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Religious Terrorism:
A Cross-Country Analysis

Naomi E. Feldman • Bradley J. Ruffle

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Naomi E. Feldman   *Bradley J. Ruffle*

Department of Economics
Ben-Gurion University
Beer Sheva, Israel

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Abstract: A growing theoretical literature explains why religious organizations are better suited to perpetrate suicide bombings in particular and terror attacks more generally than their non-religious rivals. We offer the first comprehensive test of the roles of religion and religious ideology in terrorism using a unique country level database on domestic terrorism. Our results show that religious terror groups actually carry out fewer attacks on average than groups of other ideologies (e.g., nationalist and communist). Yet, in line with the theoretical literature (e.g., Berman and Laitin 2008), religious groups claim at least as many victims as non-religiously motivated attacks for almost all tactics, not just suicide bombings as commonly perceived. In support of Adam Smith's beneficent view of religious competition, we find that increased religious diversity is associated with less terrorism, particularly religious terrorism. Moreover, our results reveal that communist and nationalist terrorist groups commit more terror attacks as terror groups in their country become more numerous, whereas religious terror groups are unresponsive to the number of competing terrorist groups. We conjecture that this difference follows from the greater lethality of religious terrorism. Religious terrorist groups behave as market leaders, while less efficient non-religious groups act as followers responding to competitive pressures.

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Contact Information:

Feldman: E-mail: nfeldman@bgu.ac.il, Tel: +972-8-6472282, Fax: +972-8-6472941.

Ruffle: E-mail: bradley@bgu.ac.il,   Tel: +972-8-6472308, Fax: +972-8-6472941.

1 Introduction

The virtues and dangers of religion have long been a contentious and hotly contested issue. On the one hand, religion is associated with charitable work, the provision of community level social services and the saving of lost souls. On the other hand, religion or religious differences often serve as the pretext for violence and war. Deadly terrorist attacks beginning with 9/11 have contributed to a growing number of recent books that blame religion for a spate of society's ills and call for its replacement with a more ethical, religion-free utopia (see, for example, Harris 2005 and Hitchens 2007). Yet, anecdotal evidence and selective case studies never constitute a compelling case on their own.

In this paper, we evaluate empirically the role of religion and religious ideology in terrorism. We investigate whether and to what extent religiously motivated terrorist groups are distinct in the number, methods and lethality of their attacks compared to terror groups driven by other ideologies. We also explore the relationship between a country's religious diversity and its susceptibility to terrorism. Are religious differences associated with heightened tensions vented through terrorism, or does religious pluralism reflect a more tolerant and peaceful society? In answering this question, we shed light on a centuries-old debate that began with David Hume and Adam Smith over the desirability of a competitive versus a monopolistic religious structure. Finally, our dataset permits us to determine whether terrorist groups respond to the total number of terrorist groups in its country and if so, do they respond to more groups by increasing their own attacks or free ride off the existence of additional active groups? Do the answers to these questions depend on the ideologies of the terror groups in question? In other words, we evaluate which terrorist ideologies view one another as competitors and what form this competition takes.

To address this host of questions, we compile a unique database of domestic terror attacks from January 1, 1998 to March 20, 2007. Our dataset and our focus on domestic terrorist incidents equip us to evaluate a number of the robust testable hypotheses advanced by

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proponents of a rational-choice approach to religious observance. As such, our research relates to the growing literatures on the economics of religion and on terrorism.

Our paper is unique in several respects. First, despite the growing theoretical literature highlighting attributes of religious organizations and their members that make them better suited for terrorism, to the best of our knowledge, this is the first empirical study that focuses on religious terrorism. A second unique feature of our study is its focus on domestic terrorism. Also to the best of our knowledge, ours is the first cross-country analysis of domestic terrorism. This may come as a surprise in light of the predominance of domestic terrorism. For instance, of the more than 24,000 terrorist attacks committed worldwide over the past 10 years, more than 90% were domestic attacks, committed in the same country in which the terrorist group is based. Yet, the rapidly expanding empirical analysis of terrorism concentrates on either transnational terrorism or country-specific studies of domestic terrorism. Since many of the hypotheses concerning the role of religion and religious competition in terrorism are meaningful in a national context only, we focus our analysis on domestic terrorism.

The academic debate on the merits of religion dates back at least to David Hume and Adam Smith. This debate was largely suspended for two centuries as the Age of Enlightenment and the advent of the Industrial Revolution supplanted academic inquiries into the organization and influence of religious institutions. Instead, proclamations of the imminent demise of religion prevailed. The advance of science and scientific evidence were eventually supposed to usurp primitive and superstitious religious beliefs (see Stark et al. 1996 for a discussion of the secularization hypothesis). The continued universality and robustness of religion have prompted a more thoughtful investigation into the attributes of religious organizations that have contributed to their success.

Beginning with Iannaccone (1992), a growing body of literature employing a rational-choice approach to religious observance attributes a range of advantages to religious institu-

tions and their membership over their secular counterparts. This literature remains agnostic on the intrinsic value of the religious message being propagated. Rather, the focus is on religious institutions' often unique organizational structure from which they derive their observed strength. Yet, these same organizational features that contribute to thriving religious institutions composed of cooperative and trusting members can turn undesirable when channeled to destructive ends. Berman (2005), Berman and Laitin (2008) and Iannaccone and Berman (2006) point out that religious groups' ability to extract signals of commitment from members enables them to execute acts of terror more reliably and with less risk of defection than groups without a religious ideology.

Contrary to public perception, our results show that religious terrorist groups commit fewer attacks per group than groups with a non-religious ideology (e.g., nationalist and communist terror groups). Yet, in support of the predictions of the above literature, terror attacks executed by religious groups are more efficient, claiming about 50% more victims per attack than attacks carried out by competing ideologies. In fact, religious terror attacks claim at least as many lives as non-religiously motivated attacks for almost all methods of terrorism, not just suicide bombings as commonly perceived.

In support of Smith's beneficent view of an unregulated religious market, we show that increased religious heterogeneity in a country is associated with fewer religiously motivated terrorist attacks per group. Religious diversity appears to be indicative of a more tolerant society less prone to terrorism. This stands in stark contrast to our finding that increased ethnic diversity is associated with more attacks and more victims per attack.

Finally, we evaluate whether the number of terrorist groups in a country relates to the number of attacks groups perpetrate. We find evidence for groups perceiving other terrorist groups as competitors. That is to say, an increase in the number of terror groups in a country coincides with increases in the average numbers of both incidents and victims of terrorist groups in that country. A closer look at the data reveals that communist and nationalist

terrorism accounts for this finding. Religious terrorist groups are unresponsive to the number of terrorist groups in the country.

In section 5, we explore in greater detail each of the above results and uncover additional ones. We elaborate on the above interpretations for our findings, linking them to the theoretical literature on the economics of religion where available or otherwise proposing our own interpretation. Before the results, we review in the next section the related literatures on the economics of religion and on terrorism. Section 3 covers several theoretical predictions that stem from the religion literature as well as others that we test with our dataset. Section 4 describes our dataset and details our empirical strategy and section 5 presents the results. Section 6 concludes.

2   Related Literature

During the three centuries since Hume and Smith debated the merits of a competitive versus a monopolistic religious market structure (to be discussed in the next section) and repeated proclamations of religion's imminent demise substituted for research on religion. Declarations of doom notwithstanding, religion remains a robust, influential, widespread and even growing phenomena worldwide. As such, religious practice poses a puzzle to economists: why would a rational actor willingly devote costly resources to something so seemingly wasteful as religion and religious ritual? Beginning with Iannaccone (1992), economists have proposed a number of plausible benefits that accompany religious practice. Iannaccone notes that, viewed as firms, religions produce local public goods such as communal prayer, hymn singing and scripture studies. Participation in these group activities provides a positive externality to other members. To boost participation, Iannaccone argues that religions adopt costly sacrifices and prohibitions that serve, at once, to screen out free riders and to tax secular activities thereby inducing substitution to religious ones. Using individual survey data,

Iannaccone finds empirical support for his model; namely, the stricter the church, the higher the average levels of church attendance, contributions and frequency of prayer.

Berman (2000) extends Iannaccone's club-good model of religion to understand the Israeli Ultra-Orthodox community's need for costly sacrifices to signal commitment and to exclude free riders from their network of charity and mutual insurance. Berman shows that government subsidies to club membership are largely dissipated since they induce even more costly sacrifices to signal group commitment (e.g., among males, full-time attendance in religious schools until age 40 on average).

Barro and McCleary (2003) demonstrate a positive relationship between religiosity and economic growth. Based on a panel-data analysis of 41 countries, they show that economic growth responds positively to the extent of a nation's religious beliefs, particularly belief in heaven and hell. They hypothesize that church attendance affects religious beliefs, which affect individual traits like thrift, work effort, honesty and trust, which affect economic outcomes. Recent experimental work confirms that religious individuals indeed display a number of these pro-social forms of behavior associated with economic growth. Sosis and Ruffle (2003) design two-player common-pool resource (CPR) games and demonstrate that members of Israeli religious kibbutzim refrain from consuming the CPR significantly more than members of comparable secular kibbutzim. Religious males (the primary practitioners of collective religious ritual in Judaism) are the most cooperative subgroup with their cooperative behavior positively correlated with their frequency of communal prayer. Building on this work, Ruffle and Sosis (2007) model religious groups' choice to adopt costly non-market activities, such as religious rituals, to screen out non-cooperative types and achieve higher cooperation. Tan and Vogel (forthcoming) show that the more an individual self-identifies as religious, the more trusting and trustworthy his behavior in bilateral trust games. In addition, religious trusters display higher levels of trust the more religious the trustee, while

non-religious trusters are insensitive to the trustee's degree of the religiosity.[1]

Berman (2005), Iannaccone and Berman (2006) and Berman and Laitin (2008) recognize that these same pro-social behaviors that render religious organizations tightknit, trusting and cooperative can be malevolent when channeled toward violence and terrorist activity. They reason that in countries with weak governments that don't supply various local public goods (LPGs) like law and order, welfare services, health care and education, private groups step in to fulfil these needs. Religious groups are particularly well suited to provide these LPGs because they exact membership fees in the form of costly sacrifices to screen out less committed individuals. These signals of commitment allow religious groups to extend their operations to terrorist activities, the success of which are sensitive to defection.[2] Members of non-religious terrorist groups who haven't displayed similar levels of group commitment are more likely to defect at some stage of the attack, thereby reducing the likelihood of a successful attack. In support of this club-good model of religious terrorism, Berman and Laitin (2008) point out that the Hamas and the Hezbollah, both fundamentalist Islamic terror groups that provide social services, commit more suicide attacks and claim more victims per terrorist attack than other Palestinian and Lebanese terrorist groups (some of which are religious, others not) that don't provide social services. For the authors, the observation that the Palestinian Islamic Jihad, a religious terrorist group, also "chooses suicide attacks so often despite its lack of social service provision may indicate that theology and indoctrination have a role in motivating suicide attackers" (p. 33).

As an alternative explanation to the organization of religious groups for their efficiency, Sosis and Alcorta (2008) propose a selection argument. Namely, religious individuals acquire, most often in their childhood, a predisposition to supernatural beliefs. This same

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[1] Iannaccone's (1998) comprehensive survey of the economics of religion includes studies that associate religious observance with other beneficial social behaviors (e.g., lower rates of crime and drug and alcohol abuse) as well as more stable marriages and mental and physical health benefits.

[2] In fact, terrorist activities can themselves often serve as the necessary signals of commitment since they lower members' outside options, thereby strengthening members' incentive compatibility constraint in the group.

predisposition renders them susceptible to the promise of afterlife rewards dangled before prospective religious terrorists. Similarly, Juergensmeyer (2003) emphasizes that religious groups succeed in framing their local political struggles as cosmic disputes. By attaching divine significance to their deeds, religious terrorist groups encourage members to sacrifice for a greater good that transcends self-interest. Nationalist, communist and terror groups of other ideologies are, by definition, unable to imbue their struggles with the same degree of other-worldly importance and thus fail to attract members with the same degree of devotion.

Chen (2005) studies the changes in social violence (defined as physical acts of destruction, killing, looting, burning, clashes, hostage taking, etc.) in response to Indonesia's financial crisis in the late 1990s. He finds that social violence increases fastest in regions where participation in Koran study also increases the fastest, which are typically those areas hit hardest economically by the crisis.

This is the extent of the empirical literature related to religious terrorism. Instead, much of the empirical terrorism literature focuses on debunking the belief that poverty generates terrorism (see, e.g., Krueger and Maleckova 2003, Berrebi 2007 and the references therein).[3] Another strand of the empirical terrorism literature investigates the impact of terrorism on economic variables (see, e.g., Eckstein and Tsiddon 2004) or on political outcomes (see, e.g., Berrebi and Klor 2006 and Jaeger et al. 2007).

Our unique dataset on domestic terrorist incidents permits us to test a number of theoretical propositions related to religiously motivated terrorism and to a population's religious diversity. In the next section, we provide the background on our theoretical predictions.

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[3] To account for the absence of a poverty-terrorism link along with the finding that terrorists tend to have above average education and come from wealthier families, Benmelech and Berrebi (2007) develop a model in which more able and more educated individuals are more likely to be assigned important terrorist targets, less likely to fail in their missions and thus more likely to cause increased casualties per attack.

3 Theoretical Predictions

3.1 Religious Competition and Diversity

David Hume and Adam Smith initiated the debate over a society's optimal religious structure. With the view that religion is highly pernicious, Hume (1773) advocated that the best way for the civil magistrate to deal with the clergy is to "bribe their indolence, by assigning them stated salaries" (quoted from Smith (1937 [1776]), p. 743). Anderson (1988) also points out that "Hume favored an established religion because he believed that such an institution tended to mute the fanaticism sometimes associated with independent religious sects" (p. 1078). Smith (1937 [1776]) held a more favorable view of religion, expounding the virtues of uninhibited competition between religious sects where every man is free "to chuse his own priest and his own religion" (p. 744). The result would be "a great multitude of religious sects ... The teacher of each little sect ... would be obliged to respect those of almost every other sect, and the concessions which they would mutually find it both convenient and agreeable to make to one another, might ... reduce the doctrine of the greater part of them to that pure and rational religion, free of every mixture of absurdity, imposture, or fanaticism" (pp. 744-745). For Smith, the numerous small sects that free religious competition would yield renders each sect "too small to disturb the public tranquility, the excessive zeal of each ... could not well be productive of any very hurtful effects, but, on the contrary, of several good ones" (p. 746).

Despite a growing literature on the benefits associated with religion, according to Iannaccone (1998), "There are, as yet, no direct tests of Smiths claim that religious competition benefits societies, by providing better religion, less civil strife, and (by extension) more prosperity" (p. 1489).[4] In section 5.1, we provide the first test of Smith's claim by determining

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[4] The hereto untested Hume-Smith debate on the optimal religious market structure continues to fascinate economists. Anderson refers to Smith's support for competitive religious markets as "the closest Smith comes in the *Wealth of Nations* (or elsewhere) to arguing in favor of free-market anarchism" (p. 1074). For other illuminating discussions of the Hume-Smith debate on religion, see Iannaccone (1991), Leathers and Raines

whether societies with increased religious competition indeed display less civil strife in the form of less internal terrorism.

3.2 Competition among Terrorist Groups

Our dataset on domestic terrorist incidents allows us to determine whether terrorist groups compete with one another in the number of attacks they carry out. We further explore the extent and nature of competition between religious and other brands of terrorism.

Terrorist groups choose their strategies non-cooperatively (for our purposes, how often and by what method to attack). We ask whether they behave as if their attacks are strategic substitutes or strategic complements. Put differently, do terrorist groups respond to one another's actions as competitors or as working together toward a common goal? On the one hand, in vying for power and prestige, a terror group will choose to increase its terror attacks in response to those of another group.[5] This effect applies to all terror organizations, no matter whether the two groups are of the same or opposing ideologies. On the other hand, the group may free ride and reduce its terror activities in response to the attacks of another group. Only terrorist groups that share the same ideology can be expected to display this response. To the extent that they do, the temptation to free ride and the drive for prestige represent opposing forces that raise the empirical question whether the group responds to the presence of more terrorist groups by increasing or decreasing its own terrorist attacks. By comparison, when two groups are of different ideologies, we would unambiguously expect an increase in the number of terrorist groups to provoke an increase from the other group, since only the drive for prestige is operative. We answer these questions in section 5.3.

(1992), Iannaccone and Berman (2006) and McCleary and Barro (2006).

[5] For instance, Bloom (2004) claims that Palestinian terrorist organizations use suicide bombings as a method of recruitment and to gain legitimacy as a competitor to the Palestinian Authority for leadership.

3.3 The Lethality and Choice of Tactics of Religious Terrorism

The theoretical literature on terrorism has provided ample reasons (reviewed in the previous section) to expect religious terrorism to be more lethal than that of any other ideology. Yet, apart from anecdotal evidence and case studies (e.g., Berman and Laitin 2008), we are unaware of any definitive tests of this proposition. Berman and Laitin (2008) show that religious Palestinian terror groups and the religious Hezbollah in Lebanon choose suicide attacks more often and claim more victims than their non-religious counterparts. In section 5.4, we evaluate whether these findings about the choice of tactic and lethality of religious terrorism generalize beyond Lebanon, Israel, the West Bank and Gaza Strip. What is more, our dataset allows us to ask whether suicide terrorism is the only tactic at which religious terror groups are more lethal than non-religiously motivated groups or might the structure and organization of religious groups grant them an advantage at all tactics? To answer these questions, we will compare the number of attacks and the number of victims per attack for each of the seven terrorist tactics and the four terrorist ideologies in our dataset.

4   Data and Estimating Equation

Our data originate from a number of sources. Perhaps due in large part to the unavailability of data until recently, cross-country comparisons of domestic terrorism have been ignored in the economics literature. The National Memorial Institute for the Prevention of Terrorism (MIPT) Terrorism Knowledge Database records all domestic attacks globally from 1998 onward and it is on these attacks that we focus our analysis.[6] The MIPT defines terrorism as violence, or the threat of violence, calculated to create an atmosphere of fear and alarm and to coerce others into actions they would not otherwise undertake, or refrain from actions

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[6] Domestic incidents are those perpetrated by local nationals against a purely domestic target. International incidents are those in which terrorists go abroad to strike the targets, select domestic targets associated with a foreign state (e.g., an embassy or military base), or create an international incident by attacking airline passengers, personnel, or equipment.

they desired to take. This violence, or threat of violence, is generally directed against civilian targets and has political motives. Summary statistics from the MIPT reveal that between January 1, 1998 and March 20, 2007 domestic terrorism accounts for 23,360 attacks – over 90 percent of total terrorist attacks (domestic plus international).[7]

Using the MIPT database, we are able to identify the ideology or ideologies of each group. The three major terrorist ideologies are religious, nationalist/separatist (henceforth referred to as "nationalist" for brevity) and communist/socialist (to be referred to as "communist"). We group all other ideologies (racist, environmental, anti-globalization, anarchist, leftist, right-wing conservative, right-wing reactionary and other) into one category given that they individually and collectively amount to a small fraction of total attacks. Note that ideologies are not mutually exclusive.[8]

Table 1 presents the the breakdown of terrorist incidents by ideology. The first point worth noting is that the number of domestic incidents far exceeds international incidents. A second noteworthy observation that perhaps accounts for the media's focus on religious terrorism is the high average victims statistic for international religious attacks. Each attack results in an average of 49.4 victims (injuries plus fatalities), which is nearly five times that of domestic religious attacks, the most lethal of all domestic terrorist ideologies.[9]

From the MIPT database we are able to generate at the terrorist-group level variables for the number of domestic attacks against a particular country. In addition, we calculate the average number of fatalities per group per geographic base. For example, the Abu Sayyaf Group based in the Philippines committed 32 incidents that resulted in 173 fatalities yielding

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[7] This includes attacks by unknown groups which account for roughly 75% of total domestic attacks during this time period. Similarly, in international terrorism, unknown groups account for over 65% of attacks. While the Iraq war accounts for a large increase in the overall number of attacks, restricting the time to frame to December 31, 2002 shows that unknown groups account for roughly the same fraction of attacks for both domestic and international terrorism.

[8] The lone exception is religious and communist ideologies: there are no groups that espouse both these ideologies and for good reason since they are incompatible.

[9] Note the possible double counting in the number of incidents recorded. A group that commits five incidents, for example, and is both nationalist and religious will have its five attacks attributed to both ideologies.

an average of 5.4 fatalities per attack. In addition, we supplement our dataset with country-specific variables from the Freedom House (FH) and the World Bank's World Development Indicators (WDI) using an average value for each variable from 1996 to 1998. We posit that the decision to perpetrate a terrorist attack is a function of country characteristics as well as the social and political surroundings of the group. Measures of a country's religious and ethnic heterogeneity or fractionalization are obtained from Alesina et al. (2003).[10] In the spirit of the fractionalization variables, we generate an additional variable that measures the market concentration of terrorist groups in a geographic base assuming that all groups have equal market share. Finally, we obtain information on a country's dominant religion from the CIA World Factbook (2006).

The complete dataset consists of 970 observations of 583 terrorist organizations active at some point during the data collection period and located in 217 geographical bases.[11] Bases with populations of less than half a million are dropped. This eliminates, for the most part, small island countries such as The Bahamas, Corsica and Malta (44 observations). In addition, all observations where either the group responsible for the attack is unknown (84 observations), the geographical base is unknown (44 observations) or the geographical base is Iraq (67 observations) are dropped. Finally, after accounting for missing data on a number of country-level variables from the WDI, the final sample consists of 609 observations of 460 terrorist groups located in 91 geographic bases. Table 2 contains variable descriptions, data sources and summary statistics for our main variables of interest.

Table 3 breaks down the number of groups that espouse a particular ideology. This table illustrates, for example, that out of 130 groups with a religious ideology, 63 have this as their sole ideology, another 61 groups have both a religious and a nationalist ideology and

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[10] These heterogeneity variables are each defined as one minus the Herfindahl index, more precisely, $1 - \Sigma s_{ij}^2$, where s_{ij} is the share of the ethnic or religious group i $(i = 1, \ldots, N)$ in country j. These measures reflect the probability that two randomly selected individuals from a population belong to different ethnic or religious groups.

[11] Although we use the terms "base" and "country" interchangeably, the former is more correct since there are a number of disputed lands included in our database (e.g., Kashmir and the West Bank).

six groups combine religious with some other ideology.

Approximately 81 percent of terrorist groups are based in one country only. Another 12 percent are based in two countries, five percent are based in three and the remaining two percent are based in three or more countries.[12] In addition, 32 percent of the geographic bases have only one known and active terrorist group, 25 percent have two or three groups, 23 percent have between four and ten groups and the remaining 20 percent of geographic bases have between 11 and 65 groups. India and Greece are the bases with the two largest numbers of groups, with 47 and 65, respectively.

Our dependent variable is an integer-valued count where 52% of terrorist groups in a geographic base commit no attack (yet, all are recorded as active at some point over the data collection period) and 90% of groups commit at most four attacks. Count data, combined with excess zeros as is the case with our data, is best modeled using a negative binomial model. The negative binomial assumes that the dependent variable is distributed Poisson, conditional on the parameter λ, such that $f(y|\lambda) = \exp(-\lambda)\lambda^y/y!$ and where λ is random, rather than being a completely deterministic function of the regressors.

A straightforward analysis of the effects of ideology and other country level variables on the number of attacks committed by a terrorist group is given by:

$$attacks_{ij} = f(\alpha_0 + X_j'\beta_k + Z_i'\gamma_h + \varepsilon_{ij}) \tag{1}$$

where i indexes the terrorist group and j indexes the geographic base. The dependent variable is the number of attacks committed by a group in a geographic base. The vector X contains base-level variables such as log(GDP per capita), population, civil liberties, the fractionalization variables, and the majority religion indicator variables. The vector Z contains binary indicators for terrorist group level ideologies.

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[12] al-Qaeda, an outlier, is based in 45 countries and is not included in the analysis.

4.1 Identification

A useful characteristic of the data that assists in identification of the ideology parameters is the within country variation in the composition of terrorist ideologies. Put another way, if all countries were home to merely one type of terror group (for example, all groups in Greece were only communist, or all groups in Afghanistan were religious and nationalist), then identification would rely primarily on cross-country differences. In this case, including country fixed effects in the estimation would preclude any identification of the our main ideology parameters. Moreover, it would be impossible to separate effects of the terror group ideologies and unobserved country-level influences on the dependent variable. Momentarily ignoring the fact that five groups hold three ideologies and taking into account that there are no groups that are both religious and communist, there are up to nine combinations of the various ideologies. Out of the 91 geographic bases in our data, 34 have one type of group, that is, all groups in the base hold the same ideology or combination of ideologies. An additional 29 bases have two types of groups (again, to be clear, a "type" refers to all of the ideologies held by the group). An example of two types of groups would be one or more groups that are only religious and an additional one or more groups that are both religious and nationalist. The remaining 28 bases have between three and seven types of groups. Thus, there is significant within country variation in group ideologies that helps to partially identify the ideology parameters in addition to the cross-country variation. The remaining country-level controls are identified off of cross-country differences.

5 Results

In each table of results, the numbers represent marginal effects in the number of incidents. For binary indicators, the marginal effects are calculated as the average difference in the count of incidents for a discrete change between zero and one for the subset of observations

for which the binary indicator equals one.[13] For continuous variables, the marginal effect is calculated for each observation and then evaluated at three points: the 25th percentile, mean, and 75th percentile. Standard errors are bootstrapped and clustered at the geographic base level. P-values are in parentheses.[14]

5.1   Religion, Religious Ideology and Terrorist Incidents

Table 4 presents the results from negative binomial regressions where the unit of observation is at the terrorist group-base level and the dependent variable is the number of terrorist incidents committed by the group in the particular base. Our first main result is that groups with a religious ideology are generally predicted to commit, on average, 1.9 – 2.7 fewer attacks than groups without a religious ideology. Given that the average number of incidents is 4.5, this result implies that religious terror groups commit 42 – 60 percent fewer attacks than non-religious groups. This result is at best significant at the ten percent level. In contrast, groups with a communist or nationalist ideology are predicted to commit more attacks than groups without these ideologies. Holding constant other factors, in particular other ideologies, a group with a communist ideology is predicted to carry out, on average, between 4.0 – 9.1 more attacks than groups without a communist ideology. Similarly, holding constant other factors, groups with a nationalist ideology are predicted to commit between 1.4 – 4.7 additional attacks. In sum, a religious ideology is predicted to have a negative impact on the average number of attacks, but the statistical significance of this estimate is sensitive to the inclusion of other country-level controls used in the estimation. Nationalist

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[13] This is analogous to the "treatment on the treated" effect.

[14] Our empirical analysis excludes four extreme outlier observations which have been found to exhibit large influence statistics on the estimated coefficients. These are the Taliban (315 incidents), Communist Party of Nepal-Maoist (386 incidents), Revolutionary Armed Forces of Columbia–FARC (486 incidents), and Hamas (491 incidents). The magnitudes of the marginal effects (particularly for the ideology parameters) and occasionally their statistical significance is sensitive to these four outlying observations. Their inclusion generally results in much larger estimated parameters. Consequently, these four observations are dropped. Results including these four observations are available upon request.

and communist ideologies are shown to have a positive impact on the average number of attacks, but, again, statistical significance depends upon the additional controls used.

Heterogeneity in religion (RF) is not found to display a statistically significant relationship with the number of attacks in any regression specification. Heterogeneity in ethnic origin EF, in contrast, shows a positive and often statistically significant relationship with attacks. In particular, when estimated at the 75th percentile, the marginal effect is between 5.9 and 10.5 attacks. Ethnic differences appear to be divisive, whereas religious differences have no real correlation with the number of attacks committed.

We next interacted RF with the binary indicator for religious ideology and EF with the binary indicator for nationalist ideology. While religious heterogeneity shows no statistically significant impact on the number of attacks, there may be differential impacts depending on the group's ideology. For instance, sensibly, religious groups may be most affected by religious heterogeneity. The first interaction tests the idea that competition in a country's religious market structure moderates religious extremism, while the second interaction tests whether a similar logic applies to ethnic heterogeneity and nationalist groups. The results are reported in Table 4, columns (5) and (6). As illustrated by the negative marginal effect of RF for groups with a religious ideology, religious heterogeneity appears to be associated with more moderate religious groups that commit fewer attacks, in line with Adam Smith's beneficent view of religious competition. This finding is statistically significant at lower and higher levels of religious heterogeneity. In comparison, the estimated marginal effect of ethnic heterogeneity shows a positive, though non-statistically significant, effect on nationalist groups.

5.2 Other Country Level Findings

Before returning to our findings related to religion and religious ideology, Table 4 points to several other country level results. More specifically, using the full sample and estimating

the marginal effect at various levels of civil liberties, we show that civil liberties exhibit an inverse u-shaped relationship with terrorist attacks. The estimated marginal effect of civil liberties evaluated at low levels is positive and statistically significant, falls to roughly zero attacks when evaluated at the mean, and becomes negative and significant at higher levels of civil liberties. Interestingly, Abadie (2006) finds an analogous inverted u-shaped relationship between political freedoms and vulnerability to international terrorist attacks.[15] We interpret our result to mean that countries with high levels of civil liberties do not supply their citizens with the requisite grievances for homegrown terrorism. At the other extreme, extremely repressive regimes succeed in preventing possible terror groups from organizing and meeting, preconditions for carrying out attacks. Terror attacks rise for intermediate levels of civil liberties.

As further evidence against the popular perception of a poverty-terrorism link, we find that the average number of domestic attacks per group is actually increasing in GDP per capita. Again, statistical significance is sensitive to whether we control for country-level majority religions.

Finally, the results in columns (4) show that compared to the omitted category of "other" religions, groups based in Muslim, Christian, Orthodox and Roman Catholic countries all perpetrate fewer attacks, on average. This is not surprising as the omitted category contains Israel, India and Nepal – three out of the top four countries in terms of total attacks by all groups.

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[15] Abadie (2006) also finds various geographic variables to be significant predictors of international terrorism. We tried a number of these country-level explanatory variables, including land area, population, population density and paved roads. Because they did not impact the overall results, none were significant and their inclusion caused a large number of observations to be dropped, we do not include them in any of the regressions.

5.3 The Nature of Competition Among Terrorist Groups

Next we turn to the strategic interactions between terrorist groups. The number of attacks is a strategic choice of each terrorist group. We ask whether, as in the case of strategic substitutes, the presence of additional terrorist groups induce groups to increase their attacks; or whether, as in the case of strategic complements, additional terrorist groups cause groups to reduce their attacks. To the extent that terrorist groups compete with one another for power and prestige, the former seems more likely. On the other hand, the costliness of planning and executing acts of terror makes free-rider considerations relevant. A group may consequently reduce its terrorist activities in the presence of more terrorist groups, especially if these groups share the same ideology and goals.

To address the existence and nature of competition between terror groups, we construct a group fractionalization variable GF measured as the inverse of the squared number of total terrorist groups (i.e., $1/N_i^2$) for each country i. This variable is analogous to the religious and ethnic Herfindahls we examined earlier where, in the absence of group membership or any other exogenous measure of group size, we weigh each terror group equally. Regressions (3) - (4) reveal that GF is positive though statistically significant only in the latter column. When evaluated at the mean level of the dependent variable, increasing GF by 0.1 from the mean marginal effect is associated with an additional 0.87, or 19.3 percent, attacks.

To determine whether terrorist groups of different ideological persuasions respond differently to the number of active terrorist groups, we reestimate the model interacting in turn the GF variable with the binary indicators for ideologies. From Table 4, column (5) reveals that when interacting religious ideology with GF, religious groups appear to be unresponsive to the number of competing terrorist groups at any conventional level of significance. This result is particularly striking when contrasted with the positive and statistically significant effects for both nationalist and communist groups at all points evaluated in columns (6) and (7), respectively. For example, considering the results from column (6), increasing GF by,

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0.1 (that is, moving towards more competition) is associated with, all else equal, 0.4, 1.6 and 2.0 additional attacks by groups with a nationalist ideology when evaluating the marginal effect at the 25th percentile, mean and 75th percentile, respectively.

Why do nationalist and communist terrorist groups respond to the number of competing terrorist groups, while religious groups feel they can ignore them? As the next section illustrates, religious terrorism is considerably more lethal than that of any other ideology. We conjecture that it is this lethality and the publicity that surrounds religious attacks that makes religious groups leaders and enables them to ignore the competition. Nationalist and communist groups, on the other hand, need to be respond to increased competition to remain relevant.

5.4 Religion, Religious Ideology, Terror Tactics and Victims

Until now, our analysis has concentrated on the number of terrorist incidents. We next turn to the number of terror fatalities. We reestimate Table 4 replacing the dependent variable with a group's average number of fatalities in the particular base. The sample is restricted to observations with at least one terror incident. The results are reported in Table 5. Similar to the data on incidents, average fatalities is count data with excess zeros. Approximately 64.5 percent of the observations report zero fatalities. Another 26.2 percent report between one and five fatalities and the remaining 9.5 percent report some number greater than five.[16] While religious groups are associated with a fewer attacks, Table 5 shows that attacks by religious groups are predicted to generate $3.2 - 5.3$ ($178 - 294$ percent) more fatalities on average per attack than groups without a religious ideology. This result is robust across empirical specifications. Both communist and nationalist ideologies, conversely, show a negative correlation with average fatalities. Groups with a communist

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[16] Similar to the incidents data, one extreme outlying observation (UNITA) was found to have high influence statistics on the estimated parameters and was therefore dropped. Results including this one observation are available upon request.

ideology are associated with 1.2 to 1.8 less fatalities. Groups with a nationalist ideology are associated with 0.2 to 1.8 less fatalities, but this latter finding is not statistically significant at conventional levels.

Our earlier finding that religious groups carry out fewer attacks than those without a religious ideology coupled with the larger number of victims per attack by religious groups suggest that religious groups are more selective in choosing targets and more effective in attacking the chosen targets. The efficiency of religious terror groups corroborates the works of Berman (2005), Iannaccone and Berman (2006), Berman and Laitin (2008), Sosis and Alcorta (2008) and Juergensmeyer (2003), discussed in section 2.

Data on terrorist incidents and fatalities by tactic employed for each of the group ideologies supports the efficiency of religious groups across the range of terrorist tactics. For each group ideology, the left panel of Figure 1 displays the fraction of attacks by tactic for the six most commonly employed tactics (non-suicide bombings, armed attacks, kidnapping, assassinations, suicide bombings and arson) and a seventh "other" category combining lesser employed tactics (hijacking, hostage-taking, unconventional and unknown methods). It is noteworthy that non-suicide bombings account for over 50% of attacks for each of the three main ideologies. Armed attacks are the second most frequently employed tactic accounting for between 15% and 21% of total attacks, depending on the ideology. Suicide bombings are the third most frequent tactic for religious groups only (11% of their total attacks), while 7% of nationalist attacks are suicide bombings and only 1% of communist incidents. Nonetheless, religious groups account for slightly less than half (200 out of 407) of all suicide attacks. With 190 suicide attacks, nationalist groups commit almost as many.[17] By and large, the

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[17] This is in line with Pape (2005) who notes that less than half of suicide terrorism between 1980 and 2003 was religiously motivated. Pape (2003) argues that terror groups employ suicide attacks against liberal democracies in order to coerce them to make territorial concessions. He documents their success at advancing this goal wherever suicide attacks have been employed, with Turkey being the lone exception. Berman and Laitin (2008) argue that suicide attacks are reserved for targets that cannot be destroyed without a very high risk of death or capture. This explains their finding that terrorist groups are more likely to employ suicide attacks than insurgents.

picture that emerges from this data is that religious terrorist groups' choices of method are in line with those of other groups. They commit proportionally more suicide bombings and proportionally fewer assassinations.

The right panel of Figure 1 displays the average number of fatalities per attack by tactic and ideology. Strikingly, religious groups' attacks claim at least as many fatalities on average as any of the other ideologies for almost all tactics (assassinations is the one example where religious groups are second to "other" ideologies) and substantially more fatalities than all other ideologies for arson and suicide bombings. In fact, arson is by far the tactic at which religious groups hold the greatest comparative advantage, killing 7.1 persons per act of arson or 237% more fatalities per attack than the next most effective ideology (other) with only 2.7 fatalities per arson attack, and 10,614% and 4,007% more fatalities per attack than communist and nationalist arson attacks which claim only 0.17 and 0.07 victims per attack, respectively. Perhaps surprisingly in light of the attention religious suicide terrorism has received in the academic literature and in the media, religious groups' comparative advantage is much slighter for suicide bombings, claiming only 16.5% more fatalities per attack than the next most effective ideology (nationalist). Their advantage increases to 315% and 938% compared to suicide attacks carried out by communist and "other" groups.

Finally, as Table 5 make clear, attacks in countries with more numerous terror groups are also less deadly. As groups aim to compete in the number of attacks, the quality of the average attack suffers. The estimated marginal effect of *GF* from Table 5, column (3) shows about 0.006 to 1.19 less victims per attack depending on where the marginal effect is evaluated.

6   Conclusion

Our paper offers a first comprehensive empirical inquiry into the role that religion and religious ideology play in terrorism. Many of our findings contradict the received wisdom on terrorism and its association with religiously motivated terror groups. Holding constant other factors, we find that religiously motivated groups perpetrate fewer attacks on average than groups without a religious ideology. Furthermore, we show that religious diversity appears to temper religiously motivated terrorism, but has no effect on the terrorism of communist, nationalist or other ideologies. This result supports Adam Smith's hereto untested view that increased religious competition benefits society by providing better religion and less civil strife. In Smith's words, a country that "favours no one sect more than another" leads to religions of "good temper and moderation" (p. 745).

Also surprisingly, the distribution of terror tactics employed by religious terrorist groups is similar to that of other terrorist ideologies. The one public perception that finds validation in our data is that religious terrorism is more lethal than the terrorism of any other ideology for all tactics. Attacks by religious groups claim approximately 1.8 – 3.3 (26 to 33 percent) additional victims compared to attacks perpetrated by groups without a religious ideology. Assassinations are the lone terrorist tactic at which religious groups do not claim the most fatalities of all terrorist ideologies. Otherwise, depending upon the tactic, religiously motivated attacks result in 2.6% (armed attacks) to 237% (arson) more fatalities per attack compared to the second most deadly ideology.

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Table 1: Number of Terrorist Incidents by Group Ideology (1998-2007)

Group Classification	Domestic Terrorism			International Terrorism		
	Incidents	Injuries	Fatalities	Incidents	Injuries	Fatalities
Religious	1,885	13,369	6,723	380	13,537	5,234
Communist	2,137	3,996	2,120	121	240	53
Nationalist	2,882	13,337	5,740	378	4,453	1,295
Other	365	284	326	110	71	63
Anarchist	62	6	0	35	0	0
Anti-Globalization	55	9	4	32	6	3
Environmental	82	0	0	0	0	0
Leftist	75	80	14	35	32	15
Racist	24	14	1	1	0	0
Right-Wing Conservative	77	11	237	8	1	11
Right-Wing Reactionary	11	8	14	0	0	0
Other	41	162	56	34	32	34

Notes: Breakdown of all domestic and international terrorist attacks between January 1, 1998 and March 20, 2007 by group ideology.

Source: MIPT.

Table 2: Variable Description and Summary Statistics

Variable	Description	Mean	Std. Dev.	Source
Ideologies				MIPT
religious	binary indicator equal to one if group has a religious ideology, zero otherwise	0.36	0.48	
communist	binary indicator equal to one if group has a communist/socialist ideology, zero otherwise	0.16	0.37	
nationalist	binary indicator equal to one if group has a national/separatist ideology, zero otherwise	0.46	0.50	
other	binary indicator equal to one if group has some other ideology, zero otherwise	0.29	0.46	
Country Characteristics				FH, WDI
Civil Liberties$^\diamond$	1-7, lower numbers reflect lower levels of civil liberties	4.20	1.73	
log(GDP/pop)$^\triangle$	Log of GDP per capita	8.02	1.70	
pop$^\triangle$	Population in millions	13.46	26.24	
Fractionalization Variables				Alesina et al. (2003), Author Calculated
Religious Fractionalization (RF)	equal to 1-Σs_{ij}^2, where s_{ij} is the share of religious group i, $i = 1...N$ in country j	0.35	0.23	
Ethnic Fractionalization (EF)	equal to 1-Σs_{ij}^2, where s_{ij} is the share of ethnic group i, $i = 1...N$ in country j	0.38	0.24	
Group Fractionalization (GF)	equal to 1-Σs_{ij}^2, where s_{ij} is equal to $1/N$ where N is the number of groups in country j	0.85	0.22	
Country-Level Religions				CIA World Factbook
Muslim	binary indicator equal to one if the dominant religion is Islam, zero otherwise	0.34	0.47	
Christian	binary indicator equal to one if the dominant religion is Christianity, zero otherwise	0.13	0.34	
Orthodox	binary indicator equal to one if the dominant religion is Eastern Orthodoxy, zero otherwise	0.14	0.36	
Roman Catholic	binary indicator equal to one if the dominant religion is Roman Catholicism, zero otherwise	0.22	0.42	
Other Religions	binary indicator equal to one if the dominant religion is Other (Buddhist, Hindu, Jewish, Other), zero otherwise	0.17	0.38	

Notes: 1. Religious terrorists commit acts of terrorism in order to comply with a religious mandate or to force others to follow that mandate.[†] 2. Communist/socialist terrorists commit acts of terrorism to pressure their government to redistribute wealth or to change ownership of industrial means of production.[†] 3. Nationalist terrorists commit acts of terrorism to defend what they believe to be the interests of their national group or in reaction to colonialism. Nationalist terrorist groups often seek autonomy or statehood on behalf of a minority ethnic or religious population that resides within a larger state, in which case the terrorists are separatists as well as nationalists.[†] 4. Other ideologies are: racist, environmental, anti-globalization, anarchist, leftist, right-wing conservative, right-wing reactionary and other. 5. N = 609.

Sources: $^\diamond$FH, $^\triangle$WDI, [†]MIPT.

Table 3: Number of Groups by Ideologies

	Religious	Communist	Nationalist	Other
Religious	63			
Communist	0	56		
Nationalist	61	16	107	
Other	6	16	17	113

Notes: There are an additional 5 terrorist groups that espouse three different ideologies (not included in the above table).

Source: MIPT.

Table 4: Estimated Marginal Effects on the Number of Terrorist Incidents by Terrorist Group

	(1)	(2)	(3)	(4)	religious (5)	nationalist (6)	communist (7)
religious	-1.971	-2.352	-2.695	-1.947			
	(0.176)	(0.193)	(0.096)	(0.117)			
communist	9.078	6.734	4.244	4.012			
	(0.049)	(0.090)	(0.229)	(0.228)			
nationalist	4.705	4.020	2.636	1.386			
	(0.017)	(0.041)	(0.104)	(0.383)			
other ideology	-1.600	-1.977	-4.060	-2.138			
	(0.305)	(0.185)	0.046	(0.142)			
RF							
25th percentile		0.170	-2.431	-0.525	-6.738		
		(0.967)	(0.530)	(0.860)	(0.084)		
mean		0.586	-1.628	-0.453	-4.560		
		(0.888)	(0.665)	(0.896)	(0.144)		
75th percentile		0.857	-0.515	-0.108	-1.374		
		(0.788)	(0.832)	(0.963)	(0.052)		
EF							
25th percentile		1.177	2.228	1.332		1.817	
		(0.424)	(0.051)	(0.221)		(0.514)	
mean		4.063	7.039	5.586		6.466	
		(0.176)	(0.046)	(0.120)		(0.270)	
75th percentile		5.937	10.508	6.471		9.042	
		(0.114)	(0.023)	(0.105)		(0.192)	
GF							
25th percentile		1.833	1.333	2.079	0.759	4.498	41.398
		(0.449)	(0.467)	(0.067)	(0.364)	(0.021)	(0.057)
mean		6.326	4.212	8.722	2.411	16.759	11.719
		(0.423)	(0.471)	(0.104)	(0.515)	(0.037)	(0.103)
75th percentile		9.244	6.288	10.103	2.754	20.213	61.890
		(0.387)	(0.400)	(0.123)	(0.475)	(0.059)	(0.068)
Civil Liberties							
25th percentile			1.098	0.996			
			(0.002)	(0.017)			
mean			-0.232	-0.697			
			(0.716)	(0.319)			
75th percentile			-2.252	-2.093			
			(0.069)	(0.017)			
Log(GDP/pop)							
25th percentile			0.407	0.115			
			(0.111)	(0.755)			
mean			1.286	0.484			
			(0.087)	(0.487)			
75th percentile			1.923	0.583			
			(0.048)	(0.395)			
Muslim				-5.517			
				(0.238)			
Christian				-5.115			
				(0.092)			
Orthodox				-4.172			
				(0.559)			
Roman Catholic				0.313			
				(0.956)			
Log PseudoLikelihood	-1117.38	-1114.17	-1098.17	-1081.79			

Notes: 1. Negative Binomial Regressions where the dependent variable is equal to the number of terrorist incidents committed by a group in a particular geographic base. 2. Variable description in Table 2. 3. Columns (5) - (7) replicate the estimation from column (4) and add an interaction term between the ideology listed in the column heading and the row variable. Only one interaction is added to each regression and this is the only marginal effect reported. For simplicity, all other marginal effects are unreported. 5. Bootstrapped (1000 replications) standard errors clustered by geographic base. 6. Population (unreported) included in columns (3) and (4). P-values in parentheses.

Table 5: Estimated Marginal Effects on the Average Number of Victims by Terrorist Group

	(1)	(2)	(3)	(4)
religious	3.221	4.369	4.793	5.304
	(0.020)	(0.015)	(0.009)	(0.062)
communist	-1.191	-1.213	-1.598	-1.890
	(0.022)	(0.119)	(0.103)	(0.061)
nationalist	-0.206	-1.251	-1.763	-1.101
	(0.812)	(0.517)	(0.436)	(0.551)
other ideology	-1.342	-1.376	-1.043	-1.263
	(0.013)	(0.084)	(0.123)	(0.154)
RF				
25th percentile		0.061	0.029	-3.665
		(0.963)	(0.988)	(0.277)
mean		0.474	0.400	-2.830
		(0.826)	(0.878)	(0.409)
75th percentile		0.650	0.617	-0.161
		(0.690)	(0.746)	(0.819)
EF				
25th percentile		0.631	0.198	0.176
		(0.071)	(0.571)	(0.696)
mean		4.879	2.713	3.092
		(0.021)	(0.136)	(0.183)
75th percentile		6.682	4.188	4.004
		(0.001)	(0.040)	(0.077)
GF				
25th percentile		0.337	-1.187	0.019
		(0.833)	(0.022)	(0.994)
mean		2.602	-0.769	0.333
		(0.467)	(0.056)	(0.921)
75th percentile		3.563	-0.056	0.432
		(0.258)	(0.079)	(0.807)
Civil Liberties				
25th percentile			1.857	3.520
			(0.075)	(0.473)
mean			0.253	0.208
			(0.447)	(0.729)
75th percentile			-0.125	-0.235
			(0.422)	(0.368)
Muslim				1.511
				(0.794)
Christian				6.148
				(0.556)
Orthodox				0.034
				(0.988)
Roman Catholic				0.082
				(0.988)
Log PseudoLikelihood	-401.73	-395.75	-378.00	-374.41
Observations = 290				

Notes: 1. Negative Binomial regression where the dependent variable is equal to the average number of fatalities resulting from attacks committed by a group in a particular geographic base. 2. Variable description in Table 2. 3. Bootstrapped (1000 replications) standard errors clustered by geographic base. 4. P-values in parentheses. 5. Log(GDP/pop) and population (unreported) included in columns (3) and (4).
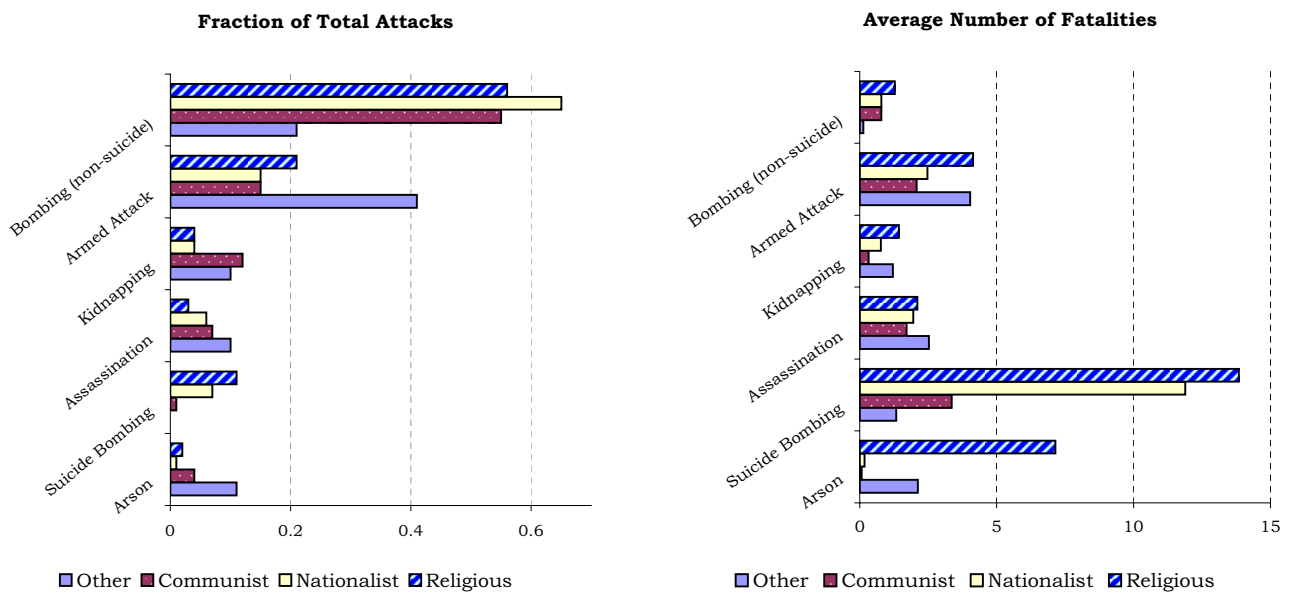
Fraction of Total Attacks

Average Number of Fatalities

Figure 1: Tactic Choice and Average Fatalities by Tactic and Ideology.

Source: MIPT, 1998-2007.

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Dr. Naomi E. Feldman joined the economics department at Ben-Gurion University after completing her Ph.D. in economics from the University of Michigan in 2004. Her primary interests are in empirical public finance, specifically issues in tax policy dealing with charitable contributions, tax evasion, and tax complexity and confusion.

Dr. Bradley Ruffle is currently a Senior Lecturer in the economics department at Ben-Gurion University, which he joined after completing his Ph.D. in economics at Princeton University. He is primarily an experimental economist whose research interests lie in several areas including (1) rational economic explanations for seemingly irrational behavior, such as religion and religious observance, in-kind gift giving and terrorism; (2) buyer countervailing power and large-buyer discounts; (3) experimental tests of tax equivalence theorems, and (4) experimental game theory on topics such as cooperation. He is an associate editor at the International Journal of Industrial Organization. His research has been published in journals such as the American Economic Review, Current Anthropology, RAND Journal of Economics and the Journal of Public Economics.

The ENS Program, established in late 2003, is an inter-mural program aiming to initiate, encourage, and facilitate high quality academic research and policy position papers on the interconnections between economics and defense. The close links between economic strength and development on one hand, and defense capabilities and security on the other are well recognized. Nevertheless, there is little theoretical and empirical research on these links by the academic community in Israel available to support policy making in these critically important matters. The Program holds periodic research meetings, organizes workshops on defense economics, and provides financial support on a competitive basis to proposals by researchers and graduate students submitted in response to widely circulated Calls for Proposals. Program participants include economists and researchers in other disciplines from various universities in Israel, research departments in the Bank of Israel and other government agencies, and some current and past officials in government and defense related organizations and industries. The Program Director is Prof. Dan Peled and the Coordinator is Col. (Res.) Moshe Elad.

Samuel Neaman Institute
for Advanced Studies in Science and Technology
Technion-Israel Institute of Technology
Technion City, Haifa 32000, Israel
Tel: 04-8292329, Fax: 04-8231889
www.neaman.org.il