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**ARTICLE**

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Samuel Rohrer and David Sobek	

*Full Length Research Paper*

# Name your price: Economic compensation and suicide terrorism

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**Suicide terrorism remains a difficult action to rationally explain. Often, scholars rely on ideological or religious motivations to explain these seemingly irrational actions. While it seems clear that non-economic motives matter, it is also the case that economic compensation can incentivize suicide terrorism in ways that allow for more robust suicide terrorism campaigns. As such, we would expect that organizations that provide cash to suicide bombers will generate more attacks. In addition, the general economic environment plays into this in that poor economic conditions should increase the attractiveness of monetary compensation. To test our arguments, we conduct a series of statistical analyses looking at seven terrorist organizations that engaged in suicide terrorism from 2000 through 2008 and find that both high levels of economic compensation and poor economic conditions are correlated with a greater number of suicide terrorist attacks.**

**Key words:** Political economy, terrorism, compensation.

## INTRODUCTION

Individuals have an intense survival instinct but some appear to circumvent this when they engage in suicide terrorism. While scholars have shown that suicide terrorism campaigns are rational for organizations (Pape, 2005; Bloom, 2007), it remains unclear as to why individuals would voluntarily commit suicide for a cause when they are not under immediate threat. Pape (2005) contends that the adoption of suicide terrorism as a strategy by an organization falls under the rubric of altruistic suicide. This position fails to explain how groups develop altruistic individuals. How, then, do organizations persuade individuals to sacrifice their lives for a cause that they will never see come to fruition? This project investigates the possibility that economic compensation

to an individual's family incentivizes self-sacrifice. The economic assistance provided to the surviving family defrays the costs to the family that is losing a potential wage earner. In other words, volunteering to participate in a suicide attack has the potential to incur economic costs on the bomber's family that is likely to deter some from engaging in the behavior. Economic incentives from a terrorist group to a bomber's family are a way to minimize these costs and ensure a sufficient pool of volunteers to carry out a prolonged, or multi-year, campaign of suicide attacks.

In some ways it seems disingenuous to argue that individuals become suicide bombers for material compensation. Unless individuals act solely on some

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psychological or idiosyncratic foundation, there needs to be a rational basis for the decision to become a suicide bomber as this choice runs contrary to an inherent desire to survive and provide for their family. In theory, terrorist organizations can motivate individuals to volunteer by altering their cost-benefit calculations. While many have focused on the benefits aspects engaging in suicide terrorism from a cultural-religious point of view, it seems equally relevant that the costs matter. This is not to say that someone becomes a suicide terrorist simply because their family will receive a monetary benefit; rather, organizations which ignore the financial burden will, on average, find it more difficult to elicit volunteers for a prolonged campaign of suicide attacks. As such, there should be a relationship between the level of material compensation and the ability of a group to conduct suicide terrorism over a prolonged period of time. In addition, this relationship implies that the availability of suicide terrorists would increase during economic hardships when additional monetary supplements become increasingly valuable.

To test this proposition, we look at seven terrorist organizations that engage in suicide terrorism from 2000 through 2008. While this pool is limited in the number of groups and years examined it represents the first substantial effort at collecting and analyzing data for terrorist groups that have elected to engage in multi-year campaigns of suicide terrorism. The collected data indicates a clustering of death benefits offered by terrorist organizations. These amounts suggest that some form of market pricing optimizing is occurring and suggests that the death benefits offered by terrorist organizations are not purely random amounts. The models indicate that both lump sum cash benefits and economic conditions are related to the amount of suicide terrorism conducted by a group. In particular, high levels of death benefits and low levels of GDP per capita are correlated with higher levels of suicide terrorist attacks. The effects are robust to a number of estimation techniques and, as such, provide solid support to our contention that terrorist organizations can use cash benefits to maintain a suitable pool of potential suicide terrorists for a prolonged campaign of suicide attacks.

### **The puzzle of suicide terrorism**

Pape (2005) describes suicide terrorism as a special case of altruistic suicide. While he does not dismiss the possibility that some suicide terrorists fall into the egoistic or fatalistic categories, he advocates that such acts constitute a minority. The key for Pape is that suicide terrorism often occurs in the context of social collaboration, that is, "attacks involve multiple individuals working together for weeks, sometimes even months, to gather intelligence, plan, and rehearse a joint mission" (Pape, 2005: 185). These types of group actions are

consistent with his definition of altruistic, as opposed to egoistic or fatalistic, behavior. They are conducted for the good of the larger community rather than individual or family gain. Bloom (2007) takes a broader view, where group competition motivates these organizations to commit acts of suicide terrorism. Hence, they are acts that are inherently selfish from the perspective of the group. They are intended to increase prestige rather than benefit a wider community or movement. In terms of individual motivations there is a more eclectic set of motivations including, "spiritual rewards in the afterlife, the guarantee of a place with God for the attackers' family in the afterlife, celebrity, and even cash bonuses" (Bloom, 2007: 85) While the previous literature delineates a large set of possible motivating factors, the key is to understand how organizations inspire an individual into self-sacrificial behaviors.

These organizations do not necessarily look for individuals prone to suicidal behavior when planning these missions. In fact, some groups are quite adamant in avoiding recruiting individuals prone towards suicidal tendencies or emotional instability. For example, an Islamic Jihad recruiter noted, "if there were a one-in-a-thousand chance that a person was suicidal, we would not allow him to martyr himself" (Goldberg, 2001: 37). The key is not that these individuals want to die. Rather they view themselves as having a special place in society, where their sacrifice is contributing to a large social good and it is one that society recognizes and approves of. As Pape (2005: 187), who draws heavily on Durkheim's view of altruistic suicide, puts it: "it is impossible to understand the conduct, motivation and self-perception of individual suicide attackers without considering the importance of the intimate ties that generally exist between suicide terrorist organizations and their communities." To generate altruistic suicide bombers, Pape contends that organizations rely on a three-pronged argument: (1) a need to respond to an occupation; (2) a conventional inferiority which mandates self-sacrifice; and (3) the enemy is vulnerable to coercive actions (Pape, 2005, 2003). From this perspective, organizations strive to create an environment where suicide terrorism is held in esteem, essentially providing at a minimum social acceptance, and at a maximum local celebrity.

Social approval is a common explanation for the decision to engage in suicide terrorism. Organizations attempt to alter opinions about suicide terrorism in such a way that individuals become incentivized to volunteer. For instance, Hafez (2006: 33) noted that "in the Palestinian territories, militant groups deploying suicide bombings foster a culture of martyrdom in order to generate volunteers for suicide missions.. [they] have succeeded in framing self-immolation as a meaningful act of redemption." Hafez (2007: 141) finds similar framing by al-Qaeda in Iraq where they "mythologize martyrdom through the image of heroic martyrs who erase the shame of defeat and redeem the honor of the Muslim nation."

While Hafez (2006, 2007) and Pape (2003, 2005) make a compelling case that organizations catalyze individuals into actions by framing the issue in important social, cultural, and historic contexts, it is unclear as to why individuals choose to act as a suicide bomber as opposed to another form of resistance. In other words, organizations make compelling calls to action (Pape, 2005; Hafez, 2006; Hafez, 2007; Bloom, 2007) but why do some individuals choose to answer these calls by volunteering as a suicide bomber? This is especially important as Victoroff (2005) and Schbley (2000) both accurately note that only a very small portion of those exposed to these measures actually volunteer to become suicide terrorists.

### Family based economic compensation and self-sacrificing behavior

Organizations that aspire to engage in suicide terrorism have two central problems that need to be solved. First, the organization needs to provide a compelling argument for the need of suicide terrorism. Second, the group needs to develop an incentive structure that leads people to decide that altruistic suicide is a palatable option for them at an individual level.<sup>1</sup> Pape (2003, 2005), Hafez (2006, 2007), and Bloom (2007) provide insightful perspectives regarding how groups are engaged in rational behavior by engaging in suicide terrorist campaigns. The existing literature has not focused as strongly on why the individual, rather than the group, rationally justifies acts of suicide terrorism. A common theme in the existing literature assumes individuals willing to commit an act of altruistic suicide exist in an adequate number that they can be convinced to participate in a prolonged campaign of suicide terrorism solely for cultural and religious reasons. While acknowledging that cultural and psychological motivations are present, this project advocates that rather than being predisposed to harming themselves, individuals enter into an essentially contractual agreement that provides both psychological benefits and minimizes material costs. Hence, it is a form of martyrdom contract as discussed in Ferrero (2006: 876) who noted that “martyrdom and suicide terrorism are just extreme cases of high-risk contracts that include, with varying probability, the request of sacrifice of life on given conditions.”

This is not to say that other factors do not matter. There is certainly a role for culture where “observation and imitation of valued traits often lead to their adoption irrespective of their specific nature and even when they

have maladaptive personal or social consequences” Qirko (2009: 291). However, these socio-cultural forces are not likely strong enough to explain away economic compensation as an explanatory variable. If it were not a vital tool in recruiting suicide terrorists over a prolonged period of time there would be little rational incentive to provide the benefit to the surviving relatives. Therefore varying levels of compensation are expected to play a significant role in a group’s ability to conduct prolonged campaigns of suicide terrorism.

While more systemic evidence is examined, the Taliban offer an interesting example of this relationship (Figure 1). From 2000 to 2005, the Taliban offered a small payment of \$250 to the families of suicide bombers and for the entire five year period they committed a total of 13 suicide attacks (Fatah, 2007). In 2006, this figure rose dramatically to \$15,000 (Fatah, 2007; Williams, 2008). The increase in payments was concurrent with a clear increase in the number of suicide terrorist attacks. In 2006, the number of attacks rose to 23, more than the entire total from the previous five years combined. The number of attacks remained at this increased level through 2007, which experienced 37 attacks, and 2008, which experienced 27 attacks. Each year following the increase in payments experienced more suicide attacks than the entire five-year period when lower payments were offered (Figure 1).<sup>2</sup>

Given that suicide bombers often gain respect for their actions, and it is frequently portrayed as a selfless act of devotion to the cause, it is unlikely that many would admit to being significantly influenced by monetary considerations. However, there are instances where the importance of economic compensation for the surviving family members has been vocalized. Hameed, a failed Palestinian suicide bomber, was quite explicit when talking about the reasons he wanted to be a suicide bomber in an interview. In particular, he noted that “I wanted my family to get money after my death, so that their economic conditions would improve” (Merari, 2010: 115). Maleckova (2006: 149) counters Hameed’s reasoning by arguing that potential suicide bombers would be better providers to their families with day jobs. This requires, however, that these jobs are available and the potential suicide terrorists are appropriately qualified. Azam (2005: 196) comes to the opposite conclusion in that “suicide bombing is just an extreme form of saving, such that the agent gives up any current consumption for the sake of enhancing the probability of his descendant to enjoy the benefit of the future public good.” Azam’s argument regarding extreme saving provides a potential explanation as to why suicide bombers are on average from relatively prosperous families and have completed college coursework. Such individuals would have a “more accurate assessments of future generations’ needs and so may increase a willingness to engage in ultimate

<sup>1</sup> While it could be argued that suicide bombers are deviants or outliers. Research has indicated that this is not the case Abadie A. (2004) Poverty, Political Freedom, and the Roots of Terrorism. *American Economic Review* 2(96): 50-56, Atran S. (2003) Genesis of Suicide Terrorism. *Science Magazine*. 1534- 1539, Silke A. (2003) The Psychology of Suicidal Terrorism. In: Silke A (ed) *Terrorist, Victims, and Society*.

<sup>2</sup> Psychological Perspectives on Terrorism and Its Consequences. West Sussex, England: Wiley, which means that a more utilitarian explanation is required



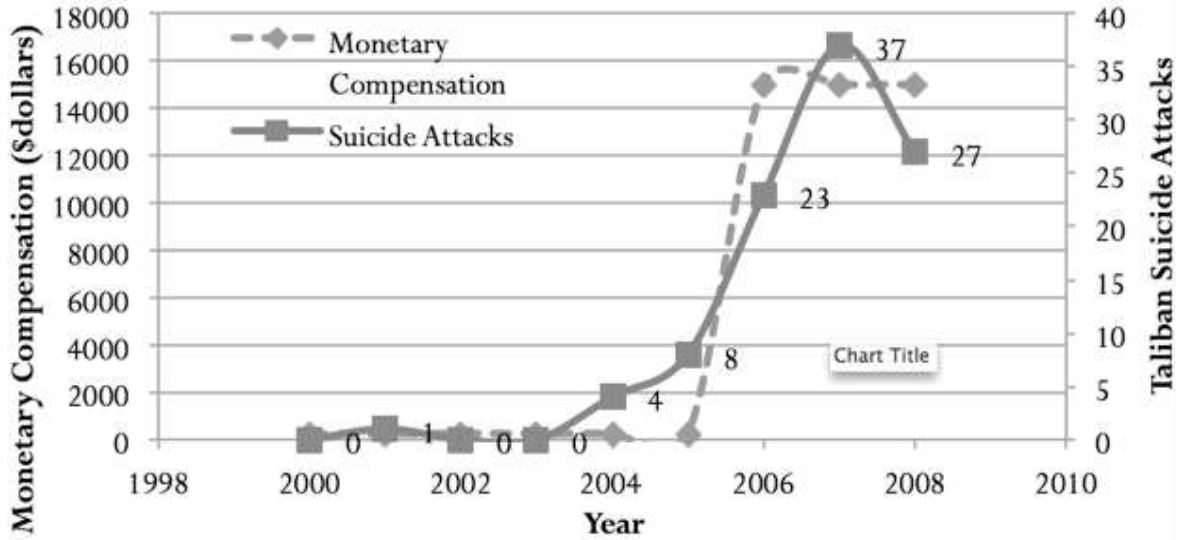


Figure 1. Taliban suicide attacks and monetary compensation.

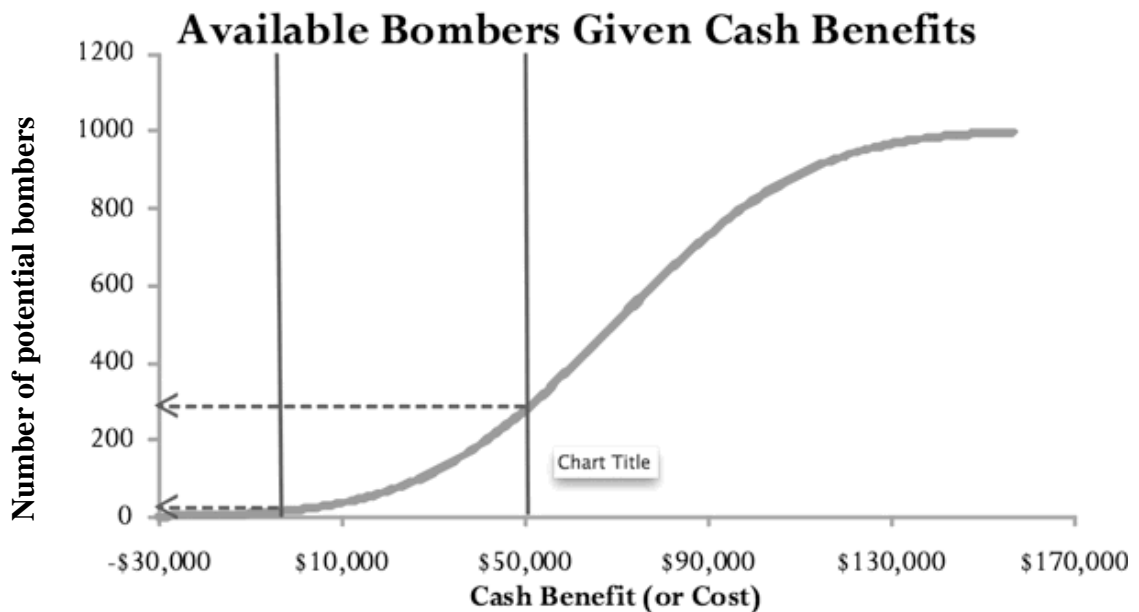


Figure 2. Hypothetical number of available bombers given cash benefits.

sacrifice” (Qirko, 2009: 303-304). Ultimately, individual case studies cannot suitably address the question as the effect is likely best observed with a larger sample size. Figure 2 presents a stylized view on the relationship between cash incentives and the number of potential suicide bombers that are available to a group. It is important to note that the numbers in the figure are for demonstration and not an actual estimate of the effect. The estimated incentive value could be higher or lower and it would not affect our argument. Our theory is about the shape of the curve not the specific values.

Given those caveats the figure highlights the basic theoretical assumptions of this project. First, it indicates that there are likely to exist a set of individuals so swayed by the non-material cultural or psychological benefits that they are willing to outlay cash for the chance to become a suicide bomber. This component of our model conforms to the theoretical expectations presented in Hafez (2006, 2007). The presence of these individuals is not an indication that our theory is incorrect as we can assume they exist and still see our hypothesized relationship. Second, the relationship

between monetary incentives and the number of potential bombers fits a normal distribution, and hence, is not a static straight line. While we hypothesize that a normal distribution is present, the precise shape of this normal distribution can vary, it may possess a sharper curve, flatter curve, thicker tails, thinner tails, and so on. The key to our hypotheses is that the curve is not flat and that is the null against which we are testing.

Figure 2 also demonstrates how changes in monetary compensation would affect the number of potential suicide bombers. For instance, from the left edge of the figure to the first line represents a group that is willing to pay or volunteer for purely cultural or psychological reasons given that the value of the monetary incentive is zero, or includes a monetary cost to become a suicide bomber. This value likely differs across suicide bombing campaigns, the length of campaign, the skill of the group in generating ideological and/or religious fervor, and likely a number of additional factors. The key is not this non-zero value but what happens if the group increases the material incentives to a positive monetary value. If the organization moved to the first line from the left, then the number of individuals increases, in this theoretical example to approximately three hundred. The size of this change is likely dependent on a number of factors that determine the precise shape of the curve but as long as the slope is not zero across the entire range, then changes in the amount of monetary compensation offered by a group increases the available pool of willing suicide bombers.

A point that needs to be clear is that to argue that economic incentives matter does not mean that other factors do not matter. There is certainly a role for culture where “observation and imitation of valued traits often lead to their adoption irrespective of their specific nature and even when they have maladaptive personal or social consequences” (Qirko, 2009: 291). But do these factors generate enough consistent interest in becoming a suicide bomber, or do groups need to rely on additional methods to supplement their non-material recruitment strategies? In other words, what strategies can groups utilize to increase the number of people willing to commit altruistic suicide?<sup>3</sup> However, it could be the case the economic incentives matter not in terms of how many individuals volunteer but which individuals volunteers. Benmelech et al. (2012) argue that poor economic conditions lead to an increase in the quality of terror, rather than, the quantity of terror. The logic follows that poor economic conditions will leave an increased number of educated, mature, and experienced individuals with less option for economic prosperity. Benmelech et al. (2012: 24) provide evidence from the universe of Palestinian suicide

terrorists against Israeli targets between the years 2000 and 2006 and find that, “high unemployment and poor economic conditions enable terror organizations to recruit more educated, mature, and experienced suicide terrorists, who in turn attack more important targets, located closer to their district of residence”. This conclusion extends to terror organizations that provide excludable public goods (e.g. education, welfare, medical care, etc.) like Hamas, thus, increasing “their ability to commit terror attacks during difficult economic times” (Benmelech et al., 2012: 24). This intuitive argument regarding the quality of attacks does not preclude a relationship between economic incentives and the quantity of suicide terrorism.

Unless one argues that suicide bombing is inherently irrational, the action must provide some sort of benefit that outweighs the cost. Hafez (2006: 38) notes, that in Islam martyrdom provides a series of post-death benefits; “remission of one’s sins at the moment the martyr’s blood is shed. Immediate admission into heaven, so martyrs do not suffer the punishment of the tomb. The privilege of accompanying prophets, saints, and righteous believers. Marriage to heavenly maidens (*hourī al-ayn*). The right to intercede with God on behalf of seventy relatives. Protection against the pain of death [and] entry into the highest gardens of heaven (*jannat al-firdaus*).” While these non-monetary rewards can be important recruiting tools, suicide bombers are often not isolated loners and their actions have an impact on others.

For instance, the majority of bombers are not from the poorest or least educated portion of a society. Additionally, they are likely generating a significant portion of the wealth needed for their family as seen in Benmelech et al. (2012). In these cases, the economic compensation provided by an organization makes the loss of a wage earner less detrimental, which might be especially critical in the context of difficult economic situations. Monetary compensation, therefore, provides an assurance to the potential bomber that their actions will not financially harm their family thereby altering the cost/benefit equation in favor of self-sacrifice.

It also is important to emphasize that we are not arguing that monetary incentives matter because the potential suicide terrorist wants to spend the money. The key is that the economic compensation will recompense the family for the loss of a wage earner. If suicide terrorist is not isolated loners, then they exist within a web of social relations and some of those relations rely on the potential bomber to be a wage earner. By sacrificing oneself, the bomber is placing an intense, long-term economic burden on the family to make up for those lost wages. This would reasonably be considered a major cost by the bomber. By providing economic relief to the family a tangible economic cost is eliminated, increasing the net benefit of the action. This decreased cost will increase the pool of potential bombers allowing a group to maintain a more intensive campaign. This leads to our first hypothesis.

<sup>3</sup> Given this we are closer to the supply-side arguments of Piazza J. (2008) *A Supply-Side View of Suicide Terrorism: A Cross-National Study*. *Journal of Politics* 70(1): 28-39., although he is more concerned with the characteristics of the organizations and targets. Our analysis focuses less on the structure of the organization and more on the choices they make in terms of whether or not to provide monetary benefits and to what degree.

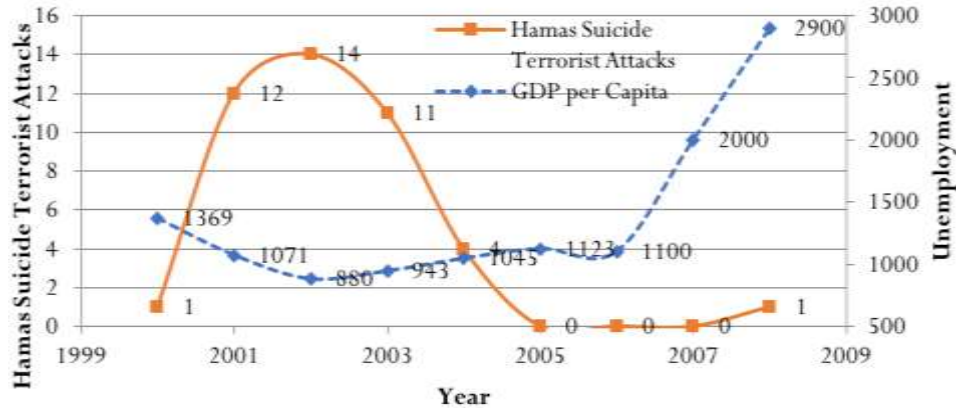


Figure 3. Hamas suicide terrorist attacks and wealth.

**Hypothesis 1:** *Larger offers of economic compensations to the family of a potential suicide terrorist by a given organization will lead to higher levels of suicide terrorist attacks by that same organization.*

Of course, material compensations likely matter more when financial conditions are poor. Economic hardships may force individuals to consider monetary issues that they might not have to during more prosperous times. This does not negate hypothesis 1. Rather, an obvious corollary is that poor economic conditions make the compensations appear more attractive. For instance, in 2000 and 2001 Hamas provided a death benefit that ranged from \$3,000 to \$5,000. The level of this benefit was then increased in 2002 to \$10,000 (Ripley, 2002; Hoffman, 2006). However, the number of attacks during the time of increased benefits varied from zero to fourteen. How can the level of death benefits explain this variation? The key is to take into account the changing economic circumstances as well as the offer of economic compensation. Figure 3 graphs the number of attacks along with Palestinian GDP per capita. In this example there is a relationship between the level of wealth and the number of suicide terrorist attacks.<sup>4</sup> Again, the logic is similar to hypothesis 1 except rather than an organization changing incentives by increasing benefits, the exogenous economic environment changed. The worsened economic conditions essentially made the death benefits a more economically attractive option.

This is not to argue that the economic conditions only matter because of its relationship to death benefits. Poverty, or decreasing economic conditions, may make individuals examine a new set of factors and revise their views on the utility of certain actions. Thus, even if the death benefits are zero, they might still come to the

conclusion that suicide terrorism is their best option. Of course, it is theoretically possible that a few individuals will take part in self-sacrificing behavior when no economic benefits are offered. These individuals would be represented in the left most tail of Figure 2. In such cases the societal prestige may serve as a sufficient compensation. However, this project posits some form of economic compensation, especially during an economic downturn, is likely to lead to greater levels of suicide attacks than no economic compensation, as the economic decline increases the relative value of the compensation package. This leads to our second hypothesis.

**Hypothesis 2:** *Poor economic conditions lead to an increase in the amount of suicide terrorism. Hypotheses 1 and 2 detail an additive relationship between the cash benefits, economic conditions, and suicide attacks.*

It is also possible that these effects interact in a more complex manner. In particular, not only do poor economic conditions independently increase the number of attacks but it may also increase the effect of the financial incentives. This relationship implies that the perceived fitness increases derived from the cash are amplified during periods of economic uncertainty. In fact, it may even be the case that economic conditions have no independent effect and only matter in how they affect the perceived benefits of the monetary compensation. While this is certainly a possibility and perhaps a logical extension of our arguments, we do not explicitly include it as a third hypothesis. At this point, there is not enough data available to conduct a convincing test of such an interaction, although, we do provide some preliminary analysis of an interactive relationship.

<sup>4</sup> Of course the jump in attacks could be correlated with the increase in compensation but that increased compensation cannot adequately explain the following drop in attacks as wealth increased.

## RESEARCH DESIGN

The analyses presented examine seven terrorist organizations

from 2000 to 2008.<sup>5</sup> We focus on groups that have made a consistent multi-year effort during the time period to engage in suicide terrorism.<sup>6</sup> There are handful of groups that have conducted such campaigns of suicide terrorism that are excluded from our analysis. In particular, the Kurdistan Workers' Party (PKK) is excluded because reliable sources indicating whether the PKK provides monetary compensation, or as a matter of policy provides no monetary compensation were unavailable. As it is simply not clear as to whether compensation is provided, the only reasonable way to code their monetary compensation is as a missing value, which would drop the case from a regression model.

The same source problem occurred with al-Qaeda in Iraq. The Revolutionary Armed Forces of Columbia (FARC) was excluded for a similar reason. While there is some evidence that they advertised a cash reward for a suicide attack, it is not clear whether they were attempting to develop the capacity to engage in suicide terrorism or if this was simply an isolated attempt to encourage the assassination of a political figure. In general, the data set contains a majority of the groups that conducted prolonged campaigns of suicide terrorism from 2000 to 2008.

To be clear, larger data sets are available regarding suicide terrorism. For instance, Santifort-Jordan and Sandler (2014) assembled a data set investigating all acts of suicide terrorism. The data collection project for this project diverges in two primary ways. First, it includes additional variables measuring the economic conditions of the states in which the terrorist organizations are based. Secondly, while smaller in scale, the data collected for this project is focused on a specialized subset of suicide terrorist organizations-only organizations that have carried out multi-year campaigns of suicide terrorism. As such, this data set and analysis are more complementary to Santifort-Jordan and Sandler (2014) as they are looking at different parts of the puzzle.

#### Dependent variable: Number of attacks

The unit of analysis is the group-year. For each observation, the number of suicide terrorist attacks for the organization is recorded based on the Global Terrorism Database (GTD). The GTD codebook describes a successful attack as one that is executed, even if it does not achieve the desired goal. In particular, a successful bombing is one that detonates and destroys property and/or kills individuals, while an unsuccessful bombing is one that is discovered and/or defused. The successful bombings are coded as a suicide attacks when "there is evidence that the perpetrator did not intend to escape from the attack alive" (National Consortium for the Study of Terrorism and Responses to Terrorism (START), 2012). The assembled dataset contains a total of 267 attacks that match the GTD's criteria. The number of attacks by the groups in a given year ranges from 0 to 37. The majority of observations have either zero<sup>7</sup> or 1 (17%) attack(s),

<sup>5</sup> The groups include: Hamas, Hezbollah, Fatah Al-Aqsa Martyrs Brigade, Chechens, Islamic Jihad/Palestinian Islamic Jihad, Taliban, and the LTTE.

<sup>6</sup> It may be argued that only focusing on organizations conducting suicide terrorism would bias our sample or limit our conclusions like Ashworth S, Clinton J, Meirowitz A, et al. (2008) Design, Inference, and the Strategic Logic of Suicide Terrorism. *American Political Science Review* 102(2): 269-273. argued against Pape R. (2003) The Strategic Logic of Suicide Terrorism. *Ibid.* 97(31-19).. That would be true if we were looking at why groups decide to use suicide terrorism but our focus is on the determinants of the amount of suicide terrorism carried out over an active and prolonged campaign.

<sup>7</sup> The large number of zero attacks in the data might make a zero-inflated negative binomial appear a desirable modelling choice. We ran the models using a zero-inflated negative binomial and the Vuong tests did not show a significant difference in models 1 and 2 which are described in Table 1.

although, there are a significant number of years with a high number of attacks (13% of observations have 10 or more attacks).

As the dependent variable is a count of events, specifically the number of suicide terrorist attacks by a group in a year, a poisson or negative binomial analysis would be most appropriate. It is also unlikely that the attacks within a given observation are independent as such a key assumption of the Poisson model is violated. The negative binomial regression relaxes this assumption allowing for over dispersion. The models in Table 1 use the negative binomial with the errors clustered on the group and robust standard errors. In addition several additional models were run to test the robustness of the results<sup>8</sup>. These include a cross-sectional time-series GEE with an AR(1) correlation, a fixed-effect negative binomial, and zero-inflated negative binomial. These results are described following and are available upon request.

#### Independent variables: Total death benefits and monthly pension

Financial compensation data was compiled for each group drawing from multiple sources including, U.S. Congressional reports, publicly accessible military documents, mainstream news sources, and secondary sources. Due to a dearth of academic literature tracking the compensation provided by terrorist organizations to the surviving families of suicide bombers, mainstream news sources served as a key data source. News sources are considered reliable so long as they are released by a major news outlet (CNN, BBC, Al-Jazeera) and involve data collected from a direct interview. The benefit packages available for a suicide terrorist consist of a combination of the following options: a one-time death benefit paid to the surviving family, a recurring monthly stipend paid to the surviving family, and bonus payments from third party sources.

This project is only concerned with financial compensation provided to family members following the death of a suicide terrorist. Therefore, payments received by suicide terrorists prior to their attack are not included as these are often used to pay for the required training to carry out the attack. As such, they are fundamentally different to the monetary compensation that the surviving family would receive after the attack. As one would expect, terrorist organizations do not readily provide specific annual reports regarding these payments, hence, it is difficult to determine precise figures. For this reason the following rules were employed to systematically classify information from disparate sources into an organized data set.

Rule 1: A source must specify a dollar amount or range, its purpose (death benefit, monthly stipend, third party payment), and the organization providing the economic benefit.

Rule 2: The time frame of the payments is determined by either, a) being directly mentioned in the source, or b) is estimated to have been implemented within one year of the publication date of the source.

Rule 3: When a compensation range is provided the lower figure will be used. This allows for a conservative estimate of the impact of economic incentives.

Third party payments made by Saddam Hussein's Baathist government to the families of Palestinian martyrs are included for

However, a zero inflated test did have an impact on models 3 and 4. In the ZINB regression of models 3 and 4, the effects of total benefits and GDP per capita were the same. However, they also demonstrated an effect

<sup>8</sup> in the inflated portion as well. In these models, both high levels of total economic benefits and low levels of GDP per capita significantly decreased the odds of having zero attacks recorded in a group year, as would be expected.

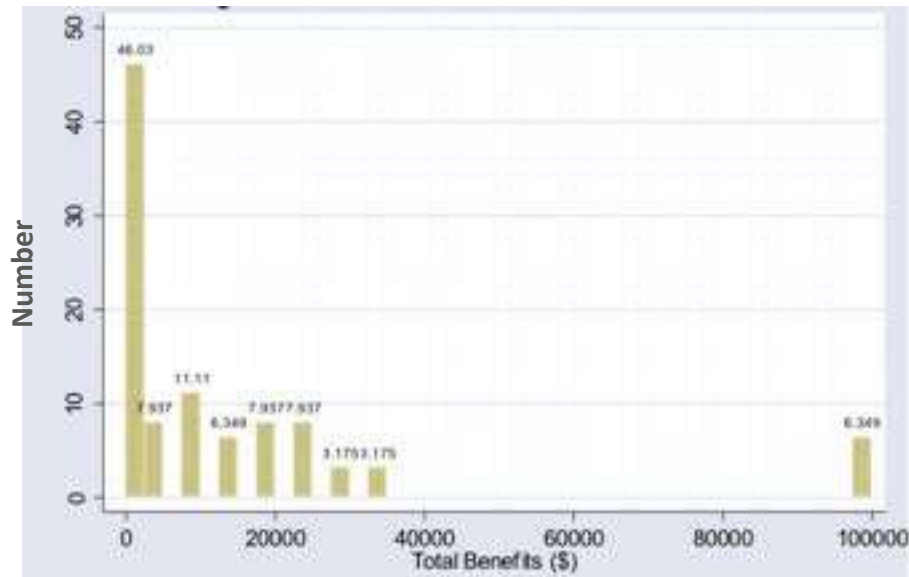


Figure 4. Distribution of total death benefits.

the years 2000-2003. In 2000, the Iraqi government is reported to have provided \$10,000 to the surviving family of martyrs (Layne, 2002; Dunne, 2010). This amount was then increased to \$25,000 in 2001 (Esterbrook, 2002). The bonus amounts are included as a variable which is only applicable to terrorist groups based in the West Bank and Gaza Strip. A specific end date for the payments is not specified in the articles. However, it is assumed that the payments ceased in 2003 following the U.S. invasion of Iraq and overthrow of the Baathist Party of Iraq. The analyses distill the information collected on compensation into two independent variables. The first, and main explanatory variable, is *total death benefits* and this encompasses the lump sum payments that a family would expect to receive. This is essentially the monetary compensation provided by terrorist organization. Additionally, it includes the Saddam Hussein bonus payments to Palestinian groups from 2000 to 2003. Aside from the lump sum payments, the analyses examine the *monthly pensions*, which are the recurring payments that organizations promise to provide to the families of the recruited suicide bombers. Presumably these are recurring payments to the families but it is not clear how long these actually last. As such, we simply use expected monthly payment without reference to the number of months these payments are expected to continue.

Total death benefits provide perhaps the most direct way to test hypothesis 1, given the variation existing across groups and time. The total death benefits ranges from \$0 to \$100,000 with a mean of \$14,500 and a standard deviation of \$25,000. In contrast, the monthly benefits vary from \$0 to \$600. To get a better sense of the distribution of the total death benefits Figure 4 provides a histogram of the payment amounts. Intriguingly, for a significant portion of the time, terrorist groups do not provide a death benefit,<sup>9</sup> and the vast majority of economics benefited offered is less than \$20,000.

<sup>9</sup> A large number of the zero cases come from the Islamic Jihad and the LTTE that have not provided any death benefits. In addition, the Fatah al-Aqsa Martyrs Brigade and Chechens provide no benefits from 2000-2002. It is also interesting to note that no group decreased their death benefits in the time period. Also, there is evidence that suicide attacks are currently more linked to cash payments than in the past. Schbley A. (2000) *Tom Between God, Family, and Money: The Changing Profile of Lebanon's Religious Terrorists. Studies in Conflict and Terrorism* 23(3): 175-196. noted that in the 1990s suicide bombers appeared to be the most ideological and devoted but more

The outlier at \$100,000, is Hezbollah from 2005 through 2008. It should be noted that during this period Hezbollah did not conduct any suicide terrorist attacks, so those outlying observations are unlikely to generate spurious support for our hypotheses, as well as a likely dearth in willing volunteers for Hezbollah.

In addition to economic compensation the total number of available suicide bombers for each terrorist group might play a role in determining the frequency and intensity of suicide attacks.

For example, a terrorist organization could choose to withhold potential suicide operatives in an attempt to maximize strategic impact. From an economic perspective the number of available suicide operatives likely plays an impact in the amount of financial compensation a terrorist group offers. If terrorist group A operates in a suicide operative rich environment, and terrorist group B operates in an environment with few readily available suicide operatives, terrorist group B would likely need to offer higher levels of compensation as compared to terrorist group A in order to carry out a comparable number of attacks. Unfortunately, reliable sources that note the changing levels of available suicide operatives for multiple terrorist organizations are not currently available. Therefore, this project focuses on the impact of financial compensation, as it is a variable that can currently be observed and measured.

#### Independent variables: GDP per capita and unemployment

Economic indicators measuring GDP, GDP per capita, and unemployment rates are included for each terrorist group by year based on their primary country/territory of operation.<sup>10</sup> The World Bank's 2000-2002. It is also interesting to note that no group

recently the bombers have a "blind addiction to money."

<sup>10</sup> The base country/territory of operation for each terrorist organization is included in the GTD data set. When multiple base countries/territories are listed, the country or territory that has the strongest link to the terrorist cause, and is likely to serve as recruiting territory is included. The Palestinian Islamic Jihad (PIJ) is listed as based in Israel, Lebanon, Syria, and the West Bank/Gaza Strip. The base country/territory for the PIJ is entered as the West Bank/Gaza Strip as this is the territory the organization seeks to separate from Israel, and likely serves as a primary area of suicide terrorist recruitment and operation.

decreased their death benefits in the time period. Also, there is evidence that suicide attacks are currently more linked to cash payments than in the past. Schbley A. (2000) *Torn Between God, Family, and Money: The Changing Profile of Lebanon's Religious Terrorists*. *Studies in Conflict and Terrorism* 23(3): 175-196 noted that in the 1990s suicide bombers appeared to be the most ideological and devoted but more recently the bombers have a "blind addiction to money."

World Development Indicators (WDI) served as the primary source for GDP and GDP per capita data. Both measures are reported in current U.S. dollars. Unemployment figures are also drawn from the WDI data. The unemployment rates report the percentage of the total labor force that is out of work rounded to a tenth of a percent. When the WDI lacks an entry for GDP, GDP per capita, or unemployment rates, CIA World Factbooks from 2000-2010 were used as a supplementary source. When no GDP, GDP per capita, or unemployment information is available from either the WDI or CIA World Factbooks, figures were collected from mainstream news sources, books focused on terrorism or economic data, and international organizations. When no information is available for a specific year an average of the preceding and following years was used. For example, the unemployment rate in Chechnya is documented as 77% in 2006, and 80% in 2008. As no data could be located for 2007, an average of these figures is used, and the Chechen unemployment rate in 2007 is estimated to be 78.5%. When no information is available for a preceding year the most recent data is assumed to be relevant. Reliable unemployment figures are not available for Afghanistan for the period between 2000 and 2004. For this reason the 2005 unemployment rate of 40% is applied for this period of time.

Collecting economic indicators for Chechnya presented a unique challenge.

As Chechnya was never formally recognized as an independent state separate from the Russian Federation it is excluded from the CIA World Factbook. Unlike, non-state territories such as the West Bank and Gaza Strip it is excluded from the WDI as well. To generate a GDP per capita estimate for Chechnya it was necessary to establish an approximate income disparity between the average Russian and the average Chechen. Hunter (2004) noted that approximately 80% of residents in the North Caucasus region are at a minimum four times poorer than the average Russian citizen. Based on this finding, the GDP per capita for Chechnya is calculated to be one-quarter of the Russian GDP per capita reported in the GDI. Hypothesis 2 argues that economic conditions affect the level of suicide attacks. In order to examine this expectation, the models use *GDP per capita* to gauge the overall levels of wealth in a given territory. Clearly, lower levels of GDP per capita imply a more challenging economic environment. However, that may not present the entire picture. As such, our models also examine the level of unemployment. While it is likely that the level of unemployment and GDP per capita are correlated, the objective was to use a set of measures capturing as complete a picture of the economic conditions as possible. Perhaps surprisingly, in our sample variables measuring GDP per capita and unemployment rates have a low correlation (-0.29).

#### Additional controls

The previous literature has suggested that non-material factors affect the level of suicide terrorism that occurs within a state. These hypotheses, and their face validity can be challenging to model for two primary reasons. First, these non-material factors are generally discussed in static terms. Does the religious nature or ideology of a group or its territorial goals change? While it is possible, there are not many cases of this occurring and definitely not in this data set. As such, these non-material factors are essentially cross-sectional in nature and do not create

confounding changes in what the variables in the data set are recording. However, the lack of observed cross-sectional variation emerges as the second modeling concern. For instance, GTD codes every group in our sample as a nationalist organization except for the Taliban. All of our groups except the LTTE and the Fatah Al -Aqsa Martyrs Brigade are religious organizations according to the GTD. Finally, the LTTE is coded as socialist but is the only group coded as such. Given such low amount of variability across group and none across time within the groups, these correlates would not provide substantive information especially given the volume of currently available data.

In order to account for a portion of these effects, fixed effects models will control for group specific effects that are not accounted for in the models. Given that most of the hypothesized non-material factors are group specific and do not change across time, these models should account for much of this variation. The limitations of fixed effect modeling are that it cannot show what non-material factors matter. Fortunately, that impact of a specific non-material factor is not key for our analysis. What is critical to know is if the inclusion of those factors will impact the investigation of our hypotheses. If the fixed-effects models dramatically change the results there is likely a larger problem. If, however, the results are consistent with the non-fixed-effects models, then we can have confidence that our exclusion of these factors is not impacting our results. When the fixed effects models are run, we find that they produce very similar results and provide additional support that exclusion of these group specific factors are not generating false support for our hypotheses. Even though the fixed effects results are supportive of our hypotheses, we have collected a number of additional controls that previous literature has noted may be significant variables. These additions should provide another layer of evidence that the results we find are not spurious. The first is the number of groups active in a territory.

It has been hypothesized that the larger the number of groups in an area, the greater the frequency of suicide terrorism. As such, we code the number of terrorist groups that are active in the same state. Our second set of controls address what type of group is present based on the classification system employed by the GTD. In particular, each group is coded as having nationalist, religious, and/or socialist goals and a single group can be coded as having multiple goals. Finally, Pape (2005) argues that suicide terrorist campaigns start because of a foreign occupation. While we are not addressing the start of suicide campaigns, but rather their intensity, we still believe that an occupation measure serves as an important control. Similar to identity the classification of a terrorist group, there was little variation in the occupation variable. All of the Palestinian groups would have seen their homeland as being occupied. A similar situation arises in the cases of the Chechens, LTTE, and Taliban. The only group where there would be variation in the occupation variable was Hezbollah, as the Israeli occupation of Southern Lebanon is coded as lasting from 2001 through 2006. While we look at political occupation in a broad sense, we are left with a lone example where variation is present, the Israeli invasion and occupation of Southern Lebanon.

## RESULTS

In general, the results are quite supportive of the hypotheses. In particular, high levels of total death benefits and low levels of GDP per capita significantly increase the amount of suicide terrorism conducted by the terrorist organizations in the data set. These effects are consistent across models and estimation techniques. In contrast, the generosity of monthly pensions appears to have little impact on the rate of

**Table 1.** The effects of monetary compensation and economic conditions on suicide terrorism.

Parameter	Model 1	Model 2	Model 3	Model 4
Total benefits	0.00003 (0.00002)**	0.00004 (0.00002)**	0.00004 (0.00001)***	0.00005 (0.00002)***
Monthly pension	-	-0.001 (0.001)	-	-0.002 (0.001)
GDP per capita	-0.001 (0.0002)***	-0.001 (0.0002)***	-0.001 (0.0002)***	-0.001 (0.0002)***
Unemployment rate	-	-	-1.67 (0.65)***	-1.78 (0.62)***
Constant	2.34 (0.11)***	2.38 (0.13)***	2.95 (0.31)***	3.05 (0.25)***
Alpha	1.35 (0.47)	1.27 (0.45)	1.27 (0.41)	1.17 (0.39)
Number of observations	63	63	63	63
Log pseudo-likelihood	-129.95	-129.49	-128.73	-128.07
Wald Chi-squared	85.72	188.25	84.12	119.39
Wald Chi- squared (p-value)	0.00	0.00	0.00	0.00

suicide terrorist attacks. Finally, the level of unemployment consistently has the opposite effect as that expected, although, preliminary evidence indicates that it has an interactive relationship with monetary compensation, in that high unemployment increases the effect of the death benefits. Table 1 contains the estimates from a series of negative binomial regressions. Given the relatively small sample, the number of independent variables included was limited in order to ensure the overall reliability of the models.

Model 1 investigates the two key measures: total death benefits as a measure of material compensation and GDP per capita as a proxy for the economic environment. The positive and statistically significant coefficient of total death benefits supports hypothesis 1, in that higher levels of monetary compensation are correlated with more suicide terrorist attacks. In addition, the negative and significant coefficient describing GDP per capita corroborates hypothesis 2 in that economic hardship is related to more suicide terrorist attacks. As such, model 1 provides preliminary support to the advanced hypotheses. However, it is important to further refine the robustness of the results.

While material compensations and economic conditions are statistically significant, they do vary in their substantive effects. For instance, when total death benefits are zero, the model predicts 1.12 attacks per year but this figure increases to 1.83 if the death benefits are at the sample mean of \$14,500. Further increasing the benefits by one standard deviation to \$29,000 would generate an expectation of 3 additional attacks. Changes in GDP per capita, however, have even more dramatic effects. With GDP per capita and total death benefits at their means, the predicted number of attacks is 1.83, but decreasing the GDP per capita by a standard deviation increases the expected number of attacks to 15. At the same time, a standard deviation increase in GDP per capita from the mean leads to a lowering of the predicted number of attacks to 0.23. Clearly, economic conditions have both a statistically and substantively meaningful effect. This is

not to imply that the effect of material compensation is not substantively important, but it is clearly not as strong a factor as the economic conditions.

Models 2 through 4 provide additional insight into the effect that material compensation and economic conditions have on the amount of suicide terrorism. First, it is important to note that in all of the models the effects of total death benefits and GDP per capita are consistent with model 1, further indicating the robustness of the results. Secondly, monthly pensions have no significant effect on the level of suicide terrorism. While this could be driven by the lack of a relationship, this variable also has a low degree of variation. In fact, in 43% of the cases the terrorist organization offers no pension, another 43% provide \$300 month, and the remaining 14% of the cases have a pension of \$600 a month. Given the limited change over this time period and between groups, it is difficult to make a strong conclusion either way. Aside from the lack of effect for monthly pensions, models 3 and 4 indicate that unemployment significantly affects the amount of suicide terrorism, but in the opposite direction of expectations. The effect of unemployment is certainly novel. It has a large variance (ranges from 5 to 80%) and it is weakly correlated with the other independent variables with ranges from -0.41 to 0.11. In fact, it has a negative correlation with GDP per capita of -0.29. Given the variation and lack of correlation with other independent variable, it could be that an outlier may be driving these results. Figure 5 plots the number of attacks and the rate of unemployment with the group ids labeled. Among the most likely potential outliers we find the Chechens, LTTE, and the Taliban. The Chechens, indicated as group 4, have high rates of unemployment and few attacks. The Taliban, indicated as group 6, have varying attacks and virtually constant, albeit high, unemployment. The LTTE, indicated as group 7, have low unemployment and a high number of attacks.

In order to more clearly examine the effects of these groups, a dichotomous variable was added for each

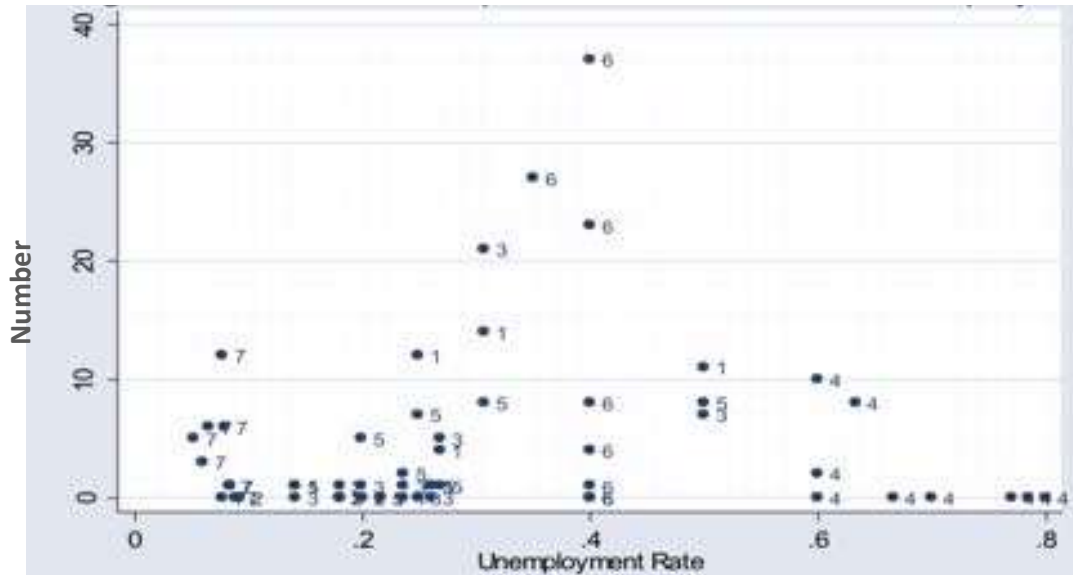


Figure 5. The Relationship between attacks and unemployment.

group and then individually tested in model 3. The inclusion of these additional controls did not change the effect of unemployment.<sup>11</sup> When all three dichotomous variables were added, unemployment became positive but statistically insignificant (p-value of 0.98). As a final test, model 3 was ran dropping the individual terrorist groups. When the Chechens or the LTTE were excluded from the data set, the effect of unemployment became insignificant but remained negative. Excluding the Taliban observations had no effect. Overall, then, the relationship may be driven by outliers but even if that were the case, the coefficient would become statistically insignificant and certainly not supportive of hypothesis 2.

While Table 1 provides robust support for the argument that death benefits and economic conditions affect the amount of suicide terrorism, it could be that the results are driven by our modeling decisions. For instance, there may be a temporal correlation, that is, attacks in the previous years are related to the number of attacks in the current year.

To address this potential modeling problem the variables were reexamined using an XTGEE with an AR(1) process. In general, the results were identical in terms of direction and statistical significance. In particular, higher total death benefits and lower GDP per capita both significantly increased the expected number of attacks. A potentially complicating modeling choice was the decision to pool a potentially disparate set of organizations into a single analysis. It could be the case that while all of these groups are engaged in prolonged campaigns of suicide terrorism that they may be driven by unique conditions. In other words, there

might be an unobserved heterogeneity that is fixed on the groups.

To test this potential, we examined the data with a cross-section time-series negative binomial with fixed effects based on the groups. There are several key observations that arose from the fixed effects model. First, both total benefits and GDP per capita were statistically significant in the expected direction, which further attests to the robustness of the finding. This is the strongest evidence that the exclusion of group specific non-material factors is not driving our results. Secondly, monthly pensions remain statistically insignificant, although, in the fixed effects version of model 2 they were positive and significant using a one-tailed test yielding a p-value of about 0.07. Third, the coefficient measuring unemployment remains negative but becomes insignificant, which is consistent with the outlier analysis described above. Overall, the fixed effects models again demonstrate the robustness of the main results.

Finally, while it was not advanced as a specific hypothesis, it was noted earlier that there could be an interaction between the level of benefits and economic conditions. The interaction of total benefits and GDP per capita was mixed. After analyzing the interaction across four different regression techniques the coefficient on the interaction term was negative and insignificant in three of the models including the negative binomial, cross-sectional time-series GEE, and the zero inflated negative binomials. The interaction was negative and significant in a fixed effects model meaning that increasing levels of GDP per capita lessened the effect of cash benefits as one would expect. Overall, however, there was not consistent support for an interactive effect between GDP per capita and total death benefits. The

<sup>11</sup> The LTTE dichotomous variable was positive and statistically significant. However, the other binary variables were insignificant.



relationship was much stronger, however, for an interaction between total death benefits and unemployment. While the estimates would not converge in the cross-section, time-series GEE, in the other three models consisting of the negative binomial, fixed-effects negative binomial, and zero-inflated negative binomial the interaction term was positive and significant.

This implies that high levels of unemployment increased the effect of death benefits.

## Conclusion

While this project is not the first to argue that economic factors affect the behavior of suicide terrorists, it advances this literature forward by both linking our theory to an individual explanation and providing systematic empirical evidence. Interestingly, Maleckova (2006: 159) noted that, “the existing literature on the causes of terrorism does not show any clear pattern regarding the connection between terrorism and poverty. While some scholars refer to the economic motivations of terrorists, these studies are usually based on anecdotal evidence, on ‘common sense.’ Or on a solid knowledge of the society from which terrorists are drawn, but not on a systematic analysis of data.” The statistical analyses in this project address the critique raised in Maleckova (2006), although, clearly more work can be done to expand our understanding on this topic. Regardless, there is robust support for both hypotheses in that higher death benefits and low GDP per capita increase the amount of suicide terrorism. In addition, there is preliminary evidence that these effects are interactive in that the effect of monetary compensation is greater during periods of economic hardship.

Given the first step nature of these results, there is room for future research. First, the analyses take an aggregate view of the relationship and, while important, additional research can delve into the specifics. For instance, Figure 1 highlights an interesting relationship between compensation and attacks from the Taliban. Digging deeper into this case, or others, could provide more precise evidence that individuals are actually swayed (or not) by monetary compensation. Secondly, the analyses focus on organizations that have a history of using suicide terrorism. An extension of this would be to look at how groups first organize suicide attacks. In other words, how does a group gain volunteers for the first set of suicide attacks and is this related in some way to monetary compensation? Thirdly, does the relationship between economic compensation and suicide bombing change over time? It could be the case that when organizations first start suicide based campaigns there is a set of devoted individuals willing to sacrifice themselves but over time that pool of individuals is depleted and a monetary incentive becomes more important in recruiting participants.

Finally, if monetary compensations matters, does this provide an opening for states to co-opt organizations by offering counter-incentives? Interestingly enough, Merari (2010: 132-133) in an interview of failed suicide bombers found that, “two said that they would have handed themselves into the Israeli authorities for a sizable monetary reward and the promise of amnesty.” As such, it would be interesting to further develop this topic to see if states can craft policies that co-opt terrorist organizations. In general, the analyses indicate that while material compensation and the economic conditions may not completely explain the amount of suicide terrorism, they play a significant and substantive role in the process and their role merits continued investigation.

## Conflict of Interests

The authors have not declared any conflict of interests.

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