	26.3	16.8	8	58	14.0	9.5	4	34
MICs	1992:2	2001:2	5.7	3.9	0	16	2.3	2.2	0	9
	1999:2	2001:2	3.7	1.1	2	5	1.8	1.5	0	5
	2001:4	2003:4	7.3	8.7	0	23	2.8	3.0	0	8
HICs	1992:2	2001:2	17.8	28.7	2	171	4.0	4.6	0	21
	1999:2	2001:2	5.6	2.3	2	9	1.2	1.1	0	3
	2001:4	2003:4	12.9	8.1	5	26	3.8	2.0	0	7
LICs/WORLD	1992:2	2001:2	67.5%	0.145	0.262	0.878	71.8%	0.122	0.385	0.913
	1999:2	2001:2	74.3%	0.095	0.600	0.878	72.2%	0.134	0.500	0.885
	2001:4	2003:4	57.0%	0.117	0.394	0.758	67.9%	0.112	0.500	0.857
			Incidents with a U.S. Target				*Casualty Incidents with a U.S. Target*			
WORLD	1992:2	2001:2	16.2	10.4	3	38	3.9	3.3	0	17
	1999:2	2001:2	16.7	12.9	3	38	2.6	1.2	0	4
	2001:4	2003:4	24.1	17.1	8	59	9.4	6.5	1	20
LICs	1992:2	2001:2	12.3	9.6	2	35	2.9	3.0	0	16
	1999:2	2001:2	13.9	12.8	3	33	1.9	1.3	0	4
	2001:4	2003:4	13.6	9.4	4	33	6.7	4.7	1	14
MICs	1992:2	2001:2	1.6	1.9	0	10	0.4	0.7	0	3
	1999:2	2001:2	1.0	0.9	0	2	0.4	0.5	0	1
	2001:4	2003:4	4.3	5.4	0	16	1.0	1.9	0	6
HICs	1992:2	2001:2	2.3	2.2	0	8	0.6	0.8	0	3
	1999:2	2001:2	1.8	2.5	0	7	0.2	0.4	0	1
	2001:4	2003:4	6.2	4.9	0	16	1.8	1.2	0	4
LICs/WORLD	1992:2	2001:2	73.6%	0.183	0.250	1.000	71.6%	0.243	0.000	1.000
	1999:2	2001:2	78.7%	0.210	0.333	1.000	69.8%	0.209	0.500	1.000
	2001:4	2003:4	57.1%	0.133	0.366	0.778	71.1%	0.119	0.333	1.000

Note: *LICs* denotes low-income countries; MICs indicates middle-income countries; and HICs depicts high-income countries.

TABLE 2. OLS and Poisson Estimates of Intervention Variables

Region	Method	Lags	*c*	*FUND*	*POST*	D_P	D_L	LR	*F*	*Q*(4)
					ALL Incident Types					
WORLD	OLS	1	61.29	25.68	-37.35	-30.13	-13.26	-17.71	0.00	0.20
			(5.66)	(2.98)	(-3.49)	(-3.34)	(-1.18)			
LICs	OLS	1	21.61	27.56	-14.24	-21.26	-12.48	-15.24	0.00	0.31
			(5.68)	(4.68)	(-2.58)	(-4.10)	(-1.85)			
MICs	OLS	1	18.15	-4.75	-8.03	-5.91	1.35	1.49	0.00	0.29
			(6.93)	(-2.08)	(-4.61)	(-2.22)	(0.50)			
HICs	OLS	2	19.32	2.99	-13.80	-2.22	-1.36	-2.56	0.45	0.89
			(4.88)	(0.84)	(-2.33)	(-0.83)	(-0.29)			
					Incidents with Casualties					
WORLD	OLS	2	6.63	2.59	-2.73	-3.41	2.79	9.37	0.53	0.52
			(3.72)	(1.17)	(-1.16)	(-1.09)	(0.78)			
LICs	OLS	2	2.44	2.97	-0.80	-6.78	2.47	8.28	0.00	0.71
			(2.79)	(1.66)	(-0.48)	(-3.02)	(0.96)			
MICs	OLS	1	3.46	-1.16	-0.77	-1.38	0.54	0.79	0.02	0.92
			(6.27)	(-2.28)	(-1.66)	(-1.58)	(0.57)			
HICs	OLS	3	2.67	0.11	-1.58	4.38	-0.06	-0.19	0.00	0.52
			(3.25)	(0.10)	(-1.27)	(5.44)	(-0.06)			
					Incidents with a U.S. Target					
WORLD	OLS	1	29.86	0.10	-15.96	-17.44	7.01	8.18	0.00	0.76
			(6.19)	(0.02)	(-4.15)	(-3.34)	(1.30)			
LICs	OLS	1	10.30	4.09	-5.04	-12.54	1.50	1.98	0.00	0.30
			(4.69)	(1.95)	(-2.24)	(-4.19)	(0.46)			
MICs	OLS	2	6.59	-3.00	-2.62	-3.16	1.69	2.78	0.00	0.26
			(4.38)	(-1.95)	(-2.38)	(-1.70)	(0.90)			
	Poisson	1	1.92	-0.45	-0.96	-32.77	0.86		0.00	
			(23.70)	(-5.88)	(-6.62)	(0.00)	(4.21)			
HICs	OLS	1	10.68	-0.45	-7.83	-1.28	3.89	3.85	0.00	0.37
			(6.56)	(-0.28)	(-5.92)	(-0.79)	(2.42)			
	Poisson	1	2.35	-0.04	-1.44	-0.21	0.96		0.00	
			(32.09)	(-0.67)	(-11.46)	(-0.45)	(5.53)			
					Casualty Incidents with a U.S. Target					
WORLD	OLS	2	4.62	0.83	-2.48	-3.09	4.58	6.08	0.00	0.89
			(5.51)	(1.10)	(-2.90)	(-1.54)	(2.26)			
LICs	OLS	1	2.49	1.72	-1.58	-6.31	3.45	3.89	0.00	0.25
			(6.64)	(3.53)	(-2.63)	(-4.17)	(2.21)			
	Poisson	1	0.96	0.45	-0.38	-34.35	0.75		0.00	
			(10.32)	(3.92)	(-3.24)	(0.00)	(4.68)			
MICs	Poisson	1	0.53	-0.67	-0.70	-34.01	0.86		0.12	
			(4.67)	(-3.42)	(-2.36)	(0.00)	(2.07)			
HICs	Poisson	1	0.40	0.10	-0.99	1.16	1.04		0.00	
			(3.31)	(0.58)	(-3.99)	(2.18)	(3.07)			

TABLE 3. Summary Statistics of the Various Incident Types by Income Group for Alternative Classification

Series	Start	End	Mean	Variance	Min	Max	Mean	Variance	Min	Max
			ALL Incident Types				*Incidents with Casualties*			
LICs	1992:2	2001:2	49.0	25.7	8	130	18.8	11.5	3	53
	1999:2	2001:2	37.3	21.6	8	79	11.8	7.0	4	25
	2001:4	2003:4	34.1	23.4	10	80	16.8	11.9	5	40
HICs	1992:2	2001:2	17.7	27.5	2	163	3.9	4.7	0	21
	1999:2	2001:2	5.6	2.3	2	9	1.2	1.1	0	3
	2001:4	2003:4	12.8	7.9	5	25	3.8	2.0	0	7
LICs/WORLD	1992:2	2001:2	77.7%	0.142	0.329	0.929	85.2%	0.115	0.563	1.000
	1999:2	2001:2	85.2%	0.053	0.763	0.929	90.6%	0.090	0.769	1.000
	2001:4	2003:4	70.8%	0.114	0.526	0.846	79.1%	0.124	0.625	1.000
			Incidents with a U.S. Target				*Casualty Incidents with a U.S. Target*			
LICs	1992:2	2001:2	14.2	10.1	3	37	3.4	3.2	0	16
	1999:2	2001:2	15.0	12.5	3	33	2.4	1.2	0	4
	2001:4	2003:4	18.2	13.8	4	49	7.7	5.7	1	14
HICs	1992:2	2001:2	2.1	2.0	0	7	0.5	0.8	0	3
	1999:2	2001:2	1.8	2.5	0	7	0.2	0.4	0	1
	2001:4	2003:4	6.2	4.9	0	16	1.8	1.2	0	6
LICs/WORLD	1992:2	2001:2	84.6%	0.150	0.417	1.000	84.9%	0.231	0.000	1.000
	1999:2	2001:2	87.8%	0.193	0.417	1.000	90.6%	0.186	0.500	1.000
	2001:4	2003:4	73.4%	0.152	0.500	1.000	79.6%	0.121	0.667	1.000

Notes: HICs depicts the 31 countries with highest per-capita GNI in 2000, while LICs denotes all other countries. See Table 1 for the WORLD statistics.

TABLE 4. OLS and Poisson Estimates of Intervention Variables for Alternative Income Classification

Region	Method	Lags	*c*	*FUND*	*POST*	D_P	D_L	LR	*F*	*Q*(4)
					ALL Incident Types					
LICs	OLS	1	34.54	24.38	-16.90	-27.79	-11.92	-13.89	0.00	0.59
			(6.24)	(3.84)	(-2.77)	(-3.89)	(-1.41)			
HICs	OLS	2	22.13	2.87	-16.99	-1.99	-1.16	-2.27	0.54	0.97
			(4.91)	(0.77)	(-2.71)	(-0.76)	(-0.26)			
					Incidents with Casualties					
LICs	OLS	2	3.51	3.24	-0.74	-8.45	2.76	8.26	0.00	0.84
			(3.15)	(1.69)	(-0.43)	(-3.10)	(0.86)			
HICs	OLS	2	4.42	0.03	-2.88	4.30	-0.25	-0.64	0.00	0.31
			(4.63)	(0.03)	(-2.19)	(5.68)	(-0.26)			
					Incidents with a U.S. Target					
LICs	OLS	1	16.15	0.87	-6.33	-16.59	3.66	4.88	0.00	0.32
			(4.73)	(0.29)	(-2.31)	(-3.84)	(0.80)			
HICs	OLS	1	12.97	-1.01	-9.84	-1.06	3.92	4.03	0.00	0.28
			(6.54)	(-0.55)	(-6.37)	(-0.67)	(2.46)			
	Poisson	1	2.44	-0.07	-1.59	-0.13	0.97		0.00	
			(26.19)	(-1.28)	(-11.56)	(-0.27)	(5.42)			
					Casualty Incidents with a US Target					
LICs	OLS	2	2.75	0.96	-1.31	-6.62	3.56	5.11	0.00	0.82
			(4.79)	(1.60)	(-1.90)	(-4.03)	(2.09)			
	Poisson	1	1.24	0.28	-0.35	-33.52	0.75		0.00	
			(14.60)	(2.85)	(-3.22)	(0.00)	(4.99)			
HICs	Poisson	1	0.75	-0.10	-1.20	1.23	1.09		0.00	
			(7.26)	(-0.67)	(-4.58)	(2.29)	(3.11)			

Note: See Table 2 for the OLS results for the WORLD sample.

TABLE 5. Summary Statistics of the Various Incident Types by Region

Series	Start	End	Mean	Variance	Min	Max	Mean	Variance	Min	Max
			ALL Incident Types				*Incidents with Casualties*			
West. Hem.	1992:2	2001:2	11.84	8.41	1	32	1.97	1.71	0	6
	1999:2	2001:2	12.33	12.19	1	29	0.67	0.71	0	2
	2001:4	2003:4	5.33	4.80	0	17	1.00	1.00	0	3
Europe	1992:2	2001:2	19.27	27.57	1	163	4.81	4.69	0	22
	1999:2	2001:2	6.33	2.60	2	10	2.22	1.39	0	4
	2001:4	2003:4	10.78	9.19	4	30	1.44	1.59	0	4
Eurasia	1992:2	2001:2	3.00	2.17	0	9	1.51	1.82	0	8
	1999:2	2001:2	2.33	2.00	0	6	0.56	1.01	0	3
	2001:4	2003:4	1.00	0.71	0	2	0.44	0.73	0	2
Africa	1992:2	2001:2	10.05	9.46	1	42	4.78	5.31	0	26
	1999:2	2001:2	9.44	6.42	1	18	4.22	3.73	0	13
	2001:4	2003:4	2.44	2.46	0	7	1.44	2.30	0	7
Mid. East	1992:2	2001:2	12.92	9.84	1	44	5.84	5.86	0	23
	1999:2	2001:2	4.78	3.99	1	13	1.89	1.83	0	6
	2001:4	2003:4	15.00	9.95	4	32	10.33	8.00	2	26
Asia	1992:2	2001:2	9.76	8.48	0	44	3.86	3.81	0	20
	1999:2	2001:2	7.78	6.22	1	21	3.44	2.65	0	8
	2001:4	2003:4	13.00	10.91	4	40	6.44	3.28	2	12
			Incidents with a U.S. Target				*Casualty Incidents with a U.S. Target*			
West. Hem.	1992:2	2001:2	6.30	6.90	0	25	0.76	1.04	0	5
	1999:2	2001:2	9.22	10.91	1	25	0.44	0.53	0	1
	2001:4	2003:4	3.33	3.46	0	12	0.78	0.83	0	2
Europe	1992:2	2001:2	1.59	1.26	0	4	0.35	0.48	0	1
	1999:2	2001:2	1.78	1.48	0	4	0.44	0.53	0	1
	2001:4	2003:4	4.67	5.00	0	13	0.22	0.44	0	1
Eurasia	1992:2	2001:2	0.49	0.65	0	2	0.16	0.44	0	2
	1999:2	2001:2	0.67	0.71	0	2	0.22	0.67	0	2
	2001:4	2003:4	0.44	0.73	0	2	0.22	0.67	0	2
Africa	1992:2	2001:2	2.68	3.58	0	17	1.30	2.82	0	16
	1999:2	2001:2	1.78	1.64	0	4	0.44	0.53	0	1
	2001:4	2003:4	1.00	1.00	0	3	0.11	0.33	0	1
Mid. East	1992:2	2001:2	2.86	2.35	0	8	0.62	0.83	0	3
	1999:2	2001:2	1.33	1.58	0	5	0.33	0.50	0	1
	2001:4	2003:4	7.56	4.82	2	11	4.78	4.09	0	11
Asia	1992:2	2001:2	2.41	2.58	0	11	0.76	1.06	0	3
	1999:2	2001:2	2.00	1.73	0	5	0.78	1.97	0	2
	2001:4	2003:4	7.56	8.40	1	29	3.11	2.32	1	7

Note: West. Hem. denotes Western Hemisphere, and Mid. East indicates Middle East.

TABLE 6. OLS and Poisson Estimates of Intervention Variables by Geographic Region

Region	Method	Lags	*c*	*FUND*	*POST*	D_P	D_L	LR	*F*	*Q*(4)
					ALL Incident Types					
West. Hem.	OLS	1	22.57	0.22	-13.25	0.51	-5.51	-7.16	0.01	0.81
			(7.40)	(0.08)	(-4.86)	(0.33)	(-2.58)			
Europe	OLS	2	18.44	5.62	-14.54	-5.40	-3.15	-5.75	0.02	0.87
			(5.45)	(1.47)	(-2.56)	(-1.75)	(-0.65)			
Eurasia	Poisson	1	-0.71	0.41	1.17	-33.63	-0.74		0.12	
			(-2.56)	(1.25)	(4.35)	(0.00)	(-2.06)			
Africa	OLS	2	1.97	2.33	1.89	-2.09	-4.53	-7.25	0.00	0.68
			(3.44)	(2.65)	(1.25)	(-2.89)	(-2.46)			
Mid. East	OLS	1	6.91	9.10	-7.35	-11.00	2.71	3.95	0.00	0.48
			(4.40)	(3.85)	(-2.91)	(-3.65)	(0.89)			
Asia	Poisson	1	1.62	0.28	-0.22	-1.63	0.24		0.01	
			(23.42)	(4.03)	(-3.39)	(-2.28)	(2.22)			
					Incidents with Casualties					
West. Hem.	OLS	2	2.50	0.63	-2.25	3.64	-0.52	-1.14	0.00	0.85
			(4.55)	(0.75)	(-2.74)	(8.77)	(-1.06)			
Europe	OLS	3	2.70	0.26	-1.66	0.22	-0.53	-1.80	0.78	0.98
			(3.53)	(0.25)	(-1.39)	(0.42)	(-0.70)			
	Poisson	1	1.32	0.17	-0.42	1.18	-0.64		0.06	
			(13.62)	(2.32)	(-4.65)	(1.55)	(-2.20)			
Eurasia	Poisson	1	-3.35	1.29	2.50	-33.03	-0.91		0.23	
			(-3.28)	(1.15)	(4.54)	(0.00)	(-1.71)			
Africa	OLS	2	0.92	0.99	1.10	-1.13	-1.97	-3.08	0.00	0.58
			(3.18)	(2.17)	(1.29)	(-1.59)	(-1.83)			
Mid. East	OLS	1	2.07	1.88	-1.03	-6.64	3.75	7.28	0.00	0.21
			(3.66)	(2.38)	(-1.02)	(-3.17)	(1.69)			
Asia	OLS	1	1.16	1.53	0.12	-3.37	2.01	2.77	0.00	0.31
			(3.71)	(2.73)	(0.19)	(-3.03)	(1.57)			
					Incidents with a U.S. Target					
West. Hem.	OLS	1	14.08	-2.18	-6.23	0.87	-2.79	-3.20	0.13	0.22
			(6.49)	(-1.11)	(-3.29)	(0.79)	(-1.87)			
Europe	OLS	1	8.80	-0.13	-7.32	-4.35	2.73	3.14	0.00	0.93
			(6.55)	(-0.07)	(-4.15)	(-2.85)	(1.76)			
Eurasia	Poisson	1	-1.00	-2.57	3.01	-31.42	-0.02		1.00	
			(-2.76)	(-2.47)	(2.90)	(0.00)	(-0.03)			
Africa	OLS	5	1.01	-0.21	1.41	-0.37	-1.28	-1.53	0.01	0.99
			(3.45)	(-0.82)	(2.22)	(-0.77)	(-1.82)			
Mid. East	OLS	1	3.04	0.38	-1.33	-5.25	3.91	5.29	0.00	0.78
			(5.46)	(0.57)	(-2.21)	(-3.52)	(2.63)			
Asia	OLS	1	2.92	2.26	-2.97	-7.26	4.66	5.17	0.00	0.69
			(4.14)	(1.94)	(-2.97)	(-2.68)	(1.69)			
					Casualty Incidents with a U.S. Target					
West. Hem.	OLS	2	1.21	0.30	-1.14	3.70	-0.07	-0.14	0.00	0.41
			(4.09)	(0.71)	(-2.72)	(11.00)	(-0.18)			
Europe	OLS	1	1.34	0.42	-1.41	-0.23	-0.12	-0.12	0.00	0.70
			(5.89)	(1.40)	(-4.87)	(-1.64)	(-0.78)			

Eurasia	Poisson	1	-56.74	0.00	29.30	-32.61	0.32		0.93	
			(-138.98)	(0.00)	(0.00)	(0.00)	(0.39)			
Africa	Poisson	1	-0.90	-0.07	1.35	-30.76	-1.10		0.19	
			(-2.99)	(-0.17)	(4.17)	(0.00)	(-1.83)			
Mid. East	OLS	2	0.52	-0.07	-0.17	-2.40	2.56	5.79	0.06	0.56
			(1.86)	(-0.23)	(-0.72)	(-2.28)	(2.36)			
Asia	OLS	1	0.83	0.40	-0.46	-3.12	2.36	2.35	0.00	0.91
			(4.76)	(1.65)	(-1.94)	(-4.25)	(3.06)			