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## Evidence about the Link Between Education, Poverty and Terrorism among Palestinians

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## Abstract

This paper investigates the ways in which terrorism is linked to education and poverty using data newly culled from Hamas and Palestinian Islamic Jihad (PIJ) documentary sources. The paper presents a statistical analysis of the determinants of participation in terrorist activities by members of the Hamas and PIJ between the late 1980s and May 2002. The resulting evidence suggests that both higher education and standard of living are positively associated with participation in Hamas or PIJ and with becoming a suicide bomber, while being married significantly reduces the probability of participation in terrorist activities.

**KEYWORDS:** terrorism, poverty, education, Hamas, suicide bomber, suicide attacks

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## 1. Introduction

Many people in today's global society, including many of its most prominent leaders and academics, maintain that terrorist activity is the result of ignorance and/or poverty. As such, unless a more subtle mechanism is at play, we should expect individual terrorists to predominantly be impoverished or ill educated.<sup>1</sup> The analysis presented in this article was the first empirical investigation, at the micro level, to assess whether individual terrorists could be linked to destitution and lack of education.<sup>2</sup> Specifically, I examine correlates of Palestinian terrorists, member of Hamas and Palestinian Islamic Jihad (PIJ) who died while attacking Israeli targets, and comparable Palestinian micro population data. The results of this analysis are surprising and might be perceived as counterintuitive.

### *What Is the Common Belief?*

Common sense might suggest that individuals who have "nothing to lose" (or comparatively less to lose) would be more likely to engage in self-destructive activities. Such conventional wisdom could follow directly from the traditional economic theory of crime (Becker, 1968)<sup>3</sup> or from the economic theory of suicide (Hamermesh and Soss, 1974).<sup>4</sup> Similarly, it is possible to rationally explain participation in terrorist groups using the economics of religious sects (Berman, 2000, 2003). A common underlying feature of these approaches is that terrorism should have a greater appeal to those with lesser marketable options. In other words, people with fewer opportunities in the legal or secular world are expected to be more likely to commit crimes, commit suicide, or join religious sects.<sup>5</sup> Since terrorism is often explained through a similar rationale, the intuitive expectation is for terrorist organizations to be populated with those individuals who have the lowest market opportunities.

This conventional wisdom has been adopted by public officials from President George W. Bush to many other government representatives and political figures

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<sup>1</sup> Examples of theories proposing that poverty furthers terrorist activity even when terrorists are disproportionately highly educated or wealthy include Becker (2005), Bueno de Mequita (2005) and Iannaccone (2006).

<sup>2</sup> An early version of this article was posted as a Princeton working paper in 2003; other analyses of this type have since appeared.

<sup>3</sup> The conventional wisdom follows despite the fact that in most variants of the Beckerian model one cannot determine the relationship between criminal participation and the variables of interest without suitable assumptions with regard to the individual's risk aversion.

<sup>4</sup> If we believe that the dynamic that brings suicide-bombers to volunteer for suicide-attacks is comparable with what brings individuals to end their lives in a suicidal way.

<sup>5</sup> Berman (2003), however, specifically raises the possibility that activist will not be disproportionately poor as long as the supply of willing, potentially wealthy and educated, disaffected individuals is large enough.

on both sides of the aisle, and it appears to form the basis for some of their policies.<sup>6</sup> For example, in a 2002 discussion regarding the motivations of terrorists, then-Secretary of State Colin L. Powell declared:

I fully believe that the root cause of terrorism does come from situations where there is poverty, where there is ignorance, where people see no hope in their lives (U.S. Department of State 2002).

This belief is neither new nor limited to US officials,<sup>7</sup> to the contrary it is held by many prominent scientists and researchers.<sup>8</sup>

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<sup>6</sup> President George W. Bush, in a speech on the closing day of a five-day U.N. conference on poverty in Monterey, Mexico on March 22, 2002 declared: “We fight against poverty because hope is an answer to terror. . . . We will challenge the poverty and hopelessness and lack of education and failed governments that too often allow conditions that terrorists can seize and try to turn to their advantage.” (White House 2002)

Former United States Vice President Al Gore told the Council on Foreign Relations in New York on February 12, 2002 “For there is another Axis of Evil in the world: poverty and ignorance; disease and environmental disorder; corruption and political oppression. We may well put down terror in its present manifestations. But if we do not attend to the larger fundamentals as well, then the ground is fertile and has been seeded for the next generation of those born to hate us. . . .” (Gore, 2002)

Deputy Secretary Of The Treasury Kenneth Dam on CBS News in Islamabad, Pakistan on February 5, 2002: “Fighting the root causes of terrorism, poverty, and hopelessness is as important as fighting terrorism directly.” (“Blocking Terror’s Funds,” 2002).

<sup>7</sup> Then-U.S. President William J. Clinton, in a speech to the Jordanian Parliament in October 1994, said, “On one side stand the forces of terror and extremism, who cloak themselves in the rhetoric of religion and nationalism....These forces of reaction feed on disillusionment, on poverty, on despair.” (“We Will Not Let You Down” 1994).

Edward Djerejian, a top US diplomat and former U.S. ambassador to Syria (1988–1991) and to Israel (1993–1994), said, “Experience suggests to us that political Islamic movements are to an important degree rooted in worsening socio-economic conditions in individual countries.” (U.S. House of Representatives, 1993, p. 91).

British Prime Minister Tony Blair in a speech at the Lord Mayor’s banquet, Tuesday, November 13, 2001, said, “The dragon’s teeth [of terrorism and terrorists] are planted in the fertile soil of . . . poverty and deprivation.” (“Full Text of Blair’s Speech,” 2001).

The *Jordan Times* on September 21–22, 2001, “Elaborating on the causes of terrorism, [Jordanian Prime Minister Ali Abul Ragheb] cited political, economic and social conditions, including poverty, ignorance and frustration (“PM Addresses the Senate,” 2001).

Shimon Peres, former Israeli Prime Minister, said, at a Briefing to UN Ambassadors and Senior UN officials at the United Nations in New York on May 30, 1995, “We have to address ourselves to the young generation and to education, so that neither poverty nor ignorance will continue to feed fundamentalism, poverty, disillusion and hatred.” (“FM Peres Briefing to UN Ambassadors and Senior UN Officials,” 1995).

Terje Roed-Larsen, United Nations special coordinator, according to the August-September 2001 edition of the *Washington Report on Middle East Affairs*, summed up his speech at the International Media Encounter on the Question of Palestine on June 19th by warning that “Poverty breeds hate . . . and hate breeds violence.” (Hanley, 2001).

### *Countervailing Evidence*

Some have started to doubt, mainly on the basis of anecdotal evidence, the conventional wisdom about terrorists being predominantly poor and ignorant. There is, of course, the well-known example of Osama Bin Laden, a man of impressive wealth and fine education. More tellingly, 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.

An intriguing publication by Hassan (2001) also suggested that economic incentives probably cannot explain terrorist activity. In an article summarizing her interviews of nearly 250 terrorists and associates of terrorists (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.

Sound empirical conclusions cannot, of course, be reached on the basis of anecdotal evidences. However, the empirical evidence collected so far gives little reason to believe that individuals' materialistic or educational improvements

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<sup>8</sup> At a gathering of Nobel Peace Prize laureates in Oslo, Norway, in December 2001, 1986 Nobel Peace Prize recipient Elie Wiesel said, "Education is the way to eliminate terrorism" (Jai, 2001). At that same gathering, 2000 Nobel Peace Prize recipient and president of South Korea Kim Dae-Jung said, "At the bottom of terrorism is poverty. That is the main cause" (Jai, 2001). Jessica Stern, lecturer on terrorism at the John F. Kennedy School of Government at Harvard University and the author of *The Ultimate Terrorists* (Harvard University Press, 1999), wrote on September 15, 2001. "We have a stake in the welfare of other peoples and need to devote a much higher priority to health, education, and economic development, or new Osamas will continue to arise" (Stern, 2001). John O. McGinnis of the Federalist Society for Law and Public Policy Studies wrote, "Ignorance and poverty are the greatest friends of the terrorist, because the ignorant and impoverished are easy prey for the conspiracy theories and millennial religious visions that are the staples of the Islamic fanatics" (McGinnis, 2003). The BBC reported James Wolfensohn, former president of the World Bank, as saying that "rich countries must build on the global war against terrorism by launching a new war on poverty" (Schifferes, 2002).

would help reduce individuals' desire to participate in terrorist activities. If anything, the findings suggests that those with higher educational attainment and higher living standards are *more* likely to participate in terrorist activity. For example, Russell and Miller (1983) attempted to draw a sociological profile of the modern urban terrorist, based on a compilation of more than 350 individual 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 postgraduate students. (p.55)

Hudson and Majeska (1999) reinforced this in a report 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 doctors, bankers, lawyers, engineers, journalists, university professors, and mid-level government executives.

Previous research, however, was drawn on unrepresentative samples of terrorists, mainly famous leaders.<sup>9</sup> The need for careful research examining the relationship between poverty, education, and terrorism is evident. The groundwork for such further research began with the work by Krueger and Maleckova (2003), who investigate the link between poverty and low education and participation in terrorist activity. Using biographical data of 129 Hizbollah members killed in paramilitary actions in the late 1980's and early 1990's, they found that both having a standard of living above the poverty line and having a secondary-school education or higher are *positively* associated with participation in Hizbollah.<sup>10</sup> This research clearly puts into doubt the common beliefs held by politicians and policymakers that suggest eradication of poverty or improved educational attainment as a means of *directly* fighting terrorism.

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<sup>9</sup> We should expect the educational attainment and wealth of leaders in any complex organization to be higher than that of its members.

<sup>10</sup> Kueger and Maleckova (2003) cite the main findings of this article's earlier working version (Berrebi 2003) to further substantiate their argument.

### *The Current Study*

It is important to test whether the Krueger and Maleckova (2003) results were specific to Hizbollah, Lebanon and the tumultuous civil war there or whether they can be generalized to other terrorist groups, areas, and time periods. In particular, this article, as noted by Krueger and Maleckova, provides the necessary micro data analysis of the Palestinian terrorist arena. The data used to investigate the link between terrorism and individual income and education were collected from biographies of deceased Hamas and PIJ terrorists and combined with population survey micro data. Logistic probability models were used to reach statistical inferences.

The article continues with a definition of terrorism and a brief description of the terrorist organizations analyzed. The third section provides theoretical considerations for the relationship between education and income and terrorism. A description of the data makes up section 4. The fifth section describes the statistical analysis used to measure the correlates of participation in Hamas and PIJ terrorist activities. The results of the study are presented in section 6, and discussed in the seventh section. The eighth section concludes the article.

## **2. Terrorism and Terror Organizations**

### *Definition of Terrorism*

Definitions of terrorism vary widely, and it is therefore difficult, if not impossible, to find a single definition that covers all aspects of terrorism as they exist in today's world. A certain event can be defined as an act of terror in the views of one country and at the same time be defined as a "fight for freedom" by another.

I have chosen to use the definition used by the US State Department, which is contained in Title 22 of the United States Code, Section 2656f(d):

The term 'terrorism' means premeditated, politically motivated violence perpetrated against noncombatant<sup>11</sup> targets by subnational groups or clandestine agents, usually intended to influence an audience.<sup>12</sup>

Relying on the US State Department definition of terrorism makes it possible to exploit the Department's identification of contemporary terrorist groups conforming to the definition. Hamas and PIJ are currently designated by the US

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<sup>11</sup> For purposes of this definition, the term "noncombatant" is interpreted to include, in addition to civilians, military personnel who at the time of the incident are unarmed and/or not on duty. . . . We also consider as acts of terrorism attacks on military installations or on armed military personnel when a state of military hostilities does not exist at the site.

<sup>12</sup> Footnote in the original. The U.S. government has employed this definition of terrorism for statistical and analytical purposes since 1983.

Secretary of State as Foreign Terrorist Organizations. However, most other definitions used in the literature would label Hamas and PIJ militant activities as *terrorist activities*. It is important to remember that, in this article, *terrorist* and *terrorists* do not necessarily refer to everyone within a terrorist organization, but to activists or operators who personally carry out a group's terrorism strategy and their leaders.

### *Hamas*

Hamas, a word meaning 'courage' and 'bravery,' is also a short form in Arabic for *Harakat al-Muqawamah al-Islamiyya*—meaning "the Islamic resistance movement." Hamas is a radical Islamic organization and since January 2006 the elected political party that forms the Palestinian National Authority (PNA) government.<sup>13</sup>

In 1978 the organization registered as an Islamic non-profit organization led by Sheik Ahmad Yassin.<sup>14</sup> Initially, Hamas' activities mainly involved spreading religious propaganda and doing social work, financed by Islamic supporters around the world.

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>15</sup> Hamas stepped up its terrorist activities in stages. Initially, it was only involved in disturbances and strikes; later it began the assassination of what it defined as "collaborators with Israel." It moved on to kidnapping and killing Israeli soldiers, then to knife attacks against soldiers and civilians, and finally to shootings, bombings, and suicide attacks in every place Israelis could be reached. Hamas has taken responsibility for the deaths of more than 500 Israeli civilians and soldiers in addition to thousands of injuries.<sup>16</sup>

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<sup>13</sup> To this day Hamas abides to its covenant and maintains that they are not willing to forgo violence as a mean of struggle, will not accept past agreements between Israel and the Palestinian Authority, and will never recognize Israel's right to exist.

<sup>14</sup> The registered organization's initial name was *Al-Mujamma Al Islami*.

<sup>15</sup> *Jihad* has multiple interpretations including that of internal and personal struggle rather than holy war. In the context of this article, I use *Jihad* only to mean waging a war that could result in fatalities and physical injuries.

<sup>16</sup> The source for the number of deaths and injuries caused by each organization comes from a terrorism chronology 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

### *Palestinian Islamic Jihad (PIJ)*

Although there are many extremist groups using the name Islamic Jihad, the Palestinian Islamic Jihad (PIJ) is the best known. PIJ calls for an armed Islamic war against Israel in order to free Palestine and create an Islamic state instead of Israel. Palestinian Islamic Jihad is a translation from Arabic for *Harakat al-Jihad al-Islami al-Filastini*, which literally means “Movement for holy war to Palestine.” During its existence, PIJ has claimed responsibility for over 150 Israeli deaths and more than 1,000 injuries.<sup>17</sup>

### 3. Theoretical considerations

Economic incentive considerations following Becker (1968) suggest that people with higher education and higher income have more at stake (or more to lose) when taking part in criminal activities than other people do. Such individuals, when choosing how to allocate their time between legal and illegal activities to maximize their utility, will presumably find better (and less risky) alternatives and would therefore have fewer reasons to join groups with tightly controlled membership. A simplified summary of the equilibrium described in Berman (2003) would suggest that highly paid individuals are less likely to be impressed by “club goods” and are therefore less likely to make sacrifices to join exclusive organizations.<sup>18</sup> Furthermore, increased knowledge (a probable result of additional education) may provide better reasoning skills, which might deter potential terrorists from engaging in militant activities.

Conversely, what could motivate more educated and wealthier individuals to disproportionately participate in terrorist activity, and, if no motivations are apparent, what else could explain empirical findings to that effect? Here, I present some possibilities, which must remain speculative at this point. It should be kept in mind that economic theory does not even stipulate whether education and income are *linked* to terrorist activities (as distinct from other criminal enterprises).

First, educational attainment may potentiate terrorist activity, or be potentiated by it, in several ways. Educational content that advocates particular political or religious messages may increase an individual’s propensity to join terrorist

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accuracy with data from the Israeli Defense Forces (IDF). For further details about the terrorism chronology database see the working version of this article (Berrebi 2003).

<sup>17</sup> Ibid 16. Further information about Hamas and PIJ can be found at the Institute for Counter-Terrorism (<http://www.ict.org.il/>).

<sup>18</sup> *Club goods* are local public goods that are excludable. In particular, non-members can be restricted from consuming them.

organizations and participate in terrorist activity.<sup>19</sup> In particular, if much of the education is religious, then it might on one hand encourage radical thought while only on the margin increase productive opportunities in the labor market.

Improved reasoning skills may lead to involvement in terrorist organizations because individuals with more education may be better equipped to understand moral and religious justifications invoked by such groups.<sup>20</sup> Highly educated individuals may be more aware of occasional instances of injustice and discrimination, and may be more aggravated by their implications; that aggravation might be channeled into membership in terrorist organizations and participation in terrorist activities. Similarly, education may contribute to the development of a sense of social responsibility and civic engagement, so that highly educated individuals may feel the need to contribute to particular causes. If an individual is a proponent of a belief that is primarily advocated via terrorism, further education might increase his likelihood to engage in terrorist activities.<sup>21</sup>

The causality could also be reversed, so that individuals initially interested in joining terrorist organizations might be more likely to get more education in an attempt to become an active terrorist. This would be especially plausible if education improves performance in terrorist organizations and in the implementation of terror activities. It would also be plausible if terrorist activities required some maturity achieved by further education.<sup>22</sup>

Second, terrorism may be a response to limited opportunities, but not in the way conventionally imagined. For example, terrorist organizations might attract highly successful (and, most likely, highly educated) individuals that are otherwise well qualified but cannot succeed in the non-terrorism marketplace because of, for example, their heritage or social standing. (this would especially be true in non-democratic societies). Or, increased grievances might be suffered by wealthy individuals who might come across barriers and restrictions that poorer individuals don't even know exist (e.g., in governmental paperwork, access to financial markets, and commercial spheres). It could also be that during times of rebellion such as in the first and second intifadas, highly educated individuals would be particularly frustrated by the loss of economic opportunities

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<sup>19</sup> An extreme example would be educational content that advocate hatred, racism and militancy.

<sup>20</sup> Note however, that the same argument can be used to hypothesize that individuals with more education would recognize that there are other means available than terrorism like protests, strikes, or appeals to the media, and would thus abstain from terrorist activities.

<sup>21</sup> In their article Gleaser, Ponzetto and Shleifer (2006) present a model and supporting evidence that suggest a relationship between education and participation across activities and across countries.

<sup>22</sup> Benmelech and Berrebi (2007) provide evidence to that effect.

and the alternative economic cost of their risking arrest or worse would be lower.<sup>23</sup>

Third, differential participation of wealthier or better-educated individuals in terrorist activities may not be a matter of differential motivation so much as choice on the part of terrorist organizations. 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 even though, on average, the education of those willing to join such organizations may be no greater than average.<sup>24</sup>

Wealth could also attract terrorist organizations or serve as an enabler of participation. Acts of terror may require the investment of personal capital, for example, when weapons are not provided by terrorist organizations and must be acquired on the expensive black market. In such cases, the wealthier of two equally motivated individuals may be chosen by the organization or may be the only one able to act on his desires.

Finally, poorer individuals could be more preoccupied with daily matters, such as providing for their families, and end up devoting less attention to militant struggles.

To conclude, it cannot be dismissed a priori that wealthy and educated individuals would be more inclined to participate in terrorist activity. Whether this is the case or not, and to what extent, are empirical questions that this article intends to answer.

#### 4. Data and Sample

##### *A. Terrorists' Biographical Data and Their Counterfactual Population Survey Data*

I have been able to translate and collect 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 websites and Online Journals of Hamas, Palestinian Islamic Jihad (PIJ).<sup>25</sup> The other 50 were from a PIJ publication containing the biographies

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<sup>23</sup> See Angrist (1995) for further details on the effect of the first intifada on the Palestinian job market.

<sup>24</sup> Similar arguments have been proposed by Krueger and Maleckova (2003), Bueno de Mesquita (2005), Becker (2005) and Iannaccone (2006).

<sup>25</sup> Hamas's website <http://www.palestine-info.net/arabic/hamas/shuhda/shuhda.htm> later replaced with <http://www.palestine-info.info/arabic/hamas/shuhda/shuhda.htm> Hamas's military wing (*Iz Al Din Al Qassam*) online journal describes its "Martyrs" on websites numbered from [http://www.qassam.org/shohadaa/shohadaa\\_1990/photo\\_1990/1990.htm](http://www.qassam.org/shohadaa/shohadaa_1990/photo_1990/1990.htm) to

of 50 PIJ leaders who were part of a group of 417 leaders and foot soldiers of terror groups that Israel expelled to Lebanon on December 17, 1992.<sup>26</sup> The guiding objective in the data collection procedure was to establish the largest data base possible of Palestinians who belonged to Hamas or PIJ and participated in terrorist activities, with enough detail to allow the later comparison of a representative sample with a sample of Palestinian counterfactuals, i.e., Palestinians similar in as many ways as possible except that they had not participated in terrorism.

Altogether, the data consists of observations taken from the available biographies with the following breakdown:

- 183 *Shahids* of Hamas
- 103 *Shahids* of PIJ, one of whom was also a Hamas member
- 50 leaders of PIJ.

In 319 of the 335 cases, the date of the biography could be determined either because it corresponded to the date of death of the *Shahid* or because the terrorist was expelled to Lebanon on a known date. The date of the biography puts a “timestamp” on the data, which range from 1987 to 2002.<sup>27</sup> In the cases for which the date is known, 35 percent (111) occurred between 1992 and 1995 and 57 percent (183) occurred between 2000 and 2002.

For 171 observations, it could be determined whether or not the death was the result of a planned attack. Of those, 89 percent (152) were from planned attacks and 11 percent (19) were not. Out of the planned attacks, 39 percent, or 66, were suicide attacks—43 by Hamas members, 22 by PIJ members, and one by a member of both organizations. Cases where the attack was not planned include actions initiated by the Israeli Defense Forces (IDF) and attacks carried out resisting arrest or after arrest. In the cases where it was clear that the *Shahid's* death was the result of an IDF extra-judicial execution (a.k.a targeted assassination) or in the remaining cases in which information about whether the attack was planned or not was absent the *Shahid* was included in the analysis only if his biography indicated previous terror attacks. In addition, 95 of the

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[http://www.qassam.org/shohadaa/shohadaa\\_2002/photo\\_2002/2002.htm](http://www.qassam.org/shohadaa/shohadaa_2002/photo_2002/2002.htm) for the respective years, and on Hamas's Al Qassam shuhada memorial association <http://www.sabiroon.org/>.

Palestinian Islamic Jihad's online journal <http://www.qudsway.com/>, their website (“Jihad Islami”) <http://www.jihadonline.org/> and <http://www.shuhadaa.com/>. see Berrebi (2003) for the entire list of sources.

<sup>26</sup> The analysis was repeated without the terrorist organizations' leaders and solely including premeditated attacks. The results were similar and are discussed below.

<sup>27</sup> The first biography is dated October 6, 1987, and the latest biography I have included in the data set is dated May 6, 2002. I have continued to collect biographies since, but more recent biographies await translation.

observations included information about the existence or non-existence of a will; approximately 93 percent of those (88) included a will showing that the *Shahid* knew his death was near.

Out of the 335 biographies, 114 gave specific details on whether or not the individual participated in one or more previous attacks. Of those 114, 96 percent (109) participated in previous terror attacks, leaving only five biographies indicating clearly that the *Shahid* had no prior terrorist activity. Also, out of the 173 cases in which it was known whether or not the individual had been arrested for participating in terrorist activity, 91 percent (158) had been arrested previously.

All available biographies are of males, of whom 32 percent (106) were married and 39 percent (132) were single, and there was no information for the remaining 29 percent (97). The biographies describe men covering a very wide spectrum of professions, from doctors to teachers to unskilled workers, as well as full-time employees of terror organizations, i.e., Hamas and PIJ.<sup>28</sup>

It is possible to tell from the biographies whether the individual lived in an urban or rural area, and, for 306 cases, the place of birth is known. Out of the 284 for which both place and year of birth are known, 25 percent (71) were born while the territories were under Jordanian rule (West Bank) or Egyptian Rule (Gaza Strip), and 75 percent (213) were born after the territories were under Israeli rule.

Age of the terrorists was either directly indicated in the biographies as the age of death (for those who died), the age at expelling time (for those that were expelled to Lebanon), or computed from the date of publication and the date of birth, when available. Age at or just prior to the time of publication was known or possible to compute for 296 of the terrorist biographies.

In 215 biographies the terrorist's religion was either clearly indicated or could be deduced indirectly from the information, and in all cases, the individual was Muslim. It is reasonable to assume that the others were Muslims as well, given the self definition of Hamas and PIJ as religious resistance organizations. In addition, 165 biographies described some kind of religious studies.<sup>29</sup>

Inferring poverty status presented more of a challenge. Although some biographies clearly implied an individual's poverty status in statements such as "he lived in poverty" or "he was a wealthy man," this was not the case for most observations. When possible, poverty status was inferred from available information such as the individual's occupation, foreign travel history (e.g., traveled abroad), car ownership, or computer availability. For example, one biography mentioned that the individual dropped out of college due to financial

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<sup>28</sup> Employment by terrorist organizations was later excluded from analyses of labor force participation and unemployment.

<sup>29</sup> Field of studies couldn't be analyzed since it wasn't available for the survey data comparison group.

burdens; another biography mentioned that the individual owned a new car that he used for weapon smuggling. I classified the former as poor while not the latter. In other cases I relied on family background descriptions, such as parents' occupations, to infer poverty status. For example, one biography described the financial dependency of the individual's family on charity networks, since his father was sick and couldn't afford paying the medical bills; another biography mentioned that the individual's family owned a successful luggage factory and that the father was one of the wealthiest businesspeople in the area. Once again, I classified the former as poor but not the latter. Poverty status information could be inferred for approximately 69 percent (230) of all cases.

One of the advantages in using the method of data collection from reports about *Shahids* derives from the fact that reporting about the *Shahid* is a divine obligation, and according to Islam it is considered a sin if one does not hail a *Shahid*.<sup>30</sup> As a result, it is probably safe to assume that all of the militants from these religious terrorist organizations who died were profiled in one way or another. Therefore, by collecting the data from the organizations' own publications and newspapers, some information should exist for each and every *Shahid* that belonged to the organizations.<sup>31</sup> As such it is safe to assume the data to be representative of religious Palestinian terrorists who participate in terrorist attacks. To further reassure us, the total numbers of successful (i.e. fatal) attacks perpetrated by Hamas and PIJ during the time period analyzed in this article are 85 and 35 respectively.<sup>32</sup> Since most attacks are perpetrated by groups of two or three on-the-ground operatives, the 285 *Shahid* biographies represent a sample which probably corresponds closely to the total number of Hamas and PIJ terrorists who died in fatal attacks during that period.

Obtaining data on the general population in the West Bank<sup>33</sup> and Gaza Strip for the relevant period proved to be difficult as well, since these areas were divided and partially controlled by different noncoordinating authorities at different periods. The latest relevant reliable and organized data available, which samples from all residents of West Bank and Gaza living in households, excluding Israeli residents living in these areas, were for 1993 from Israel's "Labor Force Surveys in Judea, Samaria and Gaza" (ISDC 1995).<sup>34</sup> The sampling

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<sup>30</sup> Ergun Mehmet Caner, professor of theology and church history at Criswell College in Dallas and co-author of *Unveiling Islam: An Insider's Look at Muslim Life and beliefs* (Kregel Publications, 2002), used a similar argument when asked if he was sure that Osama Bin Laden was still alive after the U.S. bombings in Afghanistan.

<sup>31</sup> Although biographies probably exist for every *Shahid*, many did not contain relevant information that could be used for statistical analysis.

<sup>32</sup> Ibid 16.

<sup>33</sup> Israel officially calls these Judea and Samaria.

<sup>34</sup> This data was used and collected under the supervision of Joshua Angrist. *see* Angrist (1995) for details. The Palestinian Central Bureau of Statistics (PCBS) collected later data (e.g. the 1997

methods and definitions used in this Survey are similar to those used in the Israeli Labor Force Surveys of Israel itself.

This survey of households in the West Bank and Gaza Strip (WBGS) was continually conducted by the Central Bureau of Statistics from August 1968 to September 1995. On each occasion, the survey consisted of two investigations during two consecutive quarters and, after a break of two quarters, two additional investigations. The household questionnaire contained details of household composition and dwelling. The personal questionnaire (answered by people aged 15 and over) included basic demographic as well as labor force characteristics and job location (in Israel or in the WBGS, and wages of workers).

Due to the events of the 1st Intifada in the WBGS area from the end of 1987 through 1991, enumeration suffered from difficulties of coverage as well as from fewer quality responses. Also, beginning with the April–June 1994 Survey, the data did not contain population figures from the autonomous areas of Gaza and Jericho (i.e. a significant part of the area relevant for a comparison group has been under PNA control since 1994). I thus took the 1993 survey as the basis for constructing a comparison group. This decision was supported by the facts that more than a third of the Hamas and PIJ biographies with known publication dates were from the 1992–95 period and 96 percent (293) of the 306 individuals for whom place of residence was known resided in the WBGS. Another advantage of using the “Labor Force Surveys in Judea, Samaria and Gaza” is the size of the 1993 survey sample (99,193 unique observations). (Because the sample of terrorists contained only Muslim males between 15 and 56 years old, I restricted the survey sample to these 41,762 Muslim males between the ages of 15 and 56 as well.)

The use of comparison data older than most of the *Shahid* data raises the possibility of bias because of demographic changes over time. However, in the past decade, the income levels of the inhabitants of the WBGS deteriorated due to political and security reasons caused by the ongoing conflict in the region. Therefore, the use of comparison group data from 1993 instead of more recent data may, if anything, under-represent the poor in the population.

It was not evident a priori that educational attainment did not rise in the last few years, something that, if true, would make the use of comparison group data from 1993 inappropriate. A comparison was then performed between the educational distribution of the Palestinian population in the relevant ages obtained from the 1993 survey sample and the distribution obtained from a survey collected by the Palestinian Center for Policy and Survey Research (PCPSR) from

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census). However, following PCBS’ recommendations, this data should not be used in comparison with previously collected data due to methodological differences in collection. More importantly, the data collected by the PCBS include only those areas under Palestinian Authority control at the time the survey was administrated.

December 19 to 24, 2001.<sup>35</sup> The comparison indicated that, if anything, educational attainment was lower in 2001 than in 1993.<sup>36</sup> Therefore, once again, the use of comparison group data from 1993 instead of more recent data may, if anything, under-represent the less educated in the population.

The following potential problems with the terrorist biographical data and the survey data are worth emphasizing:

- There is no indication in the “Labor Force Surveys in Judea, Samaria and Gaza” of whether an individual is also engaged in Hamas or PIJ terrorist activities. However, I estimate the Hamas and PIJ active militants to represent less than 1 in 1,000 people and suicide-bombers to represent less than 1 in 100,000 people in the relevant gender, age, and religious group of the population. I thus ignore the fact that, in principle, some individuals of the survey sample may have belonged to those terrorist groups as well.
- Most of the deceased terrorists died during a planned terrorist attack on their part; however, some died due to Israeli targeted assassinations. Since targeted terrorists are presumably of higher rank, and thus higher income and/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, all tests were repeated using only the 157 observations in which it was clear from the biography that the attack was premeditated. The results remained identical in signs and statistically significant.
- Because of the division of labor within any organization, different activities are assigned according to one’s rank. Assuming that lower ranking terrorists are assigned riskier tasks, it is probable that the share of low ranked operatives within the set of deceased is larger than their share in the organization. If so, my sample would under-represent the number of highly educated terrorists from middle or upper income families.
- However, within the subset of terrorists that are assigned riskier tasks, the data include only hailed “martyrs.” As such, they had to be dead and had to be able to have successfully executed their mission, so failed or caught terrorists are not included in the data.<sup>37</sup> Since successful terrorists are presumably abler terrorists, I might be missing relevant observations.<sup>38</sup>

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<sup>35</sup> The questionnaire and aggregate results are available from the Palestinian Center for Policy and Survey Research (2001). The breakdown of these data by educational level was provided by Alan Krueger, Professor of Economics at Princeton University.

<sup>36</sup> The comparison is presented in the Appendix.

<sup>37</sup> Terrorists who failed in their attack would most likely not be considered *Shahid*, nor be hailed, and consequently, no biography was published on their behalf.

<sup>38</sup> The absence of these data should be born in mind as a limitation of the data at my disposal.

- Biographies might be subject to reporting bias. One might suspect that, since these biographies are intended to hail the deceased, they would refrain from publishing information that might be considered unflattering or humiliating. In fact, the suspicions increase when one reads the many lengthy descriptions of the deceased's devotion to the religion and to the cause, which never mention the possible doubts in the goals or the means that they employed. Also, the clearly exaggerated glorifications indicating the bravery of the deceased add to the suspicion of reporting bias. It is not clear, however, whether descriptions of one's wealth would be exaggerated in a society in which being poor is associated with humility. In fact, in biographies in which poverty is mentioned, it is clearly emphasized with pride. Some biographies, however, indicated wealth with pride, suggesting that it was associated with a position of respect for the deceased and his family. If anything, it seems that extremes on both sides might be overrepresented, since average wealth or income might not add to the glorification and commemoration process. To overcome this problem, one would ideally want to have another, independent source of reporting for comparison. To the best of my knowledge, no additional unclassified sources exist. In the only case where an individual's biography was reported by both Hamas and PIJ, the articles tended to be in agreement.
- Education was not always explicitly mentioned in the biographies; in some cases, it had to be inferred. For example, I used the type of last school attended or the highest degree achieved in order to infer the number of years of schooling. Thus, the *Shahid* educational data are not as accurately measured as the comparison data are.
- Potentially the most significant problem is the fact that in most cases poverty status of terrorists was inferred from descriptors indicating wealth. However, the population survey data did not give any information on the individual's (or the family's) accumulated wealth. In the absence of such information, monthly wage was used to determine poverty status in the population survey. On the one hand, the measures are not perfect substitutes, but on the other hand, we know from theoretical works (Danforth, 1979) as well as empirical evidence (Bloemen and Stancanelli, 2001) that higher levels of wealth result in higher reservation wages, thus higher wages for the ones employed. Moreover, the criteria for being considered poor in the population survey have been tightened in an attempt to 'bend the curve backward,' so as to more closely match my treatment of the *Shahids*, whom I regard as above poverty only when the biography indicated possessions or a standard of living that would not be possible when destitute. Accordingly, only individuals with extremely low

wages were considered poor in the survey population.<sup>39</sup> The cutoff point was set at the point low enough that someone earning such a wage could not possibly afford to maintain the assets possessed by the above-poverty terrorists. For example, owning a car would not be possible due to maintenance costs alone, travels abroad would be out of reach, etc. Additional exogenous information, such as the very limited fraction of the population that has access to a car (approximately 20 percent) or a computer (approximately 4 percent) (Palestinian Central Bureau of Statistics, 1997), would suggest that, when comparing to the terrorists' data, the percentage of above-poverty individuals in the comparison population has been overestimated. In fact, the level of poverty I obtained from the population survey data (31 percent) is significantly lower than that given in other estimates.<sup>40</sup>

Despite the limitations of the data, none of the preceding problems gives rise to an obvious bias, and in the absence of better data I believe the collected sample of terrorists and the counterfactual survey data to be adequate for the analysis of the characteristics of individuals engaged in Hamas and PIJ terrorist activities.

## 5. Estimation Strategies

As previously discussed, the main objective of this article is to incorporate covariates and estimate the correlates of participation in Palestinian terrorist (Hamas and PIJ) activities in general as well as the correlates of becoming a Hamas or PIJ suicide-bomber, in particular. Preliminary tabulations of demographic characteristics broken down by the groups of interest (i.e., terrorists or suicide-bombers versus the general population) suggest that there are differences between the general population and the terrorist sample.

A chi-square test performed on each of the relevant characteristics tested the null hypothesis that the characteristic is independent of terrorist status. For the multivariate analysis that controls for other characteristics, I used a logistic probability model. Specifically, I model the effect of suspected variables of influence (i.e. schooling and poverty status) on the outcome ( $y_i$ ) as:

$$Prob(y_i=1) = \frac{\exp(x_i\beta_1 + schooling_i\beta_2 + poverty_i\beta_3)}{1 + \exp(x_i\beta_1 + schooling_i\beta_2 + poverty_i\beta_3)}$$

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<sup>39</sup> To be categorized as poor, one had to earn less than 40 percent of the Israeli minimum wage, which is approximately equal to 18 percent of the Israeli average wage.

<sup>40</sup> In its January 2003 report, Christian Aid stated that "almost three-quarters of Palestinians now live on less than US\$2 a day—below the official UN poverty line" (Christian Aid, 2003).

where  $y_i$  is a discrete variable that equals 1 if the outcome is positive (e.g., if the individual participated in Hamas or PIJ terrorist activities), and equals 0 otherwise;  $x_i$  is a vector of additional potentially important characteristics such as age, marital status, place of residence, and employment status.<sup>41</sup> The coefficients  $\beta_2$  and  $\beta_3$  would then be the logistic estimates of schooling and poverty status, respectively, on the dependent variable. From these coefficients, the slope (marginal effect) can be easily calculated. However, this setup presents a classic problem of choice-based sampling, because the terrorists were selected for inclusion in the sample on the basis that the dependent variable of the logistic equation equals one. Consequently, the sample does not constitute a random sample and the estimates will generally be inconsistent (Manski and Lerner, 1977). Weighting the data by the ratio of the estimated relative frequencies of the subject groups in the population to their relative frequencies in the sample yield consistent estimates.<sup>42</sup>

## 6. Results on Correlates of Participation in Terrorist Activities

### 1. Sample Descriptive Statistics

Table 1 reports the means of selected demographic variables for Palestinian (Hamas and PIJ) terrorists and the Palestinian population of similar age, sex and religion, as were tabulated using the data set culled from the terrorists' biographies as well as the "Labor Force Surveys in Judea, Samaria and Gaza". Each characteristic's category is followed by a chi-square test of the null hypothesis that the characteristic is independent of terrorist status.

These data reveal several interesting comparisons. First, 31 percent of the Palestinians, compared to only 16 percent of the terrorists, were characterized as poor.<sup>43</sup> Second, out of 208 observations in which information about the terrorist's education was available, 96 percent (200) have at least a high school education and 65 percent (135) have some kind of higher education, compared to 51 percent and 15 percent, respectively, in the Palestinian population of same age, sex and religion.

Third, the Palestinian population contains a larger share of its individuals at prime earning ages (58 percent between 25 and 54 years of age) when compared to the terrorists (only 44 percent in the same age range). Compared to the general population, terrorists tend to be younger: where only 72 percent of the general

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<sup>41</sup> Any or all of those variables were included when found fit.

<sup>42</sup> Krueger and Maleckova (2003) encountered the same problem; this study follows their suggested methodological technique for creating consistent estimates.

<sup>43</sup> See section 4 for the way that individual's economic status was inferred in each of the populations and the potential problems introduced by this method.

population is below the age of 34, 93 percent of terrorists fall into this group. The age-distribution differences further accentuate the findings of differences in poverty and education.

Fourth, terrorists tended to be from urban areas (54 percent of the 311 observations where this information was available), whereas only 34 percent of the comparable Palestinian population was living in urban areas. In particular, 47 percent of the terrorists lived in Gaza, compared to only 22 percent of the comparable population.

Fifth, out of 208 terrorists whose biographies indicated marital status, only 45 percent were married, compared to an average of 59 percent in the population of individuals with similar age, sex and religion.<sup>44</sup> Finally, out of 142 observations for which information about labor force status of the terrorists was known, 94 percent held some kind of employment,<sup>45</sup> whereas only 69 percent of the Palestinian population was employed.

To tighten the comparison, the right hand portion of the table reports the means when the sample is restricted to include only individuals between 18 and 41 years of age (slightly more than 94 percent of the *Shahids*), and to exclude the 50 PIJ leaders deported on December 17, 1992. The means of the restricted sample do not differ significantly from the ones obtained using the more inclusive sample.

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<sup>44</sup> One should remember, however, the different age distribution mentioned earlier.

<sup>45</sup> Employment does not include employment in terrorist organizations.

Table 1

Characteristics of Palestinian ( Hamas and PIJ ) terrorists and Palestinian population of similar age, sex and religion.

Characteristics	Unrestricted				Restricted <sup>†</sup>			
	Hamas and PIJ terrorists	No. of obs.	Palestinian population Age 15-56 Males and Muslims	No. of obs.	Hamas and PIJ terrorists	No. of obs.	Palestinian population Age 18-41 Males and Muslims	No. of obs.
<b>Poverty</b>		230		19590		163		16195
Poor	0.16		0.31		0.20		0.32	
Average	0.41		0.48		0.40		0.48	
Well	0.33		0.20		0.30		0.20	
Very Well	0.10		0.00		0.10		0.00	
<b>Age</b>		246		41762		230		30585
15 - 17	0.04		0.12		---		---	
18 - 24	0.51		0.28		0.55		0.39	
25 - 34	0.37		0.32		0.40		0.43	
35 - 44	0.06		0.17		0.05		0.18	
45 - 54	0.01		0.09		---		---	
55 - 56	0.00		0.01		---		---	
<b>Education</b>		208		40278		144		29992
Primary school	0.04		0.21		0.04		0.19	
Intermediate	0.00		0.28		0.00		0.27	
Secondary	0.31		0.35		0.38		0.36	
Vocational	0.08		0.01		0.03		0.01	
Post-secondary	0.01		0.06		0.02		0.08	
Academic institute	0.56		0.08		0.53		0.09	
<b>Residence Type</b>		311		41762		225		30585
Urban	0.54		0.34		0.52		0.33	
Rural	0.23		0.54		0.20		0.54	
Refugee camps	0.23		0.13		0.28		0.13	

*Table 1—Continued*

Characteristics	Unrestricted				Restricted <sup>†</sup>			
	Hamas and PIJ terrorists	No. of obs.	Palestinian population Age 15-56 Males and Muslims	No. of obs.	Hamas and PIJ terrorists	No. of obs.	Palestinian population Age 18-41 Males and Muslims	No. of obs.
<b>School Enrollment Status</b>		231		41762		164		30585
Studied previously	0.71		0.81		0.69		0.88	
Presently studies	0.29		0.16		0.31		0.10	
Never studied	0.00		0.03		0.00		0.02	
<b>Marital</b>		238		41762		214		30585
Married	0.45		0.59		0.33		0.60	
Single <sup>§</sup>	0.55		0.41		0.67		0.40	
<b>Labor Force Status</b>		142		41759		92		30583
Full-time employment	0.90		0.60		0.88		0.64	
Part-time employment	0.04		0.06		0.05		0.06	
Absent from work	0.00		0.03		0.00		0.03	
Unemployed	0.00		0.06		0.00		0.07	
Not in labor force	0.07		0.25		0.07		0.19	
<b>District of Residence</b>		306		41762		224		30585
Gaza	0.47		0.22		0.53		0.22	
Judea Samaria	0.49		0.78		0.43		0.78	
Northern	0.01		0.00		0.00		0.00	
Central	0.00		0.00		0.00		0.00	
Southern	0.00		0.00		0.00		0.00	
Jerusalem	0.03		0.00		0.03		0.00	

Chi-square test refers to a test of the null hypothesis that the characteristic is independent of Hamas and PIJ status. P-value for chi-sq test < 5% for all pairs of tests. † Only individuals between 18-41 years of age were included, and 50 PIJ leaders deported on Dec 17, 1992 were excluded. § Singles include divorced and widowed.

Table 2

Characteristics of Palestinian ( Hamas and PIJ ) Suicide bombers and Palestinian population of similar age, sex and religion.

Characteristics	Unrestricted				Restricted <sup>†</sup>			
	Suicide bombers	No. of obs.	Palestinian population Age 16-50 Males and Muslims	No. of obs.	Suicide bombers	No. of obs.	Palestinian population Age 17-28 Males and Muslims	No. of obs.
<b>Poverty</b>		48		18803		45		8947
Poor	0.13		0.32		0.13		0.40	
Average	0.54		0.48		0.56		0.45	
Well	0.25		0.20		0.24		0.15	
Very Well	0.08		0.00		0.07		0.00	
<b>Age</b>		63		39824		57		19905
15 - 17	0.06		0.13		0.05		0.10	
18 - 24	0.68		0.30		0.75		0.60	
25 - 34	0.22		0.33		0.19		0.30	
35 - 44	0.00		0.18		---		---	
45 - 50	0.03		0.06		---		---	
<b>Education</b>		44		37824		42		19593
Primary school	0.02		0.20		0.02		0.15	
Intermediate	0.00		0.28		0.00		0.26	
Secondary	0.36		0.36		0.38		0.44	
Vocational	0.05		0.01		0.05		0.01	
Post-secondary	0.02		0.07		0.02		0.05	
Academic institute	0.55		0.08		0.52		0.07	
<b>Residence Type</b>		64		38875		55		19905
Urban	0.53		0.34		0.53		0.32	
Rural	0.17		0.54		0.13		0.55	
Refugee camps	0.30		0.13		0.35		0.13	

Table 2—Continued

Characteristics	Unrestricted				Restricted <sup>†</sup>			
	Suicide bombers	No. of obs.	Palestinian population Age 16-50 Males and Muslims	No. of obs.	Suicide bombers	No. of obs.	Palestinian population Age 17-28 Males and Muslims	No. of obs.
<b>School Enrollment Status</b>		48		38875		45		19905
Studied previously	0.50		0.83		0.47		0.77	
Presently studies	0.50		0.15		0.53		0.22	
Never studied	0.00		0.03		0.00		0.01	
<b>Marital Status</b>		50		38875		46		19905
Married	0.16		0.58		0.11		0.33	
Single <sup>§</sup>	0.84		0.42		0.89		0.67	
<b>Labor Force Status</b>		24		38872		21		19903
Full-time employment	0.96		0.61		0.95		0.52	
Part-time employment	0.00		0.06		0.00		0.06	
Absent from work	0.00		0.03		0.00		0.03	
Unemployed	0.00		0.06		0.00		0.08	
Not in labor force	0.04		0.24		0.05		0.31	
<b>District of Residence</b>		62		38875		53		19905
Gaza	0.45		0.22		0.51		0.21	
Judea Samaria	0.47		0.78		0.47		0.79	
Northern	0.02		0.00		0.00		0.00	
Central	0.00		0.00		0.00		0.00	
Southern	0.00		0.00		0.00		0.00	
Jerusalem	0.07		0.00		0.02		0.00	

Chi-square test refers to a test of the null hypothesis that the characteristic is independent of Suicide bomber status. P-value for chi-sq test < 5% for all pairs of tests. † Only individuals between 17-28 years of age were included. § Singles include divorced and widowed.

Table 2 shows similar findings when characteristics of only suicide-bombers are compared to the characteristics of the Palestinian population of same age, sex and religion. The table also displays the results when the sample is restricted to include only individuals between 17 and 28 years of age (slightly more than 90 percent of the suicide-bombers sample fall under this age range).<sup>46</sup> The results remain similar when the characteristics of Hamas and PIJ terrorists are compared separately with the characteristics of the Palestinian population of the same age, sex and religion.<sup>47</sup>

## 2. Estimation Results

Table 3 provides logistic estimates using the pooled sample of terrorists (Hamas and PIJ) and the “Labor Force Surveys in Judea, Samaria and Gaza” of 1993. The dependent variable equals 1 if the individual is a Hamas or PIJ terrorist, and 0 otherwise.<sup>48</sup> The first three data columns present the unweighted estimates and the last three data columns present the weighted, consistent estimates. Standard errors appear in parentheses, and mean marginal effects in brackets. All estimates are statistically significant, and suggest that poverty is inversely related, and education is positively related, with the likelihood that someone becomes a Hamas or PIJ terrorist. The results remain similar and identical with respect to sign and significance of the coefficients when the sample excludes the 50 PIJ leaders deported on December 17, 1992, and includes only individuals between 18 and 41 years of age (Table 4).<sup>49</sup>

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<sup>46</sup> None of the 50 PIJ leaders deported on December 17, 1992 became suicide-bombers, so their exclusion was irrelevant.

<sup>47</sup> Available from the author upon request.

<sup>48</sup> Refer to section 5 for more details about the estimation strategy and the problem of choice-based sampling.

<sup>49</sup> The analysis was repeated including only individuals who died in premeditated attacks. Results are qualitatively similar and available from the author upon request.

**Table 3**

Logistic Estimates of Participation in Hamas and PIJ

Dependent Variable is 1 if Individual is a Hamas or PIJ terrorist, and 0 Otherwise

Standard errors shown in Parentheses, marginal effects are presented in brackets.

	Unweighted Estimates			Weighted Estimates		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-6.079*** (0.393)	-6.152*** (0.405)	-6.695*** (0.441)	-5.763*** (0.361)	-5.836*** (0.367)	-6.348*** (0.359)
Education	0.533*** (0.028) [0.001]	0.519*** (0.029) [0.001]	0.493*** (0.030) [0.001]	0.531*** (0.035) [0.001]	0.516*** (0.034) [0.011]	0.489*** (0.034) [0.001]
Poverty (1=yes)	-0.869*** (0.211) [-0.001]†	-0.928*** (0.213) [-0.001]†	-1.043*** (0.224) [-0.001]†	-0.842*** (0.209) [-0.002]†	-0.898*** (0.207) [-0.002]†	-1.015*** (0.220) [-0.002]†
Age	-0.189*** (0.016) [-0.000]	-0.191*** (0.016) [-0.000]	-0.143*** (0.020) [-0.000]	-0.183*** (0.020) [-0.000]	-0.184*** (0.019) [-0.000]	-0.138*** (0.020) [-0.000]
Gaza (1=yes)	---	1.149*** (0.163) [0.002]†	1.295*** (0.174) [0.002]†	---	1.121*** (0.162) [0.004]†	1.253*** (0.175) [0.004]†
Married (1=yes)	---	---	-0.926*** (0.222) [0.001]†	---	---	-0.909*** (0.209) [0.002]†
Pseudo R2	0.3612	0.3801	0.3776	0.3718	0.3906	0.3881
Number of obs.	19810	19810	19789	19810	19810	19789

Notes: Sample size is 42097. Sample pools together observations on Hamas and PIJ and the general population from 1993 Labor Force Survey in Judea, Samaria and Gaza (ICBS). Weights used in columns (4), (5) and (6) are relative share of Hamas and PIJ in population to their share in the sample and relative share of survey respondents in the population to their share in the sample. Weight is 0.12566 for Hamas and PIJ sample and 0.080491 for the survey sample.

(†) dy/dx is for discrete change of dummy variable from 0 to 1.

(\*\*\*) significant at 5% significance level.

(\*\*) significant at 10% significance level.

(\*) significant at 15% significance level.

**Table 4**

Logistic Estimates of Participation in Hamas and PIJ – sample restricted to include only individuals between 18 and 41 years of age (the 50 PIJ leaders deported on December 17, 1992 were excluded).

Dependent variable equals 1 if the individual is a Hamas or PIJ terrorist, and 0 otherwise.

Standard errors shown in Parentheses, marginal effects are presented in brackets.

	Unweighted Estimates			Weighted Estimates		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-5.479*** (0.500)	-5.603*** (0.523)	-6.878*** (0.606)	-5.199*** (0.463)	-5.318*** (0.485)	-6.562*** (0.520)
Education	0.572*** (0.035) [0.001]	0.547*** (0.035) [0.000]	0.502*** (0.037) [0.000]	0.566*** (0.044) [0.001]	0.540*** (0.043) [0.001]	0.494*** (0.043) [0.001]
Poverty (1=yes)	-0.567*** (0.223) [-0.001]†	-0.649*** (0.226) [-0.000]†	-0.768*** (0.240) [-0.001]†	-0.536*** (0.216) [-0.001]†	-0.615*** (0.217) [-0.001]†	-0.736*** (0.234) [-0.001]†
Age	-0.247*** (0.022) [-0.000]	-0.246*** (0.023) [-0.000]	-0.153*** (0.029) [-0.000]	-0.237*** (0.029) [-0.001]	-0.236*** (0.028) [-0.001]	-0.143*** (0.031) [-0.000]
Gaza (1=yes)	---	1.435*** (0.187) [0.001]†	1.724*** (0.204) [0.003]†	---	1.403*** (0.183) [0.005]†	1.679*** (0.197) [0.005]†
Married (1=yes)	---	---	-1.540*** (0.280) [-0.002]†	---	---	-1.533*** (0.267) [-0.004]†
Pseudo R2	0.3612	0.3913	0.4043	0.3705	0.4005	0.4141
Number of obs.	16358	16358	16339	16358	16358	16339

Notes: Sample size is 42097. Sample pools together observations on Hamas and PIJ and the general population from 1993 Labor Force Survey in Judea, Samaria and Gaza (ICBS). Weights used in columns (4), (5) and (6) are relative share of Hamas and PIJ in population to their share in the sample and relative share of survey respondents in the population to their share in the sample. Weight is 0.12566 for Hamas and PIJ sample and 0.080491 for the survey sample.

(†) dy/dx is for discrete change of dummy variable from 0 to 1.

(\*\*\*) significant at 5% significance level.

(\*\*) significant at 10% significance level.

(\*) significant at 15% significance level.

Table 5 presents the logistic estimates of the same analysis with regard to Hamas and PIJ suicide-bombers. The results hold in terms of the directions of the effects and statistical significance is maintained as well. Restricting the sample to include only individuals 17–28 years old did not alter the results (Table 6).

**Table 5**

Logistic Estimates of being a suicide bomber

Dependent Variable is 1 if Individual is a suicide bomber, and 0 Otherwise

Standard errors shown in Parentheses, marginal effects are presented in brackets.

	Unweighted Estimates			Weighted Estimates		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-4.781*** (0.871)	-4.757*** (0.915)	-6.701*** (1.076)	-6.804*** (0.648)	-6.869*** (0.631)	-8.913*** (0.752)
Education	0.746*** (0.070) [0.000]	0.702*** (0.070) [0.000]	0.659*** (0.074) [9.37e-06]	0.724*** (0.095) [9.22e-07]	0.743*** (0.084) [5.06e-07]	0.707*** (0.085) [3.42e-07]
Poverty (1=yes)	-1.452*** (0.499) [-0.000]†	-1.488*** (0.501) [-0.000]†	-1.522*** (0.507) [-0.000]†	-1.521*** (0.501) [-1.60e-06]†	-1.631*** (0.497) [-9.11e-07]†	-1.717*** (0.507) [-6.77e-07]†
Age	-0.436*** (0.052) [-7.22e-06]	-0.431*** (0.052) [-7.29e-06]	-0.301*** (0.061) [-4.28e-06]	-0.444*** (0.069) [-5.66e-07]	-0.480*** (0.063) [-3.27e-07]	-0.351*** (0.064) [-1.70e-07]
Gaza (1=yes)	---	1.605*** (0.365) [0.000]†	1.912*** (0.382) [0.000]†	---	1.959*** (0.377) [2.83e-06]†	2.445*** (0.394) [3.15e-06]†
Married (1=yes)	---	---	-2.525*** (0.711) [-0.000]†	---	---	-2.681*** (0.664) [-3.18e-06]†
Pseudo R2	0.4740	0.5009	0.5240	0.4110	0.4444	0.4642
Number of obs.	19637	19637	19635	19637	19637	19635

Notes: Sample size is 41828. Sample pools together observations on suicide bombers and the general population from 1993 Labor Force Survey in Judea, Samaria and Gaza (ICBS). Weights used in columns (4), (5) and (6) are relative share of suicide bombers in population to their share in the sample and relative share of survey respondents in the population to their share in the sample. Weight is 0.006338 for suicide bombers sample and 0.079977 for the survey sample.

(†) dy/dx is for discrete change of dummy variable from 0 to 1.

(\*\*\*) significant at 5% significance level.

(\*\*) significant at 10% significance level.

(\*) significant at 15% significance level.

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**Table 6**

Logistic Estimates of being a suicide bomber – sample restricted: only individuals between 17-28 years of age were included.

Dependent Variable is 1 if Individual is a suicide bomber, and 0 Otherwise

Standard errors shown in Parentheses, marginal effects are presented in brackets.

	Unweighted Estimates			Weighted Estimates		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-6.398*** (1.338)	-6.700*** (1.389)	-8.072*** (1.493)	-7.301*** (1.193)	-8.482*** (1.184)	-9.747*** (1.337)
Education	0.819*** (0.079) [0.000]	0.779*** (0.080) [0.000]	0.703*** (0.082) [0.000]	0.742*** (0.106) [0.000]	0.788*** (0.089) [0.000]	0.726*** (0.089) [9.19e-06]
Poverty (1=yes)	-1.359*** (0.502) [-0.001]†	-1.396*** (0.507) [-0.000]†	-1.476*** (0.511) [-0.000]†	-1.467*** (0.510) [-0.000]†	-1.557*** (0.507) [-0.000]†	-1.699*** (0.518) [-0.000]†
Age	-0.398*** (0.068) [-0.000]	-0.383*** (0.070) [-0.000]	-0.261*** (0.080) [-0.000]	-0.425*** (0.094) [-0.000]	-0.432*** (0.074) [-9.29e-06]	-0.324*** (0.088) [-4.10e-06]
Gaza (1=yes)	---	1.724*** (0.380) [0.001]†	2.003*** (0.400) [0.001]†	---	2.238*** (0.402) [0.000]†	2.606*** (0.413) [0.000]†
Married (1=yes)	---	---	-2.291*** (0.786) [-0.001]†	---	---	-2.401*** (0.730) [-0.000]†
Pseudo R2	0.4452	0.4787	0.4987	0.3788	0.4245	0.4398
Number of obs.	8992	8992	8990	8992	8992	8990

Notes: Sample size is 41828. Sample pools together observations on suicide bombers and the general population from 1993 Labor Force Survey in Judea, Samaria and Gaza (ICBS). Weights used in columns (4), (5) and (6) are relative share of suicide bombers in population to their share in the sample and relative share of survey respondents in the population to their share in the sample. Weight is 0.006338 for suicide bombers sample and 0.079977 for the survey sample.

(†) dy/dx is for discrete change of dummy variable from 0 to 1.  
 (\*\*\*) significant at 5% significance level.  
 (\*\*) significant at 10% significance level.  
 (\*) significant at 15% significance level.

Introducing regional and marital status dummy variables into the equations improved the log likelihood fitness of the estimations, and both dummies were statistically significant. It shouldn't surprise us that residents of the Gaza strip

(Hamas' headquarters and stronghold) were more likely to participate in terrorist activity than their counterparts in the West Bank. Marital status appears to be an important factor: Married individuals are less likely to participate in terrorist activities. An additional potentially valid control variable, the type of residence (refugee camp versus urban or rural localities), was insignificant once the regional dummy was included. Moreover, the inclusion of the type-of-residence dummy did not change any of the other results in terms of the signs or significance of the coefficients.

## **7. Discussion**

The importance of the use of education or economic growth to fight terror is not invalidated, in spite of these findings.<sup>50</sup> For example, Bueno de Mesquita (2005) develops a theoretical model in which terrorist organizations are likely to prefer better educated individuals who also tend to come from more affluent background, but these individuals are more likely to participate in terrorist activity when the economic environment worsen and limits their opportunities.

Alternative explanations of the results have been reviewed under "Theoretical Considerations." The most likely explanation of the results pertaining to education may be educational content. While I was able to infer from the biographies the terrorist's last attended educational level, they seldom went on to indicate the major, main field or even type of study. For those biographies in which some type of education was articulated, more than half indicated religious studies.<sup>51</sup> More direct, and disturbing, anecdotal evidence about how educational tools are used to breed terrorism can be observed through excerpts from the school books of the official Palestinian National Authority (PNA) education system. To demonstrate this point I have chosen a few quotes out of the official PNA textbooks<sup>52</sup> (inciting parts or words are emphasized):

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<sup>50</sup> Krueger and Maleckova (2003), Becker (2005) and Bueno de Mesquita (2005) each suggest alternative theories that could potentially explain the findings while maintaining that economic growth and/or improved educational attainment would reduce terrorism.

<sup>51</sup> Across all educational levels 168 biographies indicated some sort of religious studies. This number, however, is probably biased upward given the religiosity and agenda of the organization responsible for publishing the biographies. The second leading field of study was engineering, a field particularly useful for bomb making purposes.

<sup>52</sup> Material provided by "The center for monitoring the impact of peace": <http://www.matckh.org/articles/pa-report.htm>

This organization is clearly not unbiased, but, because I am using only the provided quotes from the original textbooks and do not rely on their interpretations, I have no reason to suspect inaccuracies. The excerpts were translated from Arabic and are ordered by grade level.

Know, my son, that Palestine is your country . . . that its pure soil is *drenched with the blood of Martyrs*. . . . Answer this: Why must we fight the Jews and drive them out of our land? (Our Arabic Language for Fifth Grade #542, p. 64–66)

This religion will defeat all other religions and it will be disseminated, by Allah's will, through the Muslim *Jihad fighters*. (Islamic Education for Seventh Grade #564, p. 125)

Bayonets and Torches . . . In your left hand you carried the Koran, And in your right an Arab sword. . . . *Without blood not even one centimeter will be liberated*. Therefore, go forward crying: Allah is great. (Reader and Literary Texts for Eighth Grade #578, p. 102)

My brothers! The oppressors [Israel] have overstepped the boundary. Therefore *Jihad* and sacrifice are a duty. . . . [A]re we to let them steal its Arab nature[?]. . . . Draw your sword. . . . [L]et us gather for war with red blood and blazing fire. . . . Death shall call and *the sword shall be crazed from much slaughter*. . . . Oh Palestine, the youth will redeem your land. . . . (Reader and Literary Texts for Eighth Grade #578, p. 120–122)

*Martyred Jihad fighters* are the most . . . honored people, after the Prophets. . . . (Reader And Literary Texts for Tenth Grade #607, p. 103)

The clearest examples of racist belief and racial discrimination in the world are *Nazism and Zionism*. (Modern Arab History for Twelfth Grade, Part I #648, p. 123)

These are sufficient to suggest that policy makers, when trying to reduce terrorism via education, should focus not solely on the amount of education (i.e. years of schooling or degree achieved) but also on its content. They should work towards changing the substance when needed in order to create positive stimulations towards democracy, moderation, appeasement and coexistence.

The results regarding economic prosperity are somewhat harder to rationalize and may be at least partially driven by the terror organizations' preference for specific individuals. Those who were able to avoid falling into poverty might have acquired abilities valued by recruiting terrorist organizations. In addition, terror organizations might be able to pick and choose those who can provide their own weapons and support.

Finally, the findings vis-à-vis marital status suggests that it probably would not hurt to encourage marriages among terrorists and potential terrorists. In fact, this was suggested by Bruce Hoffman (2001), a RAND Corporation terrorism analyst, in an article in *The Atlantic Monthly*, when he described the method used

in the mid-1970s, by the former Palestinian leader Yasser Arafat, to reign in his Black September terrorists once their uncontrollable terrorist activities became a liability.

## **8. Conclusions**

If income level and education are linked, at the micro level, to participation in terrorist activities, it is probably to the opposite effect of what the popular conventional wisdom assumes. 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. Being married is negatively associated with terrorist activities. While some hypotheses have been put forward regarding the reasons for the observed results, their testing awaits further research.

## Appendix

Table 7

Educational Distribution of Palestinian Population Age 18 or older in the West Bank and Gaza Strip as obtained from the Palestinian Center for Policy & Survey Research, between 19-24 December 2001.		
<i>Other/DK</i>	12	1%
<i>Illiterate</i>	162	12%
<i>Elementary</i>	251	18%
<i>Preparatory</i>	347	26%
<i>Secondary</i>	368	27%
<i>College</i>	111	8%
<i>BA</i>	101	7%
<i>MA+</i>	5	0%
No. of obs.	1,357	

Figure 1

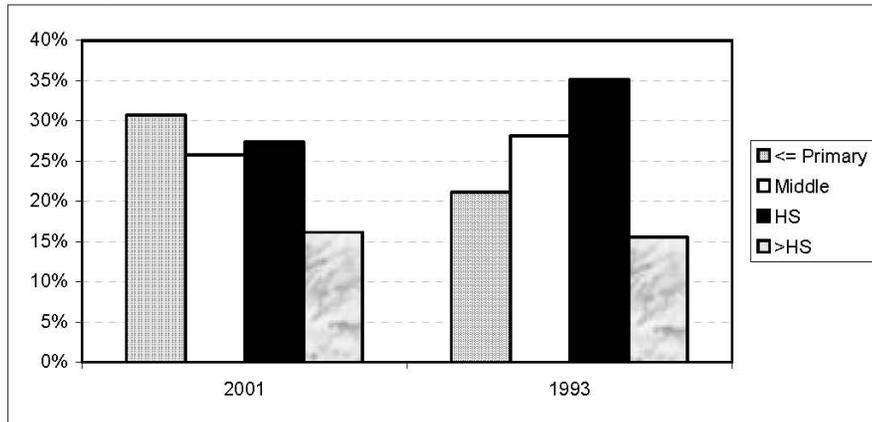
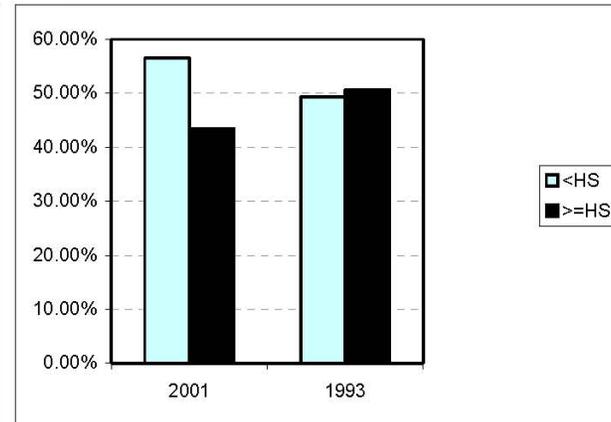


Table 8

Educational Distribution of Palestinian Population Age 15-56 Males and Muslims as obtained from the 1993 "Labor Force Surveys in Judea, Samaria and Gaza"		
<i>Other</i>	42	0%
<i>Primary</i>	8,509	21%
<i>Intermediate</i>	11,332	28%
<i>Secondary</i>	14,135	35%
<i>Vocational</i>	427	1%
<i>Post Secondary</i>	2,596	6%
<i>Academic institute</i>	3,237	8%
No. of obs.	40,278	

Figure 2



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