

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

## European Journal of Political Economy

journal homepage: [www.elsevier.com/locate/ejpe](http://www.elsevier.com/locate/ejpe)

## How do the factors determining terrorist groups' longevity differ from those affecting their success?



Khusrav Gaibulloev<sup>a</sup>, Dongfang Hou<sup>b</sup>, Todd Sandler<sup>c,\*</sup>

<sup>a</sup> Department of Economics, School of Business Administration, American University of Sharjah, PO Box 26666, Sharjah, United Arab Emirates

<sup>b</sup> School of Applied Economics, Mingde Building, Renmin University of China, No. 59 Zhongguancun Ave, Haidian, Beijing, 100872, PR China

<sup>c</sup> School of Economic, Political & Policy Sciences, University of Texas at Dallas, 8000 W Campbell Rd., Richardson, TX, 75080, USA

## ARTICLE INFO

*JEL classification:*

D74  
C41  
H56

*Keywords:*

Terrorist groups' survivability  
Terrorist groups' success  
Terrorist groups' ideologies  
Cross-sectional and panel analyses

## ABSTRACT

This paper distinguishes a terrorist group's survivability from its success. Terrorist groups succeed if they join the political process or achieve some of their goals. Based on a sample of 470 terrorist groups, we first estimate the determinants of groups' ending and, conditional on their demise, we identify factors conducive to their success. We find that religious fundamentalist terrorist groups survive longer than left-wing, nationalist/separatist, or right-wing groups; but religious groups are less apt than other ideologies to attain their objectives or to join the political process. Larger groups survive longer and possess a better success prognosis. Within-country group competition is conducive to survival, but harmful to success. Controls include groups' goals, groups' strategic choices, and home country's characteristics. Robustness tests disaggregate our success measure, provide panel estimates, and incorporate other controls.

### 1. Introduction

In recent years, data have been collected on essential attributes of terrorist groups, including their membership size, ideology, duration, alternative endings, strategic choices, goals, competitive groups, attack carnage, base countries, and base countries' characteristics (see, e.g., [Asal and Rethemeyer, 2015](#); [Blomberg et al., 2011](#); [Carter, 2012](#); [Crenshaw, 2018](#); [Cronin, 2009](#); [Jones and Libicki, 2008](#)). Those datasets provide opportunities for researchers not only to investigate the influences on terrorist groups' survivability, but also to ascertain the factors behind terrorist groups' success. Implicitly, some of the terrorism literature equates terrorist groups' longevity with their success ([Blomberg et al., 2010](#); [Cronin, 2006](#); [Gaibulloev and Sandler, 2013](#); [Jones and Libicki, 2008](#)); however, terrorist groups may survive for fifty years or more, yet never achieve their intended influence on policy – e.g., the Popular Front for the Liberation of Palestine (PFLP) or Basque Fatherland and Liberty (ETA) – or become a legitimate political voice. The PFLP wanted an independent Palestinian state, while the ETA desired an autonomous Basque state. Despite al-Qaeda's campaigns to traumatize the public at large through horrific attacks (e.g., the four deadly hijackings on September 11, 2001 – henceforth, 9/11), al-Qaeda has not realized its main goal of ridding the Moslem world of all foreign influences. Carnage and notoriety do not equate with political legitimacy or success.

\* Corresponding author.

E-mail addresses: [kgaibulloev@aus.edu](mailto:kgaibulloev@aus.edu) (K. Gaibulloev), [dfhou@ruc.edu.cn](mailto:dfhou@ruc.edu.cn) (D. Hou), [tsandler@utdallas.edu](mailto:tsandler@utdallas.edu) (T. Sandler).

<https://doi.org/10.1016/j.ejpolco.2020.101935>

Received 6 January 2020; Received in revised form 7 July 2020; Accepted 11 August 2020

Available online 20 August 2020

0176-2680/© 2020 Elsevier B.V. All rights reserved.

The current paper distinguishes the determinants of terrorist groups' survivability from those behind their success, based on empirical analyses using a sample of groups drawn from a newly constructed terrorist group dataset that covers 1970–2016 (Hou et al., 2020). For the current investigation, the success of a terrorist group is equated with either joining the political process or achieving some of its primary goal. By joining the political process, the group becomes legitimate and may influence policy through public debate or votes in the legislative body (e.g., the Irish Republican Army or the Provisional Irish Republican Army in 2005 and thereafter – see Jones and Libicki, 2008).<sup>1</sup> For another instance, Mozambique National Resistance (RENAMO) ceased operations and became a political party that shortly thereafter won 112 seats in the national assembly in October 1994 (Jones and Libicki, 2008). Post (1991, p. 38) equates terrorist success with groups that convince more powerful actors of the legitimacy of the groups' cause. Becoming a legitimate political player is one important means of displaying a relevancy to those in power and to the electorate and global community. Similarly, Thomas (2014) indicates that “a marker of success” (p. 804) for a rebel group employing terrorism is to gain an invitation to participate in negotiations. Concessions can only come when channels of communication are opened up between the government and the terrorist group. In a seminal study on foreign aid and terrorist group longevity, Bapat (2011) does *not* equate joining the political process as a sign of failure. When achieving some of their main goals, we also view terrorist groups as successful if they are sufficiently satisfied to cease terrorist attacks. Groups that gain no political participation or concessions are deemed to be unsuccessful when they end operations, are defeated by force, or splinter into factions (Bapat, 2011).

Any measure of terrorist success is fraught with difficulties (Cronin, 2006; Schelling, 1991). Our aggregate success measure is intended not only to capture groups' drive to legitimacy and accomplishment, but also to provide sufficient observations for statistical inference. In the robustness tests, we disaggregate our success measure into its two components to establish similar results.

The primary purpose of this paper is to estimate significant influences that affect the life span of terrorist groups and, conditional on their demise, the paper ascertains the key determinants that affect groups' success. For a cross-section of terrorist groups during 1970–2016, this exercise is accomplished with a probit with sample-selection model for which the two outcomes – ending versus concluding successfully – are treated as dependent processes. For comparison purposes, we also estimate separate probit regressions for which the two outcomes are considered to be independent processes. As a robustness check, we employ two panel analyses – based on annual observations and five-year averages – to identify drivers behind terrorist groups' endings versus their success. Additional robustness tests disaggregate terrorist groups' alternative endings particularly with regards to success. The sign and magnitude of the significant controls driving the two processes may differ – e.g., group size may inhibit a group's demise but may foster a successful ending. For other controls, the sign associated with the two processes may be the same so that groups' ideology may bolster their demise, while also fostering their success when ending (e.g., nationalist/separatist terrorist groups). Up until now, the extant literature on terrorist groups focuses primarily on what influences the longevity of these groups (see, especially, Blomberg et al., 2010; Blomberg et al., 2011; Cronin, 2006; Jordan, 2009; Phillips, 2014, 2015a; Vittori, 2009; Young and Dugan, 2014).<sup>2</sup> Carter (2012) and Gaibulloev and Sandler (2014) apply a competing-risk empirical methodology to find factors that influence alternative endings for terrorist groups that include defeat, splintering, joining the political process, or victory, but their studies do not make measures of success conditional on the groups' ending.

The current paper contains some key findings. First, larger terrorist groups are found not only to display a greater likelihood to survive, but also to be more inclined to end successfully from a political or strategic vantage. Second, relative to left-wing, nationalist/separatist, and right-wing terrorist groups, religious fundamentalist terrorist organizations display a smaller probability of demise, while, conditional on ending, being less apt to be successful.<sup>3</sup> Thus, longevity is clearly not synonymous with success for terrorist groups. Third, within a host country, greater competition among terrorist groups raises groups' longevity prospects<sup>4</sup> but at the expense of their success. Fourth, terrorist groups that rely more on transnational terrorist attacks are more likely to end owing to the inherent risks associated with such attacks. Fifth, terrorist groups survive longer if they employ more diversified attacks that are harder to protect against.

The remainder of the paper contains five sections. Section 2 provides essential background material on terrorist groups, including their definition, ideologies, campaign composition, and alternative endings. Section 3 offers some theoretical considerations, followed by the presentation of our empirical methodology and data in Section 4. Section 5 indicates empirical results and robustness tests, while Section 6 presents some concluding remarks.

## 2. Background

A terrorist group is a subnational organization whose members seek to obtain a political goal by intimidating an audience through violent attacks or the threat of such actions (Gaibulloev and Sandler, 2019; Phillips, 2015b). These groups may vary greatly in size from less than ten members (e.g., Communist Combatant Cells) to many thousands (e.g., Aum Shinrikyo, Revolutionary Armed Forces of Colombia (FARC), and al-Qaeda) (Jones and Libicki, 2008). By creating an atmosphere of fear through their attack campaign, terrorist groups try to cause sufficient audience costs that the targeted constituency pressures the government into making political concessions.

<sup>1</sup> The IRA split into two factions around 1969 with the Provisional IRA (PIRA) replacing the IRA. We use the IRA designation rather than the PIRA in this study.

<sup>2</sup> Some past studies analyze the drivers behind the lethality of terrorist groups (Asal and Rethemeyer, 2008; Horowitz and Potter, 2014).

<sup>3</sup> This is indicated in the literature with select cases, but not rigorous statistical test of a large number of terrorist groups (see Rapoport, 1984).

<sup>4</sup> Group competition bolsters terrorist group longevity in Phillips (2015a), but not in Young and Dugan (2014) for a much different sample. Neither article relates group competition to its success.

If those campaigns result in large-scale loss of life and property, the targeted audience may feel especially vulnerable. Terrorist campaigns consist of a mix of explosive bombings, armed attacks, assassinations, skyjackings, suicide bombings, vehicle rammings, and other kinds of attacks.<sup>5</sup>

Generally, terrorist groups abide by four basic ideologies<sup>6</sup>: left wing, nationalist/separatist (henceforth, nationalist), religious, and right wing. Left-wing terrorist groups often adhere to an anti-imperialist or else a far-left ideology (e.g., Red Army Faction, Red Brigades, and Action Directe). Nihilistic terrorist groups that want to eliminate any government rule are classified as leftist, as are terrorist groups pursuing a specific anti-establishment purpose – e.g., promoting animal rights or ending a country's membership in the North Atlantic Treaty Organization (NATO). In the case of nationalists, the terrorist group's membership works toward the establishment of an autonomous country that, in some cases, includes a portion of an existing country, such as ETA's demand for an independent Basque state. By so doing, nationalist terrorists push for territorial change. Religious fundamentalist terrorist groups employ violence and intimidation for a regime change or an all-encompassing state, such as Jemaah Islamiya demanding a pan-Asian Islamic state that imposes its religious views on everyone. Other religious fundamentalist terrorist groups include Boko Haram in Nigeria, al-Shabaab in East Africa, Islamic State of Iraq and the Levant (ISIL), and the Taliban in Afghanistan. Finally, right-wing terrorist groups often want to restore the status quo in which their members maintain control over policy. If a terrorist group can be identified with two ideologies, the overriding ideology is assigned to the group, which is consistent with our underlying group data construction (Hou et al., 2020). The practice of identifying a prime ideology also agrees with the often used, but more dated, group data of Jones and Libicki (2008). For instance, the PFLP and al-Fatah abide by a leftist orientation, but their primary ideology is nationalist – i.e., establishing an autonomous Palestinian state. Neither PFLP nor al-Fatah would end its terrorist campaign if Israel adopted a leftist ideology without allowing for the establishment of a Palestinian state. Secondary ideologies, if one exists, are not the main driver of terrorist attacks.

Since the early 1990s, the dominance of left-wing terrorist groups has given way to the dominance of religious terrorist groups (Hoffman, 2006; Rapoport, 2004). In a recent study, nationalist and left-wing groups outnumber religious and right-wing groups that started before 2002, while religious and nationalist groups outnumber left- and right-wing groups that started during 2002–2016. Nevertheless, religious groups do exist before 2002 making up about 18% of sample groups, while leftist groups do exist after 2001 comprising about 16% of sample groups (Hou et al., 2020).

Terrorist groups may engage in domestic and/or transnational terrorist attacks. Domestic attacks are within-country affairs for which the perpetrators and victims are from the venue country, where the incidents take place.<sup>7</sup> Moreover, any incident-related demands are made on host-country entities – i.e., citizens or domestic institutions. As such, domestic terrorist events generate no transnational externalities, or uncompensated interdependency, on another country. The Oklahoma City bombing of the Alfred P. Murrah Federal Building by Timothy McVeigh on April 19, 1995 was a domestic terrorist event. In contrast, transnational terrorist attacks involve two or more countries through the nationalities of the perpetrators, the victims, or the venue country. The truck ramming along a bicycle path in lower Manhattan on October 31, 2017 was a transnational terrorist incident. The perpetrator, an ISIL supporter, was a foreign national; six of the eight people murdered were foreign nationals. Most terrorist groups engage in a small share of transnational terrorist attacks, which is the ratio of transnational attacks to the sum of transnational and domestic attacks. This diminished share is likely due to the greater risks and heightened logistical complexity associated with transnational attacks. Risks are elevated because transnational attacks may require the crossing of an international border and may anger a powerful country that then dispatches its counterterrorism forces – e.g., the French bombing of Raqqa, Syria after an ISIL terrorism attack in Paris during November 2015.

Terrorist groups may remain active or they may conclude their operations. In 2016, a few noteworthy active groups are PFLP (active since 1967), al-Qaeda (active since 1988), Boko Haram (active since 2002), and Hezbollah (active since 1982).<sup>8</sup> After 2002, active terrorist groups represent all four ideologies, with religious and nationalist organizations having the greatest presence. Terrorist groups can end in at least five ways.<sup>9</sup> A terrorist group can splinter into two or more groups. Instances include Ansar al-Islam, an Iraqi-based group, for which a portion joined ISIL in 2014. Other examples involve the Islamic Front (Syria), the Democratic Karen Buddhist Army (DKBA) (Myanmar), and Black September (Jordan). The last group carried out the Munich Olympics hostage-taking attack on Israeli athletes in 1972. In December 1974, Black September split apart with remaining members absorbed by other Palestinian terrorist organizations. Terrorist groups can end through mergers with other groups – e.g., Salafist Group for Preaching and Fighting (GSPC) merged with al-Qaeda core to form al-Qaeda in the Islamic Maghreb (AQIM) in 2006 and Yarmouk Martyrs Brigade merged with Khalid ibn al-Walid Army in 2016. A third way of ending constitutes our measure of success – i.e., Politics/Victory – for which the terrorist group either joins the political process or gains some or all of its political demands.<sup>10</sup> In either case, the group ceases to engage in

<sup>5</sup> On the relative social costs of alternative attack modes in terms of injuries or the loss of lives, see the interesting calibrations in Arce (2019).

<sup>6</sup> See Gaibullov and Sandler (2019) and Jones and Libicki (2008) on these terrorist groups' ideologies.

<sup>7</sup> Our distinction between domestic and transnational terrorism is that of Enders et al. (2011) and is used to classify attacks in the Global Terrorism Dataset (GTD) whose data are used in the current study.

<sup>8</sup> The stylized facts in the remainder of this section come from the Extended Data on Terrorist Groups (EDTG), collected by Hou et al. (2020).

<sup>9</sup> These are the five endings used by Jones and Libicki (2008) and Hou et al. (2020), whose data form the basis for our study. Cronin (2006, 2009) lists seven endings, three of which overlap with our endings (i.e., victory, political participation, or defeat). Her other endings – e.g., failure to transition to next generation, lack of popular support – would result in the group becoming inactive, which is our fifth ending. She does not consider splintering or merging per se, but these may be captured by the transition failure. Because we are interested in success versus nonsuccess, the type of failure is not important for our analysis.

<sup>10</sup> There is a somewhat related literature dealing with civil war duration (Toft, 2010) and intergroup fragmentation (Cunningham et al., 2012). Because most terrorist groups are not engaging in a civil war (Gaibullov and Sandler, 2019), the study of civil war termination and post-war stability are not germane to our current study of terrorist group termination/success.

terrorism. The remaining two endings involve defeat in which the group is annihilated by the military or police (e.g., Liberation Tigers of Tamil Eelam (LTTE) in 2009, Aum Shinrikyo in 2000, Abu Nidal Organization (ANO) in 2002, and al-Ittihaad al-Islami in 1996) or else ceases activity for at least five years (e.g., Movement of Niger People for Justice, Babbar Khalsa, Lashkar-I-Omar, and Chukakuha (Middle Core Faction)).

Table 1 highlights some statistics of our 470 sample terrorist groups during 1970–2016. This sample is drawn from Hou et al. (2020) for groups whose peak size, a crucial variable, is given. The top half of the table depicts some pertinent statistics for active and demised sample terrorist groups. As indicated, 201 of the 470 sample groups (42.8%) were still active. Among sample groups, 18.1% achieved success (politics/victory) and 17.9% were defeated. Among the groups that ended, the percentages of the groups that achieved success, were defeated, and splintered are 31.6%, 31.2%, and 26.4%, respectively. Active groups possessed the largest peak size in log terms, followed by those ending in merger and then success. Within-country competition (i.e., mean number of competitive groups in the base country) was most associated with being active, while the absence of within-country competition was most tied to success. The lower portion of Table 1 relates the groups' six fates to the four ideologies. Based on our sample, left-wing and nationalist groups were more apt to succeed, while nationalist and religious groups were more inclined to remain active. Left-wing terrorist groups made up 51.2% of terrorist groups that were defeated militarily, while they accounted for 47.1% of groups that joined the political process or achieved victory. Religious groups were the least apt to succeed; religious groups constituted 13.7% (37) of all groups that ended in our sample but comprised 3.5% (3) of all groups that ended by joining the political process or gaining victory. Among religious groups, joining the political process or achieving victory, was the least frequent type of ending.

### 3. Theoretical considerations

We assume that terrorist groups are rational in their aim to survive and, ultimately, to obtain some of their goals (Enders and Sandler, 1993; Landes, 1978; Schelling, 1991). As such, terrorist groups are viewed as allocating their scarce resources among alternative attack modes to maximize their welfare, which increases with the achievement of their goals. Following Jones and Libicki (2008), terrorists' goals generally consist of territorial demands, policy change, status quo, and empire, regime change, or social revolution (denoted by ERCSR). We view terrorist-induced carnage as a means for intimidating the public and the targeted government, but not as an end or goal in itself.

The most essential resource of terrorist groups is their membership or size. A greater size allows groups to engage in more and larger attacks that are more sophisticated and have a greater probability of logistical success (Faria and Arce, 2012; Feinstein and Kaplan, 2010). Operational success is enhanced because larger size allows for more careful planning of attacks, improved tactical support, larger infrastructure, and augmented training. Bigger organizations can develop more specialized skills and greater division of labor among their members, including intelligence and bomb-making expertise. Larger terrorist organizations often develop media and propaganda branches to sway the public and to solicit funds and recruits. By increasing the number of attacks, larger groups are not only able to attract more members but are better poised to obtain financial and moral support from sympathizers. Gaining visibility is essential if terrorist groups are to legitimize their mission by either joining the political process or gaining their sought-after concessions. With bolstered operational success, terrorist groups are able to increase audience costs and, thus, place greater pressures on a besieged government to acquiesce to some of the groups' demands. In summary, terrorist groups' size should increase the groups' survivability and also their prospects for success.

Another consideration behind group longevity and success concerns group competition as measured by the number of other groups in the base country. Even violent rivalries among resident terrorist groups can promote their longevity by forcing civilian's allegiance, fostering innovation, offering new incentives, or spoiling peace negotiations (Phillips, 2015a). Moreover, enhanced within-country

**Table 1**  
Terrorist groups' characteristics and fate, 1970–2016.

Groups' fate	Entire sample			
	Number	Percentage	Mean competition	Mean peak size
Active	201	42.77	16.00	5.87
Splintering	71	15.11	7.20	3.15
Merging	5	1.06	10.11	5.53
Politics/Victory	85	18.09	3.80	4.79
Military/Policing	84	17.87	6.00	3.73
Not Active within 5 years	24	5.11	10.16	3.07
Total	470	100		
Groups' fate	Entire sample: number of groups by type			
	Left wing	Nationalist	Religious	Right wing
Active	28	88	81	4
Splintering	27	29	12	3
Merging	0	0	5	0
Politics/Victory	40	32	3	10
Military/Policing	43	23	11	7
Not Active within 5 years	7	9	6	2
Total	145	181	118	26

competition can bolster group longevity by thinning the government's counterterrorism resources as the authorities must monitor and counter more resident terrorist groups. From the terrorists' viewpoint, the spreading of domestic counterterrorism resources lowers the costs of their operations and fosters the number of successful terrorist operations, while allowing the terrorists to increase their attacks and escape capture. Terrorist groups also have better chances than targeted governments to surmount collective action problems and work together. Cooperation promotes terrorist groups' survival prospects even in unfavorable conditions, such as operating in strong states and autocratic countries (Phillips, 2014). Therefore, as the number of terrorist groups in a country increases, the likelihood of a new group locating in the country is found to rise (Gaibullov, 2015). Although group competition increases groups' survival, this intergroup competition is apt to have the opposite influence on groups' ability to obtain their goal. As this competition increases, the government is confronted with multiple groups' demands. By conceding to one terrorist group, the government is then opened to having to make concessions to other terrorist groups. The literature shows that past concessions often encourage more terrorist attacks (see, e.g., Brandt et al., 2016; Kydd and Walter, 2006, pp. 62–63; however, Crenshaw, 1991 holds an alternative view), so that governments may be more reticent to make concessions to any terrorist group. Thus, we hypothesize that within-country group competition increases groups' survival, but at the expense of their success.

Relative to other ideologies, religious terrorist groups are more likely to survive longer given their widespread support and a membership based on kinship and long-term friendships (Berman, 2009; Rapoport, 1984; Sageman, 2004, 2008). The latter makes it particularly difficult to infiltrate religious groups relative to other ideologies. However, a religious ideology is likely to have detrimental influences on group success relative to other groups (Gaibullov and Sandler, 2014; Jones and Libicki, 2008). Given their demands for empire, regime change, and social revolution, religious groups' demands are too drastic and broad to elicit concessions (Schelling, 1991). Religious terrorist groups often demand that everyone adopts their religious rules, dress, and way of life (e.g., ISIL and the Taliban). Left-wing and nationalist terrorist groups make less draconian demands and are thus more apt to join the political process or obtain some concessions, thus achieving success.

Next, we consider a couple strategic variables and their potential effect on group longevity and success. The share of transnational terrorist attacks should enhance groups' vulnerability as a powerful targeted third-party government may project power to the terrorist groups' base country (Carter, 2012). This was true of the invasion of Afghanistan by the United States, the United Kingdom, and other coalition members following 9/11. By contrast, the heightened threat posed by a terrorist group engaging in a larger share of transnational terrorist incidents may promote their success prospects owing to greater audience cost. Transnational terrorist incidents are shown in the literature to have larger economic consequences (e.g., Gaibullov and Sandler, 2019), which, in turn, may put more pressures on the targeted government to grant concessions. A second strategic variable concerns the attack diversity of the groups' terrorist campaigns. Quite simply, more diverse campaigns are more difficult for the authorities to defend against, thus resulting in more successful operations, fewer arrests, and longer-lived groups (Blomberg et al., 2011; Horowitz et al., 2018). However, attack diversity may increase or decrease the ability of the groups to achieve their goal or to be admitted into the political process. Attack diversity may augment groups' success by limiting attack predictability and raising the atmosphere of anxiety. In contrast, attack diversity makes for a more formidable and deadly opponent that may make for a more entrenched public and government owing to backlash so that no deals are consummated.

Relative to terrorist groups wanting to maintain the status quo, some terrorist goals – ERCSR and territorial change – are anticipated to limit groups' concluding operations. If, moreover, the groups do conclude their campaign, then they are less likely to achieve success with broad hard-to-fulfill demands (Gaibullov and Sandler, 2014; Jones and Libicki, 2008; Schelling, 1991). This is especially true of ERCSR.

Regime type, as measured by the Polity IV dataset (Marshall et al., 2017), is expected to affect terrorist groups' ending in myriad ways. Because democratic governments protect the rights of terrorists and provide a favorable environment for operations and publicity, democracy may promote resident groups' survival (Hoffman, 2006). In contrast, autocratic regimes take a stronger stance against resident terrorist groups, thereby hastening their demise and limiting terrorist attacks especially compared to anocracies (Chenoweth, 2013; Gaibullov et al., 2017). Our global sample includes the spectrum of regime types. With respect to terrorist success, greater democracy may have opposing influences. Democracy may bolster terrorist success by making the government more responsive to audience cost; contrariwise, democracy may inhibit terrorist success by taking decisive actions to protect lives. The latter induces a rigorous counterterrorism campaign. Democracies are generally concerned that granting terrorist aims under pressure will encourage even more terrorism (Kydd and Walter, 2006). Based on these opposing influences, the net influence of democracy on terrorist success is an empirical question that we investigate. However, given its tough stance to political challenges, autocracies are expected to inhibit terrorist groups' success.

Because we employ a probit regression with sample selection, we must identify some controls that affect whether terrorist groups end but not whether they succeed after ending. The number of base countries of a terrorist group likely promotes a terrorist group's survival because alternative bases make it more difficult to defeat the group due to the difficult-to-achieve required collective action among these base countries. By contrast, additional bases potentially affect whether splintering or merging is more likely, which are other forms of group demise (Gaibullov and Sandler, 2014). Given these opposing influences of the number of bases on terrorist groups' survival, there is no clear prior. However, the ability to join the political process or to win concessions in a particular base country is not necessarily tied to possessing bases abroad. A group's duration (i.e., its active time since 1970) may affect its longevity prospects since a longer-lived group has better infrastructure, logistics, and experience, thus making it more resilient. There is, however, no obvious reason why a group's duration should impact its success, especially when its size is held fixed. Although the carnage (i.e., nonterrorist casualties) may motivate a base country to deploy decisive counterterrorism actions to end the group, this carnage is not anticipated to foster or inhibit the group's success. We consider most base-country variables – e.g., GDP per capita, elevation, tropics, and landlocked – as potentially influencing groups' survival but not their ability to achieve success. For example, mountains and jungles provide hiding

places that augment groups' invulnerability, but these base-country characteristics should not affect groups' prognosis for success. Similarly, we view regional dummies as possibly affecting the survival but not the success of terrorist groups.

#### 4. Methodology and data

##### 4.1. Empirical methodologies

Suppose  $End_i^*$  and  $Success_i^*$  are latent variables that describe group  $i$ 's ending and success outcomes, respectively. We only observe a binary outcome of whether a group ended (succeeded) or not. The underlying relationships are modeled as follow:

$$End_i^* = \mathbf{x}_i\alpha + \varepsilon_{1i}, \quad End_i = 1 \text{ if } End_i^* > 0, \text{ and } 0 \text{ otherwise,} \quad (1)$$

and

$$Success_i^* = \mathbf{z}_i\beta + \varepsilon_{2i}, \quad Success_i = 1 \text{ if } Success_i^* > 0, \text{ and } 0 \text{ otherwise,} \quad (2)$$

where  $\varepsilon_1 \sim N(0, 1)$ ,  $\varepsilon_2 \sim N(0, 1)$ , and  $\text{corr}(\varepsilon_1, \varepsilon_2) = \rho$ . In equations (1) and (2),  $\mathbf{x}_i$  and  $\mathbf{z}_i$  are vectors of explanatory variables and  $\alpha$  and  $\beta$  are the corresponding coefficient vectors. In the fully specified model, we enter the size of the terrorist groups, the ideologies of the groups, the number of other within-country groups, the groups' share of transnational attacks, the groups' diversity of terrorist attacks, goals of the groups, population in the base country, and the Polity index of the base country as variables in both equations. The group ending regression additionally includes nonterrorist casualties, the number of bases, per capita GDP, and geographical and regional dummy variables (see Data section).

Equation (1) is the selection model: for a given group  $i$ , we observe the dependent variable  $Success_i$  only after the group ends ( $End_i = 1$ ). Thus, the sample in equation (2) contains only groups that have concluded their operations; however, we aim to make an inference about a general population of terrorist groups. If groups are selected into the second stage randomly, then we can estimate each equation separately using the probit estimator. When, however, some unobserved characteristics affect both a group's likelihood to end and its probability of success, i.e.,  $\rho \neq 0$ , then this approach yields biased results in the group success regression. For example, a change in (unobserved) socio-political environment may influence a group's decision to end and alter the prospect of achieving its goal. To address this selection bias, we implement the (bivariate) probit regression with sample selection, which applies the Heckman (1979) correction in a nonlinear setting (Greene, 2011; Van de Ven and Van Praag, 1981). We also estimate each equation separately assuming independence and compare these probit results to those of the sample-selection estimator. As a robustness check, we further estimate the panel version of equations (1) and (2) using the random effects probit regression.

##### 4.2. Data

We employ the terrorist group data from Hou et al. (2020), which update, refine, and extend Blomberg et al. (2011) list of 367 terrorist groups to 760 groups that operated from 1970 to 2016. Hou et al.'s terrorist groups are tied to terrorist incidents given in the Global Terrorism Database (GTD) (National Consortium for the Study of Terrorism and Responses to Terrorism, 2018), which is based on news media reports. Following Jones and Libicki (2008), Hou et al. (2020) assign a primary ideology – leftist, nationalist, religious, and right wing – to each group using a variety of sources (Asal and Rethemeyer, 2015; Crenshaw, 2018; GTD, 2018; Jones and Libicki, 2008; South Asia Terrorism Portal (SATP), 2018; and Terrorism Research and Analysis Consortium (TRAC), 2018). These same sources are used by Hou et al. (2020) to match each group with a primary goal – ERCSR, policy change etc. For each terrorist group, Hou et al. (2020) draw on sources to identify each group's start point and its end point, if relevant.<sup>11</sup> If the group is inactive for five years, then it is considered as ending operations. This group dataset also identifies base-country variables for each terrorist group as described below. For our current analysis, we extract a global sample of 470 terrorist groups, whose peak size is known for the sample period, that engaged in domestic and/or transnational terrorist attacks.

For our subsequent empirical runs, there are two dependent variables – group end and group success. For the cross-sectional regression,  $End$  is a dummy variable that assumes a value of 1 if the group concludes its attacks in one of the five alternative ways indicated earlier and in Table 1. Otherwise,  $End$  takes the value of 0 when the group is active. For a subsample of terrorist groups that ended operations, we construct the second dependent variable,  $Success$ , which equals 1 if the demised terrorist group joins the political process or achieves some of its demands, and 0 otherwise. In annual (5-year) panel regressions,  $End$  equals 1 in the year (5-year interval) that the group concludes, and 0 otherwise, and  $Success$  is coded 1 in the year (5-year interval) that the group ends successfully, and 0 otherwise.

Next, we turn to the independent variables.<sup>12</sup> Log (*size*) is the logarithm of the largest size that a terrorist group achieved during the entire sample period. The four ideologies of the terrorist groups are represented by dummy variables that take the value of 1 if a particular orientation applies, and 0 otherwise. For within-country competition, we use the *number (num) of other groups* in a base

<sup>11</sup> Sources for alternative endings include Asal and Rethemeyer (2015), Crenshaw (2018), Jones and Libicki (2008), South Asia Terrorism Portal (SATP) (2018), and Terrorism Research and Analysis Consortium (TRAC) (2018).

<sup>12</sup> Unless otherwise indicated, the sources for the independent variables are Hou et al. (2020) and those given in the previous footnote.

country. The nonterrorist casualties (*non terr casualt*) variable denotes the sum of nonterrorist deaths and injuries per million people in the base country. This variable is computed from GTD and is in terms of logs. Based on the split of domestic and transnational incidents given in Enders et al. (2011) and subsequent updates through 2016, the share of transnational terrorist attacks (*trans terr share*) is calculated as the ratio of transnational attacks to the sum of domestic and transnational attacks. Attack diversity (*Attack divers*) is one minus the Hirschman-Herfindahl index of alternative attack modes (i.e., assassinations, hijackings, kidnappings, barricade-and-hostage taking incidents, bombings, armed assaults, unarmed assaults, and facility/infrastructure attacks), given in GTD for each sample terrorist group. For each group, we also compute the number of base countries of operation (*Num of bases*). *Duration* consists of the number of years since 1970 that the terrorist group was active. Terrorist groups' primary goals – ERCSR, policy change, territorial (*Territ*) change, and status quo – are captured by dummy variables taking the value of 1 if the goal applies, and 0 otherwise. If a terrorist group possesses multiple base countries, we average base-variant variables over bases. Furthermore, attack casualties, transnational incidents share, attack diversity, and within-country group competition vary over time; the other variables are cross sectional. For the cross-sectional regression, we average the time-variant variables over the entire sample period, whereas for the robustness five-year panel regressions, we average these variables over each five-year interval. For annual panel data, the yearly value of each time-variant variable is recorded for an individual terrorist group.

Base-country characteristics – log (*GDP/POP*), log (*POP*), *Polity*, log (*elevation*), *Tropics*, and *Landlock* – are taken from World Bank (2018), Marshall et al. (2017), Central Intelligence Agency (2018), Gallup et al. (1999a, 1999b). The *Polity* measure varies from –10 to +10 with higher values indicating greater democracy. Our global sample includes the spectrum of regime types. In a robustness run, we allow for three types of regimes based on the terrorist group's base country *Polity* score – namely, less than –5, autocracy; –5 to 5, anocracy; and 6 and over, democracy. For GDP per capita, population, and *Polity* variables, we utilize the first non-missing value for each of these variables for the groups' base countries in the cross-sectional regressions, whereas we average these variables values for the five-year panels. Finally, we use the seven regional divisions given in World Bank (2018).

Table 2 provides sample statistics – number of observations (N), mean, standard deviation, minimum value, and maximum value for the cross-sectional sample of 470 groups. The right-hand five columns give these statistics for just the 269 groups that concluded in one of the five alternative ways. The number of sample groups in the fully specified model falls to 419 owing to missing values. The further reduction of sample groups to 269 in the success probit comes from the loss of active groups.

## 5. Results

For the cross-sectional data, Columns 2–5 of Table 3 report the baseline and fully specified probit models with sample selection,

**Table 2**  
Descriptive statistics.

Variables	Full Sample					Sample of Groups Ended				
	N	mean	St dev	min	max	N	mean	St dev	min	max
End	470	0.572	0.495	0	1					
Success						269	0.316	0.466	0	1
log (size)	470	4.733	2.365	2.303	9.210	269	3.886	2.151	2.303	9.210
Religious	470	0.251	0.434	0	1	269	0.138	0.345	0	1
Left wing	470	0.309	0.462	0	1	269	0.435	0.497	0	1
Nationalist	470	0.385	0.487	0	1	269	0.346	0.476	0	1
Right wing	470	0.055	0.229	0	1	269	0.082	0.275	0	1
Num of other groups	470	10.31	12.93	0	66	269	6.068	7.965	0	50.33
Trans terr share	470	0.211	0.312	0	1	269	0.324	0.365	0	1
Attack divers	470	0.088	0.139	0	0.647	269	0.076	0.127	0	0.583
log (non terr casualt)	448	0.344	0.753	0	4.625	247	0.294	0.689	0	4.582
Num of bases	470	1.394	0.919	1	10	269	1.435	0.923	1	7
Duration	470	13.20	13.26	0	46	269	8.089	9.604	0	42
Status quo	470	0.051	0.220	0	1	269	0.048	0.215	0	1
ERCSR	470	0.496	0.501	0	1	269	0.509	0.501	0	1
Policy change	470	0.164	0.371	0	1	269	0.234	0.424	0	1
Territ change	470	0.289	0.454	0	1	269	0.208	0.407	0	1
log (GDP/POP)	438	8.255	1.521	5.134	11.12	255	8.651	1.451	5.428	11.12
log (POP)	470	17.38	1.531	11.19	20.98	269	17.14	1.453	11.19	20.81
Polity	470	2.825	6.593	–10	10	269	3.113	6.794	–10	10
log (elevation)	469	6.352	0.592	3.405	7.850	269	6.375	0.613	3.405	7.542
Tropics	469	0.331	0.422	0	1	269	0.313	0.426	0	1
Landlock	470	0.062	0.241	0	1	269	0.052	0.223	0	1
M East & N Africa	470	0.253	0.435	0	1	269	0.223	0.417	0	1
East Asia & Pac	470	0.096	0.295	0	1	269	0.067	0.250	0	1
Europe & C Asia	470	0.253	0.435	0	1	269	0.327	0.470	0	1
Lat Amer & Car	470	0.143	0.350	0	1	269	0.216	0.412	0	1
North America	470	0.051	0.220	0	1	269	0.074	0.263	0	1
South Asia	470	0.181	0.385	0	1	269	0.108	0.311	0	1
Sub-Sah Africa	470	0.106	0.309	0	1	269	0.086	0.280	0	1

**Table 3**  
Probit regressions with sample selection.

Variables	End	Success	End	Success
log (size)	−0.096*** (0.036)	0.236*** (0.058)	−0.107** (0.052)	0.276*** (0.072)
Left wing	1.358*** (0.207)	1.191*** (0.345)	1.768*** (0.312)	1.112*** (0.388)
Nationalist	0.662*** (0.188)	1.171*** (0.343)	1.069*** (0.283)	1.130*** (0.386)
Right wing	1.415*** (0.384)	1.682*** (0.428)	1.784*** (0.462)	1.297** (0.530)
Num of other groups	−0.029*** (0.007)	−0.050*** (0.013)	−0.051*** (0.013)	−0.028* (0.017)
Trans terr share	2.710*** (0.646)	1.160*** (0.275)	2.780*** (0.769)	0.975*** (0.325)
Attack divers	−1.424** (0.667)	−2.117*** (0.791)	−0.718 (0.753)	−2.300** (0.897)
log (non terr casualt)	0.178 (0.121)		0.072 (0.148)	
Num of bases	0.226*** (0.078)		0.209** (0.089)	
Duration	−0.044*** (0.006)		−0.055*** (0.007)	
ERCSR			−0.281 (0.404)	−0.712 (0.483)
Policy change			−0.297 (0.429)	0.071 (0.474)
Territ change			−0.133 (0.411)	−0.683 (0.490)
log (GDP/POP)			0.107 (0.127)	
log (POP)			−0.088 (0.105)	−0.068 (0.077)
Polity			−0.065*** (0.019)	−0.021 (0.017)
log (elevation)			0.103 (0.164)	
Tropics			0.339 (0.377)	
Landlocked			−0.882** (0.372)	
East Asia & Pac			−0.221 (0.383)	
Europe & C Asia			−0.189 (0.312)	
Lat Amer & Car			−0.169 (0.455)	
North America			0.783 (0.514)	
South Asia			1.195*** (0.453)	
Sub-Sah Africa			−0.548 (0.451)	
Constant	0.258 (0.269)	−2.750*** (0.455)	0.661 (2.364)	−1.035 (1.415)
N	453		419	
rho	0.72**		0.45	

Notes: Robust standard errors are in parentheses. Significance levels: \*\*\* is < 0.01, \*\* is < 0.05, and \* is < 0.1. rho denotes the correlation between error terms of End (selection) and Success equations.

where the group-ending and group-success equations are estimated jointly. Groups' success is conditional on their demise. For the baseline model, Columns 2–3 include groups' characteristics (size, ideology, age, and number of bases of operation), within-country number of other groups, share of transnational attacks, attack diversity, and nonterrorist casualties. For the full specifications in Columns 4–5, we include groups' goals and variables characterizing the base countries of operation. Some variables from the group-ending regression are not included in the group success regression (see theoretical section).

The correlation between the error terms is statistically significant in the baseline sample-selection regression but is not statistically significant in the fully specified model; selection bias falls when additional control variables are entered. The sign and the statistical significance of coefficients in the sample-selection probit regressions are consistent with those of the independent probit regressions,



**Table 4**  
Probit regressions.

Variables	End		Success	
	Coeff.	Average ME	Coeff.	Average ME
log (size)	-0.103* (0.053)	-0.020* (0.010)	0.331*** (0.055)	0.086*** (0.012)
Left wing	1.691*** (0.296)	0.346*** (0.052)	1.203*** (0.398)	0.287*** (0.076)
Nationalist	1.069*** (0.286)	0.184*** (0.042)	1.220*** (0.400)	0.307*** (0.083)
Right wing	1.727*** (0.455)	0.304*** (0.062)	1.261** (0.523)	0.347*** (0.131)
Num of other groups	-0.053*** (0.013)	-0.010*** (0.002)	-0.051*** (0.018)	-0.013*** (0.005)
Trans terr share	2.698*** (0.764)	0.524*** (0.141)	0.875*** (0.273)	0.229*** (0.067)
Attack divers	-0.701 (0.765)	-0.136 (0.149)	-2.509*** (0.900)	-0.655*** (0.229)
log (non terr casualt)	0.054 (0.141)	0.010 (0.027)		
Num of bases	0.206** (0.089)	0.040** (0.017)		
Duration	-0.055*** (0.008)	-0.011*** (0.001)		
ERCSR	-0.229 (0.393)	-0.044 (0.074)	-0.793* (0.478)	-0.209* (0.120)
Policy change	-0.297 (0.422)	-0.057 (0.080)	-0.047 (0.469)	-0.012 (0.121)
Territ change	-0.100 (0.405)	-0.020 (0.080)	-0.697 (0.498)	-0.166 (0.104)
log (GDP/POP)	0.137 (0.119)	0.027 (0.023)		
log (POP)	-0.098 (0.104)	-0.019 (0.020)	0.019 (0.074)	0.005 (0.019)
Polity	-0.065*** (0.019)	-0.013*** (0.004)	-0.013 (0.017)	-0.003 (0.004)
log (elevation)	0.125 (0.159)	0.024 (0.031)		
Tropics	0.397 (0.376)	0.077 (0.073)		
Landlocked	-0.941** (0.370)	-0.183*** (0.070)		
East Asia & Pac	-0.200 (0.377)	-0.039 (0.073)		
Europe & C Asia	-0.137 (0.306)	-0.027 (0.060)		
Lat Amer & Car	-0.106 (0.448)	-0.021 (0.087)		
North America	0.807 (0.518)	0.157 (0.099)		
South Asia	1.338*** (0.391)	0.260*** (0.072)		
Sub-Sah Africa	-0.506 (0.450)	-0.098 (0.087)		
Constant	0.359 (2.332)		-2.543* (1.441)	
N	419	419	269	269

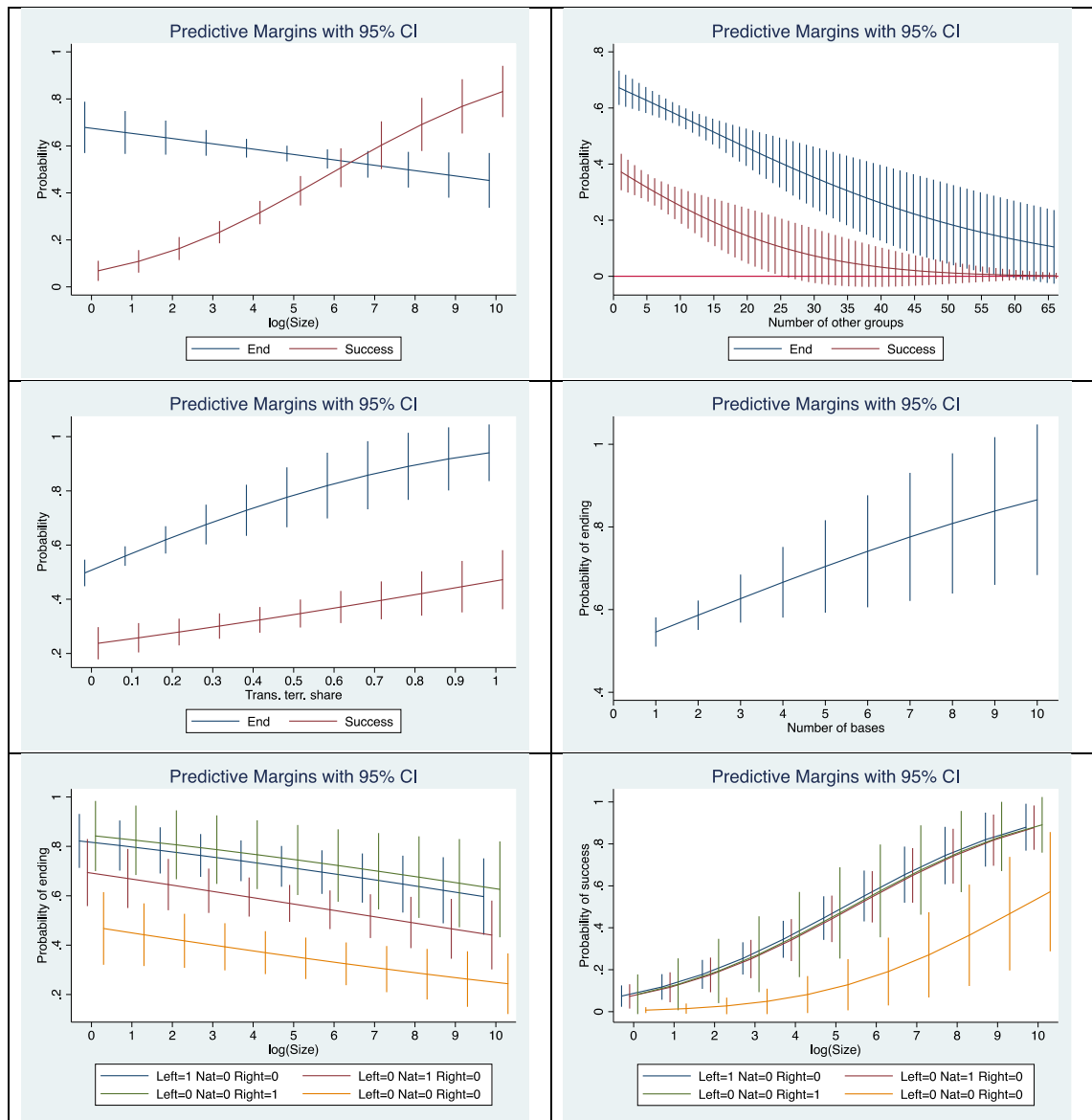
Notes: Robust standard errors (delta-method standard errors for marginal effects) are in parentheses. Significance levels: \*\*\* is < 0.01, \*\* is < 0.05, and \* is < 0.1.

which are reported later in [Table 4](#).

We first consider the baseline model's coefficients in [Table 3](#). The estimated coefficient of group size is negative in the group-ending model and is positive in the group-success equation. Consistent with our theoretical expectation, larger terrorist groups possess a better survival prospect and, once they end operations, these groups have a better prognosis for joining the political process or achieving some of their demands. As anticipated, the three ideology variables – left wing, nationalist, right wing – have positive coefficients in both equations. This implies that relative to other ideologies, religious (baseline) terrorist groups are more likely to survive but, conditional on their demise, are less likely to end successfully. An alternative explanation to this lower likelihood of ending and success would be that the majority of religious groups are established relatively recently and, therefore, end their activities less often. However, religious

groups' survival is not necessarily due to their growing presence in recent decades. First, Hou et al. (2020) indicate that 18% of sample terrorist groups before 2002 are religious, which conduct 24% of attacks, resulting in 46% of casualties, so that religious groups display a marked presence throughout our sample period. We also control for the age of terrorist groups (duration) in the group-ending model. Second, we compute the rate of ending by ideology for groups that started before and after 1990. In our sample, 33% of religious groups that started before 1990, and 31% of religious groups that started since 1990, ended by 2016. In contrast, the rates of demise among nonreligious groups for pre- and post-1990 are 81% and 46%, respectively. This is consistent with Jones and Libicki (2008, p. 36) who show that religious groups survive longer than other ideologies within each decade starting in the 1970s. Finally, among demised religious groups, only 8% achieved success (politics/victory) as opposed to the 34% success rate among terminated leftist groups. For religious groups, the success rate is very low compare to other types of endings.

The within-country competition (i.e., the number of other groups) and groups' attack diversity promote groups' probability of survival, while limiting their chance of success as anticipated. By contrast, the share of transnational attacks augments terrorist groups' likelihood of ending but promotes their probability of success once operations are concluded. A greater number of base countries for the terrorist group are associated with a greater likelihood of terrorist groups' ending, which indicates that the negative influence of splintering and merging on ending is dominant (see theoretical section). Finally, older terrorist organizations have a better chance of



Note: Left, Nat, and Right stand for Left wing, Nationalist, and Right wing groups.

Fig. 1. Predicted probabilities.

survival.

For the fully specified model in Columns 4–5 in Table 3, the coefficients generally display similar signs and significances to those in the baseline model. In terms of new variables, only three are significant. Polity (democracy) has a negative influence on groups' demise as anticipated but has no influence on their success. To account for a possible non-linear relationship, we disaggregate the Polity variable into three dichotomous variables – autocracy, anocracy (base category), and democracy. In so doing, we find that terrorist groups that are based in anocracies are less likely to end than those in autocracies, but these groups possess statistically the same probability of ending as those located in democracies. The disaggregated polity variables are not statistically significant in the success model (available upon request). Terrorist groups are less likely to end in landlocked countries, but other base countries' geographical or economic factors

**Table 5**  
Robustness regressions.

Variables	End	Success		
	Remove Merger	Remove Merger	Politics	Victory (Penalized ML)
log (size)	−0.104* (0.054)	0.330*** (0.055)	0.305*** (0.058)	0.718*** (0.173)
Left wing	1.746*** (0.300)	1.132*** (0.408)	1.156*** (0.389)	2.110 (1.699)
Nationalist	1.122*** (0.293)	1.150*** (0.409)	0.885** (0.405)	4.342** (1.693)
Right wing	1.782*** (0.457)	1.194** (0.530)	1.144** (0.532)	3.939** (1.874)
Num of other groups	−0.052*** (0.013)	−0.050*** (0.018)	−0.047*** (0.017)	
Trans terr share	2.860*** (0.790)	0.869*** (0.273)	0.860*** (0.279)	
Attack divers	−0.923 (0.779)	−2.490*** (0.907)	−2.156** (0.871)	−6.877* (4.174)
log (non terr casualt)	0.056 (0.143)			
Num of bases	0.208** (0.091)			
Duration	−0.054*** (0.008)			
ERCSR	−0.304 (0.399)	−0.787* (0.478)	−0.749 (0.503)	
Policy change	−0.360 (0.426)	−0.045 (0.469)	0.042 (0.497)	
Territ change	−0.153 (0.409)	−0.695 (0.498)	−0.522 (0.530)	
log (GDP/POP)	0.161 (0.118)			
log (POP)	−0.124 (0.106)	0.018 (0.073)	0.042 (0.077)	
Polity	−0.061*** (0.019)	−0.013 (0.017)	−0.011 (0.017)	
log (elevation)	0.171 (0.163)			
Tropics	0.472 (0.375)			
Landlocked	−0.929** (0.374)			
East Asia & Pac	−0.114 (0.376)			
Europe & C Asia	−0.082 (0.309)			
Lat Amer & Car	−0.084 (0.446)			
North America	0.861* (0.523)			
South Asia	1.473*** (0.398)			
Sub-Sah Africa	−0.414 (0.451)			
Constant	0.195 (2.329)	−2.459* (1.439)	−2.892* (1.504)	−8.622*** (2.038)
N	415	264	254	207

Notes: Victory regression is estimated using Firth's penalized maximum likelihood logistic regression. Robust (except for penalized ML) standard errors are in parentheses. Significance levels: \*\*\* is < 0.01, \*\* is < 0.05, and \* is < 0.1.

have no discernible influence on groups' duration. Finally, South Asian terrorist groups are more inclined to end relative to those in the Middle East and North Africa, the left-out category.

Table 4 indicates the fully specified independent probit regressions of ending and success. Columns 2 and 4 display the two regressions' coefficients, while Columns 3 and 5 depict the associated average marginal effects (ME). The results are consistent with those in the sample-selection probit success regressions in Table 3. In response to a one percent increase in the group's size, the probability of a group's ending reduces by 0.02 percentage points and, conditional on its ending, the group's likelihood of success increases by about 0.09 percentage points. The effect of group size is much larger if we consider the impact of a one-standard deviation change in group size from its mean, which is equivalent to around 125 and 199 percent changes in group size for the entire sample and the subsample of demised groups, respectfully. Relative to religious fundamentalist groups, the probability of groups' ending is 34.6, 18.4, and 30.4 percentage points higher for left-wing, nationalist, and right-wing terrorist groups, respectively. The smaller marginal effect for nationalist ideology indicates that, although nationalist terrorist organizations are more susceptible to ending than religious terrorist groups, nationalist groups possess a better survival prognosis than left-wing and right-wing terrorist groups. We performed a test and these differences are statistically significant at the 0.06 level or less. The marginal effect of left-wing ideology is slightly larger than that of right-wing ideology, but the difference is not statistically significant (p-value is 0.51). Conditional on groups' ending, all three ideologies have a statistically significantly better prospect for success relative to religious ideology; the marginal effects range between 28.7 and 34.7 percentage points. For each one unit increase in the share of transnational attacks, the probabilities of terrorist groups' ending or succeeding rise by 52.4 and 22.9 percentage points, respectively. If within-country competitive terrorist groups increase by an additional group, then the probabilities of terrorist groups' concluding or succeeding fall by 1.0 and 1.3 percentage points, respectively. The probability of terrorist groups' success drops by 65.5 percentage points in response to a one unit increase in its attack diversity. The impacts of transnational terrorism share and attack diversity are smaller if we consider the influence of a standard deviation change (see Table 2). For example, an increase in the share of transnational terrorist attacks by one standard deviation (0.31) is associated with a rise in the probability of terrorist groups' ending by about 16 percentage points. An additional base country (or year of activity) augments (reduces) the likelihood of a terrorist groups' ending by 4 (1.0) percentage points. A one unit increase in polity score is associated with 1.3 percentage points increase in the likelihood of terrorist groups' ending. The probability of ending is 26 percentage points higher for terrorist groups residing in South Asia compare to those in the Middle East and North Africa, and 18 percentage points lower for groups residing in landlocked countries.

Next, we examine the predicted probabilities of key variables and their interactions. Fig. 1 shows changes in the predicted probabilities of terrorist groups' ending – denoted by the blue line – and terrorist groups' success – denoted by the red line – as we vary the log of size (top-left panel), the number of other groups (top-right panel), the share of transnational terrorism (middle-left panel), and the number of bases (middle-right panel). The number of bases is not included in the group success regression; hence, only the predicted probabilities of groups' ending are calculated. The bottom-left (bottom-right) graph exhibits change in the predicted probability of groups' ending (success) with respect to group size for different ideologies.

Consistent with Table 4, group size is negatively correlated with the probability of terrorist groups' ending and positively related to the likelihood of terrorist groups' success. The predicted probability of terrorist groups' ending declines (rises) as the number of other terrorist organizations (share of transnational terrorist events) increases; at every value of the number of other groups (share of transnational attacks), the predicted probability of terrorist groups' ending is higher than the predicted probability of terrorist groups' success. For the number of other groups in the base country, the effect is statistically significant for a reasonable, but not entire, range of this variable – see Table 2 for means and standard deviations. The predicted likelihood of terrorist groups' ending is also positively associated with the number of bases. Finally, at every level of terrorist group size, religious fundamentalist organizations (the lowest orange curve) display lower predicted probabilities of ending and success than left-wing, nationalist, or right-wing terrorist groups. The relationship between terrorist groups' ideologies and their likelihood of success appears to be non-linear; the predicted probability gap between religious extremists and the other three terrorist ideologies widens as terrorist organizations become larger over a reasonable range of group size. The three non-religious ideology curves overlap; consistent with our findings, the effects of left-wing, nationalist, and right-wing ideologies on terrorist groups' success do not differ statistically.

### 5.1. Robustness findings

We perform a series of robustness checks with the first set of checks aimed at addressing our alternative endings and their implications for success. First, we remove groups that ended by merger since merger may not really indicate failure. Second, we disaggregate our measure of success by examining joining the political process and gaining victory as alternative measures of success. The sample contains only 15 terrorist groups that ended with victory. To account for the rarity of the outcome, we fit the logistic model of victory by penalized maximum likelihood regression (Firth, 1993). Furthermore, given the small number of victorious groups, we have to drop some of the controls, leaving just the key controls of group size, ideology, and attack diversity when estimating the success equation. Table 5 displays these robustness estimates.

Removing merged groups provide estimates for the ending and success equations in Columns 2–3 of Table 5 that are very close to the results in Table 4 in terms of significant variables, their signs, and their magnitude. The only exception is that North America has a marginally significant and positive influence on groups' end in Table 5. The main results of the regression in Column 4, where the outcome variable is joining the political process, are consistent with the findings in Tables 3 and 4. Caution is advised in interpreting the victory regression (Column 5) owing to a large number of explanatory variables relative to a low prevalence of outcome. The penalized maximum likelihood (ML) regression results concur with the findings in Tables 3 and 4. Left-wing ideology is the only exception; it becomes insignificant albeit the sign remains positive.

Finally, we convert the data into a panel format and separately estimate the likelihood of terrorist groups' ending and the probability of terrorist groups' success using a random effects probit estimator as a robustness check. We add time dummies to control for common time-specific shocks that may influence terrorist groups' ending and their success. Table 6 presents the results for annual and 5-year grouped panel data where groups' goals have been removed. We are cautious with these results; with the panel structure, we face a rare-events problem with a number of panel units having all-zero outcomes. Overall, the main cross-sectional results hold. In particular, group size forestalls groups' ending in the annual panel but fosters success for those groups that ended in the 5-year grouped panel. Relative to other ideologies, religious fundamentalist groups are more likely to survive but are less likely to succeed. The latter results are much clearer in the 5-year grouped panel. Moreover, the strategic variables performed as before. We also follow Semykina and Wooldridge (2018) to estimate a panel model with sample selection; we implement selection probit regression on an augmented equation, which includes individual time means of regressors. The main findings hold, though the results for strategic variables are weaker. Income, population, and, interestingly, Polity are now positive and statistically significant (available upon request).

## 6. Concluding remarks

Using an expanded dataset on terrorist groups' characteristics, the paper provides cross-sectional and panel estimates of the determinants of groups' demise and, conditional on their ending, we identify what factors favor these groups' success. Unlike the extant

**Table 6**  
Random effects probit regressions.

Variables	Annual		5-year grouped	
	End	Success	End	Success
log (size)	-0.241*** (0.074)	0.012 (0.037)	-0.127 (0.092)	0.084** (0.034)
Left wing	0.466** (0.229)	0.745 (0.673)	0.574* (0.301)	0.880** (0.345)
Nationalist	0.329 (0.203)	0.828 (0.723)	0.309 (0.247)	0.844** (0.341)
Right wing	0.699** (0.283)	1.050 (0.695)	0.737** (0.375)	1.075** (0.420)
Num of other groups	-0.014 (0.009)	-0.026 (0.024)	-0.013 (0.012)	-0.024** (0.010)
Trans terr share	0.940*** (0.132)	1.171*** (0.266)	1.611*** (0.367)	1.372*** (0.207)
Attack divers	-0.734** (0.330)	-1.393** (0.553)	-0.660 (0.418)	-1.602*** (0.549)
log (non terr casualt)	0.098 (0.088)		0.035 (0.097)	
Num of bases	-0.067 (0.064)		0.009 (0.047)	
log (GDP/POP)	0.107 (0.099)		0.119 (0.088)	
log (POP)	-0.030 (0.072)	-0.039 (0.059)	0.004 (0.055)	-0.040 (0.060)
Polity	-0.007 (0.014)	0.018 (0.022)	-0.021* (0.012)	0.008 (0.014)
log (elevation)	-0.028 (0.118)		-0.029 (0.092)	
Tropics	0.135 (0.256)		0.061 (0.206)	
Landlocked	0.013 (0.330)		-0.166 (0.297)	
East Asia & Pac	-0.041 (0.279)		-0.084 (0.223)	
Europe & C Asia	0.162 (0.253)		-0.003 (0.191)	
Lat Amer & Car	0.462 (0.296)		0.291 (0.297)	
North America	0.480 (0.400)		0.279 (0.497)	
South Asia	0.297 (0.368)		0.331 (0.306)	
Sub-Sah Africa	0.361 (0.364)		0.267 (0.294)	
Time dummies	Yes	Yes	Yes	Yes
NT	5323	1916	1398	689
N of groups	418	262	419	269

Notes: Robust standard errors are in parentheses. Significance levels: \*\*\* is < 0.01, \*\* is < 0.05, and \* is < 0.1.

literature, our probit with sample selection allows us to focus on the determinants of alternative measures of group success for groups that have ended their operations.

A policymaker may glean a number of insights from the paper's results. First, larger terrorist groups appear to possess better survival prospects. This finding is consistent with the literature (e.g., Cronin, 2009; Jones and Libicki, 2008). When, moreover, groups conclude their terrorist campaigns, groups' size may bolster their likelihood of success in joining the political process or in obtaining some of their goals, which is a novel finding. Thus, the authorities may be in a better position to curb terrorist groups' longevity and success if they hold group size in check as quickly as possible. Second, authorities are advised that religious terrorist groups tend to be more difficult to eradicate than those groups associated with other ideologies. This suggests that the commitment of counterterrorism resources should be relatively greater for religious terrorist groups, which pose the greatest threat today, than for other ideologies. Right-wing groups appear to be the easiest to eliminate, consistent with Crenshaw (1991) who does not apply a statistical analysis. Third, since greater terrorism competition within a country favors these groups' survival, more counterterrorism assets may be better allocated to counteract the thinning (dilution) of these counterterror resources that this competition creates. On the positive side, however, enhanced within-country terrorism competition curtails terrorist groups' success. Fourth, because terrorist groups with more bases abroad experience reduced longevity, authorities may be advised to curtail their counterterrorism efforts at home as resident groups expand their brand abroad, which is another novel finding. Fifth, terrorist groups' tactics may inform the need for counterterrorism actions. Terrorist groups that increasingly diversify their attacks are harder to eliminate but face smaller prospects of success, which is opposite to those groups that rely more heavily on transnational terrorist attacks. Sixth, as terrorist groups age, they are more resilient, suggesting that the quicker they are confronted, the better the prognosis for ending their terror campaigns. Finally, democracies should be particularly vigilant since democracies, relative to other regime types, tends to favor terrorist group survival.

There is still much to be learned about the drivers of terrorist groups' longevity and success. Although the data on terrorist groups and their campaigns have improved, their coverage is still limited because event datasets are not always able to attribute attacks to particular groups, so that about half of the attacks listed in GTD are not tied to any terrorist group. Even when groups are associated with a given attack, their names may be reported inconsistently owing to typos, translation problems, alternative names, and other issues. However, this latter problem is ameliorated greatly here by using the Hou et al. (2020) group dataset that takes great care to address those concerns. Despite the recent strides in assembling datasets on terrorist groups, much remains to be done if the data will become sufficiently rich and complete for more in-depth analysis of terrorist groups and their prospects. In particular, more observations are needed for the peak size of many terrorist groups, particularly because this peak size cannot be interpolated in the absence of observation. Furthermore, peak size and many other group-specific variables do not vary over time, which does not allow for a proper analysis of various changes over time. Finally, devising an identification strategy that addresses potential endogeneity and captures the causal relationship is a major challenge for future terrorism research.

## Declaration of competing interest

None.

## Acknowledgements

While assuming sole responsibility for the article's content, the authors have greatly profited from helpful comments from two anonymous referees and Toke Aidt on an earlier draft.

Sandler's research was supported by the Vibhooti Shukla Endowment at the University of Texas at Dallas. Given that the authors' support is solely from their home universities, they have no conflict of interests.

## References

- Arce, D.G., 2019. On the human consequences of terrorism. *Publ. Choice* 178, 371–396.
- Asal, V., Rethemeyer, R.K., 2008. The nature of the beast: organizational structures and the lethality of terrorist attacks. *J. Politics* 70, 437–449.
- Asal, V., Rethemeyer, R.K., 2015. Big Allied and Dangerous (BAAD), Version 2 accessed 20.8.18. [www.start.umd.edu/baad/database](http://www.start.umd.edu/baad/database).
- Bapat, N.A., 2011. Transnational terrorism, US military aid, and the incentive to misrepresent. *J. Peace Res.* 48, 303–318.
- Berman, E., 2009. *Radical, Religious, and Violent: the New Economics of Terrorism*. MIT Press, Cambridge, MA.
- Blomberg, S.B., Engel, R.C., Sawyer, R., 2010. On the duration and sustainability of transnational terrorist organizations. *J. Conflict Resolut.* 54, 303–330.
- Blomberg, S.B., Gaibullov, K., Sandler, T., 2011. Terrorist group survival: ideology, tactics, and base of operations. *Publ. Choice* 149, 441–463.
- Brandt, P.T., George, J., Sandler, T., 2016. Why concessions should not be made to terrorist kidnapers. *Eur. J. Polit. Econ.* 44, 41–52.
- Carter, D.B., 2012. A blessing or a curse? State support for terrorist groups. *Int. Organ.* 66, 129–151.
- Central Intelligence Agency, 2018. *The World Factbook*. Central Intelligence Agency, Washington, DC accessed 20.8.18. <https://www.cia.gov/library/publications/resources/the-world-factbook/index.html>.
- Chenoweth, E., 2013. Terrorism and democracy. *Annu. Rev. Polit. Sci.* 16, 355–378.
- Crenshaw, M., 1991. How terrorism declines. *Terrorism Polit. Violence* 3, 69–87.
- Crenshaw, M., 2018. *Mapping Militant Organizations*. Center for International Security and Cooperation, Stanford University, Stanford, CA accessed 20.8.18. <http://web.stanford.edu/group/mappingmilitants/cgi-bin/>.
- Cronin, A.K., 2006. How al-Qaida ends: the decline and demise of terrorist groups. *Int. Secur.* 31, 7–48.
- Cronin, A.K., 2009. *How Terrorism Ends: Understanding the Decline and Demise of Terrorist Campaigns*. Princeton University Press, Princeton, NJ.
- Cunningham, K.G., Bakke, K.M., Seymour, L.J.M., 2012. Shirts today, skins tomorrow: dual contests and the effects of fragmentation in self-determination disputes. *J. Conflict Resolut.* 56, 67–93.
- Enders, W., Sandler, T., 1993. The effectiveness of anti-terrorism policies: a vector-autoregression-intervention analysis. *Am. Polit. Sci. Rev.* 87, 829–844.
- Enders, W., Sandler, T., Gaibullov, K., 2011. Domestic versus transnational terrorism: data, decomposition, and dynamics. *J. Peace Res.* 48, 319–337.
- Faria, J.R., Arce, D.G., 2012. A vintage model of terrorist organizations. *J. Conflict Resolut.* 56, 629–650.

- Feinstein, J.S., Kaplan, E.H., 2010. Analysis of a strategic terror organization. *J. Conflict Resolut.* 54, 281–302.
- Firth, D., 1993. Bias reduction of maximum likelihood estimates. *Biometrika* 80, 27–38.
- Gaibullov, K., 2015. Terrorist group location decision: an empirical investigation. *Oxf. Econ. Pap.* 67, 21–41.
- Gaibullov, K., Piazza, J.A., Sandler, T., 2017. Regime types and terrorism. *Int. Organ.* 71, 491–522.
- Gaibullov, K., Sandler, T., 2013. Determinants of the demise of terrorist organizations. *South. Econ. J.* 79, 774–792.
- Gaibullov, K., Sandler, T., 2014. An empirical analysis of alternative ways that terrorist groups end. *Publ. Choice* 160, 25–44.
- Gaibullov, K., Sandler, T., 2019. What we have learned about terrorism since 9/11. *J. Econ. Lit.* 52, 275–328.
- Gallup, J.L., Mellinger, A.D., Jeffrey, D., Sachs, J.D., 1999a. *Geography Datasets*. Center for International Development, Harvard University, Boston accessed 20.8.18. <https://sites.hks.harvard.edu/cid/ciddata/geographydata.htm>.
- Gallup, J.L., Sachs, J.D., Mellinger, A.D., 1999b. Geography and economic development. *Int. Reg. Sci. Rev.* 22, 179–232.
- Greene, W.H., 2011. *Econometric Analysis*, seventh ed. Pearson, Upper Saddle River, NJ.
- Heckman, J.J., 1979. Sample selection bias as a specification error. *Econometrica* 47, 153–161.
- Hoffman, B., 2006. *Inside Terrorism*, Revised Ed. Columbia University Press, New York.
- Horowitz, M.C., Perkoski, E., Potter, P.B.K., 2018. Tactical diversity in militant violence. *Int. Organ.* 72, 139–171.
- Horowitz, M.C., Potter, P.B.K., 2014. Allying to kill: terrorist intergroup cooperation and the consequence for lethality. *J. Conflict Resolut.* 58, 199–225.
- Hou, D., Gaibullov, K., Sandler, T., 2020. Introducing extended data on terrorist groups (EDTG), 1970–2016. *J. Conflict Resolut.* 64, 199–225.
- Jones, S.G., Libicki, M.C., 2008. *How Terrorist Groups End: Lessons for Countering Al Qa'ida*. Rand Corporation, Santa Monica, CA.
- Jordan, J., 2009. When heads roll: assessing the effectiveness of leadership decapitation. *Secur. Stud.* 18 (4), 719–755.
- Kydd, A.H., Walter, B.F., 2006. The strategies of terrorism. *Int. Secur.* 31, 49–80.
- Landes, W.M., 1978. An economic study of US aircraft hijackings, 1961–1976. *J. Law Econ.* 21, 1–31.
- Marshall, M.G., Jagers, K., Gurr, T.R., 2017. *Polity IV Project: Dataset and Users' Manual*. Center for Systemic Peace: Polity IV Project, Vienna, VA accessed 20.7.18. <http://www.systemicpeace.org/inscrdata.html>.
- National Consortium for the Study of Terrorism and Responses to Terrorism (START), 2018. *Global Terrorism Database (GTD)* accessed 20.8.18. <https://www.start.umd.edu/gtd>.
- Phillips, B.J., 2014. Terrorist group cooperation and longevity. *Int. Stud. Q.* 58, 336–347.
- Phillips, B.J., 2015a. Enemies with benefits? Violent rivalry and terrorist group longevity. *J. Peace Res.* 52, 62–75.
- Phillips, B.J., 2015b. What is a terrorist group? Conceptual issues and empirical implications. *Terrorism Polit. Violence* 27, 225–242.
- Post, J., 1991. Terrorist psycho-logic: terrorist behavior as a product of psychological factors. In: Reich, W., Laqueur, W. (Eds.), *Origins of Terrorism: Psychologies, Ideologies, Theologies, States of Mind*. Johns Hopkins Press, Baltimore, pp. 25–40.
- Rapoport, D.C., 1984. Fear and trembling: terrorism in three religious traditions. *Am. Polit. Sci. Rev.* 78, 658–677.
- Rapoport, D.C., 2004. Modern terror: the four waves. In: Cronin, A.K., Ludes, J.M. (Eds.), *Attacking Terrorism: Elements of a Grand Strategy*. Georgetown University Press, Washington DC, pp. 46–73.
- Sageman, M., 2004. *Understanding Terror Networks*. University of Pennsylvania Press, Philadelphia.
- Sageman, M., 2008. *Leaderless Jihad: Terror Networks in the Twenty-First Century*. University of Pennsylvania Press, Philadelphia.
- Schelling, T., 1991. What purposes can international terrorism serve? In: Frey, R.G., Morris, C.W. (Eds.), *Violence, Terrorism, and Justice*. Cambridge University Press, Cambridge, pp. 18–32.
- Semykina, A., Wooldridge, J.M., 2018. Binary response panel data models with sample selection and self-selection. *J. Appl. Econom.* 33, 179–197.
- South Asia Terrorism Portal (SATP), 2018. <http://www.satp.org/staporgtp/satp/index.html>. (Accessed 20 July 2018).
- Terrorism Research and Analysis Consortium (TRAC), 2018. accessed 20.8.18. <https://www.trackingterrorism.org/>.
- Thomas, J., 2014. Rewarding bad behavior: how governments respond to terrorism in civil war. *Am. J. Polit. Sci.* 58, 804–818.
- Toft, M.D., 2010. Ending civil wars: a case for rebel victory? *Int. Secur.* 34, 7–36.
- Van de Ven, W.P.M.M., Van Praag, B.M.S., 1981. The demand for deductibles in private health insurance: a probit model with sample selection. *J. Econom.* 17, 229–252.
- Vittori, J., 2009. All struggles must end: the longevity of terrorist groups. *Contemp. Secur. Pol.* 30, 444–466.
- World Bank, 2018. *World Development Indicators* accessed 20.8.18. <http://www.worldbank.org/data>.
- Young, J.K., Dugan, L., 2014. Survival of the fittest: why terrorist groups endure. *Perspect. on Terrorism* 8, 2–33.