

## The Economics of Terrorism and Counterterrorism: What Matters and Is Rational-Choice Theory Helpful?

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### Introduction

What is the relationship between terrorism and such potential root causes as poverty, education, religion, and mental health? Is it useful to discuss cause-effect relationships in terms of a rational-choice model? The questions are related in the following way. First, many have sought to explain terrorism in terms of various structural factors such as those mentioned, without reference to issues of choice. In this case, the factors are thought of as preconditions; the imagery is then of the form “Because of such-and-such powerful factors, people are driven to or drawn into terrorism.” The empirical evidence has tended to disconfirm such approaches, as decisively as one finds in social science. An alternative approach is to explain terrorism as the result of what individuals and groups perceive (whether or not correctly) as rational choices. Accordingly, it is not so much that terrorists are victims of some external pressures but rather that they are acting in sensible ways given their preferences and surrounding state of the world (whether perceived or accurate). Evidence on this is still being sorted out. It seems clear that simple-minded rational-choice models do not work well (models such as those that limit considerations solely to monetary reward benefits and costs). However, I shall argue that more-sophisticated rational-choice models appear to have substantial explanatory power. If this is

true, such models should be useful in assessing alternative counterterrorism strategies.

## Relationships Between Terrorism and Postulated Root Causes

### Conventional Wisdom

Although terrorism experts have been changing their minds on this over the last five years or so, it is probably still conventional wisdom that people become terrorists because of some combination of economic conditions, educational attainment, religious zealotry, or mental illness. They lack the knowledge or ability to make reasoned decisions, or they are in such desperate circumstances as to seek extreme measures.

Sometimes, the arguments favoring such views are intuitive, so-called “common-sense” notions. At other times, they are based on, for example, the logic suggested by the traditional economic theory of crime (Becker, 1976),<sup>1</sup> by the economic theory of suicide (Hamermesh and Soss, 1974),<sup>2</sup> or a theory of the economics of religious sects (Berman, 2000, 2003). In all of these, the common denominator is that the terrorists possess relatively inferior marketable alternatives, and therefore their opportunity costs are low. I shall not discuss these in any length because a large body of empirical work tends to disconfirm the underlying common denominator—both at the individual and organizational levels:

- Terrorists are *not* particularly poor, ignorant, mentally ill, or religious. Their most notable characteristic is normalcy.

In what follows, I summarize the evidence for this conclusion.<sup>3</sup> The evidence I present is of the form favored by economists studying these issues, the conclusions are, perhaps, not what might be expected as they point to social, behavioral, and political factors as being most important.

The following sections deal with what the economist-lens literature has to say about our knowledge regarding (1) poverty and educa-

tion, (2) religion, and (3) mental health. After that, I return to the issue of rational-choice explanations.

### Poverty and Education

At the beginning of the decade, there was widespread belief that poverty and education were root causes of terrorism. However, evidence emerged to the contrary—informal evidence, inconclusive scientific evidence, and then increasingly definitive evidence.

**Informal Evidence.** Anecdotal evidence came to contradict the conventional wisdom about terrorists being predominantly poor and ignorant. Of course, there was the well-known example of Osama bin Laden, a man of impressive wealth and a fine education. Nonetheless, in an article in the *New York Times* on the characteristics of the September 11, 2001, terrorist hijackers, Jodi Wilgoren (2001) reported:

They were adults with education and skill . . . [who] spent years studying and training in the United States, collecting valuable commercial skills and facing many opportunities to change their minds. . . . [T]hey were not reckless young men facing dire economic conditions and dim prospects but men as old as 41 enjoying middle-class lives.

In the same year, an intriguing publication by Hassan (2001) also suggested that economic incentives probably cannot explain terrorist activity. In an article summarizing interviews of nearly 250 terrorists and associates (including failed suicide bombers, families of deceased bombers, and those who trained and prepared the bombers for their missions), she reported:

None of them were uneducated, desperately poor, simple minded or depressed. Many were middle class and, unless they were fugitives, held paying jobs. More than half of them were refugees from what is now Israel. Two were the sons of millionaires.

In a *New York Times* article, researcher Scott Atran (2003) reported:

Officials with the Army Defense Intelligence Agency who have interrogated Saudi-born members of Al Qaeda being detained at Guantánamo Bay, Cuba, have told me that these fundamentalists, especially those in leadership positions, are often educated above reasonable employment level; a surprising number have graduate degrees and come from high-status families.

In an account of the July 7, 2005, London Public Transport System, the first suicide terrorist bombing in Western Europe, Glen M. Segell (2005) reported:

This was especially the case in the July 7, 2005 attacks on the London Public Transport system where the bombers were young, middle-class, British citizens with good prospects.

In another article in the *Telegraph* on the August 2006 plot to use liquid bombs against airliner jets flying from the United Kingdom to America, Caroline Davies, John Steele and Catriona Davies (2006) reported:

Twenty-four terrorist suspects being held last night over an alleged plot to blow up as many as 10 transatlantic jets include middle-class, well-educated young men born in Britain. . . . among those arrested were the white son of a former Conservative Party worker, the son of an architect and an accountant and a heavily pregnant woman. Some had studied at university and came from families that owned several properties or ran their own businesses.

Similarly, in an account on *Fox News* of the July 2007 car bomb plot in which several medical doctors took part, David Stinger, a writer of the Associated Press, interviewed Paul Cornish, a former British army officer and director of defense studies at London's Chatham House think tank, who said:

This case could be the final proof that the idea that those involved in these types of attacks are all young, angry and poorly educated is a mistake.

Finally, in an article unraveling Chechen “Black Widows,” Nabi Abdullaev (2007) concludes:

The identified suicide bombers had not been living in abject poverty, nor were they known to have been raped or otherwise tortured and humiliated. . . .

Of course, sound empirical conclusions cannot be based on news reports or anecdotal evidence. Nonetheless, the evidence was building and more scientific evidence was being rediscovered or newly emerging as well.

**The Empirical Evidence.** The empirical evidence (by which I mean systematically developed empirical evidence) collected so far gives little reason to believe that improving individuals’ material or educational circumstances would help reduce their desire to participate in terrorist activities.<sup>4</sup> If anything, the findings suggest that those with higher educational attainment and higher living standards are *more* likely to participate in terrorist activity. Some of the reports date back decades. For example, Russell and Miller (1983) attempted to draw a sociological profile of the modern urban terrorist, using a compilation of information on more than 350 terrorists from Argentinean, Brazilian, German, Iranian, Irish, Italian, Japanese, Palestinian, Spanish, Turkish, and Uruguayan terrorist groups active during 1966–1976. They found that

. . . approximately two-thirds of those identified terrorists are persons with some university training, university graduates or post-graduate students. (p. 55)

Hudson and Majeska (1999) reinforced this in a report produced by the U.S. Library of Congress’s Federal Research Division concerning the sociological characteristics of terrorists in the Cold War period. They concluded:

Terrorists in general have more than average education, and very few Western terrorists are uneducated or illiterate. . . . Older members and leaders frequently were professionals such as doc-

tors, bankers, lawyers, engineers, journalists, university professors, and mid-level government executives.

Similarly, Singapore's Ministry of Home Affairs issued a white paper entitled *The Jemaah Islamiyah Arrests and the Threat of Terrorism*.<sup>5</sup> Among other things, the paper describes Jemaah Islamiyyah prisoners. Notably it says:

These men were not ignorant, destitute, or disenfranchised outcasts. . . . Like many of their counterparts in militant Islamic organizations in the region, they held normal, respectable jobs.

Another example is provided by Marc Sageman<sup>6</sup> who concluded, on the basis of interviews with more than 400 al-Qaeda-affiliated terrorists from the Middle East, Southeast Asia, Northern Africa, and Europe:<sup>7</sup>

The vast majority of terrorists in the sample came from solid middle class backgrounds, and its leadership came from the upper class. . . . Although al-Qaida justifies its operations by claiming to act on behalf of its poor brothers, its links to poverty are at best vicarious. . . . About two-thirds of the sample had attended college. . . . About 60 percent of al-Qaida terrorists in the sample have professional or semi-professional occupations. (2006)

This evidence was not yet conclusive for various reasons, so a series of further studies tightened the investigation. The earlier research was drawn from unrepresentative samples of terrorists, mainly famous leaders.<sup>8</sup> News reports could be similarly biased, since they emphasize the sensational and might neglect to report those instances in which economically desperate individuals participate in terrorist activity. This proved not to be a problem, however, judging by recent empirical analyses of the characteristics of terrorists. The groundwork was laid with the work of Krueger and Maleckova (2003), who investigated the links between poverty, low education, and participation in Hizballah militant activity. Using biographical data of 129 Hizballah members killed in paramilitary actions in the late 1980s and early 1990s, they found that both having a standard of living above the poverty line and having

a secondary-school education or higher were *positively* associated with participation in Hizballah. The U.S. State Department and the British Home Secretary have declared Hizballah to be a terrorist organization, but during the period studied by Krueger and Maleckova, Hizballah could, arguably, have been termed a resistance organization (Krueger, 2007).

I performed a similar analysis on members of Hamas and Palestinian Islamic Jihad (PIJ)—organizations who are, and were during the period studied, on the U.S. State Department list of terrorist organizations, and for good reason. In August 1988, Hamas published the Islamic Covenant in which it declared jihad (holy war) against Israel, with the stated purpose of destroying Israel and creating a Palestinian state between the Mediterranean Sea and the Jordan River.<sup>9</sup> Since then, Hamas has taken responsibility for the deaths of more than 500 Israeli civilians and soldiers in addition to thousands of injuries and tens of thousands mortar shell attacks against Israeli cities.<sup>10</sup> PIJ calls for an armed Islamic war against Israel to free Palestine and create an Islamic state instead of Israel. During its existence, PIJ has claimed responsibility for over 150 Israeli deaths and more than 1,000 injuries.<sup>11</sup>

I have been able to collect and translate information from the biographies of 335 Palestinian terrorists. Of these, 285 came from a representative sample of operational terrorists. To find these data, I tracked down Shahid (“martyrs”) publications from Web sites and online journals of Hamas and PIJ between 1987 and early 2002. I turned these translations into a dataset and then combined it with data on more than 40,000 Palestinian males ages 15 to 56 obtained from the “Labor Force Surveys in Judea, Samaria and Gaza.”<sup>12</sup> These data are described in greater detail in Berrebi (2007). The data, to be sure, have serious limitations. Most of the deceased terrorists died as part of a terrorist attack, but some died as a result of Israeli targeted assassinations. Since targeted terrorists are presumably of higher rank, and thus of higher income or education, the results might suffer from a bias that would be introduced by the overrepresentation of relatively better-off terrorists. To evaluate this potential bias, the study repeated all tests using only the 157 observations in which it was clear from the biogra-

phy that the deaths were as part of planned terrorist attacks. The results were identical in sign and statistically significant.

Since information at that time was available only for those hailed as “martyrs,” it included only dead terrorists who had been able to successfully execute their missions. It did not include terrorists who had failed or who had been caught.<sup>13</sup> It is reasonable to suspect that successful terrorists will also be abler terrorists, potentially not representative of the entire population of terrorists, and therefore the results could not be generalized beyond successful terrorists.<sup>14</sup> Reporting bias was a legitimate concern, as well as the fact that in most cases the poverty status of terrorists was inferred from descriptors indicating wealth, whereas the population data provided information about earnings rather than accumulated wealth. Despite the limitations, these data are informative. First, summary statistics revealed that 31 percent of the Palestinians, compared with only 16 percent of the terrorists, were considered impoverished.<sup>15</sup> Second, out of 208 observations in which information about the terrorist’s education was available, 96 percent of the terrorists had at least a high school education and 65 percent had received some higher education, compared with 51 percent and 15 percent, respectively, in the Palestinian population of the same age, sex, and religion. I used these data to estimate a logistic equation to model participation in Hamas and PIJ, controlling for several factors simultaneously. The results from the simple summary statistics held up in the more-sophisticated analyses. Namely, both higher education and standard of living appear to be *positively* associated with membership in terror organizations such as Hamas or PIJ and with becoming a suicide bomber (Berrebi, 2007).

In a later study, Efraim Benmelech and I were able to obtain detailed information on all suicide attacks by Palestinian terrorists against Israeli targets in Israel, the West Bank, and the Gaza strip between September 2000 and August 2005. The information, collected from reports provided by the Israeli Security Agency, was culled into a dataset that covers 151 suicide bombing attacks carried out by 168 suicide bombers. These attacks killed 515 Israelis and injured 3,428. More important, the data also contained detailed information about failed attacks. As before, we reaffirmed that suicide bombers were on

average more educated than the general Palestinian population (Benmelech and Berrebi, 2007). These data, however, suggested lower estimates than the ones estimated in Berrebi (2003, 2007). Since previous data did not include suicide bombers who were caught or failed in their mission, or suicide bombers who did not succeed in killing others—and who tend to be less educated than those who succeed in their killing missions—we suspect that selection bias may be the main reason for these differences in the estimates of education among suicide bombers. Table 5.1 reports the name, age, education, and terror organization affiliation of the top five suicide bombers, measured by the number of people they killed and injured in their attacks, and provides detailed information about the date, location, and number of the incidents. Three of the top five suicide bombers had academic degrees, two were master's candidates, and one had a degree in law.

Another potential explanation for the difference in the magnitude of the estimates is that Berrebi (2003, 2007) uses data on suicide bombing attacks between 1993 and early 2002, and it is possible that during

**Table 5.1**  
**Top Five Palestinian Suicide Bombers, 2000–2005**

Name	Age	Education	Organization	Attack Date and Location	Number Killed	Number Injured
'Abd al-Baasit 'Awdeh	25	High school	Hamas	3/27/2002 Netanya	29	144
Raa'id 'Abd al-Hamid 'Abd al-Razzaaq Misk	29	Master's candidate	Hamas	8/19/2003 Jerusalem	23	115
Sa'eed Hasan Husayn al-Hutari	22	High school	Hamas	6/1/2001 Tel-Aviv	21	83
Hanaadi Taysir 'Abd al-Malik Jaraadaat	29	Law school graduate	PIJ	10/4/2003 Haifa	21	48
Muhammad Hazzaa' 'Abd al-Rahmaan al-Ghoul	22	Master's candidate	Hamas	7/18/2002 Jerusalem	19	50

SOURCE: Benmelech and Berrebi (2007).

the al-Aqsa intifada terror organizations faced an excess demand for suicide bombers and became less selective in their recruiting during the 2001–2005 period. In either case, we were able to confirm earlier findings that Palestinian suicide bombers are more educated than the average in Palestinian society.

A new study about the human capital and participation in domestic Islamic terrorist groups in the United States is based on a comparative analysis of the characteristics of 63 alleged domestic Islamic terrorists, who were indicted or convicted for involvement in terrorist activities, with those of the population of Muslims residing in the United States (Krueger, 2008). The study reveals that the alleged terrorists were somewhat better educated and younger, on average, than the general population of Muslim Americans. They were about as likely to be idle (neither working nor enrolled in schools) as were other American Muslims and overall did not appear especially deprived.

In summary, the preexisting literature, whether relying on biographical interview information, case studies, or more sophisticated econometric models analyses of the comparative population, typically agrees in its findings with respect to the socioeconomic status and education of individual terrorists. Namely, terrorist are rarely characterized by poverty or lack of education.

Evidence about individual terrorists does not necessarily indicate that poor economic conditions are not a source of terrorism. It could well be argued that poor macroeconomic conditions are the drivers behind the choice to engage in terrorism. Under this hypothesis, individuals can become terrorists because of poverty in their country, even if they are not themselves impoverished. Evidence to that effect would align closely with the literature on conflicts and civil wars.<sup>16</sup> However, the literature on terrorism typically suggests that macroeconomic conditions have little if anything to do with the amount of terrorism produced by countries.

In a study of terrorist incidents and casualties in 96 countries from 1986 to 2002, Piazza (2006) considers the significance of poverty, malnutrition, inequality, unemployment, inflation, and poor economic growth as predictors of terrorism, along with a variety of political and demographic control variables. This study's findings are that,

contrary to popular opinion, no significant relationship between any of the measures of economic development and terrorism can be determined. Rather, such variables as population, ethno-religious diversity, increased state repression, and, most significantly, the structure of party politics are found to be significant predictors of terrorism.

Similarly, Abadie (2006) uses country-level data on terrorism risk from the World Market Research Center's Global Terrorism Index (WMRC-GTI); this covers 186 countries in 2003 and 2004 and studies the effect of poverty, measured by gross domestic product (GDP) per capita, on the intensity of international and domestic terrorism combined. Terrorist risk ratings have obvious limitations. They provide only a summary measure of an intrinsically complex phenomenon. However, they have the advantage of reflecting the total amount of terrorism intensity for every country in the world (Abadie, 2006). The empirical results of a regression analysis, using instrumental variables to correct for reverse causation, show that terrorism risk is not significantly higher for poorer countries once country-specific characteristics have been controlled for.

The unit of observation in these studies is the country in which the terrorist attack occurred (or expected) rather than the country from which the terrorists originated. Arguably, economic conditions in the country of origin should be of greater importance to the terrorists and their organizations.

Krueger and Laitin (2008) examine the link between macroeconomic conditions and terrorism by looking not only at the target country but also at the attackers' country of origin. The analysis in this study relies on two datasets. The first dataset contains information on 781 worldwide significant events that, according to the U.S. Department of State's annual report, *Patterns of Global Terrorism*, occurred between 1997 and 2003. The second dataset contains information on 236 recorded suicide attacks in 11 countries since 1980. Variables describing the country, such as GDP per capita, GDP growth, and measures of terrain, religious affiliation, and literacy, were added to the data based on either the country of origin or target country. Using a myriad of econometric models and specifications, the study concludes:

The most salient patterns in the data on global terrorism that we presented suggest that, at the country level, the sources of international terrorism have more to do with repression than with poverty. The regression analysis showed that neither country GDP nor illiteracy is a good predictor of terrorist origins. . . . Thus terrorist perpetrators are not necessarily poor. But those who are repressed politically tend to terrorize the rich, giving international terrorist events the feel of economic warfare. Suicide attacks reveal much less on the interstate level. . . . in the suicide dataset, we see as with international terrorism, the origins are more likely to be in countries that deny civil liberties. . . .

In his book, *What Makes a Terrorist*, Alan Krueger after reviewing the macro evidence on terrorism, at the society or country level, concludes:

Education and poverty probably have little to do with terrorism. There are many reasons for improving education and reducing poverty around the world, but reducing terrorism is probably not one of them. (p. 90)

Later, when concluding the analysis of the national origins of foreign insurgents in Iraq, Krueger adds:

Economic circumstances in the countries of origin of foreign fighters do not seem to be particularly important predictor variables. . . . (p. 103)

. . . the occurrence of terrorism is mostly unrelated to GDP in the origin country and positively related to GDP in the target country. . . . (p. 104)

Similarly, Krieger and Meierrieks (2008), who reviewed the existing evidence based on 26 cross-country macroeconomic studies for which they assessed the influence of economic, political, demographic, international and geographic factors, concluded:

no convincing evidence is found that economic factors—for example, economic growth, poverty, income disparity or the

like—are closely connected to terrorism. Richer countries only seem to be more often targeted by transnational terrorism. . . . Additionally, higher levels of education or democratic or political system do not guard effectively against terrorism. . . . From our review, the most important determinants of terrorism are found to be political and demographic but not of economic nature.

The above-mentioned studies rely on cross-country analyses and examine the effect of macroeconomic conditions on the amount of terrorism at the state or country level. Arguably, cross-country studies have serious limitations. The underlying assumption in such analyses is that changes in countries' economic conditions share a common effect on the quantity of terrorism that those countries produce, once all the observed country characteristics have been accounted for.<sup>17</sup> However, this assumption is implausible because many features of individual countries cannot be feasibly controlled for in a multivariate regression analysis framework. These relate to, for example, underlying institutions; social, cultural, or psychological sensitivity to economic conditions or to violence in general and terrorism in particular; and to variations in how economic activity and terrorism activities are classified and reported.

Because of such concerns, I—together with my coauthors Efraim Benmelech and Esteban Klor—studied the effect of macroeconomic conditions on suicide terrorism at the regional level.<sup>18</sup> We used quarterly district economic data from the Palestinian Labor Force Surveys for 2000 to 2005 and merged these data with district data on suicide terrorism for the same period, employing additional control variables to account for grievances and local counterterrorism efforts. We were then able to assess whether economic conditions have an effect on the number of suicide terrorists originating from each district. Our findings, although still preliminary, are representative of the cross-country studies' findings mentioned above: notably, that any link between wages or unemployment and the number of suicide attacks is either weak or nonexistent.

## Religion

According to the Merriam-Webster dictionary the word *religion* can be interpreted in several ways. The first is “the service and worship of God or the supernatural;” a second is “a personal set or institutionalized system of religious attitudes, beliefs, and practices”;<sup>19</sup> the third is “a cause, principle, or system of beliefs held to with ardor and faith.” According to the third definition, communism and extreme nationalism could well be defined as religions, as could other secular system of beliefs. For this analysis, and to be able to draw from the economics of religious sects as portrayed by Berman (2000, 2003), I have chosen to restrict discussion to the main organized religions, following the spirit of the first and second definitions presented above.

It would be out of scope for this section to deal with the complexity of the potential interlinkages between terrorism and religion; the intention here is rather to provide the reader with a brief overview of studies that attempted to examine the correlation between observed religions and terrorism. Other perspectives regarding the effects of religion are provided in Cragin (2009).

Examining the micro, individual-level, data Krueger and Maleckova (2003) find that none of the largest religious affiliations<sup>20</sup> seem to be distinctively prone to terrorism. Similarly, when studying the macro, country-level, terrorism data, Krueger and Laitin (2008) find that:

We cannot reject that the same shares affiliated with the various religions jointly have no effect on terrorism at any of the levels of analyses. No religion appears to have a monopoly on terrorism; countries with very different religious faiths have all experienced terrorism, as target, origins, and hosts.

This evidence shows that no specific religion is more linked to terrorism than other religions. However, it does not indicate that religions play a less significant role than secularism.

In his 2005 book, *Dying to Win*, Robert Pape studied 315 suicide terrorist attacks from 1980 to 2003. He found little connection between suicide terrorism and Islamic fundamentalism or any one of the world’s religions. Pape’s claim relies mainly on the Tamil Tigers, which he describes as a group influenced by a Marxist/Leninist ideol-

ogy,<sup>21</sup> which is largely atheistic and disavows any connection with the Hinduism practiced by many of the people in the region of Sri Lanka where this group operates. The Tamil Tigers were responsible for more suicide attacks over the studied period than any other group.

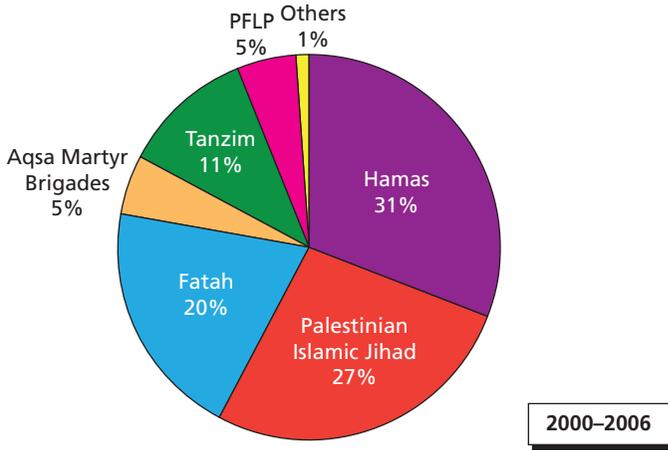
Similarly, after his 2004 study of al-Qaeda–affiliated individual terrorists, Sageman clarifies (Sageman, 2006):

In my sample, only 13 percent of terrorists went to madrassahs, and this practice was specific to Southeast Asia, where two school masters, Abdullah Sungkar and Abu Bakar Baasyir, recruited their best students to form the backbone of the Jamaah Islamiyah, the Indonesian al-Qaida affiliate. This means that 87 percent of terrorists in the sample had a secular education. . . . The vast majority of al-Qaida terrorists in the sample came from families with very moderate religious beliefs or a completely secular outlook. Indeed, 84 percent were radicalized in the West, rather than in their countries of origin. Most had come to the West to study, and at the time they had no intention of ever becoming terrorists. Another 8 percent consisted of Christian converts to Islam, who could not have been brainwashed into violence by their culture.

In conflicts where both secular and religious organizations engage and compete in the amount of terrorism they produce,<sup>22</sup> as is the case for Palestinian terrorism, attacks tend to originate equally from both. Figure 5.1 provides a breakdown of suicide attacks by terror organizations from 2000 to 2006. Notably, the share of suicide attacks initiated by religious organizations (such as Hamas and PIJ) is only slightly greater than the share perpetrated by the remaining secular organizations.

Feldman and Ruffle (2008) analyze 23,360 domestic terrorism attacks between 1998 and 2007. They find that religious terror groups actually carry out fewer attacks on average than do groups of other ideologies (for example, nationalist and communist). However, aside from the Tamil Tigers<sup>23</sup> the remainder of the five deadliest terrorist organizations currently in operation are all radical Islamists (that is, al-Qaeda, Hizballah, Taliban, and Hamas).<sup>24</sup> Moreover, religious groups claim at least as many victims as non-religiously motivated attacks

**Figure 5.1**  
**Suicide Bombing Attacks by Terror Organizations**



SOURCE: Benmelech, Berrebi, and Klor (2008).

RAND MG849-5.1

for almost all tactics, not just suicide bombings as commonly perceived.<sup>25</sup>

Krieger and Meierrieks (2008) in their review of the terrorism cross-country analyses literature conclude:

Although religion in popular discourse has been suggested as an important determinant of terrorist activity, empirical evidence tells a different story. . . . the nature of this linkage does not appear to be clear, as both a negative and positive connection between spiritual ideology and terrorism can be detected.

Dealing with religious terrorism can be confusing, since it is difficult to know whether terrorist organizations, which on the face of it are considered religious, are using religion to attract an audience while primarily motivated by secular goals. Further confusing to the outside observer is when political goals are claimed by terrorist organizations in the name of religion despite the fact that religion was not at the source of these claims. Clearly, it is possible to find religiously motivated terrorists and terror organizations, and there is indication that religious

terrorist organizations are potentially more effective in recruiting operatives, particularly committed volunteers for suicide missions. However, relying solely on religion-based explanations to study terrorism in general would leave a hole in our ability to understand the behavior of the many secular terrorists.<sup>26</sup> Despite the evidence of increased lethality of religious terrorism further research on the link between terrorism and religion is warranted.

### **Mental Health and Irrationality**

Mental health is crucially important in evaluating whether rational-choice behavior is a good model. If terrorists were disproportionately mentally ill, there would be no point in searching for indications of rational behavior or in using rational-choice theory to analyze such behavior. In such a case, evidence about the characteristics of terrorists that seemingly contradicted potential rational-choice explanations would not be puzzling. On the other hand, if we were to find out that terrorists, including suicide terrorists, are not typically mentally ill, we would be compelled to continue our search for better explanations, keeping in mind that costly behavior does not equal crazy behavior.<sup>27</sup> Therefore, I have searched for evidence regarding the mental health of terrorist operatives.<sup>28</sup>

Martha Crenshaw (1981) has concluded from her studies that:

No single motivation or personality can be valid for all circumstances. What limited data we have on individual terrorists . . . suggest that the outstanding common characteristic of terrorists is their normality.

Ariel Merari, a psychologist who has studied the psychological profiles of suicide terrorists since 1983 through media reports that contained biographical details, interviews with the suicides' families, and interviews with jailed would-be suicide attackers, concluded that they were unlikely to be psychologically abnormal (Merari, 2006). Hudson and Majeska (1999) also suggest that the-terrorists-as-mentally-ill approach appears to be contradicted (pp. 20–21).

Similarly, in a study of suicide terrorism Scott Atran (2004) finds that:

Overall, suicide terrorists exhibit no socially dysfunctional attributes (fatherless, friendless, jobless) or suicidal symptoms. Inconsistent with economic theories of criminal behavior, they do not kill themselves simply out of hopelessness or a sense of having nothing to lose.

Marc Sageman (2006) finds a near-total lack of mental disorders in his sample of al-Qaeda–affiliated individual terrorists. He explains that this makes sense, as individuals with mental disorders are usually weeded out early from any clandestine organization for security reasons.

Anat Berko, a criminologist and colonel in the IDF, who studied the inner world of suicide bomber terrorists through a series of prison interviews she conducted with ‘would-be’ suicide bombers whose mission was foiled either directly by the IDF or by some technical failure in the mechanism of the explosives they were carrying, noted (Berko, 2007):

. . . many of the suicide bombers do not have financial difficulties . . . not only do they generally not have economic problems, but most of the suicide bombers also do not have an emotional disturbance that prevents them from differentiating between reality and imagination. . . . (p. 9)

In their work on the psychology of terrorism, Kruglanski and Fishman (2006), reach similar conclusions:

Terrorists do not seem to be characterized by a unique set of psychological traits or pathologies. . . . The vast heterogeneity of terrorism’s users is consistent with the “tool” view, affording an analysis of terrorism in terms of means-ends psychology. The “tool” view implies conditions under which potential perpetrators may find terrorism more or less appealing. . . .

In an article that reviews the state of the art of available theories and data regarding the psychology of terrorism and relies on data and theoretical material gathered from the world's unclassified literature, Victoroff (2005) concludes that terrorists are psychologically extremely heterogeneous. He explains that whatever the stated goals and group identity, every terrorist, like every person, is motivated by his own complex of psychosocial experiences and traits. I interpret his conclusion to mean that we should not expect terrorists to be disproportionately insane.<sup>29</sup>

### Summary

In summary, individual terrorists do not fit the profile of poor, ignorant, or religious individuals with low opportunity cost and no valued marketable skills; nor are they mentally unstable. The various "root causes" that have long been discussed may well be at work, but in complicated and sometimes nonintuitive ways, and apparently not in decisive ways. Other explanations appear to be needed. The next sections of the paper discuss whether the economist's rational-choice model, suitably adapted, may be more appropriate.

## Rational-Choice Approach

### Defining Terms: What Is a Rational-Choice Model?

"Rationality," as that term is used here, is based on "rational-choice theory," which serves as a framework for understanding and often modeling social and economic behavior. It is the dominant theoretical paradigm in microeconomics and is also central to modern political science.<sup>30</sup> However, even within these narrow guidelines one could distinguish between at least three levels of rationality. In the weakest sense, all actions are rational so long as the individual is using them to achieve predetermined ends. A stronger definition requires that individuals choose the *best* action according to stable utility functions<sup>31</sup> and the constraints facing them.<sup>32</sup> Finally, an even stronger definition of rationality requires that individuals respond to incentive,<sup>33</sup> and behave according to rational expectations (that is, the individual's beliefs are

correct on average).<sup>34</sup> In all of these cases, of course, choices and behaviors may prove ineffective because of erroneous information or perceptions, lack of information, or unpredictable complexity in the external world—the ingredients of what Nobelist Herbert Simon called “bounded rationality” (Simon, 1982) the result of which may be to settle for solutions that appear to be “good enough” whether or not truly the best.

Of interest to us is to what extent terrorists, including suicidal terrorists, satisfy the stronger definitions of rationality. Arguably, in the case of terrorism research in general and terrorists’ behavior in particular, one needs to allow for a flexible form of utility function that could include satisfaction from perceived altruism and intangible psychological or social rewards, including expected rewards in the afterlife.<sup>35</sup>

The main argument favoring a rational-choice model is that if terrorists and terror organizations behave rationally, knowledge of their beliefs and preferences should help us understand and predict their behavior. However, if they are irrational, their behavior cannot be explained through rational-choice models, and no systematic trends based on these models should be observed or sought.<sup>36</sup>

Are there any indications to suggest that terrorists and their organization behave rationally? To be sure, before searching for rational-choice explanations, it would be useful to observe behavior that suggests, or at least anecdotally supports, economic rational decision-making on the part of terrorists and their organizations. In looking for evidence for the rational-choice model, we should look at several levels of organization. Often, this is thought of as the level of individuals versus groups, but we can think also of tactical, operational, and strategic levels. Rational behavior might well exist at some, but not other, levels. For example, terrorists are often pragmatically risk-averse in conducting operations, even if the rationality of their overall strategy is questionable.<sup>37</sup>

### **Evidence**

Let me consider evidence separately for tactical- and operational-level issues, and strategic issues.

**Tactical- and Operational-Level Rationality. *Reasonably Chosen Targets.*** At the group level, the evidence tends to support economic rational decisionmaking. For example, Darius Lakdawalla and I used comprehensive terrorism data from the Israeli-Palestinian conflict between 1949 and 2004 to study spatial and temporal determinants of terrorism risk (Berrebi and Lakdawalla, 2007). Specifically, we used detailed data about the exact location and timing of all fatal attacks against Israeli civilian targets<sup>38</sup> and merged those data with information about the targeted localities. We then explored how the spatial risk of terrorism differs with measures of target value and attack cost and analyzed the spacing, or the “waiting time” between terrorist attacks in a given locality. Doing so, we were able to assess whether or not terrorists behave rationally when they decide *which* targets to attack most often and whether there was an empirical pattern in terrorists’ decisions about *when* to attack.

Four factors stand out as key determinants of spatial variation in risk: proximity of terrorist home bases, proximity of international borders, the presence of a Jewish population, and the presence of a center of government administration.<sup>39</sup> The first two probably improved access for terrorists and lowered the cost of attack; the latter two probably raised the expected benefit of attacks in the eyes of terrorist groups. Our analysis indicates that when distance to a terrorist home base doubles, the frequency of attacks falls by around 30 percent. International border localities are more than twice as likely to be hit. Areas with a Jewish population are three times as likely to be hit as other areas, as is Jerusalem and localities with a regional capital. It would seem, then, that attacks are hardly random: They are chosen for a combination of target attractiveness, feasibility, effectiveness, and cost.

***Explainable Attack Timing.*** The analysis of attack timing also leads to several important conclusions. First, in the wake of a terrorist attack, the risk of a subsequent attack climbs in the hours following it and peaks the following day. After that point, risk decays for eight weeks. In fact, if a locality survives for eight weeks without an attack, it returns to its low, preattack risk level. That is, localities that have experienced an attack within the past eight weeks are at greater risk of an attack than other localities, but after eight weeks, their risk is

no longer elevated. It is interesting to note that although this subsidence of risk occurs on average, patterns are very different for politically sensitive localities that are seats of government. For such localities, risk subsides within the first eight weeks but then begins a noticeable climb upward: Apparently, terrorists are not content to leave such high-profile areas untouched, even though they may choose to do so for less-attractive cities. The analysis of waiting time between attacks experienced by localities is consistent with a reasonable interpretation of the benefit value seen by the terrorists.

***Reasonably Chosen Attack Tactics.*** Berman and Laitin (2005) explain that terrorists use suicide tactics primarily against “hard targets” where the probability of apprehension is high using a conventional attack technology and targets are well protected—reducing significantly the expected success of a conventional attack, which altogether indicates a clear calculus in the terrorist’s choice of attack tactics and targets.

***Recognition of Human Capital Considerations in Suicide Bombing.*** Perhaps more indicative of tactical rationality are the findings from a recent study (Benmelech and Berrebi, 2007). In this study of the relationship between the human capital of suicide bombers and the outcomes of suicide attacks, we used, as noted above, detailed biographical data on 151 suicide bombing attacks carried out by 168 suicide bombers in Israel, the West Bank, and Gaza. The data contained detailed information about the characteristics of the attackers and also about the targets they were assigned. We were then able to estimate which characteristics were likely to increase the productivity of terrorists and whether terrorist organizations seemed to be using these characteristics in assigning terrorists to targets, as projected based on rational expectations. In other words, we identified the characteristics that statistically increase the ability of individual terrorists to kill or injure and statistically decrease their probability of getting caught or failing in their attack mission. We then analyzed the characteristics of those sent to the most-valued and lucrative targets.<sup>40</sup> We found that the two key explanatory variables were the academic background and age of the suicide bomber. Both education and age indicate ability and experience. First, in terms of performance, we found that suicide bombers

who had more than a high school education were 56.4 percent less likely to be caught, relative to the sample mean. An additional year of age is associated with a decrease of 17.6 percent, relative to the sample mean, in the probability of being caught. Similarly, older and better-educated suicide bombers, when assigned to more important targets, were more effective killers. For example, an educated suicide bomber killed roughly four to six more people when attacking a large city.

Given these results, rational-choice theory would suggest that terrorist organizations should assign their older and more-educated terrorists to attack larger, more-important, lucrative, civilian targets. Indeed, analyzing the connection from higher-ability suicide bombers to more important targets, we find that the effect of one year of age is large and represents an increase of 4 percentage points in the probability that a suicide bomber will be assigned to a target in a large city. In terms of economic magnitude, this coefficient implies that a 25-year-old suicide bomber has a 28 percentage points higher probability of being assigned to a target in a large city (representing an increase of 53.1 percent relative to the unconditional mean) than an 18-year-old suicide bomber. Similarly, educated suicide bombers are 62.8 percent less likely, compared with the unconditional mean, to be assigned to military targets. In short, assignment of terrorists to targets is statistically unlikely to be random. To the contrary, terrorist organization seems to behave rationally, since they do take into account their success and performance probabilities and target values when considering assignments of terrorists to targets.

These cases strongly suggest short-term, tactical (and operational) rationality. I will next discuss the available evidence about organizations' behavior with respect to their long-term, officially stated goals.

**Strategic-Level Rationality. *Economic Warfare.*** According to a videotape of Osama bin Laden, released to the Arabic-language network Al-Jazeera on November 1, 2004, the head of al-Qaeda said that his group's goal is to force America into bankruptcy (CNN.com, 2004). As part of the "bleed-until-bankruptcy plan," he cited a British estimate that it cost al-Qaeda about \$500,000 to carry out the attacks of September 11, 2001, an amount that he said paled in comparison with the costs incurred by the United States. In this example, it seems that

al-Qaeda's leader behaved in a rational and calculated fashion and was extremely successful in the pursuit of his goal. After all, he claims to have forced the United States into implementing expensive counterterrorism measures that affected its entire economy and into pursuing a war in Afghanistan while spending significant amounts to help Pakistan capture terrorists on its ground. Some might even argue that the war in Iraq was a reaction to the aftermath of bin Laden's September 11, 2001, attack against the United States.

Accordingly, if we believe that an ultimate goal of terrorist organizations is to maximize economic hardship on its enemies, we should observe that attacks cause a serious, maybe even debilitating, cost on the targeted economies or at least a disproportionately higher cost than that incurred by the terrorist organization in organizing the terrorist attack or campaign. And, indeed, the evidence seems to mostly support this hypothesis. Abadie and Gardeazabal (2003) were probably the first to convincingly estimate the economic effects of terrorism, using E.T.A. terrorism in the Basque region of Spain as a case study. They find that, after the outbreak of terrorism in the late 1960s, per capita GDP in the Basque region declined by about 10 percentage points relative to a "synthetic control region" without terrorism.<sup>41</sup> Eckstein and Tsiddon (2004) analyzed the effect of terrorism on consumption, investment, exports, and GDP per capita in Israel. They concluded that if Israel had not suffered from terrorism between 2000 and 2003, its GDP per capita would have been 10 percent higher than its actual level. In another study that empirically assessed the effect of terrorism on the stock-market valuation of Israeli companies that are traded in American markets, Esteban Klor and I find that although the effect differed across industries, terrorism had a significant negative effect overall of 5 percent on nondefense-related companies.<sup>42</sup> We use data on Israeli and matching U.S. stocks that were traded on Amex, the New York Stock Exchange, and Nasdaq.<sup>43</sup> We collected daily end-of-the-day share prices for the sample period between January 1, 1998, and September 10, 2001,<sup>44</sup> and merged the data with daily terrorism data for this period.<sup>45</sup> We then employed an event study approach and estimated the divergence of the abnormal returns between Israeli and matching U.S. stocks to quantify the effect of terrorism on stock returns. The

magnitude of the losses caused by terrorism is on the order of \$84.6 million in market capitalization for the average Israeli company not related to the defense sector as measured in July 2007 (Berrebi and Klor, 2005, 2009). Similarly, Karolyi and Martell (2007) looked at the consequences of terrorism on targeted publicly traded firms such as Royal Dutch Shell, British Petroleum-Aamoco Corp., Coca-Cola, McDonalds, and American Airlines.<sup>46</sup> Overall, they identified 75 attacks between 1995 and 2002 in which publicly traded firms were targeted and performed an event study to uncover a significant 83 basis point decline, which constitutes an average loss in market capitalization per firm per attack of \$401 million. Is this enough to handicap an economy? Probably not, but it certainly could cause a significant economic hardship and the economic consequences would be several orders of magnitude greater than the cost of perpetrating the attacks. One could argue that terrorism has only a small effect on the economy, particularly when compared with the effect of external wars or natural disasters.<sup>47</sup> However, it is important to keep in mind that it is far less costly to perpetrate a terrorist campaign than to wage a war. To summarize, it seems that we can find evidence for a relatively significant effect of terrorism on the economy, although most can be attributed to psychological reactions in the aftermath of the attacks, rather than to the actual damages caused by the attacks.<sup>48</sup> From the point of view of terrorist organizations the economic effect of terrorism reasonably supports rational-choice behavior, since it achieves serious “bang for the buck.”

***Pursuit of Territorial and Liberation Goals.*** Also shared by many terrorist organizations are territorial goals.<sup>49</sup> Territorial goals are often termed “liberation of territories from occupation.” These goals typically reflect sincere beliefs or perceptions that territories that they believe to have rightful historical or religious claims on are subject to occupation. At times, however, an organization will make such claims in a deliberate manipulation intended to attract support from a targeted audience. In either case, it is relatively easy to find examples of terrorist organizations seeking territorial gains.

Following are some examples:<sup>50</sup> The charter of the Palestinian terrorist organization Hamas clearly has as a goal—what it perceives as

the liberation of the land of Palestine.<sup>51</sup> The Al-Aqsa Martyrs' Brigade (AAMB), an armed Palestinian terrorist faction composed of Fatah-affiliated "Islamic Nationalists," have set as an objective the establishment of an independent and sovereign Palestinian state and an end to the occupation of what they see as occupied Palestinian territories. Hizballah, as can be derived from its February 16, 1985, political manifesto,<sup>52</sup> includes among its goals the removal of all Western influences from Lebanon and from the Middle East, as well as the destruction of the state of Israel and the liberation of all Palestinian territories and Jerusalem from what it sees as Israeli occupation. Jaish-e-Mohammed (JeM), a Pakistan-based radical Islamist terrorist organization, advocates the liberation and subsequent integration of Jammu and Kashmir from Indian control into Pakistan. The Liberation Tigers of Tamil Eelam (LTTE), a Sri Lanka-based terrorist organization, advocates what it sees as the liberation of their homeland in the north and northeastern part of Sri Lanka, which it has called "Tamil Eelam." The Euskadi Ta Askatasuna (ETA) is a Basque terrorist group with the goal of liberating the Basque homeland region from what they perceive as Spanish occupation. The Kurdistan Workers' Party (PKK) is a Kurdish terrorist organization that has as a goal to liberate Kurdistan, an area that comprises parts of southeastern Turkey, northeastern Iraq, northeastern Syria and northwestern Iran, from what they perceive as foreign occupation.

Similarly, as will be discussed in greater details below, terrorist activities regarding political goals and their influence on public opinion and electoral outcomes are yet another indication of rational-choice behavior.

***Does Terrorism as a Strategy Work?*** With so many terrorist organizations sharing territorial claims, it should be possible, at least anecdotally, to document territorial concessions in response to terrorist campaigns.<sup>53</sup> Perhaps most convincing is a study of 188 suicide terrorist attacks worldwide from 1980 to 2001 (Pape, 2003),<sup>54</sup> which concluded:

this study shows that suicide terrorism follows a strategic logic, one specifically designed to coerce modern liberal democracies to

make significant territorial concessions. Moreover, over the past two decades, suicide terrorism has been rising largely because terrorists have learned that it pays. Suicide terrorists sought to compel American and French military forces to abandon Lebanon in 1983, Israeli forces to leave Lebanon in 1985, Israeli forces to quit the Gaza Strip and the West Bank in 1994 and 1995, the Sri Lankan government to create an independent Tamil state from 1990 on, and the Turkish government to grant autonomy to the Kurds in the late 1990s. In all but the case of Turkey, the terrorist political cause made more gains after the resort to suicide operations than it had before.

It is important to note that some terrorism researchers maintain that terrorists do not, on average, achieve their ultimate objectives (Abrahms, 2006) and accordingly challenge the rational terrorist thesis (Abrahms, 2004),<sup>55</sup> claiming that:<sup>56</sup>

terrorism has a habit of eliciting the opposite of the intended policy response.

Nobel laureate Thomas Schelling in his work on international terrorism suggested that although terrorists frequently accomplish intermediate means toward political objectives, they fail to achieve long-term objectives (Schelling, 1991).<sup>57</sup>

Allegedly, these last arguments cast doubt in the rational behavior of terrorist organizations.<sup>58</sup> However, when evaluating these claims, one should remember that terrorist organizations have different long-term goals<sup>59</sup> and each is likely to have several internally competing goals.<sup>60</sup> Therefore, it is difficult to estimate the extent to which they are successful in achieving their goals.<sup>61</sup> Moreover, as outside observers, the ability to assess whether terrorists achieve their goals can be established only if we know what those goals are. Nevertheless, we anecdotally observe terrorist organizations pursuing short-run and long-run objectives along costs and benefits considerations that directly influence their activities, which enables us to argue more comfortably in support of rational-choice behavior despite the inherent lack of predic-

tive power. Counterterrorism expert Boaz Ganor suggests in his book, *The Counter-Terrorism Puzzle* (2005), that:

In general, terrorist organizations usually conduct rational considerations of costs and benefits, but they often attribute different weight to the values taken into account in their cost-benefit calculations, and occasionally, may even consider values that are different from those of the ones coping with terrorism, thus making a decision that appears irrational to an outside observer. In most cases, though, the leadership of a terrorist organization will not make a decision whose cost is perceived to outweigh its benefits, that is, an irrational decision.

According to the evidence from the previous discussions, it is likely that terrorist organizations respond to incentives and more often than not use rational expectations in their calculations—thus conforming to the behavior expected in the rational-choice theory.

**Ability to Explain Puzzles?** Is there any rational-choice explanation to the seemingly contradictory evidence with respect to an individual's characteristics? Recall that individual terrorists tend to be wealthier and better educated than the population from which they are drawn, not particularly religious, and most likely in good mental health.

One possible explanation is that terrorists, although initially in good mental health, are unwittingly programmed" or "brainwashed," potentially even through the educational system that is controlled or influenced by the leaders of terrorist organizations. If this is the case, we should observe rational behavior at the organizational level; however, it would suggest that terrorists are unlikely to follow consciously calculated behavioral choices. On the contrary, they would be unwittingly manipulated into joining the terrorist organization. This hypothesis, if true, would explain why educational attainment potentiates terrorist activity or is potentiated by it. Accordingly, the educational system is used to brainwash potential terrorists. Educational content that advocates particular political or religious messages would therefore increase an individual's propensity to join terrorist organizations and partici-

pate in terrorist activity, encouraging radical thought while only on the margin increasing productive opportunities in the labor market.

Although educational content is likely to be a factor influencing individual behavior, past experience suggests that we should be extremely careful of prematurely adopting an explanation that relies on the absence of free will.<sup>62</sup>

Another possible explanation is that terrorism is a high-skill occupation.<sup>63</sup> As such, individuals who want to volunteer must first have the necessary skills and show their ability to commit. If so, causality could be reversed. Accordingly, it is not those who are highly educated and hold lucrative jobs who disproportionately want to join terrorist organizations but rather that those who are initially interested in joining terrorist organizations must get more education and show their ability to hold a job, in an attempt to become an active terrorist. The limitation of this argument is that it requires that individuals decide relatively early in life that they want to become terrorists, as investments in education and job market skills are acquired from early age.<sup>64</sup>

### **What Might Rational-Choice Models Look Like?**

It has been argued that we need more creative approaches to rational-choice behavior models in ways that move from the straightforward notion of self-interest into a notion of self-interest that is driven from pride, dignity, self-respect, or recognition (Varshney, 2003). These approaches can help us understand participation in terrorist activity. I am inclined to borrow from the concept of “value rationality” first proposed by Max Weber (1978). However, I consider an explanation to be within the framework of rational-choice theory only if a cost-benefit calculus can be applied, necessitating the abandonment or adjustment of goals if the costs of realizing them are too high, even if the goals consist or are driven by ethical, aesthetic, religious, or other beliefs and the costs and benefits are measured in terms of satisfaction, suffering, hardship, or discomfort. Nevertheless, it seems to me that various alternative explanations based on rational-choice theory, as defined here, could support the literature’s empirical individual-level and country-level findings.

**Altruism.** One such creative approach is provided in an intergenerational model where the current generation is linked to the next one by some altruism, as in standard dynastic family models, and terrorist attacks in the current period increase the probability of the benefit of some public good accruing to the next generation. According to this model, although above average education and wealth are expected to increase the opportunity cost of participation in terrorism, and in particular in a suicide attack, it is suggested that it probably also increases the sensitivity and feeling of responsibility to the future generation's welfare.<sup>65</sup> The latter effect might offset the deterrent effect of the former (Azam, 2005). The limitation of this explanation is that it relies on factors that are difficult to empirically observe or measure, such as altruism.<sup>66</sup>

**Demand Versus Supply.** So far, I have considered only the supply side of this equation (that is, the willingness of individuals to engage in terrorist activities). Suppose that differential participation of wealthier or better-educated individuals in terrorist activities was not a matter of differential motivation so much as choice on the part of terrorist organizations (that is, the terrorism market is mostly driven by demand-side forces). Such organizations may be faced with an excessive supply of potential participants and might therefore choose the select few they desire. Consequently, it may be that the terrorists selected by these groups are highly educated and in good socioeconomic status even though, on average, the education and wealth of those willing to join such organizations may be no greater than average. Ethan Bueno de Mesquita (2005) has developed a theoretical model of the interaction between a government, a terrorist organization, and potential terrorist volunteers in which, as a result of an endogenous choice, individuals with low ability or little education are most likely to volunteer to join the terrorist organization. However, the terrorist organization screens the volunteers for quality and, as a consequence, actual terrorist operatives are not poor or lacking in education.

Along similar lines, Iannaccone (2006) presents a compelling model that explains why, under certain conditions, a market for suicide terrorist attackers ("martyrs") can flourish. According to Iannaccone,

it is on account of limited *demand* rather than limited supply that markets for “martyrs” so rarely flourish. Suicidal attacks almost never benefit the group best fit to recruit, train, and direct the potential martyrs. Once established, however, a market for martyrs is hard to shut down. Supply-oriented deterrence has limited impact because: In every time, place, and culture, many people are willing to die for causes they value. . . . Demand-oriented deterrence has greater long-run impact because: The people who sacrifice their lives do not act spontaneously or in isolation. They must be recruited, and their sacrifices must be solicited, shaped, and rewarded in *group* settings. Only very special types of groups are able to produce the large social-symbolic rewards required to elicit suicide. Numerous social, political, and economic pathologies must combine in order to maintain the profitability of (and hence the underlying demand for) suicidal attacks.

The model in Iannaccone (2006) provides a rational-choice explanation in which largely symbolic rewards provided to the individuals, and a profit obtained by the terrorist organization from the suicidal attacks, make this market possible. Similarly, the behavior of terrorists motivated by religion, including suicide attackers, could be persuasively explained through rational-choice models (Berman and Laitin, 2008). Berman and Laitin use “clubs,” “club goods,” and religion and emphasize the function of voluntary religious organizations as efficient providers of local public goods to persuasively model participation in suicide terrorist attacks. According to this model, the sacrifices that these groups demand are economically efficient and make them well suited for solving extreme principal-agent problems in recruiting candidates for suicide attacks who will not defect. The predictions of this model are consistent with the evidence observed in the data on religious terrorist organizations and do not require appeal to irrationality or utter fanaticism. However, the main limitation of this model is that it does not apply to some important examples of terrorist campaigns (including suicide terrorist campaigns), such as the one launched by the Tamil Tigers. For one, LTTE is completely secular; second, there is no record of providing essential services to the poor to reduce members’ reliance on the state; finally, the Tigers have not sent their most valuable cadres

to perform suicide missions as predicted by the model.<sup>67</sup> A modified model is consequently proposed by the authors. In the modified model, an alternative type of club is introduced; this club threatens the general population while protecting its members from that threat. That is, it is bad for nonmembers but it provides a local public good for members (relative to nonmembers). Rather than reducing the risk of defection by augmenting the inside options of members with benign local public goods, it reduces the risk of defection by destroying outside options of members with a pervasive public bad—the threat of attack from the club itself (Berman and Laitin, 2008). Although the combination of the two club models presented here provides a good explanation for most suicide terrorism campaigns, it leaves out examples of secular terrorist organizations, which fail to provide community services, and yet, to the best of our knowledge, do not rely on coercion for recruiting and threats to avoid defections, such as the Palestinian Al-Aqsa Martyrs' Brigades<sup>68</sup> or the Kurdistan Workers' Party for example.<sup>69</sup>

Another somewhat parallel explanation is that terrorists are rational people who use terrorism primarily to develop strong affective ties with fellow terrorists (Abrahms, 2008).<sup>70</sup> Accordingly, individuals join terrorist organizations to develop a sense of solidarity with other like-minded people.<sup>71</sup> The limitation of this explanation is that there seem to be many less-dangerous alternatives to develop these kinds of social bonds.

**Political Activism.** Perhaps most convincing is the idea that terrorism is an extreme and violent form of political activism. After all, terrorism is often defined as the systematic use of violence to create a general climate of fear in a population and thereby to bring about a particular *political* objective [emphasis added by author].<sup>72</sup> As such, we should observe that participation in terrorist activity is akin to political activism, attracting the more-educated and wealthier individuals, therefore settling the seemingly puzzling evidence described above. Accordingly, poorer individuals are more likely to be preoccupied with daily matters, such as providing for their families, and end up devoting less attention to militant struggles, and less-educated individuals are less likely to hold the convictions necessary to express opinions,<sup>73</sup> even more so to act on them. Political activism is as likely to be based on

religion as it is to be rooted in secular ideologies, and politically active individuals are not expected to be mentally ill, both matching the micro-level evidence about terrorist operatives. An explanation based on the premise that terrorism is an extreme version of political activism could therefore be supported by rational-choice theory at both the individual and organizational levels.<sup>74</sup>

Besides providing one added alternative explanation, I find it useful to stipulate which observations would support this hypothesis and which would contradict it.

For example, according to this hypothesis, terrorists should be more likely to originate from areas where political freedom or civil liberties are limited,<sup>75</sup> be more likely to attack politically sensitive targets, or intensify their terrorist campaigns during politically sensitive periods. Perhaps most important, to support rational expectations, terrorism should have a clear political effect on its targeted population.

***Political Freedom and Civil Liberties.*** Krueger and Laitin (2008) used the Freedom House Index, which rates various countries on the basis of civil liberties and political rights, to study the characteristics of the countries of origin of terrorists involved in 956 terrorist events that occurred from 1997 to 2003. They found that origin countries tend to have low levels of civil liberties. Similarly, Piazza (2006), who studied terrorist incidents and casualties in 96 countries from 1986 to 2002, found that increased state repression and, most significantly, the structure of party politics are significant predictors of terrorism. Alberto Abadie, in his analysis of the roots of terrorism, determines that political freedom has a significant, but nonlinear, effect on terrorism risk (Abadie, 2006). Finally, Krueger (2007) concludes his analysis of foreign insurgent in Iraq by saying:

The results for civil liberties were the same as what I found in the international terrorism results: countries with fewer civil liberties were more likely to be source countries of foreign insurgents in Iraq. If we measured political rights instead of civil liberties, we found that foreign insurgents were coming from more totalitarian regimes. On the other hand, civil liberties were more powerful as a predictor.

**Political Sensitivity of Targets.** It could be argued that the overwhelming number of political figures or targets, such as embassies, obviates this point. The RAND-Memorial Institute for the Prevention of Terrorism (RAND-MIPT) terrorism chronology database reveals that between January 1, 1968, and January 1, 2007, of the 30,611 recorded terrorist attacks worldwide, over a quarter (7,739) were against government or diplomatic targets. In fact, political targets were attacked more often than any other target category, more than religious figures and institutions, educational institutions, journalists and media, telecommunication, food or water supplies, utilities, transportation, tourists, airports, airlines and aviation, nongovernmental organizations, maritime or military, abortion-related, or even other terrorists and former terrorists targets *all combined*. Notably, half of the assassinations perpetrated by terrorists, and about 60 percent of the terrorist hostage and barricade attacks, were against government and diplomatic targets.

Careful use of logistic probability and count model regression analyses of the Palestinian case study shows, as mentioned above, that politically sensitive areas, such as localities with a regional capital, were three times more likely than other localities to be targeted. The same study also revealed that terrorists are unlikely to leave politically sensitive areas calm for long periods, whereas they might choose to do so for other comparable but politically insensitive areas (Berrebi and Lakdawalla, 2007).

**Timing of Attacks and Electoral Outcomes.** An interesting feature of the timing of terrorist attacks is that they tend to be concentrated within well-defined campaigns. Robert Pape, in his work about suicide terrorist attacks, finds that nearly all suicide attacks occur in organized, coherent campaigns, not as isolated or randomly limited incidents (Pape, 2005). Contrary to popular beliefs, terrorists are unlikely to attack in an uncalculated reaction to events or grievances. Jaeger and Paserman, in their study about the dynamics of violence in the Palestinian-Israeli conflict since the outbreak of the Second Intifada in September 2000, find that the conflict has followed an uneven pattern, with periods of high levels of violence and periods of relative calm. The estimated reaction functions for both Israelis and Palestinians reveal evidence of unidirectional Granger causality from Palestinian violence

to Israeli violence, but not vice versa. Although Israelis react systematically to Palestinian attacks, Palestinian attacks are not caused by or in response to Israeli violence. The authors then conclude that despite the popular perception that Palestinians and Israelis are engaged in “tit-for-tat” violence, there is no evidence to support that notion (Jaeger and Paserman, 2008).

In a study of the interaction between terror attacks and electoral outcomes, Esteban Klor and I used the Israeli-Palestinian conflict to develop and analyze a game-theoretical dynamic model of reputation, whose predictions about the interaction between terrorism and electoral outcomes we tested empirically (Berrebi and Klor, 2006). The unique pure-strategies Markov-perfect equilibrium of our model (which takes place in an environment characterized by well-defined preferences and limited information, and which incorporates strategic behavior derived from beliefs that are in turn updated according to Bayes rule following the actual realization of terrorism and election outcomes) predicts two important empirical outcomes. First, we expect relative support for the right-wing party to increase after periods with high levels of terrorism and to decrease after periods of relative calm. Second, perhaps paradoxically, the model predicts that the expected *short-term* level of terrorism will be higher during the left-wing party’s term in office than during that of the right-wing party. Notably, these predictions follow from the Palestinians’ strategic considerations and not from different deterrence policies that the Israeli government might implement. The intuition behind the empirical predictions is that when Israelis believe that there is a high probability that attacks cannot be prevented through concessions, they expect a high level of terrorism whether territorial concessions are granted or not. Therefore, Israelis, who, everything else equal, benefit from greater territorial control, vote for the right-wing party. Within this range of beliefs, Palestinians realize that further attacks will not bring about territorial concessions and will only strengthen the Israeli voters’ conviction that there is no point in making any. It is then that there is an effort by the Palestinians to scale down terrorist attacks to establish a reputation as a reliable partner for peace. Once such a reputation is established, if terrorism is kept at a low level, Israelis would not suffer a cost from maintaining

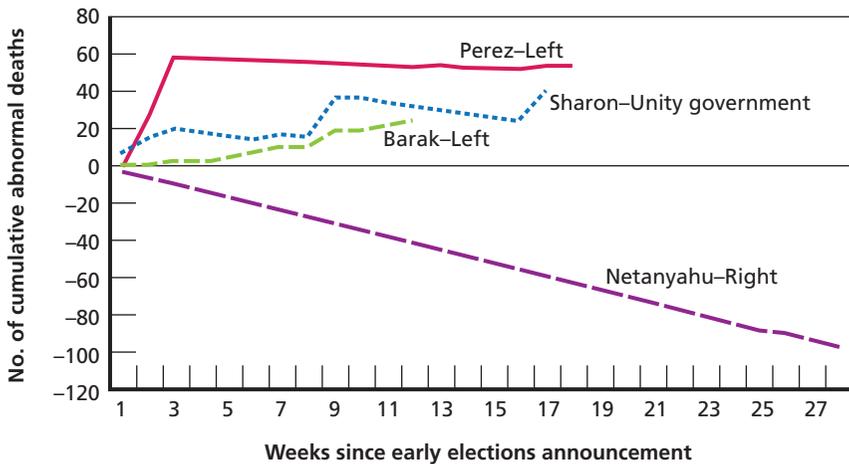
the occupation and would thereby try to perpetuate it. Therefore, to impose a cost on the Israelis and force them to give up the perceived occupied territories, terrorism is ramped up again. Israelis, who now believe in the ability of the Palestinians to reliably control terrorism, then realize that the continued control over the claimed territories will lead to a stream of high-level terror attacks and therefore vote for the left-wing party.<sup>76</sup> Following the implications of the theoretical model, our empirical estimation concentrates on the striking variability in the level of terrorism for periods that precede Israeli elections. Accordingly, the Palestinians' optimal level of terrorism before an Israeli election varies depending on the identity of the incumbent political party in Israel. We therefore expect to observe a higher level of preelection terrorism when Labor (the left-wing party) holds office than when the Likud (the right-wing party) is in power. We test the hypotheses that our theoretical model elicits by combining data on terrorism in Israel, the West Bank, and Gaza between 1990 and 2003 with electoral outcomes data for the same period.

To determine whether preelection terrorism is relatively higher when Labor (the left-wing party) holds office, we use a combination of event-study methods and likelihood-ratio tests. The event-study method treats the ideology of the elected Israeli government as exogenous and studies its effect on the level of terrorism. To conduct an event-study analysis, we define the day on which the forthcoming Election Day is announced as the day of the event. Our sample contains four events: the elections of 1996, 1999, 2001, and 2003. For each event, we define an event window that spans from the day of the event until the end of the tenure of the corresponding government. The event-study method compares the level of terrorism during the event window with the level of terrorism during a previously specified estimation window. We define our estimation window as the event window of the preceding government. For each event, we calculate the weekly abnormal number of deaths from terrorism, defined as the difference between the observed weekly number of deaths (during the event window) minus the average number of weekly terror fatalities during the preceding government (the estimation window). We interpret the abnormal number of deaths from attacks during the event window as a measure of the effect of

the ideology of a given government on terrorist activity. We aggregate the abnormal deaths into the number of cumulative abnormal deaths (CAD) to draw overall inferences. If the CAD graph oscillates around zero, then the studied event does not have an effect on the level of terrorism. On the contrary, if the theoretical predictions of our model are correct, then CAD should be positive and increasing for a left-wing government that succeeds a right-wing government and negative and decreasing for a right-wing government that succeeds a left-wing government. Figure 5.2 provide the results of this analysis.

The evidence obtained from the event-study analysis supports the hypothesis about the expected level of terrorism. The standard statistical test applied in event studies assumes that CAD is normally distributed. This is clearly not the case in our study, since terror fatalities are count data, and are best described by a Poisson distribution. Therefore, we perform the more-conventional likelihood-ratio test, assuming that deaths from terror attacks do follow a Poisson distribution. The

**Figure 5.2**  
**Terrorist-Attack Intensity versus Time, Relative to Announcement of Early Elections**



NOTE: The comparison period is from the preceding elections (under the previous government).

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findings of the likelihood-ratio tests also support the conclusions adduced from the event-study analysis.

Accordingly, there is a statistically significant increase in the level of terrorism during the left-wing party's term in office and a statistically significant decrease in terrorism during the tenure of the right-wing party. Therefore, we conclude that the timing of terrorist attacks is strategically set and oscillates around election periods.

When considering the political effect of terrorist attacks, a good non-Palestinian example is the March 2004 Madrid trains bombings. Ten bombs exploded on three commuter trains full of passengers on their way to Madrid. The attack resulted in 191 deaths and 1,500 wounded. The terrorist group that carried out the attack sought to compel Spain to withdraw its troops from Afghanistan and especially Iraq. A study by Jose Garcia Montalvo (2008) compares absentee ballots cast before the bombing with votes cast after them and convincingly shows that the aftermath of the attack mobilized voters to elect a new government led by the Socialist Party because, in large part, this party campaigned on the promise to pull Spanish troops from Iraq.

For a rigorous analysis of voters' sensitivity to terrorism, Esteban Klor and I, went on to identify the causal effects of terrorism on the preferences of the Israeli electorate (Berrebi and Klor, 2008a). The assumption that voters' preferences are significantly affected by terrorism is of crucial importance and warrants careful examination. Our empirical strategy is based on a difference-in-differences approach that uses the variation of terror fatalities across time and space to control for possible time- or location-specific effects. Specifically, this methodology allows us to estimate the causal effects of terrorism by comparing changes in consecutive electoral results of localities that suffered terror attacks (treated group) to changes in electoral results of localities that did not suffer from terror attacks (control group). The key identifying assumption of this approach is that, in the absence of terrorism, the trends of the electoral preferences of treated and control localities would be the same. We use electoral data at the level of the polling station, provided by the Israeli Central Bureau of Statistics (ICBS), which include the total number of eligible voters, voter turnout, and the support for each political party in the parliamentary elections of

1988, 1992, 1996, 1999, and 2003. We then geographically divide the data into localities according to ICBS guidelines, divide the political parties with representatives in the parliament into right-left bloc vote, and combine the data with information on the number of noncombatant Israeli fatalities from terror attacks during the respective period. We incorporate into the analysis additional political, socioeconomic, and demographic variables. We find that one terror attack causes an increase of roughly 1.35 percentage points in the relative support for the right bloc. This effect is of a significant political magnitude, to the extent that the occurrence of a terror attack before an election (or the lack thereof) can clearly determine the electoral outcome. A calibration of the effect of terrorism on the distribution of seats in the Israeli parliament shows that terrorism not only affected the composition of every Israeli parliament during the time period at issue, but it may have very well determined which party obtained a plurality in two of the elections analyzed and could have shifted the majority of the parliament from the left to the right bloc of parties in one more election if another attack had occurred before that election. This study also reveals that terrorism can cause the ideological polarization of the electorate.

Many additional studies report a correlation between terrorism (or the threat thereof) and the electorate's political preferences.<sup>77</sup> Even if these correlations cannot be interpreted causally, they contribute to the evidence about the link between terrorism and electoral outcomes and provide numerous examples of cases in which terrorism was likely to have influenced political preferences and electoral outcomes.

At first glance, the effect of terrorism on voters' preferences may seem paradoxical from the terrorists' standpoint. Terrorism fatalities, with few exceptions, increase support for the bloc of parties associated with a more-intransigent position toward terrorism and territorial concessions. In other words, terrorism supposedly undermines the terrorist faction's goal. Some scholars may interpret this as further evidence that terrorist attacks against civilians do not help terrorist organizations achieve their stated goals (Abrahms, 2006). Other scholars place more emphasis on the complex structure of terrorist factions, who tend to have a number of objectives (Kydd and Walter, 2006) and are therefore likely to face trade-offs between their main objectives, with the

risk that a chosen strategy in pursuit of some of them will undermine the likelihood of achieving others. An alternative explanation is that terrorist organizations perpetrate attacks with the goal of provoking reaction from the targeted government into a forceful response against the population whose interests they are supposedly representing, in the hope of radicalizing the population and increasing overall support for terrorist actions (Bueno de Mesquita and Dickson, 2006; Jaeger and Paserman, 2008; Siqueira and Sandler, 2006). These studies suggest that violence is used to radicalize the population. Jaeger et al. (2008) directly test this hypothesis using public-opinion polls taken regularly in the West Bank and Gaza Strip since the beginning of the second intifada in 2000 and merging them with data on Israeli-inflicted Palestinian fatalities. They find that although Palestinian fatalities immediately increase the radicalization of the Palestinian population, this effect is fleeting. In fact, the shift in opinion toward more radical views rarely persists more than a few weeks and disappears completely after 90 days. Moreover, there is no statistically significant radicalization effect in the aftermath of targeted killings.

According to Berrebi and Klor's (2006) model, discussed above, it is possible that, even if the electorate's support for the right bloc increases as a consequence of terror attacks, the political position of the right bloc (although still more hawkish than that of the left bloc) may be affected as well and may become less intransigent over time. Therefore, they rationalize not only the behavior of terrorist factions but also that of the targeted electorate (or government).

The discussion about the effect of terrorism on politics and electoral outcomes is also tied to the ability to induce territorial concessions, as discussed above. This can be viewed as political objectives in the same way that influencing voters' preferences are. Whether true or perceived, many withdrawals, from partial to complete pullouts, are attributed to the success of terrorism. Examples abound over the entire course of history, from the French pullout from Algeria in 1962 following the terrorist activities of National Liberation Front (FLN) and the National Algerian Movement (MNA) to the more recent Israeli pullouts from Lebanon in 2000 following Hizballah terrorist activity and the pullout from the Gaza Strip in 2005 following Palestinian,

mainly Hamas, terrorism. According to Krueger (2007), in some writings in Britain at the end of the 18th century, George Washington was considered a terrorist for fighting the British military. Regardless of the obvious differences, terrorists do perceive these and numerous other examples as proof that terrorism can achieve political goals, influence electoral outcomes, and induce concessions, so they rationally chose their actions based on it.

To summarize, I find that a limited set of objectives to describe terrorist organizations or individuals is likely to produce a flawed representation of complex phenomena. As with other organizations, terrorist organizations have multiple, sometimes competing, objectives.<sup>78</sup> Having reviewed the literature and researched the issue myself, it seems that two objectives, shared by numerous terrorists and terrorist organizations, stand out as empirically grounded and concurrently provide hypotheses that conform to rational-choice behavior, therefore, the most compelling hypothesis. The first is based on political objectives along the lines presented in Krueger (2007), Berrebi and Klor (2006, 2008), which has the “bonus” feature of actually matching the terrorists’ own stated goals and our accepted definition of terrorism. The second is based on a combination of social objectives along the lines presented by Berman and Laitin (2008), Iannaccone (2006), and Abrahms (2008). In addition to the main factors, which stand at the core of these explanations of terrorists’ behavior, numerous permissive elements are likely to play a significant role; for example, the availability of a breached educational system that allows for indoctrination and recruiting by the terrorist organizations or their supporters. Furthermore, these hypotheses should not be regarded as mutually exclusive as they probably reflect many factors affecting terrorists and terrorist organizations’ behavior.

## **Potential Implications for Counterterrorism**

Given the evidence, it is not realistic to put much stock in “root-cause” explanations of terrorism, although the factors in question may indeed be contributors to the beginning, maintaining, and ending of terrorism

(see also Noricks, 2009; Paul, 2009; and Gvineria, 2009). This conclusion is about as robust as they come in social science. The evidence gathered so far suggest that the pursuit of political power is a more likely motivating determinant and, to the extent possible, should guide us when devising counterterrorism policies.

Terrorists and terrorist groups should be assumed to be rational, at least in the sense of taking actions they believe are consistent with their goals, sometimes in the stronger sense of being “smart” (that is, locally optimal) and sometimes in the even stronger sense of being consistent with a credible assessment of prospects.<sup>79</sup>

While addressing the issue of rationality in counterterrorism strategy, Ganor (2005) suggests that:

It is a common error to judge the enemy's rationality through the subjective mirror of those coping with terrorism. Cost-benefit considerations are the result of several variables—history, culture, sociological and psychological aspects, etc. An act that is perceived as beneficial to one, may not necessarily be perceived as such by someone else. The rational judgment must be based, therefore, on the cost-benefit considerations as perceived by the enemy alone.

Surely, our findings indicate that we should consider that terrorists are sensible to cost-benefit considerations and we ought to use this information to our advantage. Indeed, there are indications that counterterrorism methods devised to increase the cost considerations of terrorists can be effective. For example, although the results are still preliminary, a study that examines the effectiveness of home demolitions as a counterterrorism strategy against suicide terrorists suggests that by carefully targeting the attacker's homes for punitive demolitions, it is possible to deter future potential suicide attack volunteers (Benmelech and Berrebi, 2008).<sup>80</sup> Moreover, if we did not think that terrorists were rational and respond to incentives, we would be left with a “capture and kill” only strategy for counterterrorism. Establishing that incentives (at least in their weaker form) can potentially work in our favor is not only useful but a very hopeful message as well.

The model of rational choice needs to be applied with an extended concept of utility that allows for valuing causes greater than the individual and for valuing developments that may or may not occur in the individual's lifetime.<sup>81</sup>

We should be careful when considering potential concessions, since each concession is later incorporated into the terrorists' rational expectations, providing them with further support for the effectiveness of their tactics. Likewise, we should recognize the importance of psychological considerations in deterrence.<sup>82</sup>

Facing a rational opponent, it is only natural to expect terrorists to adapt to the counterterrorism measures we develop, as they reevaluate their cost-benefit calculus every period. Accordingly, no counterterrorism tool or method should be expected to last forever. Michael Intriligator, in his work on the economics of terrorism, cautions that terrorists will substitute other forms of terrorism if one form becomes more expensive or less valuable. They will substitute one target for another as it becomes harder to hit that target (Intriligator, 2008). Indeed, in a time-series analysis of various attack modes used by terrorists and after further examination of counterterrorism methods, Enders and Sandler (1993, 2002) find that terrorists both substitute attack modes and complement them. Accordingly, policies designed to reduce one type of attack can increase other attack modes.

Efforts to reduce the supply of terrorists may have low leverage because the phenomenon is actually driven by demand, with the terrorist organization requiring relatively few recruits but ones of relatively high quality.

Finally, although terrorism has often been considered a tactic, it is sometimes a conscious, rational strategy. This conclusion is especially well substantiated with respect to efforts to fight against perceived occupations or foreign influences.

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## Endnotes

<sup>1</sup> The conventional wisdom follows even though, in most variants of the Beckerian model, one cannot determine the relationship between criminal participation and the variables of interest without making assumptions about the individual’s risk aversion.

<sup>2</sup> This applies if we believe that the dynamic that brings suicide bombers to volunteer is comparable with what brings individuals to commit suicide.

<sup>3</sup> Further background details on the likely sources for widespread embrace of the theory that poverty is behind terrorism can be found in Berrebi (2003, 2007).

<sup>4</sup> An underlying assumption in this paper is that what causes terrorism in one context is relevant to other contexts. Clearly, as the similarities in circumstances weaken, so does this assumption's validity.

<sup>5</sup> Republic of Singapore, Ministry of Home Affairs (2003).

<sup>6</sup> Marc Sageman is a forensic psychiatrist, former Central Intelligence Agency (CIA) officer, senior fellow at the Foreign Policy Research Institute in Philadelphia, and a senior associate at the Center for Strategic and International Studies in Washington.

<sup>7</sup> Quotes are from U.S. Department of State (2006).

<sup>8</sup> We should expect the educational attainment and wealth of leaders in any complex organization to be higher than that of its members.

<sup>9</sup> Jihad has multiple interpretations, including that of internal and personal struggle rather than holy war. Here I use jihad to mean waging a war that could result in fatalities and physical injuries.

<sup>10</sup> The source here is a database that I have constructed containing daily information on all fatal terrorist attacks against noncombatants that occurred on Israeli soil from 1949 to January 31, 2003. Every attack is described by date, method of operation, location, terrorist organizations claiming responsibility, and additional data about the victims, such as age, gender, and place of residence. The information was gathered from the Israeli Foreign Ministry, the National Insurance Institute of Israel, and Israeli newspapers *Ha'aretz* and *Ma'ariv*. The information was checked for accuracy against data from the Israeli Defense Forces (IDF). For further details about the terrorism chronology database, see (Berrebi, 2003).

<sup>11</sup> Further information about Hamas and PIJ can be found at the Public Safety Canada Web site.

<sup>12</sup> These data were collected and used under the supervision of Joshua Angrist. See Angrist (1995) for details.

<sup>13</sup> Terrorists who failed in their attack would most likely not be considered Shahid or be hailed; consequently, no biography was published on their behalf.

<sup>14</sup> A more recent study repeated this analysis on a more comprehensive dataset, which included failed attacks. It and reached similar qualitative, though quantitatively slightly weaker, results (Benmelech and Berrebi, 2007).

<sup>15</sup> See Berrebi (2007) for how an individual's economic status was inferred in each of the populations and a discussion of potential problems introduced by this method.

- <sup>16</sup> See Fearon and Laitin (2003), Collier and Hoeffler (1998, 2004), and Miguel, Satyanath, and Sergenti (2004) for examples of a positive link between civil wars, conflicts, and economic conditions.
- <sup>17</sup> To alleviate this problem, economists often construct specifications that include countries and years' fixed effects.
- <sup>18</sup> See Benmelech, Berrebi, and Klor (2008) for further details.
- <sup>19</sup> To interpret the word *religious* included in the second definition provided for *religion*, the reader is directed to the definition of *religious*, namely: "relating to or manifesting faithful devotion to an acknowledged ultimate reality or deity."
- <sup>20</sup> The four major religious faiths considered in this study were Islam, Christianity, Buddhism, and Hinduism.
- <sup>21</sup> Hoffman (2006) argues that the Tamil Tigers are best described as nationalist-separatist and that, despite its apparent secularism, the group operates more like a cult than a secular terrorist group.
- <sup>22</sup> See Bloom (2004, 2005) for a model of outbidding between terrorist factions.
- <sup>23</sup> See Bloom (2004, 2005).
- <sup>24</sup> This puzzle will be addressed later in this paper as a part of the discussion of rational choice.
- <sup>25</sup> These groups, arguably, constitute a greater threat to government than does the threat emanating from secular terrorist groups characterized by higher incidence of less-deadly attacks.
- <sup>26</sup> Including a significant share of suicide attackers.
- <sup>27</sup> Even when the cost is extremely high, such as giving up one's life.
- <sup>28</sup> In the past, arguments about ill-mindedness and irrationality were easily accepted by the media, professionals, and academics with respect to individuals who joined cults such as the International Society of Krishna Consciousness or the Bhagwan movement of Shree Rajneesh, only to be proven wrong later. The profile of the typical cultist ended up including normal background and circumstances, normal personalities and relationships, and a normal subsequent life (Iannaccone, 2006). We should make every effort to avoid falling into this "convenient" trap in the research of those who engage in terrorist activities.
- <sup>29</sup> Although the empirical evidence suggests that mental health is unlikely to predict involvement in terrorism, there is a possibility that sustained involvement with terrorism would cause detrimental effects to one's mental health. To that extent, long periods of involvement with terrorism could arguably lead to less than rational decisionmaking.

<sup>30</sup> The “rationality” described by rational-choice theory is different from the colloquial and most philosophical uses of rationality. For more on rational-choice theory, see Becker (1976).

<sup>31</sup> A utility function is a conceptual device for summarizing the factors that influence a person’s overall well-being. Rational people are assumed to maximize their utility subject to the constraints they face.

<sup>32</sup> Notably, this definition requires at minimum a consistency and transitivity of choice (that is, if I prefer A over B, and B over C, I must prefer A over C). Models of rational choice are diverse and exist in various forms, adding complexity and assumptions to this simplified definition.

<sup>33</sup> In economics jargon, this would be referred to as facing a negatively sloped demand curve.

<sup>34</sup> Caplan (2006) discusses different types of rationality and analysis with respect to terrorists.

<sup>35</sup> This form of utility function relaxes the need for strict individual self-interest, narrowly construed. An alternative way to partially reconcile selfishness, rational expectations, and rational-choice theory is through the theory of “rational irrationality” (Caplan, 2000). However, this approach suggests that volunteer suicide attackers are irrational (Caplan, 2006). Caplan’s “rational irrationality” should be distinguished from what Schelling (1966) calls “the rationality of irrationality,” in which an act that is seemingly irrational for individual attackers is meant to demonstrate credibility to a democratic audience that still more and greater attacks are sure to come.

<sup>36</sup> Alternative approaches have been suggested for dealing with irrational terrorists (for example, Caplan, 2006 and Wintrobe 2003).

<sup>37</sup> In many instances, tactical rationality could suffice to help us develop deterrence tools based on rational-choice behavior. For a discussion of operational rationality and resulting deterrability, see Davis and Jenkins (2002).

<sup>38</sup> Detailed descriptions of each terrorist event in our data enabled us to associate a latitude-longitude coordinate with each attack, which we incorporated into Geographic Information System (GIS) software for mapping and distance computations. Noncombatant military personnel who at the time of the incident are unarmed or not on duty were counted as civilians.

<sup>39</sup> A locality is defined as having a regional capital or a center of government administration if one or more of its cities or villages hosted an official bureau of the Israeli Ministry of Interior in 2004. See Berrebi and Lakdawalla (2007) for additional details about the data.

<sup>40</sup> For further details about the data and empirical estimations used in this study, see Benmelech and Berrebi (2007).

<sup>41</sup> By using the different regions in Spain that did not suffer from terrorism and constructing a weighted average comparison to the Basque region, Abadie and Gardeazabal (2003) effectively created a “synthetic control region” that mimics the Basque region in the absence of terrorism.

<sup>42</sup> It is interesting to note that companies related to the defense, security, or anti-terrorism industries economically benefit from terrorism (Berrebi and Klor, 2005, 2009).

<sup>43</sup> See Berrebi and Klor (2005, 2009) for further details about the matching methodology.

<sup>44</sup> Our analysis stops on September 10, 2001, since after that date, U.S.-traded companies are no longer valid controls for Israeli companies affected by terrorist attacks. To allow a comparison of the before and after Intifada effect, only companies traded both before and after September 28, 2000, were included.

<sup>45</sup> See Berrebi (2003) for details about the Israeli daily terrorist attacks data.

<sup>46</sup> These are the five publicly traded firms that have suffered the biggest cumulative losses according to Karolyi and Martell (2007).

<sup>47</sup> See Llussa and Tavares (2007) for a synopsis of studies that discuss the effect of terrorism on aggregate output. For an example of the economy adjusting its allocation of resources to the circumstances imposed by the event of terrorism, see Berrebi and Klor (2005, 2009).

<sup>48</sup> For a good discussion of small versus big effect views of the consequences of terrorism, see Krueger (2007). For a review of the cost of responding to terrorist threats see Treverton et al. (2008), Richardson, Gordon, and Moore (2007), and Jackson, Dixon, and Greenfield (2007).

<sup>49</sup> I distinguish between territorial goals and the more-inclusive category of political goals, which often comprise territorial ones.

<sup>50</sup> The examples are only that: partial and arbitrary. There was no intent to systematically review the universe of terrorist groups with territorial claims. That would be beyond the scope of this paper.

<sup>51</sup> For an English translation of Hamas’s charter, see Yale Law School (2009).

<sup>52</sup> For further details about Hizballah and its manifesto, see Wikipedia.

<sup>53</sup> One problem that arises when evaluating the success in achieving ultimate territorial goals is that, as long as a terrorist campaign is ongoing, it is impossible to confidently determine a failure. Rational expectation would be consistent if, on average, out of those terrorist organizations that ceased their terrorist activities, more achieved concessions than not.

<sup>54</sup> Pape conducted a follow-up study (Pape, 2005) that expanded and updated this analysis. The follow-up study adds more data on the global patterns of suicide terrorism through the end of 2003 and also tests the main hypotheses against all of the other causal factors that are prominent in the literature across several domains relying on methods that include variation between cases of suicide terrorism and cases without variation (Pape, 2008). The main findings remain unchanged.

<sup>55</sup> Abrahms (2004) recognizes that terrorists behave according to what I have termed tactical rationality, on several dimensions, including purposiveness, logic, timing, target selection, and learning. However, he based his irrationality argument on the inability of terrorists to achieve their ultimate stated political goals, such as furthering territorial concessions.

<sup>56</sup> Note that the article was written on the basis of the Palestinian terrorist's example before Israel's pull-out (that is, complete evacuation) of the Gaza Strip in 2005, and Hamas's de facto control of the Strip shortly thereafter. These events (considered major achievements to the terrorist organizations in pursuit of their objectives) put Abrahms's irrationality thesis into questions.

<sup>57</sup> "with a few exceptions it is hard to see that the attention and publicity have been of much value except as ends in themselves" (Schelling, 1991), p. 20.

<sup>58</sup> Brian M. Jenkins argues that al-Qaeda sees their cause as a process rather than as the efficient pursuit of concrete objectives "Allah will decide what outcomes will be, but the process of jihad is worthy" (Jenkins, 2006). This might explain the doggedness with which al-Qaeda and predecessor organizations have pursued their cause despite incredible setbacks. Some contrary evidence can be seen in recent recounting of discussions among al-Qaeda members and associates (Stout, Huckabay, and Schindler, 2008).

<sup>59</sup> For example, within the category of political goals, nationalist groups might seek autonomy or secession, whereas religious groups seek the replacement of secular with religious law, and social revolutionary groups seek to overthrow capitalism.

<sup>60</sup> A multitude of competing goals does not contradict stable preferences in the framework of a well-behaved utility function. For example, rational individuals can have preferences over money and leisure at the same time, despite the obvious trade-off between the two, and allocate their time to best achieve both).

<sup>61</sup> As we seek a probabilistic rather than a deterministic measure, the relevant measure in this context would rely on the appropriate weighted average of their goals given their preferences over differing and potentially competing goals and the a priori probability of achieving each. Notably, it is possible to observe seemingly inconsistent behavior over time because of changes in success probabilities while preferences remain stable.

<sup>62</sup> See Iannaccone (2006) for refutation of claims that cultists lack freedom of choice.

- <sup>63</sup> See Benmelech and Berrebi (2007) for supporting evidence to that effect.
- <sup>64</sup> Further limiting is in cases where the terrorist organization did not even exist during the time the individual had to invest in his education and therefore could not have influenced investment decisions with respect to aspired educational attainment.
- <sup>65</sup> See also a recent book (Gupta, 2008).
- <sup>66</sup> Arguably, it is impossible to empirically single out altruism from other potential factors. However, we should not dismiss a potentially valid explanation just because we lack the tools to empirically validate it.
- <sup>67</sup> As acknowledged by the authors this is an anomaly unsettled by their basic model.
- <sup>68</sup> For more details about the al-Aqsa Martyrs' Brigades, see Wikipedia.
- <sup>69</sup> For more details about the Kurdistan Workers' Party, see Wikipedia.
- <sup>70</sup> Economists, social scientists, and sociologists routinely treat social objectives as rational. As noted above, the definition of rationality in this chapter accords with this interpretation of rationality.
- <sup>71</sup> This study also challenges the notion that terrorists are rational actors who attack civilians for political ends. However, the political reality mostly contradicts the authors' interpretation of the terrorists' achievements, which leads me to believe that both political and social goals could be at work simultaneously.
- <sup>72</sup> "Terrorism" (2008).
- <sup>73</sup> See Krueger (2007) for empirical evidence to that effect.
- <sup>74</sup> For empirical support for the rational-behavior theory of voter participation, see, for example, Silberman and Durden (1975). Note that there is an ongoing debate with respect to the adequacy of rational-choice theory to explain voters' behavior and political parties' operations.
- <sup>75</sup> This assumes that terrorism is not only an extreme version of, but also a substitute for, peaceful political activism.
- <sup>76</sup> For a formal mathematical presentation of the game theoretical equilibrium results, along with further intuition, see Berrebi and Klor (2006).
- <sup>77</sup> For examples relating to the United States, see Davis and Silver (2004), Guilmar-tin (2004), and Shambaugh and Josiger (2004).
- <sup>78</sup> I have omitted objectives that I believed would not be feasibly quantified, such as revenge in response to immediate or long accumulated grievances. Such other objectives are likely to be important in and of themselves.

<sup>79</sup> For a contrast between rational-analytic methods for decisions and intuitive decisionmaking based on heuristics and suggested steps toward a synthesis, see Davis, Kulick, and Egner (2005).

<sup>80</sup> These findings contradict those of IDF's Brigadier General Ariyeh Shalev who, in his book on the first intifada (Shalev, 1991), examined the effect of house demolitions on the scope of violence and found that "House demolitions during the [first] Intifada revealed no correlation between the number of houses demolished and the number of violent incidents reported". Many have interpreted this to mean that ". . . the number of violent events did not diminish following house demolitions, and at times even rose." It should be noted that Shalev (1991) used seven data points and no formal analysis to reach his conclusion. Similar findings were reached in an internal IDF report on house demolitions during the al-Aqsa intifada (according to Harel and Isacharoff, 2006). I am unaware of any *empirical* analysis that supported this decision.

<sup>81</sup> It should be noted that "utility" was initially understood to include far more than just selfish materialistic self-interest (Mill, 1879).

<sup>82</sup> For a good example, see Intriligator and Brito (1988).