

Determinants of the Demise of Terrorist Organizations

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Abstract

This paper investigates the determinants of terrorist groups' failure by applying survival analysis in a discrete-time specification. Our sample consists of a diverse set of 586 terrorist groups, in which just over 63% end operations (demise) during 1970–2007. We use RAND event data and Jones and Libicki terrorist group data. Findings show that terrorist groups' survival is bolstered by diversifying attacks, having multiple home bases, locating in the Middle East, locating in a democratic country, and limiting reliance on transnational terrorist attacks. Moreover, larger groups have better survival prospects. Religious fundamentalist terrorist groups face better survival prospects than other terrorist groups. Terrorist groups located in a country with larger tropical territory are less likely to end operations; however, groups based in a landlocked country are more likely to fail.

Keywords: Terrorist group failure, Groups' resources, Survival analysis, Panel estimates, Base of operations

Determinants of the Demise of Terrorist Organizations

1. Introduction

With the accumulation of 40 years of event data on terrorist organizations' operations, researchers can now employ statistical analyses to ascertain what determines the survival of terrorist groups. In particular, we can investigate how groups' tactical decisions, their organizations' characteristics, and their base-country characteristics (i.e., economic, political, location, geographic, and military spending) promote or inhibit the survival prospects of terrorist groups. Understanding the influences on the survival of terrorist groups can inform effective counterterrorism policy. If, for example, terrorist groups in the Middle East face better survival prospects than those in other regions, then countries will need to pool counterterrorism resources and work in greater unison to eradicate terrorist groups in this region. By relating group ideology to survival prospects, we can assess whether the rising dominance of religious fundamentalists over leftist terrorist groups poses greater threats for society.¹ Terrorist groups may end their operations owing to myriad factors – e.g., defeat by the governments, lost of popular support, achievement of goals, or the death of a leader (Cronin 2006, 2009).

This paper investigates the determinants of the longevity of terrorist organizations by applying survival analysis to a diverse set of 586 terrorist groups that engaged in operations, at various times, during 1970–2007. Unlike some previous analyses (e.g., Blomberg, Engel, and Sawyer 2010; Young and Dugan 2010), we know when terrorist groups cease operations, based on data in Jones and Libicki (2008). Hence, we do not equate terrorist groups' demise to a one-to-three-year hiatus in attacks. Some terrorist groups may suspend attacks for one or more years – e.g., Ejército Popular de Liberación (EPL), Euskadi ta Askatasuna (ETA), and Sendero Luminoso (Shining Path) – but have not truly disbanded. If such groups return, then these previous studies treated them as new groups.

The current study differs in a number of essential ways from an earlier companion article by Blomberg, Gaibullov, and Sandler (2011). First, we use the RAND (2012) data set in the current study rather than the Global Terrorism Database (GTD) (National Consortium for the Study of Terrorism and Responses to Terrorism 2009), which was employed in the earlier study. The RAND data set allows us to match more groups with their operations. The reliance on an alternative data set adds robustness to the findings in the companion study – e.g., Gassebner and Luechinger (2011) showed that alternative event data sets can alter empirical findings regarding the study of terrorism. Second, compared to the earlier article, this new study contains 60% more terrorist groups, of which 371 (63.3%) ended operations and 215 (36.7%) remained active at the conclusion of the sample period. Third, the current analysis contains additional explanatory variables, including the number of base countries for a group, within-country group competition, the groups' attack intensity, and military expenditures. Fourth, we focus one set of runs on the post-1997 period marking the dominance of religious fundamentalist terrorists. Fifth, this new study has alternative robustness tests.

Our study differs in crucial ways from other earlier works on terrorist group longevity. Unlike the pioneering survival article by Blomberg, Engel, and Sawyer (2010) which relied exclusively on transnational terrorist incidents, we include transnational and domestic terrorist incidents for the 1998–2007 subperiod.² Because most terrorist groups engage in both types of terrorism, the inclusion of domestic terrorism provides a more realistic picture and indicates whether the mix of transnational and domestic terrorist incidents affect group survival. Blomberg, Engel, and Sawyer (2010) and Young and Dugan (2010) focused on the characteristics of the venue or target country of the attacks, while our study relies on the characteristics of the base country of the terrorist group.³ We believe that groups' survival is more tied to where they reside than where they attack if they engage in some transnational

terrorism. The venue country of the attack is more informative for the success of a given terrorist attack than for the group's survival. In contrast to the duration study by Young and Dugan (2010), we have continuous tactic variables for the terrorist group in order to investigate the importance of attack diversity (i.e., how mixed is a group's portfolio of attacks) and the share of transnational terrorist attacks on groups' survival. In general, our study possesses a much richer set of regressors than earlier studies. Cronin (2009) also used the RAND event data to track 457 terrorist groups, but her statistical study reported correlations (e.g., between groups' ages and their proclivity to negotiation) and did not present survival analysis. Finally, Jones and Libicki (2008) only found group size to be a significant determinant of terrorist group longevity, consistent with the theory in Feinstein and Kaplan (2010) and Gutfraind (2009).⁴

Relative to other ideologies, our study finds that religious groups have better longevity prospects. This latter result is also consistent with a recent paper by Carter (2012) on state sponsorship and terrorist group survival. Terrorist groups are less likely to end operations (demise) if their campaign portfolios are more diverse (i.e., use more varied combination of attack modes) with a smaller proportion of transnational terrorist attacks. Terrorist organizations with bases in more countries are more apt to survive for longer. As in Jones and Libicki (2008) and Blomberg, Gaibullov, and Sandler (2011), group size promotes longevity. In the base countries, larger populations and democratic principles bolster the survival prospects of resident terrorist groups. Somewhat surprisingly, military spending in the base country of the terrorist group also augments its survival, which may arise from backlash (Faria and Arce 2012a; Rosendorff and Sandler 2004). However, military spending is not a significant variable when lagged, which attempts to address endogeneity regarding this variable. A base country with a larger tropical area is favorable to resident terrorist groups' survival; whereas a base country with landlocked territory is conducive to resident terrorist groups' failure.

The remainder of the paper contains five sections. Section 2 presents some preliminaries to foster understanding of concepts used in the paper. In Section 3, theoretical considerations are discussed, along with some anticipated influences of independent variables on terrorist groups' demise or survival. Section 4 presents our empirical method and data, followed by empirical results and robustness tests in Section 5. Concluding remarks are contained in Section 6.

2. Preliminaries

Although there has been a long-running debate on the definition of terrorism (e.g., Hoffman, 2006), there has been a convergence to the following definition by those who do empirical research. Terrorism is the premeditated use or threat to use violence by individuals or subnational groups against noncombatants to obtain political or social objectives through the intimidation of a large audience beyond that of the immediate victims (Enders and Sandler 2012). This definition concurs with that used to construct the three primary terrorist event data sets – i.e., ITERATE (for transnational terrorism), GTD, and RAND. Key elements of the definition include violence, subnational perpetrators, political objectives, noncombatant victims, and a wide audience. By focusing on subnational perpetrators, this definition rules out state terrorism, but does not eliminate state-sponsored terrorism, for which a state supports the terrorists through intelligence, arms, funding, or other means (Mickolus 1989). Typically, this support is clandestine, as was the Libyan support in the downing of Pan Am flight 103 over Lockerbie, Scotland on 21 December 1988. The presence of a political or social objective distinguishes terrorism from criminal acts. Attacks against an occupying army or government forces are not characterized as terrorism, because the victims are combatants.⁵ The noncombatant requirement for victims rules out insurgent attacks. Finally, the wide audience captures the notion that terrorists want to cause sufficient societal anxiety that the public

pressures the government to grant the terrorists' demands so that attacks end. Success in gaining concessions can spur the terrorist organization to demand more or to demonstrate to other terrorists that terrorism is effective (Brandt and Sandler 2009).

An important distinction in this and other studies is drawn between transnational and domestic terrorism. If a terrorist incident involves victims, targets, supporters, and/or perpetrators from more than one country, then the incident is transnational in nature. The kidnapping in January 2002 and subsequent murder of *The Wall Street Journal* reporter Daniel Pearl, an American, in Pakistan was a transnational terrorist incident. The four hijackings on 9/11 were transnational terrorist events with victims from upward of 80 countries and foreign perpetrators. In the case of 9/11, al-Qaida funding came from abroad. Domestic terrorism is home directed and homegrown in which all participants (perpetrators and victims), the venue, supporters, and intended audience are solely from the same country. Much of the leftist terrorism in the United States during the late 1960s and early 1970s was domestic.

The world is plagued with a lot more domestic than transnational terrorism (Enders and Sandler 2012). Most terrorist groups do not exclusively rely on one type of terrorism. In an earlier study, Blomberg, Gaibullov, and Sandler (2011) found that terrorist organizations with the longest duration engaged in transnational terrorist attacks only 30% of the time, while the deadliest groups executed transnational terrorist attacks only 27% of the time. Since most terrorist groups engage in both kinds of terrorist attacks, the study of terrorist organization survival necessitates the use of both domestic and transnational terrorist attacks when such data are available. In the current study, we rely on RAND (2012) terrorist event data, which distinguish between transnational and domestic terrorist attacks after 1997. Thus, our analysis for 1998–2007 will use the share of transnational terrorist attacks as an essential tactical variable.

3. Theoretical Considerations

We view terrorist groups as rational entities that allocate their scarce resources – manpower and weaponry – over alternative modes of attack so as to maximize their expected payoff (see, e.g., Berrebi and Lakdawalla 2007; Sandler, Tschirhart, and Cauley 1983; Shughart 2011). As such, the terrorists must weigh their probability of success from contemplated attacks against their payoffs. They may engage in riskier – lower likelihood of success – attacks if associated payoffs compensate for the risk. The likelihood of success of a given type of attacks depends on terrorists' resources, their tactics (e.g., share of transnational attacks), environmental factors (e.g., regional location, geographical considerations, and population), group aspects, and counterterrorism climate.⁶ The longevity of a terrorist group hinges on it accumulating resources and followers over time through successful attacks. Terrorist group success and, hence, its longevity increases with the size of the group (Faria and Arce 2012b; Gutfraind 2009) and the number of bases of operation. Greater size allows the group to better plan and to execute operations by deploying terrorists with the appropriate skills. More bases allow the terrorist group to draw followers from additional countries. Moreover, multiple bases permit the group to redistribute its assets to counter the risks posed by the host governments' counterterrorist operations. Quite simply, multiple bases provide groups with greater flexibility and choice. Fatah, the Popular Front for the Liberation of Palestine (PFLP), and the Abu Nidal Organization (ANO) changed their primary bases depending on pressures brought by adversarial governments.

Judicious choice of tactics makes for more successful attacks and, therefore, greater longevity for the terrorist group. Diversification of attacks should bolster the success of terrorist operations by keeping the targeted government guessing as to where to allocate its counterterrorist resources against the type of attack. If modes of attacks (e.g., kidnappings, armed attacks, assassinations and bombing) can readily substitute for one another, then terrorist

groups can offset a government's defensive measures with little increase in their costs of operations (Sandler in press). Thus, greater attack diversity is anticipated to increase the survival prospects of terrorist groups. The proper choice of attack diversity is akin to finding the best mixed strategy among attack modes. The share of transnational terrorist attacks is also a crucial tactical choice. *Ceteris paribus*, transnational terrorist attacks are riskier than domestic terrorist attacks insofar as the former requires that borders may have to be crossed, which puts terrorists and their assets in greater peril. Moreover, transnational terrorists have a more difficult time blending in on a foreign soil than domestic terrorists have blending in on their home soil. Domestic terrorist groups can also establish a better support base on home turf. Transnational terrorist incidents may motivate targeted governments to mount a counterterrorist offensive – e.g., the drone attacks launched by the United States on al-Qaida after 9/11. Nevertheless, terrorists may still be drawn to some transnational operations in order to enhance their visibility or to hit the assets of an enemy nation on its own soil or abroad. We expect that a larger share of transnational terrorist attacks will reduce the group's survival owing to enhanced risks. When we only have observations on transnational terrorist attacks during 1970–1997, we anticipate that a large number of these attacks per capita will hasten the group's demise as the authorities have more opportunities to capture operatives or to compromise their infrastructure. The number of casualties (i.e., deaths and injuries) stemming from a group's terrorist campaign may also affect its survival. On the one hand, greater carnage may induce a larger counterterrorist offensive, which can reduce survival prospects; on the other hand, greater carnage may provide more followers and supporters, which can augment survival prospects.

Next, we turn to the environmental factors that may affect the terrorist group's campaign and, therefore, its longevity. All environmental variables are from the viewpoint of the base country of the terrorist group. The greater the number of terrorist groups in a base country, the

greater is the anticipated longevity of the group. This follows because the base government must spread its counterterrorist assets over more terrorist groups. Larger population in the base country can offer a shield so that terrorists are more difficult to locate. Base-country gross domestic product (GDP) per capita may have opposing influences on the terrorist group's prognosis. From a positive prospect, larger per capita GDP may mean more skilled recruits for the group (Benmelech and Berrebi 2007). From a negative prospect, larger per capita GDP may placate citizen discontent, thereby losing support for the terrorists. In addition, a larger per capita GDP may mean more counterterrorism resources for the country. In the base country, we anticipate that democracy fosters terrorist logistical success and survival because of government (executive) restraints, freedom of association, target-rich environment, and individual rights and protections (Hoffman 2006; Li 2005). Trade openness can bolster terrorist group survival, especially for transnational terrorist attacks, by providing greater cover for the transit of terrorists and their equipment (Li 2005). Their region of operation may promote or hinder group success and survival. Because of indigenous support, terrorist infrastructure, large recruitment pools, and (sometimes) permissive governments, the Middle East may be conducive, relative to other regions, to terrorist group survival. Mountains and jungles may provide sanctuaries in a base country (Abadie 2006; Fearon and Laitin 2003), thereby aiding group survival. Groups based in landlocked country have harder time in moving their resources (e.g., personnel and weapons) into and out of the country, which may hurt their survival prospect. Additionally, ethnic fractionalization may affect group success and survival, in which an intermediate level of fractionalization may foster group success. This follows because very homogeneous societies are a hostile environment for dissent, while very heterogeneous societies may assimilate dissent (Basuchoudhary and Shughart 2010).

Terrorist group orientation may also influence its survival. Over time, the dominance of

various terrorist ideologies have changed with nationalists/separatists (henceforth, nationalists) giving up their dominance to the leftists in the early 1970s (Rapoport 2004). Since the early 1990s, the religious fundamentalists have rose to prominence among terrorist organizations (Enders and Sandler 2000; Hoffman 2006; Rapoport 2004). Our intent is to ascertain whether these religious fundamentalist terrorist groups have greater survival prospects over the other three types of ideologies – i.e., right wing, left wing, and nationalists/separatists.

One of the most difficult things to measure in the study of terrorism is counterterrorist effort in a base country. The United States is forthright about its homeland security budget since the creation of the Department of Homeland Security in 2002, but it is difficult to know US proactive spending – e.g., expenditures on drone attacks. Counterterrorist spending is not readily available for other countries. In this study, we use two proxies – government and military spending. Admittedly, neither is a great proxy, with the military spending being a better proxy for proactive counterterrorism measures. In countries with paramilitary terrorist groups, such as Colombia, military spending may be an adequate measure for offensive measures. Our priors are not clear on these proxies. If sufficient expenditures are tied to counterterrorism, then resident terrorist groups' survival may be jeopardized. If, however, government countermeasures are brutal, then citizen backlash may assist group recruitment and survival (see, e.g., Rosendorff and Sandler 2004).

4. Empirical Methods and Data

Method

We rely on discrete-time hazard models for our empirical analysis (Allison 1982; Jenkins 1995; STATA 2009). Define T_i as a random variable measuring the length of time that a

terrorist organization is active. Given that a terrorist group survives until t_s and conditional on the regression's explanatory variables, the probability of a terrorist group failing in a given time interval, $[t_s, t_{s+1})$, $s = 1, 2, \dots$, and $t_1 = 0$, is

$$P_{is} = \Pr(T_i < t_{s+1} | T_i \geq t_s, \mathbf{x}_{is}) = F(\mathbf{x}_{is}\boldsymbol{\beta} + \alpha(s)), \quad (1)$$

where \mathbf{x}_{is} is a vector of regressors for group i at time s , and $\boldsymbol{\beta}$ is a vector of corresponding coefficients. In (1), $\alpha(s)$ is an unknown function of duration and $F(\cdot)$ is a cumulative distribution function. We implement the logit estimator by assuming that $F(\cdot)$ is a logistic cumulative distribution. Two alternative specifications of $\alpha(s)$ are used: a quadratic specification, $\alpha(s) = \alpha_0 t_s + \alpha_1 t_s^2$; and a piecewise constant specification with a set of dummy variables for distinct periods that share the same hazard rate. As a robustness check, we extend our model to control for unobserved heterogeneity and implement the random-effects logit estimator.

Data

We construct a panel dataset of 586 terrorist groups for 1970–2007. Our data on terrorist groups and their attacks are from Jones and Libicki (2008) and RAND (2012). In some cases, the same groups have different variants of their names reported in RAND (2012). For example, Lashkar-e-Taiba (LeT) is sometimes reported as Lashkar-e-Toiba or just LeT. Similarly, the Kurdish Workers Party is sometimes listed as the Kurdistan Workers Party. We manually went through the list of groups in the RAND data and made corrections prior to merging these two data sets.

Data from Jones and Libicki (2008) are used to construct variables on groups' size,

ideologies, their bases of operation, and their longevity. Using the information on the starting and ending (if relevant) years of a terrorist group, we construct the dependent variable, terrorist group failure, which equals one if a terrorist group ends in a given year and equals zero if it is active in that year. If the terrorist group ends in any of the ways indicated by Jones and Libicki (e.g., military defeat, disbandment, joining the political process, or a negotiated settlement), the group is classified as ended in our study. We compute the logarithm of a group's membership at its peak, $\log(\text{size})$, to control for the strength of a terrorist group. Four dummy variables for ideology are introduced to denote *Left wing*, *Nationalist*, *Right wing*, and *Religious fundamentalist* groups.⁷ We count the number of base countries for a group and label this variable as *Number of bases*. About 73% of terrorist groups have a single base of operation, around 19% have two bases, somewhat less than 6% have three bases, and less than 3% have more than three bases.⁸ We also compute the average number of other groups based in the same country, indicated by *Number of other groups*.

The *RAND Database of Worldwide Terrorism Incidents* (RAND 2012) supplies information on terrorist groups' incidents, such as the number of attacks, casualties (deaths and injuries) for each attack, type of attacks, and tactics of the groups. This database contains observations solely on transnational terrorism from 1968 until 1997. During 1998–2009, RAND reported transnational and domestic terrorist incidents. We, therefore, rely on transnational terrorist attacks for our main regressions covering 1970–2007, and perform a separate analysis utilizing both domestic and transnational terrorist attacks for 1998–2007. To investigate whether a group's survival is affected by the intensity of its terrorist campaign, we construct *Transnat terr/POP*, which is the number of transnational terrorist attacks per million persons by a terrorist group in a given year. *Casualties per attack*, which is the average number of transnational terrorism casualties per attack by a group in a given year, is intended to capture whether a

group's carnage influences its longevity. The *Attack diversity* variable is one minus the Hirschman-Herfindahl diversity index for a terrorist group in a given year. That is, $Attack\ diversity = 1 - \sum_i \tau_{ijt}^2$, where τ_{ijt} is the share of the i th type of attack in total attacks by group j in year t . Seven alternative types of incidents are considered: bombings and arson attacks, kidnappings, barricade and hostage taking, skyjackings, assassinations, armed attacks, and other and unconventional attacks. The attack diversity variable ranges between 0 and 1, where larger values correspond to greater diversity. The share of transnational attacks in total attacks by a group in a given year (*Transnat terr share*) is computed only for 1998–2007, when attacks are dichotomized into domestic and transnational terrorist events.

Next, we construct variables that are specific to a terrorist group's base country of operation, as identified by Jones and Libicki (2008). When terrorist groups have more than one base country, we average variables across base countries of operation. Base countries' macroeconomic variables – the logarithm of real per capita GDP in 2005 constant international dollars [$\log(GDP/POP)$], the logarithm of population [$\log(POP)$], the percentage share of international trade in GDP (*Openness*), and the percentage share of government spending in GDP (*Gov. spending*) – are constructed for each sample year using information from *Penn World Table Version 7.0* (Heston, Summers, and Aten 2011). The percentage share of military expenditure in GDP (*Military expenditure*) is taken from World Bank (2010). The polity variable (*Polity*) is drawn from the *Polity IV dataset* (Marshall and Jaggers 2009), which ranges between -10 (strongly autocratic) and $+10$ (strongly democratic). An index of ethnic fractionalization (*Ethnic frac.*) is obtained from Alesina et al. (2003), with larger values indicative of greater diversity. We also include regional dummy variables for East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa,

North America, South Asia, and sub-Saharan Africa (World Bank 2010). Finally, we include the logarithm of a country's mean elevation [$\log(elevation)$], the percentage of land territory in the tropics (*Tropics*), and a dummy variable equal to one if a country does not have a direct access to international waters (*Landlocked*) to control for base countries' geographical characteristics (Gallup, Mellinger, and Sachs 1999; Gallup, Sachs, and Mellinger 1999). The descriptive statistics of our data is given in Table 1.

[Table 1 near here]

Around 37% of groups are left wing, 37% are nationalists, 21% are religious, and 5% are right wing. Most groups are based in Europe and Central Asia (more than 30%), Middle East and North Africa (more than 20%), and Latin America and Caribbean (around 18%). Some groups (around 7%) have base of operations in more than one region. In Table 1, the means are in units described earlier.

We should also say something about survival time for our sample of 586 terrorist groups. Around 26% of our sample groups did not survive beyond the first year, which is much less than Rapoport's (1992, p. 1067) well-known conjecture that 90% of modern terrorist groups do not survive for a year. Around 68% of our sample groups existed for 10 years or less. The average duration of our sample terrorist groups is around 10 years. For those groups that made it beyond a year, around 56% of them ended in 10 or fewer years, which is more in keeping with Rapoport's (1992) conjecture of 50%. The average duration for our sample groups that survived beyond the first year is around 13 years.

5. Empirical Results

Table 2 presents the logit regressions results. Model 1 is the baseline regression. Models 2-4 include regional dummy variables and Model 4 also replaces government spending with

military expenditure. The duration dependence pattern is specified as quadratic in Models 1 and 2 and as piecewise constant in Models 3 and 4.

[Table 2 near here]

In Table 2, we first consider group-specific variables. A group's membership size reduces the likelihood of a terrorist group's failure in a given year, *ceteris paribus*. In general, left-wing, nationalists, and right-wing terrorist groups are more likely to end operations than religious fundamentalist groups, which is the left-out category. Casualties per attack increase the chance of a group's termination, everything else held constant. These findings are statistically significant across all models. The only exception is the left-wing ideology variable, which is not significant in Model 4. Greater attack diversity, *ceteris paribus*, increases the survival probability of a terrorist group. This finding is statistically significant at the .10 level in Models 1-3, but is not significant in Model 4. In Model 4, we replace government spending with military expenditure and lose a large number of observations owing to missing values. The results above concur with our prior expectations (see Section 3) and generally support the findings of Blomberg, Gaibullov, and Sandler (2011). Having more bases of operation, as expected, significantly helps a group's chance of survival. The survival impact of terrorist attacks (per capita) on a group's failure prospect, however, is not robust. It is positive and significant with the piecewise constant specification, but is not statistically significant with the quadratic specification of duration dependence. Number of bases and terrorist attacks per capita were not considered in earlier studies.

Next, we investigate variables associated with a group's base(s) of operation in Table 2. The effect of the number of other groups in a base country is sensitive to model specification; it is negative and conducive to survival (as anticipated) and significant only in Models 1 and 4. In general, the influences of socio-economic variables are not robust. The impact of per capita

GDP on a group's probability of demise is positive and significant only in Model 1, whereas the effect of population on a group's likelihood of failure is negative and significant in Models 1 and 4. Openness and government spending do not significantly influence a group's survivability. Polity's democracy indicator is statistically significant with the piecewise constant specification, but is not significant with the quadratic specification; its impact on a group's failure is negative, which is consistent with democracy restraining the actions of the authorities and protecting terrorists' rights. Ethnic fractionalization is generally not significant, except in Model 4, where an intermediate amount of fractionalization is conducive to a group's survival. Military expenditure, surprisingly, reduces a group's probability of termination, which agrees with backlash in favor of the terrorist group (Rosendorff and Sandler 2004). However, there might be an endogeneity concern with regard to this variable; military expenditure may affect a group's survivability, but a government may also step up military spending in response to terrorist groups' activities. We will revisit this issue in our robustness analysis. Finally, most regional dummy variables are not statistically significant across models, with the exceptions of Europe and Central Asia, and sub-Saharan Africa. Both are positive and statistically significant in Models 2 and 3; groups based in these regions are more apt to cease operations in a given year than groups based in Middle East and North Africa.

[Table 3 near here]

To describe the magnitude of effects, we compute the marginal effects of the variables (see Table 3). *Ceteris paribus*, a 10% increase in the membership size of a terrorist group, decreases the likelihood of its failure in a given year by about 0.1-0.2 percentage points. Left-wing or nationalists ideology improves the probability of a group's demise by about two to three percentage points, while right-wing ideology augments the chance of a group's termination by about four to six percentage points compared to a religious fundamentalist terrorist group. If the

number of casualties per attack goes up by 10, then the probability of a group's failure rises by about 0.03 percentage points. When a group adds one more base of operation, its chance of terminating in a given year falls by about one percentage point. A standard deviation (0.11) increase in attack diversity reduces the probability of a group's demise by about 0.5 percentage points; however, attack diversity is not significant in Model 4. The likelihood of a group's termination decreases by about 0.9 percentage point in response to 1% increase in the share of military expenditure. Terrorist groups based in Europe and Central Asia have about 2 percentage points higher chance of ending operations in a given year than those based in Middle East and North Africa. This statistically significant result does not hold in Model 4. The impact magnitudes of a group's size, its ideology, its attack diversity, and its location in the Europe and Central Asia region are generally comparable to the findings of Blomberg, Gaibullov, and Sandler (2011). We note that our source of data on terrorist attacks differs; Blomberg, Gaibullov, and Sandler (2011) relied on GTD, whereas we use the RAND terrorism database. Enders (2007) documented many differences between GTD and RAND data, so that our robust findings in light of these differences, many more terrorist groups, and some new variables are of particular interest.

The impacts of the other variables are either not significant or not robust across models. For example, in Models 3 and 4, the probability of a group's termination increases by 0.4 and 3 percentage points, respectively, in response to a one unit rise in the number of transnational terrorist attacks per million population. The difference in sample size may explain the disparity in magnitude of the effect of terrorist attacks between Models 3 and 4. A group's failure prospect falls by about 0.1 percentage points in response to a unit increase in the polity index in Models 3 and 4, respectively. The impacts of terrorist attacks and polity are not statistically significant in Models 1 and 2.

The casualties and terrorist attacks variables are based on transnational terrorism because domestic terrorism is available only after 1997 in the RAND database. Therefore, we re-estimate Tables 2 and 3, using a subsample for 1998–2007, which allows us to introduce the share of transnational terrorist attacks in total attacks. Tables 4 and 5 display the results.

[Table 4 near here]

The composition of groups based on ideology changes between the two samples. Around 29% of groups are religious and about 30% are left wing in the subsample for 1998–2007. For the whole sample, the share of religious and left-wing groups constitute about 21% and 37%, respectively. Compared to Table 2, the transnational attack per capita is replaced with the transnational terrorism share variable. Also, casualties per attack and diversity of attack variables are now based on total terrorist attacks. A group's size, nationalist ideology (except for Model 2), polity (Models 3-4), military spending, and Europe and Central Asia (Models 2-3) remain statistically significant for the post 1997 sample period. The signs of the coefficients are also consistent with those in Table 2. The North America variable now becomes statistically significant. Right-wing ideology and number of bases are, however, now sensitive to model specification. Moreover, left-wing ideology (except for Model 1), casualties, and attack diversity are no longer significant. Similar to the Blomberg, Gaibulloev, and Sandler's (2011) finding, transnational terrorism share is statistically significant and conducive to groups' failure, as anticipated, owing to the enhanced risk of transnational terrorist attacks. The marginal effects of the variables are given in Table 5 and are interpreted similarly to Table 3.

[Table 5 near here]

Finally, we perform several robustness checks. As mentioned earlier, military spending may cause an endogeneity issue. Similarly, potential endogeneity problems may arise with other variables. Furthermore, geography is also expected to be important determinant of groups'

survival (see Section 3). Hence, we re-estimate Table 2 using lagged values of all time-varying variables and adding base-country specific geographical variables for elevation, tropics, and access to international waters (Table 6).

[Table 6 near here]

The quadratic specification of duration dependence is used in Model 1 and a piecewise constant specification is used in the other three models. Government spending is replaced with military expenditure in Model 3. To account for unobserved heterogeneity, the random-effects logit estimator is applied to Model 4. A group's size, number of bases, and ideology variables remain statistically significant. The polity variable is a negative influence of a group's failure and is highly significant across all models; it was not robust in Table 2. We have performed a further robustness check by replacing the polity variable with one of its key components, executive constraints. Similar to the polity variable, the executive constraints variable is negative and statistically significant across all models (the results are available upon request). The Latin America and Caribbean, and North America region variables are now statistically significant, except for Models 1 and 3, respectively; however, other group-specific variables, such as casualties and attack diversity, and variables associated with the base country, such as military expenditure and Europe and Central Asia (except for Model 3), are no longer statistically significant. As an alternative to military expenditure, we also used spending on public order and safety as a percent of GDP (International Monetary Fund 2012). Like lagged military expenditure, this variable is not statistically significant (the results are available upon request). We note that, due to numerous missing values for public order and safety, the sample size reduces dramatically to less than 600 observations, which, not surprisingly, affects the overall results. The public order and safety variable is not available until 1995 or 1999 for countries, if it is available at all. Geographical variables produce interesting results. As

expected, larger land area in the tropics reduces the likelihood of a resident group's failure, *ceteris paribus*. A terrorist group based in a landlocked country is more likely to fail. The elevation variable, however, is not statistically significant. Finally, based on Jones and Libicki's (2008) coding, 25 terrorist groups in our sample ended with victory and 106 groups ended through a political process. This may mean that these groups have succeeded in achieving their objectives. We have re-estimated Table 6 by excluding these "successful" groups. The size, ideology, and tropics variables remain statistically significant, while number of bases, polity, and landlocked variables are no longer significant. The lagged value of military spending becomes positive and statistically significant determinant of a group's failure. The terminated groups in the reduced sample ceased operations as a result of either policing, or the use of military force, or splintering; this may explain the significance of military spending.

6. Concluding Remarks

This paper utilizes the RAND (2012) database of terrorist incidents to investigate the determinants of the demise of terrorist groups during 1970–2007. Because the RAND data set differs from the GTD data set used in a companion study, the current paper can, among other things, provide a robustness check. We find that larger terrorist groups are less likely to end operations. Religious fundamentalists have better survival prospects than left-wing, right-wing, and nationalist/separatists terrorist groups. If a terrorist group possesses multiple home bases, then its survival is enhanced. This is a novel finding. There is weak evidence that attack diversity may foster group survival. In addition, terrorist organizations that leave more casualties per attack generally reduce their longevity. The last two findings, however, are sensitive to the robustness checks.

Some base-country characteristics matter for terrorist groups' survival. First, terrorist

groups residing in the Middle East and North Africa live longer than those based in other regions. Second, there is evidence that democracy lengthens a resident terrorist group's longevity. This evidence is much stronger than that from Blomberg, Gaibullov, and Sandler (2011) and is contrary to the findings by Young and Dugan (2010). Third, there is novel evidence that a terrorist group possesses better survival prospects when based in a country with larger topical territory, as presumably jungles provide sanctuaries. Fourth, a group based in a landlocked country is less likely to survive, as a lack of direct access to international waters creates obstacles to the movement of its assets in and out of the base country, which is another novel finding.

For the post-1997 period, we present empirical runs that distinguish terrorist groups' transnational and domestic attacks. Even though the sample period is much reduced, the influence of some key control variables – group size, group nationalist ideology, and democracy – remain robust. The key new finding for this subperiod is that a larger share of transnational terrorist attacks hastens a terrorist group's demise at the .01 level of significance for alternative runs. This is consistent with why successful high-profile terrorist groups (e.g., al-Qaida and Hezbollah) engage in a greater share of domestic terrorist attacks (Blomberg, Gaibullov, and Sandler 2011).

Numerous policy conclusions can be drawn from the empirical results. First, countries should take new terrorist groups seriously before their size grows to the point where ongoing survival is more assured. Second, counterterrorism policy must curb multiple modes of attack simultaneously, since attack diversity may bolster terrorist group survival. This then favors proactive counterterrorism measures against the resources of the terrorist groups rather than defensive measures against a particular form of attack (e.g., metal detectors in airports to curb skyjackings) if the goal is to eradicate the group and not just to stop a dangerous tactic. Further

study on this issue is warranted, since diversity is not always significant in our findings. Third, targeted countries must take a collective approach against religious fundamentalist terrorist groups and groups located in the Middle East and North Africa because of their favorable prognosis for survival over the entire sample period. Similarly, additional collective efforts should be made against groups located in countries with large tropical area. Fourth, even terrorist groups that primarily conduct domestic terrorist missions pose a threat for the world community, because these groups will launch some transnational terrorist attacks for visibility. Moreover, by limiting their share of transnational terrorist incidents, these terrorist groups survive for a long time unless concerted actions are taken against them. Fifth, targeted countries must work together to keep terrorist groups from establishing bases in multiple countries, because such bases augment a group's survival.

Future research needs to identify the exact cause of the demise of terrorist groups, which would require more data on groups and the use of advanced survival analysis. If we know what causes terrorist groups to cease their operations, then we are better equipped to engineer effective counterterrorism measures. Carter (2012) made an initial attempt by distinguishing terrorist groups that end owing to internal difficulties and terrorist groups that end owing to external defeat. These two categories can be broken down further – e.g., internal difficulties could come from lost of a leader, internal division, or other causes. Future analysis can also introduce group linkages (including alliances) into the survival analysis. Currently, these data are only available for a select Middle East sample of terrorist groups.

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Endnotes

1. On the dominance of religious fundamentalist terrorists, see Enders and Sandler (2000), Hoffman (2006), and Rapoport (2004).
2. RAND only identifies domestic terrorist incidents after 1997. The Blomberg, Gaibullov, and Sandler (2011) study of 367 terrorist groups also distinguished between domestic and transnational terrorist incidents based on the division of GTD events, engineered by Enders, Sandler, and Gaibullov (2011).
3. In a recent study, Carter (2012) also used target countries' characteristics in his study of the impact of state sponsorship on terrorist group survival. Basuchoudhary and Shughart (2010) stressed that the base country is more important than the target country for many terrorism inquiries. In their study, they investigated whether ethnic tension, economic freedoms, and other considerations influenced the country of origin for the terrorist attacks.
4. Also, see the dynamic recruitment models of Faria and Arce (2005, 2012a,b), where group size ultimately drives survival.
5. Attacks against peacekeeping forces are classified as terrorism – e.g., the attack on the US Marine barracks in Lebanon on 23 October 1983. Also, attacks against passive military forces stationed in a foreign country are considered terrorism – e.g., a bomb placed under the car of a US soldier stationed in Germany.
6. See Berrebi and Lakdawalla (2007) and Blomberg, Gaibullov, and Sandler (2011) for an explicit model.
7. We use Jones and Libicki's (2008) classification of terrorist organizations by ideology. They assign a single primary ideology to each group.
8. From the data, we know the group's base of operation by country. We do not know whether a terrorist group has more than one base of operation within a country.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.
<i>log(size)</i>	5820	4.99	2.19
<i>Left wing</i>	5820	0.34	0.47
<i>Nationalist</i>	5820	0.41	0.49
<i>Right wing</i>	5820	0.04	0.18
<i>Religious</i>	5820	0.21	0.41
<i>Transnat terr/POP</i>	5820	0.07	0.49
<i>Casualties per attack</i>	5820	3.02	78.97
<i>Number of bases</i>	5820	1.63	1.14
<i>Number of other groups</i>	5820	17.44	12.91
<i>Attack diversity</i>	5820	0.03	0.11
<i>log(GDP/POP)</i>	5819	8.57	1.17
<i>log(POP)</i>	5820	10.61	1.50
<i>Openness</i>	5819	0.54	0.33
<i>Gov. spending</i>	5819	0.10	0.05
<i>Military expenditure</i>	3611	3.40	3.29
<i>Polity</i>	5622	3.82	6.32
<i>Ethnic frac.</i>	5801	0.41	0.22
<i>East Asia & Pacif.</i>	5820	0.11	0.32
<i>Europe & Centr.Asia</i>	5820	0.25	0.43
<i>Lat. America & Car.</i>	5820	0.16	0.37
<i>Middle East & North Africa</i>	5820	0.22	0.42
<i>North America</i>	5820	0.04	0.20
<i>South Asia</i>	5820	0.20	0.40
<i>sub-Saharan Africa</i>	5820	0.11	0.31
<i>log(elevation)</i>	5793	6.31	0.64
<i>Tropics</i>	5793	0.39	0.43
<i>Landlocked</i>	5787	0.09	0.29

Table 2. Logit Regressions of Terrorist Group Failure, 1970–2007

Variable	Model 1	Model 2	Model 3	Model 4
<i>log(size)</i>	−0.386*** (0.047)	−0.389*** (0.049)	−0.465*** (0.053)	−0.385*** (0.063)
<i>Left wing</i>	0.663*** (0.217)	0.432* (0.245)	0.525** (0.252)	0.444 (0.337)
<i>Nationalist</i>	0.713*** (0.201)	0.518** (0.219)	0.657*** (0.228)	0.551* (0.284)
<i>Right wing</i>	0.959*** (0.312)	0.769** (0.337)	1.002*** (0.340)	0.802* (0.460)
<i>Transnat terr/POP</i>	0.064 (0.054)	0.081 (0.054)	0.124** (0.058)	0.618* (0.358)
<i>Casualties per attack</i>	0.001*** (0.0003)	0.001*** (0.0003)	0.001*** (0.0003)	0.001*** (0.0003)
<i>Number of bases</i>	−0.207** (0.100)	−0.245** (0.099)	−0.315*** (0.112)	−0.292** (0.126)
<i>Number of other groups</i>	−0.014** (0.006)	−0.011 (0.007)	−0.011 (0.008)	−0.020* (0.010)
<i>Attack diversity</i>	−1.337* (0.771)	−1.341* (0.787)	−1.499* (0.811)	−1.569 (1.428)
<i>log(GDP/POP)</i>	0.164* (0.084)	0.107 (0.121)	0.119 (0.122)	0.008 (0.147)
<i>log(POP)</i>	−0.096* (0.054)	−0.099 (0.079)	−0.134 (0.088)	−0.325*** (0.121)
<i>Openness</i>	0.018 (0.219)	0.265 (0.216)	0.214 (0.239)	−0.319 (0.366)
<i>Gov. spending</i>	1.561 (1.098)	1.022 (1.153)	−0.216 (1.206)	
<i>Polity</i>	−0.009 (0.012)	−0.010 (0.012)	−0.023* (0.013)	−0.038** (0.019)
<i>Ethnic frac.</i>	−0.818 (1.039)	−0.171 (1.309)	0.147 (1.362)	4.264** (1.662)
<i>Ethnic frac. squared</i>	1.549 (1.281)	0.295 (1.678)	−0.044 (1.774)	−5.874*** (2.130)
<i>Military expenditure</i>				−0.179*** (0.059)
<i>East Asia & Pacif.</i>		−0.210	−0.222	−0.333

		(0.374)	(0.394)	(0.635)
<i>Europe & Centr.Asia</i>		0.440** (0.222)	0.450* (0.234)	0.322 (0.403)
<i>Lat. America & Car.</i>		0.410 (0.264)	0.348 (0.276)	-0.033 (0.517)
<i>North America</i>		0.458 (0.306)	0.425 (0.329)	0.101 (0.552)
<i>South Asia</i>		0.119 (0.442)	0.110 (0.450)	0.150 (0.565)
<i>sub-Saharan Africa</i>		0.834* (0.461)	0.820* (0.486)	0.992 (0.639)
<i>Duration variables</i>	yes	yes	yes	yes
<i>N</i>	5605	5605	5605	3442
<i>Log-likelihood</i>	-1128.89	-1120.86	-1160.78	-702.65
<i>Pseudo R-squared</i>	0.15	0.16	0.13	0.13

Notes: Robust standard errors are in parentheses. Constant and duration variables are

suppressed. The duration dependence pattern is specified as quadratic for Models 1–2 and as piecewise constant (dummy variables for a group of periods 1970–79, 1980–89, 1990–99, and 2000–07) for Models 3–4. Significance levels: *** is <.01, ** is <.05, and * is <.10.

Table 3. Marginal Effects for the Logit Regressions in Table 2, 1970–2007

Variable	Model 1	Model 2	Model 3	Model 4
<i>log(size)</i>	−0.012***	−0.013***	−0.017***	−0.018***
<i>Left wing (d)</i>	0.023***	0.015	0.021*	0.023
<i>Nationalist (d)</i>	0.024***	0.018**	0.025***	0.028*
<i>Right wing (d)</i>	0.047**	0.036*	0.057**	0.054
<i>Transnat terr/POP</i>	0.002	0.003	0.004**	0.030*
<i>Casualties per attack</i>	0.00003***	0.00003***	0.00004***	0.00004***
<i>Number of bases</i>	−0.007**	−0.008**	−0.011***	−0.014**
<i>Numb. of other groups</i>	−0.0004**	−0.0003	−0.0004	−0.001*
<i>Attack diversity</i>	−0.043*	−0.044*	−0.054*	−0.075
<i>log(GDP/POP)</i>	0.005*	0.004	0.004	0.0004
<i>log(POP)</i>	−0.003*	−0.003	−0.005	−0.016**
<i>Openness</i>	0.001	0.009	0.008	−0.015
<i>Gov. spending</i>	0.050	0.034	−0.008	
<i>Polity</i>	−0.0003	−0.0003	−0.001*	−0.002**
<i>Ethnic frac.</i>	0.014	0.002	0.004	−0.031
<i>Military expenditure</i>				−0.009***
<i>East Asia & Pacif. (d)</i>		−0.006	−0.007	−0.014
<i>Europe & Centr.Asia (d)</i>		0.016*	0.018*	0.017
<i>Lat. America & Car. (d)</i>		0.015	0.014	−0.002
<i>North America (d)</i>		0.018	0.018	0.005
<i>South Asia (d)</i>		0.004	0.004	0.007
<i>sub-Saharan Africa (d)</i>		0.038	0.041	0.069
<i>N</i>	5605	5605	5605	3442

Notes: (d) is for discrete change of dummy variable from 0 to 1. Significance levels: *** is

<.01, ** is <.05, and * is <.10.

Table 4. Logit Regressions of Terrorist Group Failure, 1998–2007

Variable	Model 1	Model 2	Model 3	Model 4
<i>log(size)</i>	−0.204** (0.083)	−0.183** (0.086)	−0.281*** (0.083)	−0.276*** (0.081)
<i>Left wing</i>	0.808** (0.400)	0.414 (0.457)	0.429 (0.464)	0.353 (0.444)
<i>Nationalist</i>	0.708* (0.371)	0.501 (0.372)	0.631* (0.370)	0.738** (0.361)
<i>Right wing</i>	1.063* (0.551)	0.770 (0.571)	1.016* (0.564)	0.823 (0.566)
<i>Transnat terr share</i>	1.451*** (0.268)	1.430*** (0.267)	1.664*** (0.276)	1.815*** (0.276)
<i>Casualties per attack</i>	0.0005 (0.0005)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
<i>Number of bases</i>	−0.060 (0.127)	−0.181 (0.139)	−0.270* (0.156)	−0.311* (0.163)
<i>Number of other groups</i>	−0.013 (0.010)	−0.001 (0.013)	−0.007 (0.013)	−0.002 (0.012)
<i>Attack diversity</i>	−0.267 (0.824)	−0.288 (0.826)	−0.429 (0.818)	−0.385 (0.825)
<i>log(GDP/POP)</i>	0.090 (0.140)	0.034 (0.181)	0.073 (0.175)	0.053 (0.182)
<i>log(POP)</i>	−0.083 (0.094)	−0.198 (0.137)	−0.191 (0.143)	−0.355** (0.156)
<i>Openness</i>	−0.286 (0.382)	−0.186 (0.421)	−0.183 (0.413)	−0.729 (0.485)
<i>Gov. spending</i>	1.017 (2.407)	−0.047 (2.741)	0.043 (2.759)	2.683 (2.906)
<i>Polity</i>	−0.029 (0.027)	−0.035 (0.027)	−0.046* (0.026)	−0.065** (0.026)
<i>Ethnic frac.</i>	−0.010 (1.739)	0.740 (2.240)	0.894 (2.183)	3.394 (2.206)
<i>Ethnic frac. squared</i>	−0.284 (2.133)	−1.759 (2.772)	−2.194 (2.745)	−4.845* (2.732)
<i>Military expenditure</i>				−0.160** (0.081)
<i>East Asia & Pacif.</i>		0.523	0.593	0.787

		(0.591)	(0.618)	(0.737)
<i>Europe & Centr.Asia</i>		0.739*	0.775*	0.739
		(0.386)	(0.407)	(0.484)
<i>Lat. America & Car.</i>		0.795	0.826	0.479
		(0.603)	(0.612)	(0.684)
<i>North America</i>		1.484**	1.053*	1.127*
		(0.662)	(0.624)	(0.648)
<i>South Asia</i>		0.480	0.487	0.339
		(0.649)	(0.669)	(0.668)
<i>sub-Saharan Africa</i>		1.255	1.192	0.985
		(0.854)	(0.901)	(0.885)
<i>Duration variables</i>	yes	yes	yes	yes
<i>N</i>	2012	2012	2012	1971
<i>Log-likelihood</i>	-423.79	-418.60	-432.91	-418.71
<i>Pseudo R-squared</i>	0.15	0.16	0.13	0.14

Notes: Robust standard errors are in parentheses. Constant and duration variables are

suppressed. The duration dependence pattern is specified as quadratic for Models 1–2 and as a dummy variable coded 1 for 2000–07 (and zero for the period prior to 2000) for Models 3–4.

Significance levels: *** is <.01, ** is <.05, and * is <.10.

Table 5. Marginal Effects for the Logit Regressions in Table 4, 1998–2007

Variable	Model 1	Model 2	Model 3	Model 4
$\log(\text{size})$	-0.009***	-0.008**	-0.013***	-0.014***
<i>Left wing (d)</i>	0.040*	0.019	0.022	0.020
<i>Nationalist (d)</i>	0.032*	0.023	0.032	0.041*
<i>Right wing (d)</i>	0.071	0.046	0.075	0.061
<i>Transnat terr share</i>	0.061***	0.062***	0.079***	0.095***
<i>Casualties per attack</i>	0.00002	0.00003	0.00003	0.00003
<i>Number of bases</i>	-0.003	-0.008	-0.013*	-0.016*
<i>Number of other groups</i>	-0.0005	-0.0001	-0.0003	-0.0001
<i>Attack diversity</i>	-0.011	-0.012	-0.020	-0.020
$\log(\text{GDP}/\text{POP})$	0.004	0.001	0.003	0.003
$\log(\text{POP})$	-0.003	-0.009	-0.009	-0.019**
<i>Openness</i>	-0.012	-0.008	-0.009	-0.038
<i>Gov. spending</i>	0.043	-0.002	0.002	0.141
<i>Polity</i>	-0.001	-0.002	-0.002*	-0.003**
<i>Ethnic frac.</i>	-0.010	-0.031	-0.045	-0.033
<i>Military expenditure</i>				-0.008*
<i>East Asia & Pacif. (d)</i>		0.027	0.035	0.054
<i>Europe & Centr.Asia (d)</i>		0.038	0.044	0.046
<i>Lat. America & Car. (d)</i>		0.046	0.053	0.030
<i>North America (d)</i>		0.124	0.080	0.096
<i>South Asia (d)</i>		0.023	0.026	0.019
<i>sub-Saharan Africa (d)</i>		0.089	0.090	0.075
<i>N</i>	2012	2012	2012	1971

Notes: (d) is for discrete change of dummy variable from 0 to 1. Significance levels: *** is

<.01, ** is <.05, and * is <.10.

Table 6. Robustness Analysis, 1970–2007

Variable	Model 1	Model 2	Model 3	Model 4
$\log(\text{size})$	-0.230***	-0.234***	-0.165**	-0.284***
<i>Left wing</i>	1.028***	1.217***	1.231**	1.349***
<i>Nationalist</i>	0.740**	0.927***	0.998**	1.161***
<i>Right wing</i>	1.666***	1.873***	1.678***	2.232***
<i>(L) Transnat terr/POP</i>	0.037	0.062	-0.154	0.037
<i>(L) Casualties per attack</i>	0.0001	0.0001	-0.0003	-0.0001
<i>Number of bases</i>	-0.212*	-0.238*	-0.298*	-0.238*
<i>Number of other groups</i>	-0.001	0.005	0.009	0.009
<i>(L) Attack diversity</i>	0.138	0.209	-0.487	0.244
<i>(L) log(GDP/POP)</i>	0.077	0.026	-0.193	0.012
<i>(L) log(POP)</i>	0.004	-0.075	-0.389**	-0.164
<i>(L) Openness</i>	0.536**	0.209	0.011	0.074
<i>(L) Gov. spending</i>	1.367	1.656		2.121
<i>(L) Polity</i>	-0.029*	-0.049***	-0.092***	-0.060***
<i>Ethnic frac.</i>	0.367	1.105	2.474	0.962
<i>Ethnic frac. squared</i>	-0.678	-1.547	-4.171*	-1.392
<i>(L) Military expenditure</i>			0.021	
<i>East Asia & Pacif.</i>	-0.321	-0.041	1.481*	0.224
<i>Europe & Centr.Asia</i>	0.177	0.180	1.107***	0.403
<i>Lat. America & Car.</i>	0.668	0.781*	2.255***	1.103**
<i>North America</i>	0.642*	0.962**	0.974	1.616***
<i>South Asia</i>	-0.225	-0.349	0.775	-0.281
<i>sub-Saharan Africa</i>	0.906	0.942	2.241***	1.246*
$\log(\text{elevation})$	-0.156	-0.225	-0.297	-0.178
<i>Tropics</i>	-0.579	-0.792**	-1.237**	-0.984**
<i>Landlocked</i>	0.766**	0.788**	0.420	0.752*
<i>N</i>	5036	5036	3042	5036

Notes: Standard errors, constant, and duration variables are suppressed. Quadratic specification of

duration dependence is used for Model 1 and piecewise constant specification (dummy variables for

1970–79, 1980–89, 1990–99, and 2000–07) is used for Models 2–4. Models 1–3 are estimated with the

logit estimator and Model 4 is estimated with the random effects logit estimator. *(L)* indicates that a

given variable is lagged. All time-varying variables are lagged. Significance levels: *** is $<.01$, ** is $<.05$, and * is $<.10$.