Title

Provoking local ethnic violence – A global study on ethnic polarization and terrorist targeting

Abstract

This article theorizes and empirically investigates the link between ethnic divisions and terrorist attacks on a local scale. We argue that terrorists in ethnic contexts can use two separate provocation strategies: one targeting the government and one targeting opposing ethnic groups in order to stir up ethnic conflict. Following the second strategy, terrorists should target especially highly polarized localities, which are more prone to an escalation of ethnic conflict. Empirically, we suggest an innovative approach to estimate ethnic division indices at sub-national level, using 55 X 55 km grid cells as the unit of observation. Our empirical analysis uses negative binomial regression models including a spatially lagged dependent variable to account for spatial autocorrelation. The analysis reveals that, from 2002 to 2014, areas with high levels of ethnic polarization encountered more terrorist attacks. The results are robust for different model specifications and ethnic polarization remains the most robust ethnic predictor. We conclude that the pattern of terrorist attacks is consistent with our argument that terrorism can be used as a strategy for local ethnic provocation.

Keywords

ethnic division, ethnic fractionalization, ethnic polarization, PRIO-GRID, provocation, terrorism.

INTRODUCTION

In this article, we theorize and empirically investigate the link between local ethnic division and terrorist attacks. Recently, the study of the role of ethnic groups in conflicts has experienced an upsurge. Ethnic groups were found to be influential in the onset (Cederman, Wimmer, & Min, 2010), intensity (Eck, 2009), duration (Wucherpfennig, Metternich, Cederman, & Gleditsch, 2011), and the use of violence against civilians in civil war (Fjelde & Hultman, 2014) to name just a few. However, the study of terrorism has not, yet, engaged in an equally thorough scrutiny of the role of ethnicity (McAllister & Schmid, 2011).

On a macro level several studies found that the emergence of terrorism is linked to some of the same variables as the emergence of ethnic civil wars and armed conflicts. For instance, terrorism seems to be more likely in the presence of excluded and concentrated ethnic groups (Arva & Piazza, 2016; Choi & Piazza, 2016) and ethnically diverse countries (Basuchoudhary & Shughart, 2010; Piazza, 2008b), although the effects of variables like the ethno-linguistic fractionalization index (ELF) and ethno-linguistic polarization may depend on the ideological background of terrorist groups (Kis-Katos, Liebert, & Schulze, 2014).

To our knowledge there is currently only one global disaggregated study on terrorism that accounts for the influence of ethnicity at least as a control variable. Nemeth, Mauslein, & Stapley (2014) investigate the covariates of terrorist attacks on a local level and control for ethnic diversity, measured as the number of ethnic groups present. They find that ethnic diversity only matters in democratic countries from which they infer that ethnic diversity as a predictor of targeting is highly context specific as it produces competition among ethnic groups only in democratic countries. However, the authors do not engage with theories of ethnic conflict (which favor polarization instead of ethnic diversity as predictor of conflict); nor does the paper provide an adequate theoretical link between risk factors of ethnic conflict and terrorism.

In this article we aim for more clarity in studying the connection between ethnicity and terrorism. First, we argue that local competition among ethnic groups is insufficient in explaining terrorism. Terrorists often attack targets based on strategic considerations and not on mere spatial proximity. Instead we argue that terrorists can take advantage of local ethnic conflict. While it is often

observed that terrorists exploit the consequences of violent backlashes perpetrated by government armed forces, we think they can equally benefit from local violence. Therefore, provoking local ethnic or religious organizations and stirring up ethnic violence against the terrorists' own ethnic constituency can have the same effect as an overblown government reaction, i.e. increase support for the terrorists. For that reason, we argue that terrorists will target areas that have a high propensity to escalate into ethnic conflict. The recent literature and empirical findings on ethnic violence carried out especially at local levels suggest that ethnically polarized areas are more prone to experience violence. Therefore, we assess our argument with a global study based on disaggregated data on terrorist attacks as well as ethnic division indices measured at a local scale. Using negative binomial regression models, we find that high values of ethnic polarization are associated with a higher expected number of terrorist attacks and our results are robust to different model specifications. These findings have important policy implications. If terrorists do not only seek to provoke the government but also local ethnic groups, counter-terrorism in ethnic contexts needs to also countervail this strategy of inciting ethnic conflict in order to be effective.

Terrorism as provocation

In our view terrorism is best understood as a subset of violent strategies designed to reach a political goal. We follow Kydd & Walter (2006) and define terrorism as the "deliberate targeting of civilians by non-state actors to attain political goals". The focus on violence against civilians separates terrorism from other violent strategies in conflict. Attacks on government officials and attacks on military facilities, which are sometimes subsumed under the heading of terrorism, may in fact follow very different strategic reasoning and have a differing potential for provocation (e.g. Carter, 2016; Stanton, 2013).

From this definition it follows that terrorism is a strategy of low costs, low risk and low military impact. The strategic rationale of this sort of terrorism is, therefore, seldom to wear down the enemy militarily but more often to signal a message to an audience, either the government or a civilian population (Kydd & Walter, 2006, p. 50). While most authors agree that terrorism is meant to be first and foremost a signal, the literature distinguishes several distinct signaling strategies. For

instance, Kydd & Walter (2006, p. 51) identify five different logics of terrorism: attrition, intimidation, provocation, spoiling, and outbidding. In this paper we will concentrate especially on provocation, which is frequently cited as one of the most important terrorist strategies (Fromkin, 1975; Kydd & Walter, 2006).

Provocation is generally used as a strategy with the intent to increase support for the terrorists from the population. To that end terrorists attack in order to provoke a violent, indiscriminate backlash by the government that disproportionately hurts the innocent among the civilian population. The more indiscriminate the government's response, i.e. the more innocent people have to suffer from the government reaction, the more people will come to the conclusion that fighting the government is inevitable (Kalyvas, 2006). The government reaction can, thus, help the terrorists to overcome their collective action dilemma and make support for the terrorists more likely (Kalyvas & Kocher, 2007). In addition, an indiscriminate reaction can reveal information about the government. If the government deliberately chooses indiscriminate repression, the population may take this as a signal that the government is unconcerned with their welfare which pushes them further into the direction of violent opposition (Bueno De Mesquita & Dickson, 2007).

In the context of ethnic conflicts, the provocation strategy is essentially designed to provoke a government backlash against the terrorists' ethnic group. Since ethnic groups often do not have a strong coherent identity before a conflict, the provocation strategy can be used as a powerful instrument to create a group identity or to increase group cohesion (Byman, 1998; Goodwin, 2006). Yet, provocation strategies of this kind can be found in many places. Terrorist groups such as the *Euskadi Ta Askatasuna* (ETA) in Spain, the *Rote Armee Fraktion* (RAF) in Germany, the *Front de Libération Nationale* (FLN) in Algeria and many others sought to target governments in order to provoke a violent backlash. The empirical literature on terrorism seems to confirm that terrorist attacks can be successful in provoking governments (Piazza & Walsh, 2009; Robison, 2009). Although recent studies point out that provocation may work better when targeting governments with low bureaucratic capacities (Blankenship, 2016) and when not targeting civilians (Carter, 2016).

However, so far, accounts on the provocation strategy mostly only concentrate on the potential provocation of the government and fail to consider other targets of provocation. Yet,

terrorists may equally seek to incite reactions from non-state actors like ethnic or religious organizations.

We argue that terrorists can seek to provoke members of ethnic groups in order to incite local violence. From the terrorists' point of view, stirring up ethnic violence on a local level has the same logic as provoking the government. If, for instance, terrorists target the places of worship of an opposing ethnic or religious group, they may hope to produce riots and pogroms against their own constituency with the effect that individuals of their own group will be more inclined to actively join the conflict on their side. Depending on the strength of the terrorists and pre-existing patterns of conflict, the provocation of local violence may prove much less difficult and more effective than provoking the government. First, attacking important government targets may be too difficult to reach for terrorists. If the terrorist organization is fighting a strong state or if the terrorist organization is very weak it may be cost-efficient for terrorists to aim for a more localized reaction. Second and related to the first point, the impact of a terrorist attack will be felt more strongly on a local level than within a government. Terrorism lives from the implicit threat that the terrorists can strike again with a similar attack. By attacking soft targets such an implicit threat is more credible than with spectacular attacks that cannot be repeated. Finally, if terrorists are successful in inciting ethnic violence, the government will have to divert resources in order to police the situation.

While the theoretical and quantitative literature on terrorism has not focused so far on the instigation of local violence, cases abound with descriptions of this mechanism. A prominent example of such a strategy and its success can be found in Iraq. Abu Musab Al-Zarqawi, the leader of Al-Qaida in Iraq from 2004 to 2006, had the vision that it was more important to incite a sectarian civil war in Iraq than to direct the efforts at military targets of the government or the Coalition Forces (McCants, 2015; Warrick, 2015). When Zarqawi applied for membership in Al-Qaida, he explained in a lengthy letter to Bin Laden, what his vision was for Iraq:

> "If we are able to strike them [the Shi'a] with one painful blow after another until they enter the battle, we will be able to [re]shuffle the cards. Then, no value or influence will remain to the Governing Council or even to the Americans, who will enter a second battle with the Shia. This is what we want, and, whether they like it or not, many Sunni areas will stand with the

> mujahidin. Then, the mujahidin will have assured themselves land from which to set forth in striking the Shi`a in their heartland, along with a clear media orientation and the creation of strategic depth and reach among the brothers outside [Iraq] and the mujahidin within" (Zarqawi, 2004).

Zarqawi's aim was to incite the Shia's anger and have them enter into a civil war[1]. While Al-Qaida leaders were at first skeptical about this strategy and later openly critical (McCants, 2015), Zarqawi's rational seemed to quickly bear fruit. After explaining his strategy in the letter to Bin Laden, Zarqawi went into action and showed what he meant by striking at the Shia. On March 2, 2004 Iraq saw one of the worst terrorist attacks during the whole conflict. On that day Shia's all over the country commemorated the death of Hussain ibn Ali, the first imam of Shia Islam who died in Karbala. Suicide attackers detonated their bombs within large crowds in Baghdad and Karbala killing close to 180 and injuring more than 500 people. This and the many other attacks greatly stirred up sectarian violence in Iraq and helped Zarqawi in gaining support and his successors, the Islamic State, to gain vast territories in Syria and Iraq (Warrick, 2015, pp. 192–196).

As a second example, a similar strategy can be found during the Sikh insurgency in Punjab. At the end of the 1970s and the beginning of the 1980s the Sikh self-determination movement turned to violent action. However, faced with the problem that popular support for the Sikh militant groups at the beginning of the 1980s was limited and unable to incite a popular insurgency, some of these groups resorted more and more to terrorism (Fuller, 1999, p. 124 ff.). Terrorist attacks seemed to have two targets. On the one side, the militant groups attacked police and officials and these attacks were aimed directly at the government. For instance, in August 1982 a plane was hijacked on its way to Canada and the terrorists demanded that the government should grant autonomy to Punjab immediately. However, on the other side, Sikh militants also directed their attacks at local Hindus with the aim to stir up ethnic violence. For instance, in 1982, Hindu temples were increasingly attacked and sometimes actions were purely symbolic like throwing severed cow heads on a temple area. Analyzing the latter strategy, *The Times of India* observed in 1982:

> "But obviously there is method in this madness. Having failed to gain much support for their separatist objectives, the extremists have now stooped to the crudest methods of stirring up

> communal passions and conflict in the hope that they can fish in troubled waters. The initial reaction to their drastic act must have been to their liking. For the protest against it predictably led to violence, an attack on the information office on the outskirts of the Golden Temple [the most important Sikh temple, the authors] and tear-gassing by police. Tension now grips not only Amritsar but also other cities in Punjab. […] The perpetrators of the sacrilege that has taken place at the two Amritsar temples must be brought to book and meted out exemplary punishment. But to embark on so-called retaliatory action would be to play into the hands of the mischief-makers" (The Times of India, 1982).

Consequentially, it seems that Sikh militancy had two separate targets for provocation: first, the government and, second, the Hindu population. As in Iraq this strategy was also quite effective in Punjab. Following frequent terrorist attacks, the 1980s in Punjab were marked by recurrent clashes pitting local Hindus and local Sikh against each other resulting in hundreds of deaths.

Findings in the study of ethnic conflict

If our argument is correct, we should expect terrorists to target areas more prone to encounter an escalation of ethnic violence and quantitative studies have identified several potential risk factors. On a country level early studies focused on assessing the effects of ethno-linguistic *fractionalization*[2] producing mixed results (Collier & Hoeffler, 2004; Fearon & Laitin, 2003; Sambanis, 2001). However, this measure was and still is often criticized for not adequately capturing possible causes of ethnic conflict (Buhaug, Cederman, & Gleditsch, 2014; Buhaug, Cederman, & Rød, 2008; Cederman, Buhaug, & Rod, 2009; Cederman & Girardin, 2007; Posner, 2004). Subsequent research gave more emphasis to measures of ethno-linguistic *polarization*[3] or turned to the study of the ethno-political configuration of countries. For polarization most studies confirm that it is associated with conflict onset (Duclos, Esteban, & Ray, 2004; Esteban & Ray, 2008; Forsberg, 2008; Montalvo & Reynal-Querol, 2005) although this is not always the case (Collier & Hoeffler, 2004; Østby, 2008). In addition, group level ethnic exclusion and the political and economic configurations within countries have received intensive investigation. These factors are consistently found to be better predictors of

ethnic conflict than the ELF (Buhaug et al., 2014; Cederman & Girardin, 2007; Cederman et al., 2010).

On the local level, there are only few studies investigating the link between ethnic groups and violence. However, recent findings seem to confirm the importance of the ethnic distribution in a locality as an important predictor of violence. For instance, Balcells, Daniels, & Escribà-Folch (2015) investigate low-level sectarian violence in Northern Ireland. They argue that numerical parity between groups increases competition over territory, and increases opportunities to commit violence by providing safe houses for perpetrators. This argument is in line with previous studies pointing out that the proximity of ethnic groups may increase competition among them (Scheepers, Gijsberts, & Coenders, 2002) and that increased threat perceptions can lead to the emergence of a security dilemma (Posen, 1993). Empirically, Balcells et al. (2015) find that violence is highest in areas where there is parity between Protestant and Catholic inhabitants. In addition, highly homogeneous localities bordering homogeneous localities of the other religion are also more likely to experience violence.

The consideration of Balcells et al. seem to be supported by previous studies on ethnic riots which concentrated on empirical analyses. For instance, in a study on Hindu-Muslim riots in India, Bohlken & Sergenti (2010, p. 596) find that evenly matched ethnic groups increase the likelihood of violence. In addition, Toha (2015) finds that a local increase in the size of the second largest religious group in Indonesia raises the number of riots. Barron, Kaiser, & Pradhan (2004) also investigate Indonesia and find that ethnic clusters (villages that are ethnically different from their surroundings) are associated with high levels of violence. However, they do not find any association between ethnic fractionalization and violence.

In sum, it seems that on the local level, ethnic polarization is best in capturing the risk of ethnic violence. Whenever, more or less equally sized ethnic groups live in close proximity, conflict is more likely. The reasons for this seem to be mostly the following: First, the proximity of groups makes conflict and an escalation of conflict possible. Second, a low number of equally sized groups gives all sides a high incentive to compete for more influence within that locality. Since groups are relatively equal in size they can gain dominance by ousting a low proportion of the opposing

population. Third, an even distribution of the size of the groups increases the probability that each group has enough capability to fight the opposing groups.

Coming back to our consideration on local provocation, this means that ethnically polarized areas should be attractive targets for terrorists. In these areas, only few terrorist acts may trigger violence that escalates into a self-sustaining conflict from which terrorists can profit. As terrorist attacks increase the level of fear among local ethnic groups, they could make them spiral into a violent tit-for-tat situation (Posen, 1993).

In this sense terrorism is not driven by the same considerations as ethnic violence. While ethnic violence is attributed to competition among groups, terrorists may be merely using the structural propensity for violence in order to maximize their impact. Linking terrorism and ethnicity in this way has an important theoretical advantage. Many theories of ethnic violence must assume that ethnic groups are present and unitary actors acting according to group preferences. While such an assumption may be defensible in some cases as Northern Ireland, it cannot easily be extended to all ethnic groups (Brubaker, 2002). In our proposed theoretical link, it is not necessary to assume that ethnic groups are already activated as actors. Terrorism may be used exactly for the purpose of creating what Brubaker (2002) calls "groupness". Whether it is successful or not is a different question. This mechanism may explain how ethnic conflicts start even when groups do not yet exist as coherent phenomena. Brubaker, perhaps the most present critic of the group assumption, admits that violent situations are the most likely circumstances to produce group identities. "[D]eliberate violence, undertaken as a strategy of provocation, often by a very small number of persons, can sometimes be an exceptionally effective strategy of group-making" (Brubaker, 2002, p. 171). Other authors seem to have made similar observations. For instance, Byman argues that identity creation is at the heart of ethnic terrorism (Byman, 1998). In addition, Kalyvas points out that ethnic identities may in fact be the result of civil war violence and not the cause (Kalyvas, 2008). This means that our proposed mechanism for terrorism may provide an explanation for group formation and mobilization. Put another way, terrorism could be a catalyst that facilitates ethnic violence.

Thus bringing together our argument about the provocation of local violence and the findings of the literature on ethnic conflict and ethnic violence we hypothesize that more terrorist attacks are expected in areas where there is a highly polarized ethnic population.

H1: Local ethnic polarization is positively associated with the number of terrorist attacks.

While the empirical literature on the local level seems to suggest that ethnic fractionalization is weaker in explaining conflict on a country level or a local level, it is sensible to explicitly assess this hypothesis in the context of terrorism. It is still possible that more ethnically diverse localities are more prone to ethnic conflict. As Esteban & Ray (2011) suggest, fractionalization and polarization may represent two attributes that both can lead to conflict but differ to do so with regard to the "publicness" of the prize that groups fight about (i.e. the degree to which groups winning the conflict can privately consume the spoils of war). Therefore, we take as our second hypothesis that ethnic fractionalization increases the number of terrorist attacks.

H2: Local ethnic fractionalization is positively associated with the number of terrorist attacks.

DATA

Our study aims at detecting patterns of terrorism which cannot be observed at a country level and this orientation requires us to use a sub-national unit of observation (Buhaug & Rød, 2006). For this reason, we use PRIO-GRID as spatial unit of analysis (Tollefsen, Strand, & Buhaug, 2012). PRIO-GRID consists of regular grid cells of 0.5 decimal degree resolution (approximately 55 X 55 km at the equator) that cover all terrestrial areas worldwide. This level of aggregation gives us the opportunity to study the determinants of terrorism on a local scale.[4]

First, we intersected PRIO-GRID with country polygons obtained from *Natural Earth* (Kelso & Patterson, 2010) in order to consider only grid cells that belong to countries. PRIO-GRID cells that are irrelevant to the study would only inflate the number of zeros. Therefore, we also removed all cells below a latitude of 45°S and above a latitude of 65°N, where terrorist attacks did not and presumably could not occur. Furthermore, we removed cells smaller than one quarter of a PRIO-GRID cell (approximately 25 X 25 km) in order to avoid an overweighting of the observations from

areas of negligible size. This procedure generated a net total of 54,656 PRIO-GRID cells (R code in Appendix 1b). In this study we do not include a time dimension. Hence, both time-dependent and time-independent variables were aggregated for each grid-cell, as described in further detail below.

Regarding data on terrorism, researchers have produced several databases on terrorist events with worldwide coverage. For our study we chose the *Global Terrorism Database* (GTD) which provides the most comprehensive geo-localized data on terrorist incidents (START, 2015). Other datasets were either limited in the time dimension as the *RAND Database of Worldwide Terrorism Incidents* (RDWTI), geo-localized only at country level as the *International Terrorism: Attributes of Terrorist Events* (ITERATE) (Enders, Sandler, & Gaibulloev, 2011) or may suffer from strong geographic bias as the *Global Database of Events, Language, and Tone* (GDELT) (see Hammond & Weidmann, 2014). GTD uses numerous sources and articles (more than 4 million news articles and 25,000 news sources from 1998 and 2015 in order to identify terrorist attacks (START, 2015). This limits the risk of reporting bias resulting from inconsistent ways of reporting the number of fatalities in different media, as noticed by Drakos & Gofas (2006). Currently, GTD includes more than 150,000 events from 1970 until 2015 and is updated on an annual basis.

Our dependent variable is a count variable that measures the number of terrorist attacks (against civilians) in each grid-cell. To construct this variable, we selected only GTD events that, first, were coded at the highest level of spatial accuracy; second, targeted civilians and third, occurred after 2001 (Figure 3a).[5] This leaves us with a total of 23,676 terrorist events for the entire study period (2002-2014) which are distributed over 2,343 cells (approximately 4% of the total number of PRIO-GRID cells) (R code in Appendices 1a and 1b).

[Figure 1 about here]

Our two main independent variables are indices of ethnic polarization (*ethrq*) and ethnic fractionalization (*ethfrac*) measured at PRIO-GRID level (Figures 1c and 1d; R code in Appendix 1b). In order to construct these indices we used the *Geo-referencing of ethnic groups* (GREG) dataset, which consists of 8,969 polygons of ethnic group territories grouped into three layers (Weidmann, Rød, & Cederman, 2010).[6] For each PRIO-GRID cell, we identified all ethnic groups from the GREG dataset and constructed measures of polarization and fractionalization, respectively. First, for each

PRIO-GRID cell, we computed *ethrq*, which ranges from 0 to 1 (Figure 1l). We used the formula developed by Marta Reynal-Querol (1998):[7]

$$ethrq = 4\sum_{i=1}^{n} \pi_i^2 \, (1 - \, \pi_i) \, ,$$

with π_i, being the proportion of the *population* corresponding to ethnic group i among n ethnic group(s) in a given PRIO-GRID cell.

Second, we computed *ethfrac*, which ranges from 0 to 1 (Figure 1k) using the *Herfindahl index* from Taylor and Hudson (Taylor, 1970):

$$ethfrac = 1 - \sum_{i=1}^{n} \pi_i^2 \, ,$$

with π_i again being the proportion of the *population* corresponding to ethnic group i in a given PRIO-GRID cell. For the computation of both *ethrq* and *ethfrac*, we estimated π_i by dividing the population corresponding to ethnic group i with the total population of the corresponding PRIO-GRID cell. As a simplified alternative, we also computed a measure of ethnic fractionalization (*sethfrac*) and ethnic polarization (*sethrq*), which uses π_i as the proportion of the *area* instead of the proportion of the *population* covered by ethnic group i in a PRIO-GRID cell. We estimated π_i by dividing the area covered by ethnic group i with the total area of the corresponding PRIO-GRID cell (R code in Appendix 1b). The relationships among the ethnic division variables are illustrated in Figure 2. In our view the measures of ethnic division using the underlying *population* are preferable (*ethrq* and *ethfrac*). Since ethnic fractionalization and polarization indices first and foremost relate to estimated measures of ethnic division within society, its estimation using *area* can only be seen as a rough proxy.

[Figure 2 about here]

In addition, we used several control variables that have a potential impact on terrorist attacks. First, we used variables taken from the PRIO-GRID dataset in the version 2.0 (Tollefsen, Strand, & Buhaug, 2016). We included the population size since a larger population should provide terrorists with more potential targets and therefore make terrorist attacks more likely. In addition to the pure amount of people, populated areas offer more high-value targets (buildings or installations), high-

value human targets (government officials, mayors, etc.), and public targets (public transport, shopping center, cinema, sports arena, public venues, etc.). The data on population is originally taken from the *Gridded Population of the World, Version 3* (GPW) (CIESIN & CIAT, 2005). We also include satellite data on night light emissions, which provide information about worldwide human activity at a high spatial resolution. The original database is provided by the US National Oceanic and Atmospheric Administration (NOAA): v*ersion 4 DMSP-OLS Nighttime Lights Time Series* (Chen & Nordhaus, 2011; NGDC & NOAA, 2014). In addition, we used the average area covered by mountains. The association between mountainous terrain and terrorism is a somewhat ambiguous. On the one side a high proportion of mountains can be seen as a proxy for areas where state control is weak and locations where terrorists are able to hide. This might make attacks in mountainous areas more likely. On the other side, mountainous terrain offers relatively few targets which should make attacks less likely. The data on terrain is originally taken from Blyth, Groombridge, Lysenko, Miles, & Newton (2002). In addition, we included the distance to the nearest national border. Closeness to a national border is often seen as a risk factor as terrorists can hide easily in neighboring countries. The variable is originally taken from Nils B. Weidmann, Kuse, & Gleditsch (2010).

Second, we used a proxy for armed conflict within a grid-cell, since the presence of an armed conflict should make terrorist attacks more likely. Unfortunately, PRIO-GRID 2.0 does not include the conflict variable from version 1.0 anymore which indicated if an armed conflict was present in that grid cell. For that reason we approximated conflict intensity in a grid-cell by counting conflict events (*conflict*) for each PRIO-GRID cell during the study period based on *UCDP georeferenced event dataset version 4.1* (GED) (Croicu & Sundberg, 2016; Sundberg & Melander, 2013). This count variable only includes conflict events of the type "state conflict" and excludes one-sided violence against civilians.

Third, we control for several country-level factors. As a measure of political regime, we included the *polity2* variable from the *Polity IV Annual Time-Series, 1800-2015* (Marshall, Gurr, & Jaggers, 2016). There is an ongoing debate on the effect of democracy on terrorism especially when it comes to the mechanisms that link the two. However, a considerable literature notes that democracies tend to experience more terrorism than autocracies (Chenoweth, 2013). Furthermore, based on

Montalvo & Reynal-Querol (2005), we controlled for country-level ethnic fractionalization and country-level ethnic polarization. Note that Montalvo & Reynal-Querol exclude Russia from their analysis. For this reason we calculated the values for Russia based on the 2010 Russian population census (Russian Federation, 2013) (Figures 1a and 1b). In line with Freytag, Krueger, Meierrieks, & Schneider (2011) who show that terrorism markedly differs among countries, we included country-fixed effects.

Fourth, terrorism often exhibits clustered patterns in space (LaFree, 2010; Nacos, 2009; Piegorsch, Cutter, & Hardisty, 2007). Therefore, our data might be affected by *spatial autocorrelation*, which violates the independence assumption between observations. Consequentially and similar to Buhaug & Rød (2006), we added a country-level spatially lagged dependent variable (Anselin, 1988), which counts for each grid-cell the (log) number of GTD events that occurred from 2002 to 2014 in any other part of the country except in the observed grid-cell.

The above variables build our core model. In addition, we generated more comprehensive models using three additional variables that previous research showed to be influential in predicting terrorism. First, we added the distance to the nearest capital, which is expected to be negatively associated with terrorism. The assumption is that capitals are attractive targets. The variable is originally taken from Nils B. Weidmann, Kuse, & Gleditsch (2010). Second, terrorist attacks may also target critical infrastructures. Therefore, we control for onshore petroleum deposits (Lujala, Rød, & Thieme, 2007). Third, the average time to travel to the nearest large city (>50,000 inhabitants), which can be viewed as a measure of rurality (Uchida & Nelson, 2009) is expected to be negatively associated with terrorism. As a reduced travel time makes locations more accessible, terrorist attacks may become more likely (Heyman & Mickolus, 1980; Wilkinson, 1977, p. 189).[8]

NEGATIVE BINOMIAL REGRESSION MODELS

Our dependent variable counts the number of terrorist attacks. This means that the variable is left-censored (does not show values below 0). Moreover, 96% of the observations (PRIO-GRID cells) did not encounter any terrorist event during the study period. This leads to *heteroskedasticity* (studentized Breusch-Pagan test's p-value<0.0001), which needs to be addressed. Furthermore, the presence of

overdispersion (variance is greater than the expected variance) violates the assumption of independence of the observations required for a proper ordinary least squares (OLS) estimation. Consequently, it may generate inefficient and/or inconsistent OLS estimators, and biased inference based on standard t-tests and measures of fit (R^2) (Anselin, 1990; Anselin & Griffith, 1988; Anselin & Rey, 1991). Therefore, and similar to previous work, we opt for the use of negative binomial (NB) models in order to take the data structure into account (Li, 2005; Piazza, 2008b; Young & Dugan, 2011).

We ran eight NB models (results in Table 1, Stata code in Appendix 1c). While Models 1a, 1b, 2a, and 2b investigate the effects of *ethnic polarization*, Models 3a, 3b, 4a, and 4b focus on the effects of *ethnic fractionalization* on the number of terrorist events. Recall that Models 1a, 1b, 3a, and 3b use *population* as basis to compute *ethfrac* and *ethrq*. As simplified alternative, Models 2a, 2b, 4a, and 4b use *area* as basis to compute ethnic polarization (*sethrq*) and ethnic fractionalization (*sethfrac*) (R code in Appendix 1b). Models with suffix "a" only include the core control variables while models with suffix "b" include all control variables. Since multicollinearity cannot be excluded among some control variables and the natural logarithm of the population size (*logpop*): (*logcapital*, *logpop*: r=-0.51, p<0.0001; *logttime*, *logpop:* r=-0.69, p<0.0001), we generally prefer the core models (models with suffix "a") and exclude the other three control variables since a reduction of the effects of multicollinearity allows us to obtain a more accurate estimation of the coefficients of the variables of interest.

RESULTS

In all models, all four variables on ethnic polarization (*ethrq* and *sethrq*) and fractionalization (*ethfrac* and *sethfrac*) are positive and highly significant (p<0.01) predictors of the number of terrorist attacks on civilians (Table 1). We find strong support for both hypotheses (H1 and H2). For example, Model 1a predicts that, with all other variables held constant, cells with very high levels of ethnic polarization (*ethrq*=0.9) have an expected number of attacks circa 20% higher than the expected number of attacks in cells with very low levels of ethnic polarization (*ethrq*=0.1). In addition, the effect of ethnic fractionalization measured at country level (*ethfraccountry*) is positive and highly

significant ($p<0.01$) in all Models. The effect of country-level ethnic polarization is positive and significant ($p<0.05$) in Models "b" only.

[Table 1 about here]

In addition, the control variables have produced some interesting insights as well. As expected, *logpop* and *lum* are both highly significant ($p<0.001$) positive predictors, in line with findings from country-level studies (Crenshaw, 1981; Ross, 1993; Savitch & Ardashev, 2001; Swanstrom, 2002). For example, Model 1a predicts that the expected number of terrorist attacks triple in areas with a population of 10,000 compared to areas counting 1,000 inhabitants, with everything else held equal to the median. Furthermore, the natural logarithm of the percentage of mountainous area (*logmountain*) appears as a highly significant positive predictor ($p<0.001$). The results are in line with the empirical findings of Nemeth et al. (2014) and consistent with *rough terrain* hypothesis, which postulates that insurgent and terrorist groups have tactical advantages to carry out attacks in less accessible areas, such as mountainous regions (Abadie, 2006; Fearon & Laitin, 2003).

Previous studies have indicated the presence of armed conflict, including war, riot, strike or state failure leads to an increase in terrorist activities (Piazza, 2008a, 2008b; Weinberg & Eubank, 1998). Our variable on local conflict events corroborates this. As expected, on a local scale, the effect of the number of conflict events (*conflict*) is positive and highly significant ($p<0.001$). The costs of terrorism in democracies tend to be reduced since terrorist groups might benefit from fewer constraints in speech, movement and association (Li, 2005). Therefore, one might expect that grid-cells in democratic states are more likely to experience a higher number of terrorist attacks than locations in less democratic states (Eubank & Weinberg, 2001; Ross, 1993). However, the results contrast with the expected values: the effect of *polityIV* is negative and significant ($p<0.05$) in all models. Furthermore, the spatially lagged dependent variable (*spatial lag*) is negative and significant ($p<0.05$), which suggests that higher number of terrorist attacks observed locally tend to occur within countries that exhibit lower levels of terrorism elsewhere.

Our results support the hypotheses that link time to reach the nearest large city with the number of terrorist attacks. The natural logarithm of the travel time to the nearest large city (*logttime*) is negative and highly significant ($p<0.001$). This results that terrorists are more likely to attack in the

vicinity of large cities. However, the (log) distance to the nearest capital city (*logcapital*) is positive and significant ($p<0.05$). The augmented measures often deployed by states to protect their citizen in capital cities might dissuade terrorist groups aiming at targeting civilians in capitals. Moreover, the results do not provide support that the costs of terrorism are reduced close to national borders, despite that terrorists may use borders as safe havens, allowing them to escape from government forces after an attack that would have been perpetrated close to the borders (Kittner, 2007; Nemeth et al., 2014).

Research on terrorism has indicated that the presence of oil exporting or producing industries may attract terrorism (Chalecki, 2002). However, our results are not conclusive: the effect of *oil* is not significant at 10% level. A potential reason for this might be that precautionary security measures are deployed near petroleum production sites and this might have a deterring effect on terrorist groups (Farrell, Zerriffi, & Dowlatabadi, 2004; Klare & Volman, 2006).

Robustness Check

As a robustness check, we ran four zero-inflated negative binomial (ZINB) models (zb1a, zb2a, zb3a, and zb4a) corresponding to the parsimonious NB models (1a, 2a, 3a, and 4a), respectively (Appendix 1c).[9] In order to deal with excess zeroes, zero-inflated models distinguish two distinct processes: a 'count' model (grid-cells that can potentially encounter terrorist attacks even if no attack occurred) and a 'zero' model for predicting excess zeros (grid-cells that cannot experience terrorism - i.e. where the probability of attack cannot be greater than 0). We used *logpop* and *lum* to explicitly account for excess of zeros, since we assume that terrorist attacks on civilians should not occur in under-populated areas or in areas that exhibit little or no human activity. Ethnic polarization appears more robust than ethnic fractionalization; the former index remains always positive and significant while the latter loses significance in model zb3a (Table 2). The results of the BIC-corrected Vuong tests ($p<0.05$) among corresponding NB and ZINB models suggest to favor ZINB over their corresponding NB models (Appendix 1c). As acknowledged in Long & Freese (2001), it should be noticed that ZINB models may overfit the data; in which case, they would not be able to distinguish locations that could encounter terrorist attacks from those that cannot. Therefore, we report the results obtained

from NB models (Table 1) and ZINB models (Table 2) but we will use exclusively the results of NB models for further discussion.

[Table 2 about here]

In-sample and out-of-sample predictions

In order to assess the validity of our models, we carried out *in-sample* and *out-of-sample* predictions (Appendix 1c). We use the specifications of Models 1a and 1b, which include our variable of interest: ethnic polarization and additional covariates. We further refer to the predictive models, NB1a and NB1b, in reference to the corresponding Models 1a and 2b, respectively. Both results from NB1a and NB1b are considered in-sample predictions since the data used to estimate the parameters are identical to those used for the predictions. Put another way, NB1a and NB1b use GTD events that occurred from 2002 to 2014, in the entire study area and at PRIO-GRID level.

We compare the performance of the in-sample predictions from NB1a and NB1b with the observed number of terrorist events. Figure 3a shows the number of observed terrorist events that occurred between 2002 and 2014, aggregated at PRIO-GRID level. The absolute difference (Δ) between the observations and the expected values from NB1a and NB1b are highlighted in Figures 3e and 3c, respectively. Most values are relatively well predicted by both models, as illustrated by Δ values close to 0 in most grid-cells. The predictions of NB1a and NB1b are very similar with 95% of the differences between the observations and the predicted values below 0.19 in both models and *root-mean-square error* (rmse) slightly better for NB1a (5.24) compared to NB1b (5.12).

Performing in-sample predictions does not guarantee accurate out-of-sample predictions (Inoue & Kilian, 2005). Therefore, we compared the out-of-sample performance of two NB models (NB2a and NB2b) in forecasting the 2015 GTD events at PRIO-GRID level. The specification of NB2a and NB2b corresponds to NB1a and NB1b, respectively. We fit NB2a and NB2b models using a *training* dataset, which includes the number of GTD events observed from 2002 to 2014. The number of GTD events that occurred in 2015 are predicted by the model, which adapts the values of time-dependent covariates (*polity, logborder, logcapital,* and *lum*) employed to fit the model with

covariate values gathered in 2014 (except for *logpop* and *lum*, we used 2010 and 2012 values, respectively: *logpop* is available until 2010 only and *lum* data is comprehensive until 2012 only).

Figure 3b shows the number of (observed) terrorist events that occurred in 2015, aggregated at PRIO-GRID level. Figures 3f and 3d indicate the absolute difference (Δ) between the observations and the expected values from NB2a and NB2b, respectively. Overall, the performance of the predictions of both models are satisfactory, as illustrated by absolute Δ values close to 0 in most locations. The predictive performance of NB2a and NB2b are quasi identical, with 95% of Δ values below 0.26 and 0.24, respectively, and equal rmse for both models: 1.07.

[Figure 3 about here]

Model Limitations

Despite all our care in applying procedures to reduce and mitigate potential issues, this does not prevent us from shortcomings. We identify several key issues which might call into question the internal and external validity of the results, and describe actions already undertaken in our present research work and/or possible suggestions that can be investigated in further studies.

First, one should be reminded that the concept of terrorism is contested (Beck & Miner, 2013; Hoffman, 2006). In this article we chose to focus on terrorist attacks perpetrated against civilians and select the data accordingly. Neither have we put forward a theory nor a data analysis that can speak to attacks on government officials, police or military actors. Our findings should therefore be taken as what they are: findings on terrorism against civilians. Despite the inherent limitation of our approach, our theoretical understanding of the concept of terrorism necessitates this focus.

Second, the picture of ethnic conflict painted here is inevitably a simplification. For instance, case study research has shown that the nature of ethnic fault lines may have a tremendous impact on the dynamics of violence on a local level (Wilson, 2010). Wilson argues in a comparison between Upper Silesia and Ulster that the "open categories" of identity in Upper Silesia, where no clear cut distinction between Germans and Poles existed, made the conflict much less likely to erupt into cycles of violence than in Ulster, where the categories of Catholics and Protestants left no room for ambiguity (Wilson, 2010). This means that not all ethnically polarized areas may have the same

propensity to lead to a self-sustained ethnic conflict. However, the currently available data do not allow us to perform a more detailed analysis and it will remain for further research to take up this task.

Third, one source of bias might stem from the fact that media reports, from which database providers collect data on terrorist incidents, might underestimate the number of events according to the state's degree of control on the media (Drakos & Gofas, 2006; Sheehan, 2012). However, as a robustness check, we use country-fixed effects, which account for specific circumstances of each individual country with regard to its degree of control of media. Assuming that the control of media is homogeneous within countries, this model specification ensures that the validity of our results are not affected by a potential presence of reporting bias.

Fourth, we suggested an approach to compute four indices of ethnic division at sub-national level based on data from GREG. Since GREG is the digitalized version of the Soviet *Atlas Narodov Mira* (ANM), this dataset is liable to some of the same criticism as its own source. For instance, the ANM only covers linguistic differences between groups and does not take the political or social relevance of groups into account. In our view this is not a major problem for our analysis as we think that ethnic terrorism can be used precisely to increase the social and political relevance of groups and increase what Brubaker calls "groupsness". Therefore, as for instance Morelli & Rohner (2015) pointed out, excluding these groups might result in sample bias. Another problem with this dataset is that it has not been updated since the 1960s when it was compiled. Population movements may have resulted in different settlement patterns observed nowadays. Finally, one of the biggest concerns with GREG is that it only covers groups with a territorial basis. As described by the authors of the dataset, tiny pockets of groups are frequently indicated by symbols on the ANM maps. However, these symbols have not been integrated into the GREG dataset (Weidmann, Rød, et al., 2010, p. 493). As a result, the dataset and consequentially our measures will underestimate the presence of ethnic minorities.

CONCLUSION

This article started with the observation that terrorism studies, until now, have not given serious attention to ethnic terrorism. For this reason, this article outlined an often overlooked aim of ethnic terrorism. While most terrorists seek to provoke the government, and this provocation mechanism is often acknowledged, ethnic terrorists have a second potential target for provocation, the opposing ethnic group. Following this observation, we argued that terrorists should target especially those places that are more likely to escalate into local ethnic conflicts and/or riots, which then produce a constant stream of new recruits for the terrorists. In addition, inciting ethnic violence has the advantage for the terrorists that it often sustains itself and terrorists need to do little to keep the flame from dying.

Reviewing the empirical literature on ethnic conflict we found that ethnic polarization seems to be one of the best predictors of ethnic conflict with ethnic fractionalization being less important but still often used as an indicator. This led us to hypothesize that if our argument is correct we should expect that ethnically polarized locations should experience more terrorist attacks.

Our empirical analysis used data from 2002 to 2014 and PRIO-GRID as the spatial unit of analysis. In order to analyze the link between risk factors of ethnic conflict on a local level and terrorism we suggested an approach to measure *ethnic polarization* and *ethnic fractionalization* according to two different estimation methods. Using negative binomial regression models, we found strong support for our main hypotheses, which assume that both ethnic polarization and ethnic fractionalization increase the number of terrorist attacks. These findings hold, regardless of the way we measure these ethnic division indices and the specifications of the model. In addition to our main findings, the results suggested that terrorist attacks are more frequent in areas with high levels of human activity, in mountainous locations, in the presence of conflict, in large cities, populated areas but further away from capital cities.

In our view these findings have important implications for further research on ethnic terrorism as well as policies to combat terrorism. First, the fact that ethnic terrorism has two separate targets for provocation seems to have been generally overlooked in the theoretical literature and quantitative research on terrorism, while case studies frequently describe this provocation strategy. Researchers should take into account that terrorists in ethnic contexts can choose from these strategies

and may not make the government reaction their main priority. For instance, the finding of Carter (2016) that violence against civilians does not provoke governments as much as attacks on the military may be due to the fact that ethnic terrorists often do not seek to provoke the government. Second, our findings suggest that terrorists are more inclined to target areas of higher ethnic polarization. This terrorist strategy should not be underestimated in the development and implementation of counter-terrorism measures. The fact that terrorists have two strategies at hand means that possibly once the government puts more pressure on the terrorists they may switch from attacks on the government to inciting ethnic violence. Counter-terrorism in an ethnic context should therefore be carefully designed to not just trade one strategy for the other. However, currently too little is known about the causes and the effects of potential interactions between these two strategies and additional research is needed to better understand this facet of terrorism.

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NOTES

[1] While the tactic to stir up ethnic violence was frequently criticized it nevertheless gained great popularity among Islamist groups. In 2004 a book named *The Management of Savagery* began to circle online among Islamists which gained great popularity. Within that book the author repeatedly argued that it was necessary to be overly brutal in order to create an environment of chaos on which the Islamists can thrive (McCants, 2015).

[2] Ethno-linguistic fractionalization is a measure that captures the likelihood of two individuals within a society to come from two different groups and the most common fractionalization index, the so-called ethno-linguistic fractionalization index (ELF) is based on data from the Soviet Atlas Narodov Mira (ANM).

[3] Ethnic polarization was introduced by Esteban & Ray (1994), Wolfson (1994), and expanded later by Duclos et al. (2004). In the version of Montalvo and Reynal-Querol it has its highest value when two equally sized groups confront each other and therefore captures aspects of the groups' ability (both groups are big enough to engage into conflict) and incentive (both groups compete for dominance) to engage in a conflict. (Montalvo & Reynal-Querol, 2005, p. 798)

[4] The choice of the grid resolution may have a considerable impact on the results, a well-known problem referred to as the *modifiable areal unit problem* (MAUP) (Holt, Steel, & Tranmer, 1996). As terrorist attacks are attributed to the centroid of the city in which they occur (see note 5), finer grids would increase the number of observations without providing any substantial gain in accuracy.

[5] We selected spatially accurate events based on the GTD variable *specificity*. We kept observations with *specificity=1*, which corresponds to events that occurred in a city, village, or town with provided coordinates of its centroid. Furthermore, we select terrorist events perpetrated against civilians using the GTD variable *targtype1*. We kept observations with *targtype1= {1 (Business), 5 (Abortion Related), 6 (Airports & Aircraft), 8 (Educational Institution), 10-14 (Journalists & Media, Maritime, NGO, Other, Private Citizens & Property), 18 (Tourists), 19 (Transportation)}* (see the *GTD codebook*: www.start.umd.edu/gtd/downloads/Codebook.pdf).

[6] Note that we also provide an approach to compute ethnic diversity (i.e. the number of different ethnic groups) (R code in Appendix 1b). However, ethnic diversity is excluded in this study, since we focus on explaining the role of ethnic *division* rather than ethnic *diversity* on terrorism.

[7] The index of ethnic polarization has been originally developed in Reynal-Querol (1998; 2001).

[8] In order to avoid endogeneity (more specifically: simultaneity) between some covariates and the dependent variable, we measured the values of covariates that vary temporally prior the study period. Furthermore, when applicable, we took the natural logarithm of control variables to reduce bias due to potential outliers.

[9] As an alternative, zero-inflated Poisson (ZIP) models have been also used in the literature to take into account excess zeroes. However, ZINB exhibit better goodness-of-fit values than ZIP (both AIC and BIC), and the results of the likelihood-ratio test ($p<0.001$, Appendix 1c) suggest to favor ZINB over ZIP.