Terrorism, Provocation, and Mobilization

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TERRORISM, PROVOCATION, AND MOBILIZATION

By

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But the reason I call myself by my childhood name is to remind myself that a scientist must also be absolutely like a child. If he sees a thing, he must say that he sees it, whether it was what he thought he was going to see or not. See first, think later, then test. But always see first. Otherwise you will only see what you were expecting.

- Douglas Admans, _So Long, and Thanks for All the Fish_ 1999
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ABSTRACT

The main aim of this dissertation is to study the underlying competition between governments and terrorist organizations for support of the population. The government and the terrorist organization are locked in a struggle to win the hearts and minds of potential followers, and their weapons are to strike at each other or attempt to buy the support of the population. This dissertation investigates this battle and attempts to answer why governments so often respond with harsh, disproportional responses when these responses appear to strengthen the terrorist organization. While the terrorist organization may have an incentive to risk triggering a crushing and debilitating response from the government if this response increases their base mobilization rate, the question remains as to why the government responds with such an attack.

This dissertation is structured in five chapters: (1) Introduction, summarizing the key insights from the 3 main papers; (2) Paper 01, investigating the role of uncertainty regarding the terrorist’s resource level and the impact this uncertainty plays on the decision to respond with a discriminating or undiscriminating counterstrike; (3) Paper 02, addressing the role social services plays in strengthening the popular support of the terrorist organization; (4) Paper 03, adding more nuance to the previous arguments by allowing for the support of the terrorist organization to be heterogeneous (consisting of both core and popular support) and endogenizing this support as a response to the actions of the terrorist organization and the government; (5) Conclusion, discussing the limitations of the project and a discussion of future research.
CHAPTER 1
INTRODUCTION

“In employing his forces, a guerrilla commander is like a fisherman casting his net, which he should be able to spread wide as well as draw in tight. When casting his net, the fisherman has to ascertain the depth of the water, the speed of the current and the presence or absence of obstruction; similarly, when dispersing his units, a guerrilla commander must take care not to incur losses through ignorance of the situation or through miscalculated action. Just as the fisherman must keep a grip on the cord in order to draw his net in tight, so the guerrilla commander must maintain liaison and communication with all his forces and keep enough of his main forces at hand. Just as a frequent change of position is necessary in fishing, so a frequent shift of position in necessary for a guerrilla unit” (Mao Tsu-Tung (2000); 63).

How do groups generate mobilization? How do government policies shape these incentives? Social movements have been playing an increasingly important role in our world. Recent events in Syria, Libya, Tunisia, Egypt, Bahrain, and Yemen highlight the importance of understanding the mechanisms by which groups gain support and the role of government repression on transforming this support from an alienated extremist organization into widespread violent opposition. The popularity and political success of terrorist organizations such as Hamas and Hezbollah point to the necessity of research focusing on the underlying competition between governments and terrorist organizations for support and the ways in which providing social services increases that support. This dissertation investigates at its broadest level the impact of terrorist group behavior on mobilization and mobilization’s impact on counter-terrorism decisions. At a more narrow level, this dissertation can be seen as a response to Lake (2002) who argues that a terrorist organization will preemptively attack a government in hopes of generating increased mobilization as a result of a counter-attack. While his model is used to explain the use of provocative attacks, which
could trigger crushing and debilitating responses, this logic however begs the question of why the
government, whether in response to a transnational attack or a domestic attack, responds to the
provocative attack with a counter-terrorist military strike if this means the terrorist group will
benefit due to increased mobilization? In an attempt to answer this question I look first at the role
of uncertainty regarding the terrorist’s resource level and the impact this uncertainty plays on the
decision to respond with a discriminating or undiscriminating counterstrike. In the second section I
turn my attention to investigating the role social services plays in strengthening the popular support
of the terrorist organization. In the third second I allow support for the terrorist organization to
be heterogenous: consisting of both core and popular support. I also allow this support to be
endogenous to the actions of the terrorist organization and the government.

In the first paper, I present a formal model investigating the interplay between a terrorist group
and its target government where the target government must choose a counterterrorism response
to the terrorists actions. By introducing a key tradeoff for the government, I hope to answer
the theoretical puzzle of why if terrorist organizations are using provocative attacks to increase
their mobilization, governments respond as expected. This key tradeoff for the government is that
counterterror strikes damage the resources of a terrorist organization but may also increase support
for the terrorist organization. After receiving a provocative terrorist attack, the government must
choose the type of counterterror response: discriminating or undiscriminating. The key difference
between these choices relates to the level of damage caused to the population. The undiscriminating
counterterror causes a large amount of damage to the terrorist organization but also inflicts damage
upon the population of potential terrorist supporters. The discriminating counterterror attack
only damages the terrorist organization but causes a smaller degree of damage. If the government
knows the terrorist organization is protected by a village, and opting to save money on intelligence
gathering, the government targets that entire village, an undiscriminating response has been used.
Every stronghold within the entire village is destroyed, weakening the terrorist organization, but
this destruction is at the cost of harm to the villagers. If the government instead takes the time
to gather intelligence and strikes against only the building the terrorist organization uses as a
headquarters, the government utilizes a discriminating counterattack. The villagers have been
spared but the damage to the terrorist organization’s resources now consists only of that single village. The government faces a “strong” or a “weak” terrorist organization. The key difference between these two groups is that a weak terrorist group cannot translate the destruction of resources caused by the government counterstrike into increased support. Strong groups are able to do so. When an undiscriminating attack is used by the government, the strong organization provides the social services needed to rebuild from this attack, gaining support. As such the strong organization prefers an undiscriminating attack. However, the weak organization can do nothing but sit back and watch a different violent organization or even worse the government step in and fulfil this need. In the wake of an undiscriminating response, the weak organization gains no mobilization boost and only suffers a loss of numerous resources. As such, the weak organization prefers a discriminating attack.

If the government was able to tell by the attack choice whether or not the terrorist organization would benefit from a mobilization boost caused by their undiscriminating attack, the government correctly choose a discriminating tactic. However, the terrorist organizations know this and the Strong desires to mimic the weak and receive an undiscriminating attack. The Weak group desires to mimic the strong and receive a discriminating attack. The magnitude of the attack sent by the strong or weak organization conveys no information to the government. An example of this situation is that which Israel faces when responding to a Palestinian attack. While Hamas may gain popular support from Israeli counterstrikes, the Islamic Jihad was weakened by these actions. Thus when striking in Palestine, Israel may be uncertain how much their actions will impact Hamas versus the Islamic Jihad. Unlike the previous literature, which investigates the incentives smaller groups have to mimic larger groups in an attempt to temper the retaliatory responses by the government (Overgaard, 1994; Lapan and Sandler, 1993), this model allows incentives to mimic on both sides. As such my model finds that the government always responds with suboptimal counterterrorism attacks regardless of how each side values the future.

In the second paper, I focus on the theoretical puzzle surrounding social services provision. If a ”strong” terrorist organization, is one as defined by the first paper which benefits from a mobilization boost because they have a comparative advantage at providing social services, why do not all terrorist organizations do so? In this paper, I present a formal model investigating
the strategic competition for popular support between a terrorist group and its target government when the terrorist group provides social services. The terrorist organization and the government still face tradeoffs. Increasing militant attacks increases the terrorist group’s chance of success but decreases the resources available to provide social services. The government faces a tradeoff between an effective counterterror campaign which reduces the probability of success or the terrorist organization but also destroys the economy. Once the terrorist organization and the government have chosen their levels of resources for attacks and counterterrorism, the population must decide whom to support. If a member of the population supports the terrorist organization, she will benefit from social services and terrorist campaign success but will suffer from decreased participation in the economic market. The model illustrates that terrorist groups only increase mobilization by providing social services provisions when the utility a potential supporter gains from those services increases at a faster rate than the probability of a successful attack would increase had those resources been used for military actions instead. This finding helps to explain why social provisions are only provided by a few terrorist organizations, despite the widespread belief that they aid in mobilization. The model predicts that social services are more likely to be provided when the public has great need of these services, such as in the absence of public goods provision by the government. Using originally collected club goods data from the Terrorist Organization Profiles by START, this result is strongly supported. The results strongly support that the provision of social services is more likely to result in a larger group when public goods are provided at low levels by the government. Additionally, once this positive impact on size has been taken into account, I find no further effect of club goods on the likelihood of an attack. These results suggest that terrorist organizations only become more militant when they provide social services because it increases their size, not because it increases group cohesion and decreases the likelihood to defect (Berman and Laitin, 2008).

The third paper returns to the original question of why government’s respond with counterstrikes when the terrorist organization benefits from this response by asking how terrorist organizations grow. This paper asks how a terrorist organization caters to both core supporters (those who are the active members of the group) and the more passive population (those who support the group
by providing sanctuary but not direct support). In this model the government and the terrorist organization faces a more nuanced tradeoff to that mentioned above. While the government still juggles a counterterrorism tactic which reduces the terrorists’ likelihood of success but increases their support, the government only needs to worry about increasing passive support. The pool of potential supporters for the those who become active members are those who have already moved against the government and supported the terrorist organization by providing passive support. These potential members do not worry about whether the government is a more viable option, as they have already decided it is not, but instead worry about whether the terrorist organization is strong enough to justify the potential risk of becoming an active member. The pool of potential supporters for the passive population on the other hand are still deciding between supporting the terrorist organization or the government, and as such, react negatively when the government destroys their resources. The terrorist organization also knows that spending on attacks will increase their likelihood of success but decrease their resources for social services. However, as with the government, the pool of potential core supporters are reacting to strength, not social services. As such, the terrorist organization actually increases their core support by spending money on attacks, as this increases their likelihood of success.

This model finds that actions in the first stage strongly impact the actions in the stages to follow. If the terrorist organization increases their attacks in the first stage, this increases the terrorists exposure as the government can more easily target larger organizations (due to increased core support) who must leave their sanctuary to use those resources. As such the government responds to this increase by increasing their resources for counterterrorism. Since the government pays the cost of increased passive support in the first round, the government further increases their attacks in the second round. The cost to increased attacks, loss of support, was already paid in round one. The terrorist faces a dilemma on how to respond to an increased level of counterstrikes in the first stage. The increased counterterrorism strikes increase the level of passive support, causing the provision of social services to the community to be less useful, but on the other hand the destruction of the social goods in the community (such as a hospital) induces demand for those goods. This leads to an interesting finding of the model. Social service providers have an incentive
to induce demand for their services by utilizing attacks in the first round and then switching to social services in round 2. This result counters the argument that terrorist organization reduce their attacks following a counterterrorism campaign because that campaign was successful. In fact this shows the opposite. Some organizations will decrease their attacks because they can increase their level of passive support through social goods provision at a faster rate then increasing their attacks increases their probability of success and core mobilization. Both the probability of success and core mobilization were increased in the first round and the terrorist organization does not benefit from the smaller marginal effect of a further increase in the second round.

The case of Israel provides a nice example of the double sided nature of counterterrorism. Israel at times was very successful in reducing the operational capacity of the terrorist organization but at other times has suffered from increased popular support. Daniel Byman states: “Many of Israel’s problems come down to the issue of tactics versus strategy. The Israeli’s are usually strong tactically...At the same time, however, Israel often blunders from crisis to crisis without a long-term plan for how to solve the problem once and for all” (2011; pg.11). During the early stages of counterterrorism efforts, Israel was facing a Palestinian resistance force made up more of border wars instead of a nationalistic base in Palestine. In response to the 1949 armistice ending the war, Israel interpreted the agreement as a mandate stopping Palestinians from coming back to Israel regardless of whether they were raiders or refugees. After this armistice, many of the refugees did try to go home to Israel. In 1952 the number of attempted infiltrations peaked at sixteen thousand but then continued to fall until the 1956 war. While the majority of these infiltrations were benign, some of the border crossers, former mufti of Jerusalem and the Muslim brotherhood, devoted themselves to violence. In 1954, Egypt and Syria began to use Palestinians to attack the IDF patrols and the Israeli settlements on its borders. At this time period we see a nascent guerrilla group, merged of core supporters from the former mufti of Jerusalem and the Muslim brotherhood, operating with the support of state sponsors and not relying on popular support. As predicted by the model, increased counterterrorism efforts led to decreased strength. Daniel Byman in “A High Price” discusses the autonomy given to the IDF commanders as a strategy which “paid off handsomely”. As expected a group of guerrillas operating without passive support
were successfully crushed by the Israeli counterterrorism. The impact of the counterterrorism was stronger at decreasing the probability of success than it was at increasing support for the terrorist organization. The small guerrilla groups were unable to benefit from increased discontent because they never switched from attracting core supporters to attracting passive supporters. As we saw, this was not the case for Hezbollah who operated from the very beginning in a state of very high passive support. This passive support existed initially out of discontent with both the Lebanese government and the Israeli counterterrorism but overtime was increased through a shrewd mixture of militant attacks combined with a social service program by Hezbollah.
CHAPTER 2
TERRORISM AND SIGNALLING: PUBLIC GOODS PROVISION AND ASYMMETRIC INFORMATION

“With regard to violence we start from the principle established by Chairman Mao Tsetung: violence, that is the need for revolutionary violence, is a universal law with no exception. Revolutionary violence is what allows us to resolve fundamental contradictions by means of an army, through people’s war...The problem of revolutionary violence is how to actually carry it out with people’s war...We see the problem of war this way: war has two aspects, destructive and constructive. Construction is the principal aspect. Not to see it this way undermines the revolution - weakens it. On the other hand, from the moment the people take up arms to overthrow the old order, from that moment, the reaction seeks to crush, destroy, and annihilate the struggle, and it uses all the means at its disposal, including genocide. We have seen this in our country; we are seeing it now, and will continue to see it even more until the outmoded Peruvian State is demolished” (Chairman Gonzalo, 1988 as quoted in Dawson (2011); 240).

2.1 Introduction

On July 12, 2006 Hezbollah kidnapped two Israeli soldiers. In response, Israel launched its largest offensive since its 1982 invasion, destroying Lebanon’s infrastructure and killing 1000 civilians (Guardian, 2007). Although Israel’s action was in direct response to the kidnappings by
Hezbollah, popular support for Hezbollah increased in its wake. A poll released by the "Beirut Center on Research or Information" on July 26 reported that 87% of the Lebanese supported Hezbollah’s actions against Israel, an increase of 29% from a similar poll conducted in February (BCRI, 2006). This case provides an illustration of “propaganda by deed” and illuminates the key problem faced by governments in the aftermath of a terrorist attack. Destroying the resources of the terrorists may increase the security of the government but it may also increase the terrorists’ ability to launch a future attack by generating support (De Figueierdo and Weingast (2001); Rosendorff and Sandler (2004); Bueno de Mesquita (2005a)). This dilemma raises a key question. If terrorists use violence to provoke governments into harsh and indiscriminate counterterrorism policies as an attempt to radicalize their population, why are the governments indeed provoked into using these responses?

Building on seminal signalling games in the literature, this paper analyzes the conditions under which a terrorist group will perpetrate acts of violence with the goal of mobilizing popular support by focusing on two causal mechanisms. The first is the importance of a comparative public goods advantage for the terrorist group and the second is the desire of the strong to mimic the weak. The 2006 conflict between Israel and Hezbollah illustrates the first. Hostilities ended between Hezbollah and Israel in August, and within a week, Hezbollah’s construction arm, Jihad al-Binaa, identified 20,000 homes damaged or destroyed and made plans to complete repairs on the damaged homes within three months (Stinson, 2006). Speaking in response to these actions, Mohemed Kashmar, a forty-two year old from the southern village of Hallousieh, stated “I lost my house and nobody helped me – only Hezbollah” (Stinson, 2006). This specific example mirrors a more general incentive. Terrorists who have the capability of hiding in the population (due to a high level of support) and then providing public goods, including social services and security, when harsh counter-strikes harm this population have an incentive to induce demand for these goods.

However, if the government knew the terrorist group could successfully mobilize the population following a harsh indiscriminate counter-strike, the government would respond with a measured counterattack. The government is not likely to be completely informed regarding the mobilization capabilities of the group and must determine the appropriate response under conditions of incom-
plete information. The government may be uncertain regarding the mobilization capabilities for a number of reasons. Perhaps multiple terrorist groups are claiming responsibility for the same attack. Additionally, the organization structure of a terrorist group changes over time, and these organizational changes will impact both the level of indiscriminate casualties and the efficiency of club goods distribution. Moreover, as Arce and Sandler (2007) pointed out, new splinter groups arrive on the scene. Similarly, the government may be uncertain which groups will be impacted by their response. For example, while Hamas may gain popular support from Israeli counterstrikes, the Islamic Jihad was weakened by these actions. Thus when striking in Palestine, Israel may be uncertain how much their actions will impact Hamas versus the Islamic Jihad. Finally, in many instances, no group claims responsibility for its action, and the government may not know which group to retaliate against.

Unlike the previous literature, which investigates the incentives smaller groups have to mimic larger groups in an attempt to temper the retaliatory responses by the government (Overgaard, 1994; Lapan and Sandler, 1993), this model allows incentives to mimic on both sides. Similarly to Overgaard (1994) and Lapan and Sandler (1993), I find that a weak terrorist group has an incentive to mimic the strong terrorists and send a large attack in order to induce a measured counterstrike. However, unique to my model, I find that a strong terrorist group equally has an incentive to mimic the weak terrorist group and send a smaller strike in hopes of provoking a harsh indiscriminate counterstrike.

Arce and Sandler (2007) also incorporates incentives to mimic for both types of terrorist groups. However, Arce and Sandler focus on the motivation of terrorist groups (political or military) and find that conditions do exist under which information is revealed. They find that given sufficient discounting of the future, a militant terrorist group has an incentive to attack heavily in the first period instead of biding their time and waiting for a better environment in which to attack in stage 2. By focusing on the mobilization capacity of terrorist groups, I find that even under the extreme case where a terrorist group is interacting with the government only in a single stage, and as such gains zero utility from future actions, no informative equilibria are possible. Because the government desires to crush a weak terrorist group through a harsh counterterrorism policy, the strong terrorist
group always has an incentive to mimic the weak group in order to gain the mobilization boost gained by providing public goods. Given these incentives to mimic on both sides, my model finds that the government always responds with suboptimal counterterrorism attacks regardless of how each side values the future.

2.2 The Model

In this paper I use a signalling model to analyze the interaction between a terrorist group which sends an attack and a government who must respond to this attack. This formal model builds on previous models in the game-theoretic literature which analyze the relationship between government counterterrorism policy and militant groups, mobilization, and on the literature of signalling models. Unlike the existing signalling models in the literature, this model does not limit the mimic incentives to weak terrorist groups who wish to temper the retaliatory responses by the government (Overgaard, 1994; Lapan and Sandler, 1993) nor does it introduce these two-sided mimic incentives by examining the differences across ideological groups (Arce and Sandler (2007)). Instead, in this model, I investigate both the incentives of smaller groups to lessen retaliation and the incentives of larger groups to provoke a harsh response in the hopes of generating mobilization. However, if terror truly is "propaganda by deed" (Kropotkin cited by Rapoport 1984: 660) and terrorists do indeed terrorize in order to provoke attacks upon themselves (Gibbs, 1989; Lacquer, 1978; Wilkinson, 1986), why do governments respond with harsh counterterrorism policy? In particular, this paper is interested in addressing why governments send a counter-terrorism policy that induces mobilization when that government could have instead sent a mediated counter-strike. To answer this question, I use a signalling game.

The structure of the game is as follows. There are two players: the government (G) and the terrorist group (T). In the model, the terrorist groups may desire to commit acts of violence for a number of reasons. The terrorists may wish to commit an act of terror in order to get their policy heard or to send fear to the government’s population. Given that the terrorist group wishes to commit a terrorist act, in the model the terrorist must choose the magnitude of that attack.
The government responds to this act by choosing a retaliatory action. The terrorists have private information unknown to the government about their strength. For simplicity, there are only two possible types of terrorists, weak or strong.\(^1\) Weak or strong are defined in this game in terms of both total resources and in relationship to the opposing moderate faction. A strong terrorist group is a terrorist group that has enough resources to provide public goods to the aggrieved public following a terrorist attack and has a comparative advantage in providing these resources over the moderate. Public goods in this situation refer to both public services such as health care, water supply, waste removal and also to the provision of security. Moderates in this game can be either a competing terrorist faction (such as Fatah) or the government (such as the Lebanese government).

It is assumed that if the moderates are better at providing these public goods to the aggrieved population, the aggrieved population will side with the moderates. If the moderates are equivalent at providing public goods then the aggrieved population will also join the moderates because the extremists are seen as instigating the crisis by launching the initial attack.

However if the extremists have a comparative advantage at providing public goods and the resources to provide them following a harsh counter-strike, the population, who is in need of these public goods and angry at the government for attacking them, will be more likely to mobilize for the extremists. A weak terrorist group is therefore defined as either a group weak in resources or comparatively disadvantaged. A weak terrorist group either does not have enough resources to provide the public goods necessary or cannot provide more public goods than the opposition group. The key here is that the government damages resources of the aggrieved population, and the terrorist organization which can step in and fill this void gains support. The government is uncertain as to the type of terrorist and can only observe the magnitude of attack made by the terrorist group and given this signal must decide a counter-terrorism policy.

The government has a prior belief on the type of terrorist group and is only able to observe the size of the attacks the terrorists carry out (small or large). Specifically nature moves first and draws a type \(S_T \in W, S\) for the type of terrorist. The terrorist observes his type and sends a

\(^1\)While allowing for only two types of terrorist groups simplifies the analysis, this specification also makes it easier for the terrorist group to signal their type compared to a continuous specification.
message \( m \in a, A \) where \( a \) represents an attack with a small magnitude and \( A \) represents an attack with a large magnitude.\(^2\) Similarly to Overgaard (1994), I assume that \( A \) uses more resources to send than \( a \). I assume that the cost to send this signal is higher for a weak terrorist group than a strong terrorist group, \( c_w > c_s \). The cost for the weak group is assumed to be higher due to opportunity costs. It costs the same amount of resources to send the attack for both groups, \( c \), and 
\[
\frac{c}{R_s} < \frac{c}{R_w}
\] where \( R_i \) is total resource of terrorist group \( i \). Therefore, because the weak group has less total resources, the resources lost in an attack are more valuable to the weak group than the strong group.

Upon observing this message, the Government must choose a counter-terrorism policy. In this model terrorists only have the option of choosing \( p \in dc, uc \).\(^3\) Following Bueno de Mesquita and Dickson (2007), I assume that the government can choose either discriminating counterterror (\( dc \)) or undiscriminating counterterror (\( uc \)). Undiscriminating counterterror is assumed to cost less and be effective only against weak terrorist groups. Discriminating counterterror is assumed to be more costly but the only strategy effective against strong terrorist groups.\(^4\) Cost in this context captures the expense, both in terms of material resources and time, of intelligence gathering. If the government knows the village a terrorist organization is located in, the government can quickly respond with an undiscriminate attack and wipe out a vast amount of the terrorists resources. However, if the government instead wishes to utilize a discriminating tactic, the government must delay and gather intelligence. When they strike, the attack is targeted at the terrorist organization (say perhaps a house used as a base) but the damage is smaller and the delay shown to the government’s constituents has lengthened. Since the interest of this paper is why governments send ineffective counter-terrorism policies, the game is modeled so that the government must choose between an effective policy and an ineffective policy where the effectiveness of the policy depends on the type of opponent. As such, the government always adopts some form of militant retaliatory

\(^2\)The levels of attack which a terrorist group can send is assumed to be dichotomous in this model. Realistically the terrorists can attack with a magnitude that is continuous.

\(^3\)This assumption of a dichotomous strategy set is made because the purpose of this behavior is to analyze the trade-offs made by the government when it must choose a counter-strike with asymmetric information. The government trades off between choosing an attack effective on a weak group (\( uc \)) versus an attack effective on a strong group (\( dc \)). This assumption is made to keep the model simple and to focus on the key component of the mechanism.

\(^4\)This model normalizes these costs and assumes that \( uc \) is costless and that \( dc \) costs the terrorists \( K \).
counter-strike after experiencing an attack and does not make concessions.

The government’s choice of retaliatory policy will have two key effects: resources are destroyed (a gain for the government) and mobilization is provoked (a loss for the government). The effectiveness of the counterterrorism policy is defined to be a function of both the resources destroyed and the mobilization it generates. The level of mobilization is different based on the type of terrorist while for simplicity the amount of resources lost is assumed to be the same for both strong and weak terrorist groups. Undiscriminating counter-terror policies are assumed to destroy more resources than discriminating policies. I define:

\[
\begin{align*}
\alpha &= r_{dc|s} - m_{dc|s} \\
\beta &= r_{uc|w} - m_{uc|s} \\
\gamma &= r_{dc|w} - m_{dc|w} \\
\delta &= r_{uc|w} - m_{uc|w}
\end{align*}
\]

where \( r_{p|ST} \) equals the amount of resources destroyed by government policy \( p \) given that the terrorist is of type \( ST \) and \( m_{p|ST} \) equals the amount of mobilization generated by policy \( p \) for type \( ST \).

While these counterattacks always destroy resources of the terrorist group, the public is also always mobilized by a counter-terrorism retaliation. The level of damage to a terrorist group depends on both the counter-terrorism strategy chosen and on the type of terrorist group. Since the strong terrorist group is capable of providing public goods to the aggrieved population once this demand is induced by an attack, the strong terrorist group’s mobilization boost is greater for undiscriminating attacks which cause damage to the general public \( (m_{uc|S} > m_{dc|S}) \). Since the strong terrorist group gains a larger mobilization boost from mobilization when faced with an undiscriminating attack compared to a discriminating attack, the government gains more utility

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5 However, since a weak terrorist group begins with fewer overall resources, this loss of resources has a stronger cost.
6 De Figuieredo and Weingast (2001) also make this assumption.
7 As an illustration of this idea assume that the terrorist group is efficient at reconstruction. The public will not benefit from this unless reconstruction is necessary. The terrorist group however will gain supporters once it can fill the demand for this reconstruction.
from using a discriminating attack even though fewer resources are destroyed (i.e. the additional resources lost from an undiscriminating attack does not compensate for the increased mobilization boost), \( r_{dc|s} - m_{dc|s} > r_{uc|s} - m_{uc|s} \). On the other hand, since a weak terrorist group cannot mobilize effectively following a harsh counter-strike, the government is now better off using an undiscriminating counter-strike to destroy more resources, \( r_{uc|w} - m_{uc|w} > r_{dc|w} - m_{dc|w} \). For a weak terrorist group the additional resources destroyed are not overpowered by a loss from increased mobilization due to their ineffectiveness at mobilizing.

It should be mentioned that in this model while counter-terror strikes are costly to the terrorist group strikes do not eradicate them. As such this paper analyzes how governments respond to minimize the threat of future attacks from terrorist groups which can never be completely abolished. Even when faced with a threat from a weak terrorist group, the government can only make a decision between a policy that decreases the strength of the group and a policy that causes a larger decrease but cannot choose a policy which completely abolishes the threat. Since counter-strikes provoke mobilization, at least some individuals in a population will have grievances and wish to pursue militant policies.

Given these assumptions the payoffs for the game are shown in Figure 2.1. This is a zero sum game where an increase to the government is assumed to be a direct loss to the terrorist group. In order for this game to be interesting it is assumed that the gains from using discriminating tactics over undiscriminating tactics against a Strong terrorist are greater than the cost of using that policy, or \( \alpha - \beta > K \). If this were not the case the government would always wish to choose undiscriminating counter-terror regardless of whether it faces a strong or a weak opponent. This is added to the previous assumptions of \( \alpha > \beta, \delta > \gamma, and c_w > c_S \).

The following propositions are derived from an equilibrium analysis. The proofs are in the appendix.:

Proposition 1 : No informative equilibrium (separating or semi-separating) exist.

Proposition 2 : There only exists uninformative equilibria (pooling) in which both terrorist types send a small attack.
The intuition behind these propositions is simple. Proposition 1 implies that no equilibrium exists in which any information regarding the terrorist type is revealed. The simplistic explanation to reveal the intuition behind this result is to imagine a purely separating equilibrium in which each terrorist type chooses a different message so that the message perfectly identified the player type. However, if the government can perfectly distinguish the Weak type from the Strong type, then the government will prefer to send an undiscriminating counterterrorism response to the Weak terrorist and a discriminating counterterrorism response to the Strong terrorist. The terrorists have no incentive to allow this differentiation to be possible. In both cases the terrorist (Strong or Weak) will never pay a price to send a signal that will be utility reducing. One terrorist will always prefer to switch from sending a large attack, $A$, to sending a small attack, $a$, to gain utility. If the Weak terrorist is sending a large attack, $A$, the government responds by sending an undiscriminating attack. However, the Weak terrorist can increase its utility by sending a smaller attack, $a$. By sending $a$, the Weak terrorist group is able to both save the costs of sending the large attack and benefit from receiving a discriminating response from the government. The same is true if it were
instead the Strong terrorist sending the large attack. The government responds to the Strong terrorist by sending a discriminating response. Thus the Strong terrorist group has an incentive to switch and send a small attack, both saving the costs of the large attack and benefiting from receiving an undiscriminating attack from the government.

The intuition for Proposition 1 remains the same if partial pooling equilibrium are examined instead. In partial pooling equilibria, both types of terrorists choose different mixed strategies. In this model four partial pooling equilibria are possible but none of them exist. In the first partial pooling equilibria, type S terrorist always sends a large attack and the Weak terrorist sends a large attack with probability q. If a large attack is sent, the government sends a discriminating counter attack with probability r. If a small attack is sent, the government knows this can only be the Weak terrorist, and sends an undiscriminating counter-attack. In the second partial pooling, type S terrorist always sends a small attack and the Weak terrorist sends a small attack with probability q. If the small attack is sent, the government does not know which terrorist sent the attack, and the government sends a discriminating counter attack with probability r. If a large attack is sent, the government recognizes that this is the Weak terrorist and sends an undiscriminating counter attack. In the third partial pooling equilibria, type W terrorist always sends a large attack and the Strong terrorist sends a large attack with probability q. If a large attack is sent, the government sends a discriminating counter attack with probability r. If a small attack is sent, the government sends a discriminating counter strike. In the fourth partial pooling equilibria, type W terrorist always sends a small attack and the S terrorist sends a small attack with probability q. If a small attack is sent, the government sends a discriminating counter attack with probability r. If a large attack is sent, the government sends a discriminating counter attack.

These partial pooling equilibrium do not exist for the same reason the separating equilibrium do not exist. The terrorist group that is paying to send a large attack, A, always has an incentive to not pay this cost and instead receive a more beneficial counterstrike. Imagine a terrorist group (Weak or Strong) which has a pure strategy of sending A. Either type of terrorist group will prefer to switch to a small attack, a, because the government would then send the counterstrike which would benefit the terrorist group and the group would not have to pay for this switch. An example would be the
equilibria where the strong group is sending $A$ with probability 1 (in other words, always sending a large attack) and the Weak terrorist group sends a large attack with probability $q$. If the Strong terrorist group switched and sent $a$, the government would send an undiscriminating attack because while the government in this equilibria cannot tell which group sent the large attack, the government knows that the Weak terrorist group is the only type sending a small attack, $Pr(W|a) = 1$. Thus the Strong type benefits from a switch to $a$ because an undiscriminating counterattack increases its utility. The same logic applies to the case with the Weak group always sending $A$ and the Strong terrorist group sending $A$ with probability $q$. Here the weak group benefits from switching to $a$ because the government believes the only group sending $a$ is the Strong type and as such responds with a discriminating strike. The weak terrorist group prefers a discriminating strike to an undiscriminating strike and as such has an incentive to deviate and instead send a small attack.

If we analyze the case where one type of terrorist has a pure strategy of sending a small attack, we see that the type sending a small attack will still benefit from switching from $a$ to $A$. However in these equilibria, the terrorist group will now have to now pay a cost for that benefit. Thus, looking at the incentives to deviate for the type sending the pure strategy, $a$, is not the reason these equilibria do not exist under all conditions. Instead, the terrorist group sending the small attack with probability $q$ has no incentive to send a large attack at all. In other words, the government cannot pick an $r$, the percentage of time it mixes between undiscriminating and discriminating, to make the mixing terrorist group indifferent between $A$ and $a$. To help with the intuition think of the equilibria in which the Strong terrorist group always sends a small attack and the Weak terrorist group sends a small attack part of the time (with probability $q$). This means that the government must make the Weak type indifferent between playing $A$ and $a$. However, the government knows in this equilibrium that the only group ever sending a large attack, $A$, is the Weak type, $Pr(W|A) = 1$. The Weak terrorist group never has an incentive to pay to allow the government to differentiate between it and the strong. Therefore the Weak type will never be indifferent between $A$ and $a$ and would always prefer to play $a$. Importantly and distinct to this model, the incentives are the same for the strong group. While a Strong group may be able to pay the costs of sending a large attack more easily, the Strong group never desires to allow any differentiation because the Strong
group also benefits from mimicking the Weak. If the Strong group allows for differentiation by only mimicking a portion of the time (by sending $a$ with a probability $q$), the Strong group always has an incentive fully mimic the Weak group and not pay to send $A$.

The intuition behind Proposition 2 is also straightforward. This can be seen by examining the pooling equilibria. In a pooling equilibria both types of terrorists choose the same signal so that the message provides no information at all. In this game there are two possibilities for a pooling equilibria: both types send a large attack or both send a small attack. No pooling equilibria exist when both types choose a high level of attack but pooling equilibria exist when both types choose to send a small attack.

There is a straightforward intuition behind these results. If both players choose the strategy of sending a large attack this attack is costly for them to send. Therefore given that regardless of the government’s actions (play the same counterterrorism response for both actions or play a different response for both actions), at least one player will always benefit from switching to the other side because this switch increases their payoff and is costless for them. If the government plays the same signal for both actions, the only change to the terrorist group who deviates from sending a large attack is that this group now saves that cost. If instead the government sends a different attack, at least one of the two terrorist groups has an incentive to deviate. If the government responds to a large attack with an undiscriminating tactic but to a small attack with a discriminating tactic, the Weak terrorist group has an incentive to switch to a small attack and receive the discriminating tactic instead. If instead the government responds to a large attack with a discriminating tactic but a small attack with an undiscriminating tactic, it is now the Strong terrorist group who has an incentive to deviate and receive the undiscriminating response.

However, when both players choose the strategy of sending a small attack, this attack is costless for them and switching is now costly. Thus, given that the government plays the same strategy both on equilibrium and off equilibrium path, the terrorists never have incentive to switch because they get the same payoff but now have to pay the cost of sending a large attack. In other words, if the government responds the same regardless of whether the equilibrium strategy of $a$ has been sent or the strategy of $A$ has been sent, the terrorist group will never want to pay a cost to receive the
same response from the government. If the government plays a different strategy on the equilibrium path (after seeing \( a \)) and off the equilibrium path (after seeing \( A \)), at least one terrorist will benefit from this switch. However, in this scenario to get the higher payoff, the terrorist group must take into account the cost of switching from a small attack to a large attack. Whenever the gains from switching are greater than the cost, they prefer to switch and therefore, these are not Perfect Bayesian Equilibrium. Since it is likely the case that the gains from deflecting an optimal response for the government are likely to exceed the costs of committing a larger terrorist attack it does not appear that these equilibria are likely to hold in most cases. Thus an equilibrium seems most likely when the government responds the same to on and off the equilibrium actions.

The most important implication from Proposition 1 and Proposition 2 is that the counterterrorist policy will always be inefficient for the government compared to the ideal situation where the government has complete information. The government will always have a chance of either sending an undiscriminating counterstrike to a Strong terrorist group (who benefits from mobilization) or of sending a discriminating counterstrike to a Weak terrorist-group (who could have been weakened by an undiscriminating strike). This intuition is captured in the Proposition below.

Proposition 3: Counterterrorism policies are always inefficient in pooling equilibria.

As undiscriminating retaliation becomes more effective at destroying resources against the Strong type for the government, hence \( \beta \) becomes larger, the prior belief necessary for the government to play \( uc, p^* \), decreases. In contrast, as discriminating counterterror becomes more effective than undiscriminating counterterror for the Weak type \((\gamma - \delta)\) increases, \( p^* \) increases. Thus as discriminating strikes become more effective, the prior belief necessary for the government to send an undiscriminating attack, \( uc \), becomes larger as the benefit from sending this attack decreases. This intuition is captured in the Proposition below.

Proposition 4: As undiscriminating retaliation becomes more effective against the Strong terrorist type, the prior belief necessary for the government to choose an undiscriminating attack decreases. However, if the discriminating attack becomes more effective
at destroying resources, the prior belief necessary to choose an undiscriminating attack increases.

2.3 Examples

2.3.1 Confusion in Abundance

As explained in the introduction, the government is not likely to be completely informed regarding the mobilization capabilities of the group. Given this, the government must determine the appropriate counterterrorism response under conditions of incomplete information. The government may be uncertain regarding the mobilization capabilities for a number of reasons. Perhaps multiple terrorist groups are claiming responsibility for the same attack. Perhaps the organization structure of a terrorist group changes overtime. These organizational changes will impact both the level of indiscriminate casualties and the efficiency of club goods distribution. Moreover, as Arce and Sandler (2007) pointed out, new splinter groups arrive on the scene and the government may be uncertain as to the capabilities of these new groups.

Additionally, even in cases in which the government is facing an established group, the government may be uncertain which groups will be impacted by their response. For example, while Hamas may gain popular support from Israeli counterstrikes, the Islamic Jihad was weakened by these actions. Thus when striking in Palestine, Israel may be uncertain how much their actions will impact Hamas versus the Islamic Jihad. The birth of Hezbollah demonstrates this point nicely. When Israel invaded Lebanon in 1982, Israel was successful in ousting the PLO. While discussing the decrease in the strength of the PLO, Mishal and Sela (2006) wrote: “The PLO’s loss of its autonomous territorial base in Lebanon as a result of the Israeli incursion into that country in 1982 generated mounting ideological and structural crises within the organization, which had effectively been deprived of its military option and had its political options severely curtailed by being forced out of Lebanon (14).” However this same action increased support for Hezbollah and led to their formation just a few years later.

Perhaps more importantly, it is difficult to predict how an action will impact a group. Mishal
and Sela’s comment that “Israel’s targeted killings of Hamas’s top military and political figures, including the movement’s founder, Sheikh Ahmad Yasin (assassinated in March 2004) and his successor in the Gaza strip, 'Abd al-'Aziz Rantisis (assassinated in April 2004) constituted a serious blow to Hamas’s operation capabilities. Yet Israel’s activities had little or no effect on the movement’s prestige within the Palestinian public.” (2006; xix). When dealing with Hamas, Israel is still faced with uncertainty over the magnitude of the operational disruption. Additionally, the disruption to the groups organizational structure will also disrupt social goods provision. Frisch (2006) argues that Israel has successfully decreased Hamas’ organizational capabilities, and this disruption led to a decrease in attacks. Frisch (2006) shows that suicide attempts declined from the peak in 2003 to 2004 by over one-third (from 184 to 119), successful suicide attacks declined by over 40 percent (from 26 to 15), and Israeli fatalities from suicide bombings and other forms of Palestinian violence decreased by 75 percent from its peak in 2002.

Indeed, given that terrorist groups do not benefit from differentiating themselves, this model helps to explain why, contrary to the literature on competition between groups (Bloom, 2004), terrorist groups do not claim responsibility for their attacks. Terrorist groups about whom the government has a strong prior knowledge regarding their type, due to a longer history, have an incentive to generate confusion about the response environment by not claiming credit for an attack. For example, the government may mistake which group sent the attack and instead send a harsh counterstrike to a strong terrorist group. LaFree et al (2008) show that from the late 1990s until 2004, the percentage of claimed terror attacks fell to 14.5%, and only about half of those could be confirmed as valid claims of responsibility (LaFree et al, 2008). Further research should conducted on credit taking to understand when incentives to generate confusion (as explained by my model) outweigh incentives to demonstrate superiority over a competitor (as expected by Bloom (2004), and Hoffman (2010)). For example, Hoffman (2010) finds evidence, based on an analysis of transnational terrorism events conducted in the Israeli theater of operations between 1968 and 2004, that a competitive context is a consistently strong predictor of credit-taking. When the existence of competing groups leads to credit taking instead of avoidance as groups hope to generate confusion should be looked at in further detail in future research.
2.3.2 Shining Path

The Sendero Luminoso (SL, Shining Path) provides an interesting case regarding misinformation of the government. With the successful capture of Sendero’s leader, Abimael Guzman, in 1992, the Sendero Luminoso appears to be a case of the government responding correctly to the terrorist actions. However, if the Sendero Luminoso is examined back in the late 1980s, this story no longer appears to be the case. In fact, looking back as late as 1990, a different narrative was being used to describe the Sendero Luminoso. Alberto Bolivar, a terrorism expert in Peru, explains that “From the beginning of the insurgency, both the civilian and military leaders failed to understand the real nature of the threat as a revolutionary war machine whose main objectives were political, although the primary symptoms felt were the military actions of Ejercito Guerrillero del Pueblo (EGP)” (2002; 85).

Bolivar quotes a Peruvian journalist Gustavo Gorriti who wrote in March of that year “In the history of guerrilla insurrections, there are few, indeed if any, in which the factor of political will, supported by exhausting planning, has been so preponderant. It this is a war of apparatuses, SL will win because it is more efficient, better organized, and has better intelligence” (104). This pessimistic story is echoed by a former minister who is quoted by journalist John Simpson just shortly before Guzman’s capture. In this interview the minister states: “In a few months’ time this country will have no government. It will have collapsed. And the SL will be the only force capable of governing. It will be like Year Zero in Cambodia” (106).

In March of 1990, Gordon McCormick wrote a similar report for Rand Corporation in which he stated “the most serious problem, ultimately, is the threat posed by the Shining Path, manifest in the group’s growing range of operations, its new-found ability to appeal to traditional elements of the legal left, and the government’s apparent inability to stop it” (1990; v). Speaking of how the army should combat the threat by the Sendero Luminoso, he writes “to succeed, the army would have to kill or incarcerate SL members and sympathizers at a faster rate than SL was generating them. Such a campaign, whatever its ethical objections, is probably beyond the army’s ability to carry out” (vii).

Yet in just two years time, by 1992 it became clear that the war being waged by Sendero and the
Peruvian government during 1989 and 1992 was being lost by Sendero. In retrospect the analysis shows that Sendero was not inculcating followers at this accelerated rate but was instead moving away from the population. In the late 1980s, the rondas emerged from earlier self-defense groups created in Cajamarca and Piura to fight cattle rustlers. The rondas became a serious threat to the Sendero Luminoso (Bolivar, 2002). Francisco Reyes, a Peruvian socialist, explains both the distancing of the Sendero Luminoso from the support of the public and the power of these rondas: “The rondas have plucked out the ‘thousand eyes and ears of Guzman’s men’ and what is more they have infiltrated their enemy’s territory with their own eyes and ears. They move like fish in the water, because they do not wear uniforms and have learned to move unseen, becoming part of the environment and extending their espionage system” (Bolivar, 2002; 108).

This quote hints at the change in counterterrorism tactics by the Peruvian government. Early on, when the Peruvian government did not understand the nature of the threat and underestimated the size and scope of the threat, the responses by the Peruvian government were losing the war for them. The 1982 deployment of troops to Ayacucho did not crush the Sendero Luminoso supporters as expected. President Belaunde’s error was caused by his inability to separate the insurgency of 1965 (which was easily infiltrated and destroyed by security forces), with the new threat launched by the Sendero Luminoso on May 17, 1980 in Chuschi, known as the inicio de la Lucha Armada (ILA, or beginning of the Armed Struggle). Bolivar explains that Belaunde referred to the “insurgents as cattle rustlers and delinquents” (Bolivar, 2002; 98). Given this lack of information regarding the magnitude of the threat, the Belaunde government responds as predicted by the model, with a harsh militaristic counterterrorist campaign intended to crush the threat. The Belaunde government gains no information from the Sendero Luminoso attacks and behaves accordingly to its prior beliefs.

The counterterrorism response by the Belaunde government was suboptimal and Sendero Luminoso actually grew stronger due to the misinformation of the government. Sendero Luminoso did not have unified support of the countryside at the time of the armed forces actions. The Sendero

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8This is an example of lack of information as opposed to ineptness as Belaunde correctly responded to his government’s stated description of the Sendero Luminosos.
Luminoso was able to villainize the Peruvian government and gain recruitment by emphasizing the poor economic conditions. While the Shining Path started as a radical university group, they were able to bridge the gap between the university and the peasantry and gain widespread popularity and acceptance. Individuals joined the Sendero Luminoso for the same reason at all levels of recruitment: economic misery. McClintock (1998) interviewed 33 Sendaristas in the Huancayo area, and she found that “Shining Path members emphasize socioeconomic misery as the key impetus to their decision to join the revolutionary movement” (273). McClintock writes that “the guerrillas bemoan the hunger, malnutrition, and generally abject conditions of living and dying in Peru, and they also contend that the Peruvian government is responsible for these conditions” (273). In “Children of Cain: Violence and the Violent in Latin America”, Rosenberg discusses a conversation with “Javier” at a Shining Path party. Rosenberg asked one of “Javier’s” friends how things were and the answer from the Shining Path member was “Great. A million percent inflation, garbage piling up, no jobs, no water, no electricity. The forces of history are really on our side (186).” The Sendero Luminoso was able to provide security and safety to these regions (especially for the cocaine farmers in Upper Huallaga Valley (UHV)) and was able to offer a better option for the future. The Sendero Luminoso did not lose ground until the government, under President Alberto Fujimori, switched its strategy from one of indiscriminate retaliation to a strategy based on the rondas and intelligence gathering. President Fujimori learned from Belaunde’s mistakes and was able to correctly switch to discriminating attacks given this new information.

2.4 Conclusion and Directions for Future Research

While Lapan and Sandler (1993) and Overgaard (1994) also model the conflict between terrorists and governments in a setting of asymmetric information, in these models the incentive to mimic only exists for the weak side. In both games, the magnitude of the terrorist attack is seen as a signal of the terrorist resources. Given this signal, the government must decide whether or not to capitulate to the terrorist group. Since the government is uncertain regarding the resources of the terrorist group, the resulting actions are non-optimal, with the government at times capitulating
to a group with insufficient resources and at others not capitulating to a group with sufficient resources. In both models, informative equilibria only exist when the low resource terrorist (defined dichotomously in Overgaard (1994) and continuously in Lapan and Sandler (1993)) lacks sufficient resources to mimic the high resource groups. In contrast, since both weak and strong terrorist groups have an incentive to mimic each other, no informative equilibria exists in my model.

The key difference between these two models is that Overgaard (1994) focuses on what Arce and Sandler (2007) term “politically motivated” groups. “Politically motivated” groups allocate all remaining resources to political purposes if the government does not capitulate. In contrast, in Lapan and Sandler (1993), “militant” terrorist groups are analyzed. “Militant” terrorist groups apportion all remaining resources on attacks if the government does not grant concessions. Arce and Sandler (2007) investigate a unifying model incorporating government uncertainty over the type of the terrorist group: militant and political terrorist groups. My model is similar to Arce and Sandler (2007) in that both models allow for a twofold effect of uncertainty. In Arce and Sandler, the model does not focus on uncertainty over the resources of the terrorist groups (as was the case in Overgaard (1994) and Lapan and Sandler (1993)), but instead focuses on uncertainty over the ideology of the terrorist group. Since militant terrorist groups utilize all remaining resources for attacks if the government does not capitulate, the government wishes to concede or increase defensive measures in order to prevent subsequent attacks. However, the government wishes to hold firm if it is facing politically motivated terrorists because these terrorists use the remaining resources on political activities instead of attacks. The politically motivated terrorists therefore have an incentive to mimic the militants because using spectacular attacks may lead to concessions from the government. Additionally, militant groups may have an incentive to mimic political groups to trick the government into expending fewer resources on hardening targets. Given these two-sided mimicking incentives, Arce and Sandler find two pooling equilibria. However by focusing on different ideological incentives between the groups, they also find a separating equilibrium. In the separating equilibrium, the militant terrorist groups are able to distinguish themselves from the political groups by sending a larger attack. If the group does not value the future, the militant terrorist group has an incentive to attack heavily in the first period instead of biding their time.
and waiting for a better environment in which to attack in stage 2. In contrast, in my model the government uncertainty does not arise from the ideology of the terrorist group type. The ideology of the terrorist group is the same for both terrorist groups, and the government uncertainty arises from the mobilization capacity of the group.

By focusing on the mobilization capacity of the group, I am able to explore the impact of allowing a strong terrorist group the incentive to trick and provoke the government. Bueno de Mesquita and Dickson (2007) use a signaling model to examine the conditions under which a counter-strike will lead to mobilization. By focusing on the uncertainty the supporters have over the government type, they find that radicalization can result either from the economic damage caused by counterterror policies or from the information conveyed through these policies about the government’s motivations. Building on these incentives for the strong group, in my model, the government desires to send a measured counter-strike to a strong terrorist group and a harsh indiscriminate counter-strike to the weak terrorists but must decide its action based only on the size of the attack. I find that in equilibrium the government can never distinguish the type of terrorist group by the size of attack sent, demonstrating the importance of increased intelligence as emphasized by Arce and Sandler (2007). This model shows that regardless of whether uncertainty exists over ideology or mobilization capacity, the counterterrorism policy for the government will always be suboptimal. In fact, this problem is exacerbated under uncertainty regarding mobilization capacity as no informative equilibria exist. I find that governments can never distinguish Weak from Strong groups and will at times harshly retaliate against an organization capable of mobilization and at other times moderate their response to a small group who would have been crushed by a harsh response under full information.
CHAPTER 3

CHOOSING SIDES: TERRORISM, COUNTER-TERRORISM, AND SOCIAL GOODS PROVISION

3.1 Introduction

On January 5th, 1995, Al-Quds radio broadcasted the following: “The Hamas movement stresses to the Palestinian people . . . that the martyrdom of leader Yahya Ayyash is part of his battle against the Zionist entity which, having usurped our people’s land, now seeks to uproot them. The Hamas movement vows before God that it will continue its jihad and resistance programme. Let the invaders and their henchmen await the movement’s response to the Zionist crime.” (BBC, 1995:1). The response to the assassination of the Hamas bomb-maker, better known as “the Engineer”, was virulent and vast. 100,000 Palestinians escorted his coffin to the Martyr’s Cemetery, holding his four-year old up, and shouting, “Retaliation! Retaliation! For the blood of this martyr” (Independent, 1996:1). In abandonment of Arafat’s ceasefire, Hamas responded with four suicide attacks against Israeli buses and other targets, killing 48 Israelis (Byman, 2006).

However, just a year prior, a successful assassination of Fathi al-Sahaqi, the leader of the Palestinian Islamic Jihad, crippled the organization for years. The immediate aftermath of both attacks closely resembled each other. Just four days after the assassination, on October 30th, demonstrations and commercial strikes were staged in the Gaza Strip and West Bank to show
solidarity with the Palestinian Islamic Jihad (BBC News, 1995). What could have predicted that the PIJ would be successfully weakened by the assassination, but that Hamas would emerge even stronger, contributing to the collapse of the Peres’ Labor-led government? This paper will argue that these two reactions to counter-terrorism strikes, one which started strong but quickly weakened and another which continued to proliferate over time, can be explained by differential levels of local support.

In order to understand these different reactions, one must look at the decisions of the terrorist organization, the government, and potential supporters. While terrorist organizations are often portrayed as a small band of radicals, visible organizations, like Hezbollah and Hamas, are known to engage in many social and political activities. What helps to explain these differences? Why do some of the most well-known terrorist groups engage in social services while the majority of groups do not? In order to answer these questions, the impact of social services on potential supporters must be understood. Potential supporters of terrorist organizations gain utility from successful attacks and also from the benefits provided by the terrorist organization. Terrorist organizations can curry potential supporters’ favor by choosing to spend their resources on both military actions and on the provision of social services.¹ The benefits of providing social provisions have long been understood. Mao Tse-tung argued that “the guerrilla must move amongst the people as a fish swims in the sea” (Tse-tung, 2000). Che Guevara (1998) recognized that rebel groups could gain support in villages by providing them with social services. For Guevara, this meant that rebel group success depended in part on the provision of social services. The literature is flush with examples of terrorist support to charitable and humanitarian organizations (Ly, 2007; Flanigan, 2006). Ghandour (2002) reports that Hamas devotes 95% of its budget to maintain a network of NGOs. Jihad Al Bina’a, a Hezbollah charity, provides municipal services, such as garbage removal and drinking water, to south Beirut (Fawaz, 2005). The Islamic Salvation Front provided aid more effectively to victims of an earthquake in October 1989 than the government (Ly, 2007:178). These

¹This paper will use the term social services and club goods interchangeably to refer to items a terrorist organization provides to supporters. I use these terms to refer to excludable but non-rivalrous goods such as health care, water supply, or waste removal. The terms public services or public goods are used to refer to the provision of these same items by the government. Although public goods generally refer to non-excludable and non-rivalrous goods, I use this term even though the government would like to exclude terrorist supporters from use of these goods.
examples and the importance of social support on recruitment raise the question: why don’t all groups invest heavily in club goods?

This paper examines the interaction of terrorist and government choices and the impact of this interaction on the population through a formal model and tests a key prediction from the model. I argue that some groups choose not to invest in club goods because terrorists face a trade-off when deciding the level of investment into club goods. When a terrorist organization provides social benefits, resources for these actions are taken directly from military actions. The provision of social services by a terrorist group on one hand can act as way for the terrorist to enhance the welfare of recruits, increasing the number of recruits (Ly, 2007). On the other hand, supplying social services reduces the amount of military expenditures, lowering the probability of a successful attack. If supporters benefit from a successful attack\textsuperscript{2}, one should not expect a terrorist organization to provide club goods if the success rate increases at a faster rate with an additional unit of military resources than the utility from club goods increases with an additional unit.

Moreover, the decision made by a potential terrorist sympathizer on whether to support the terrorist organization or not to is dependent not only on actions taken by the terrorist organization but also on the effectiveness and destructiveness of the counterterrorism strategy undertaken by the government. Similarly to the terrorist organization, the government also faces a trade off. The government’s counterterrorism strategy increases the government’s security by destroying the resources of the terrorist but also destroys lives and resources in the economy. When Israel assassinated Salah Shehada, a senior leader of Hamas, the bomb killing him additionally killed his daughter and eight other children (Byman, 2006). Immediately following the attack, the operations of Hamas were disrupted but popular support for Hamas, both domestically and internationally, increased. This assassination highlights the trade-off governments face and the role counterterrorism policies may have.

\textsuperscript{2}There are a number of reasons a terrorist supporter may benefit from a successful attack. The probability of a concession may be higher if an attack is successful. Similarly, Bueno de Mesquita and Dickson (2007) look not at the probability of a single successful attack but instead allow the probability to represent the total probability that the armed conflict is won by the terrorist organization. In Ly (2007), a potential supporter gains utility from fostering the goals of the terrorist organization, which include successful attack. Bueno de Mesquita (2005a) allow an individual terrorist to gain utility derived from being a successful terrorist. In Faria and Arce (2005) the number of new terrorist recruits is positively related to previous levels of terrorist activity. A successful attack may act as an advertisement for the terrorist organization.
Given the trade-offs both the government and the terrorist organization face, this paper has two main goals. The first is to provide insight into why some terrorist organizations invest significant resources into non-militant activities such as funding NGOs to provide social services to its population and why others do not. The second goal of this paper is to investigate how the militant activities of a terrorist organization are influenced by the decision to provide club goods and the counter-terrorism strategy of the government. In support of the first goal, the model finds that the likelihood a potential member of a population joins a terrorist organization is a function of the probability of success of an attack, the level of social services provided, and the ability of the terrorist group and government to differentiate between supporters and non-supporters. Depending on the marginal benefit of providing a unit of additional resources for military activities, a member of the population may become more or less likely to join a terrorist organization as social services are provided. This is an important finding: not only does it show that increasing the level of social services provided does not necessarily increase support for the terrorist organization (Ly, 2007) but it also offers key insight as to when an increase of support will occur. If the marginal benefit gained from military activity is greater than the marginal utility increase from increased club goods, providing social services actually decreases the likelihood of a sympathizer joining the terrorist organization. Using aggregated data from 1970 to 2003, this result is tested by examining the impact of club goods provision on group size. When the marginal benefit of increasing club goods is high, the size of the terrorist organization should increase with the provision of social services. To get at this hypothesis, I look at the interaction of club goods provision and public goods provision. If a government is unable to provide social services to its population, club goods will be able to be used efficiently and should have a larger effect because they can fill this void. As an example, imagine a terrorist organization responsible for providing health services to the community (such as Hezbollah through Al Haya’a Al Sahhiyyah (Flanigan, 2006)). The medical centers will be needed in areas without government medical services. Using newly collected club goods data from the Terrorist Organization Profiles, I show that in countries with low levels of public services, the provision of club goods increases the size of the terrorist group.
Similarly this model finds that at times increasing the counterterrorism campaign is successful and at others it is not. This finding is different from that of Bueno de Mesquita (2005a) where increased counterterrorism causes more economic damage thus increasing the number of supporters. In this model, if the marginal benefit of increasing the counterterrorism campaign by reducing the likelihood of success is greater than the marginal loss by damaging the economy, the number of supporters will decrease. Therefore, this model allows for conditions to exist under which the level of support will decrease for the terrorist group in response to a counterterrorism strike even though economic damage has occurred. Under certain conditions the best response of the terrorist organization to an increase in counterterrorism is to decrease its military actions. This finding suggests that terrorist violence may be reduced following a counter-terrorism surge because the terrorists now find it useful to invest in public services. The first section of this paper will present a literature review, the second section will present the model, the third section will present the testable hypotheses and empirical tests, and the fourth section will summarize.

3.2 Literature Review

This paper builds on the current literature analyzing the importance of counter-terrorism policy and social goods provision. Signaling models have been used to investigate the role of counter-terrorism strategies on mobilization. Instead of focusing on the interaction of counter-terrorism policy and club goods for social support, Overgaard (1994) analyzed the provision of counter-terrorism in a setting of asymmetric information. In his game, the magnitude of the terrorist attack is seen as a signal of terrorist resources. When the government does not know the resource level of the terrorists, terrorists with low resource levels wish to convey a message that resources are large in an attempt to soften government retaliation. Lapan and Sandler (1993) also argue that terrorist violence may signal the strength of the terrorist organization to the government. Ginkel and Smith (1999) find that revolutionary vanguards may use terror attacks to reveal that the government is weak given their private information. Bueno de Mesquita and Dickson (2007) also investigate the role of uncertainty but instead allow this uncertainty to exist on the behalf of
the supporters. Similarly to this paper, they find that counter-terrorism will increase mobilization under certain conditions. They find that radicalization can result either from the economic damage caused by counterterror policies or from the information conveyed through these policies about the government’s motivations, whereas I find that increased radicalization may result from either economic damage or club goods provision.

The impact of counter-terrorism strategies on mobilization has also been investigated without signaling models. De Figueierdo and Weingast (2001) and Rosendorff and Sandler (2004) find that government crackdowns may radicalize the moderates which in turn leads to an increase in violence. Bueno de Mesquita (2005a) develops a model showing that government crackdowns can lead to either an increase or decrease in support on terrorism, depending on the relative effect of counterterror on economic opportunity, ideology, and the future success of the terrorist organization.

This paper also builds directly on literature that has investigated the role of social goods provision on mobilization. Azam (2005) assumes that agents only care about the welfare of their descendants whom benefit from a club good with some probability. The probability of benefiting from the club good can be increased by engaging in bombing, and the agents in his model are therefore willing to give up some of their consumption today to contribute resources for the next generation. Faria and Arce (2005) present a dynamic model where the number of new terrorist recruits depends positively on the level of social support for terrorism. In this model the terrorists benefit from popular support which is assumed to depend positively on previous levels of terrorist activity and an exogenous underlying support. Berman and Laitin (2008) use Berman’s (2003) club good model to rationalize the use of suicide bombing. This model shows that the sacrifices necessary to guarantee religious club goods decrease the likelihood of defecting which thereby increases success at suicide bombing. Azam (2006) attempts to explain why some rebellion leaders are regarded as thugs while others are considered heroes. Using the example of the Eritrean Peoples Liberation Front, this paper argues that those leaders who engage in social spending are more likely to gain popular support.

Formally, this model is similar to Siqueiera and Sandler (2006). They develop a model analyzing the factors leading to terrorist survival. They find that the length of survival is dependent on the
responsiveness of the grassroots supporters, the effectiveness of the government’s counterterrorism campaign, and the terrorist’s ability to attract outside support. In this paper, they allow the government to provide public services to the population but only allowed the terrorist to choose the level of resources used in attacks. In addition, they do not allow the government’s counterterrorism strategy to directly affect the utility of a potential supporter by decreasing the economic activity available to a non-supporter.

Substantively, the paper related most closely to this paper is Ly (2007). Ly presents a formal model explaining that different types of organizations arise in equilibrium depending on the exogenous levels of government policies. Two key differences exist between this model and Ly’s model. First, instead of assuming an exogenous strategy for the government, this model allows for strategic interaction between the government and its choice of counterterrorism strategies and the terrorist group. Secondly, charitable actions benefit terrorist supporters in Ly’s model because these charitable donations act as an advertisement to increase the potential supporter’s valuation of the terrorist organization. In my model supporters of the terrorist organization benefit directly from the provision of social services by the terrorist group.

### 3.3 Model Overview and Specification

This model attempts to capture the dynamics involved in providing social goods in order to gain support of the population. Formally, this model is adapted from Siqueira and Sandler (2006). In their model, the government could gain support by providing public goods. The same formal framework is utilized in this model to analyze instead the consequences of the terrorist organization providing club goods. In the first stage of the game the government and the terrorist group act simultaneously, taking the best response of their counterpart as given. The government chooses the level of counterterrorism, $c$, while the terrorists determine the magnitude of their military campaign, $m$, and the amount of club goods provided, $g$. This situation is modeled as a simultaneous game because both the government and the terrorist organization are assumed to take their actions without knowing the decision of the other first (i.e., the terrorists do not know the level of counterterrorism
undertaken by the government and the government does not know the level of social goods provided by the terrorists). The terrorists in this model receive utility from campaign success (where $\psi(c,m)$ denotes failure), and from the number of supporters (denoted in the model as $(1 - \sigma)$) and the supporters’ welfare (which is increased through the provision of social goods). The assumption that the terrorist group gains utility from the welfare of its supporters in addition to the number of supporters is meant to capture the idea that the marginal productivity of the individual increases with additional wealth (Barro’s (1990), Siqueiera and Sandler (2006)).\footnote{Ly(2007) also allows for the terrorist organization to gain utility from the wealth of their supporters but does this to incorporate an altruistic component to the terrorist organization.} The overall utility for the terrorist group from these three components is denoted $U^T(\psi(c,m), (1 - \tilde{\sigma}), g)$.\footnote{$\tilde{\sigma}$ is defined in a few paragraphs but refers to the individual who is indifferent between supporting or not supporting the terrorist organization.} The government gains utility from decreasing the likelihood of a successful attack and from consuming some type of good besides counterterrorism, denoted $x$ in the model. The utility for the government from these two components is denoted $U^G(\psi(c,m), x)$ in the model.

In the second stage of the game the potential supporters must decide whether or not to support the terrorist organization while taking the first-stage equilibrium activity levels of the government and terrorist group as given. The population therefore knows both the level of counterterrorism and the amount of social services provided and makes its decision accordingly. If a member of the population supports the terrorist organization her utility is denoted $N_T(\psi(c,m), g)$ and she gains utility from terrorist campaign success and club goods provision but loses some economic activity as she devotes more time to the terrorists and is excluded by the government. To solve this game backwards induction is used to obtain the subgame perfect equilibrium by first finding the subset of supporters for the terrorist group and then determining the first stage strategies of the government and the terrorists. I more formally lay out the assumptions of the game and solve it beginning in the next subsection. Here I discuss its key insights.

The model highlights the key trade-off a terrorist organization faces when choosing to provide club goods. A potential population member does not support a terrorist organization solely based upon club goods provision. Instead, the model allows for a potential supporter to also gain util-
ity from a successful attack. Solving for the individual indifferent between supporting and not supporting the organization, the model shows that a terrorist organization will only gain support by increasing their social goods provision when the marginal utility a terrorist supporter gains from increasing the likelihood of a successful attack is less than the marginal utility gained from increasing the club goods expenditure. In other words, the size of a terrorist organization is not a monotonically increasing function of club goods expenditure. Providing club goods is only beneficial to the mobilization of a terrorist organization when the supporters benefit more from this provision compared to utilizing the same resources on military attacks.

The likelihood of the marginal utility from club goods increasing at a faster rate than the probability of a successful attack increasing should be larger when the supporters of the terrorist organization need these club goods. If the government is unable to provide these services, the population must look to the terrorist organization to provide them. As explained in the introduction, terrorist organizations such as the Islamic Salvation Front, LTTE, Hezbollah, and Hamas often provide services like trash removal, drinking water, health care, and a postal service, that typically are considered under the government’s purview.

The model additionally shows that the ability to correctly distinguish supporters from non-supporters is important for understanding how club goods provision impacts the utility of a terrorist supporter. As the ability of the terrorist group to correctly distinguish supporters from non-supporters decreases, the utility gained from joining the terrorist organization also decreases. This occurs because the marginal utility derived by a supporter from club goods decreases as non-supporters are more likely to “incorrectly” obtain these goods. In this situation, a terrorist group will benefit more from increasing military attacks as opposed to spending resources on club goods.

A supporter of the terrorist organization is also impacted by the counterterrorism campaign of the government. One the one hand, increased counterterrorism decreases the probability of success for the terrorist organization, lowering the utility of a supporter. On the other hand, increased counterterrorism causes more economic damage, lowering the opportunity cost of becoming a terrorist supporter. Examining the individual indifferent between supporting and not supporting the terrorist organization, the model shows that support for the terrorist organization will only decrease
if the rate of economic damage occurs faster than the rate of destruction of terrorist resources.

Solving the simultaneous decision of the government and the terrorist organization reveals that the level of counterterrorism and club goods provided also depends on tradeoffs. The terrorist organization gains utility from both the number of supporters and the wealth of these supporters and also from a successful attack. Since providing club goods decreases the number of resources used for military attacks, a terrorist organization will only provide club goods under certain conditions. When providing club goods increases the size of the terrorist group, the terrorist group will increase club goods provision so long as the benefit gained from increasing both the wealth and number of supporters is greater than the benefit of increased success had these resources been used in military attacks. In fact, since the only benefit to a terrorist organization from club goods comes from its impact on size and wealth of supporters, the likelihood of a terrorist attack should decrease when club goods are provided once size is taken into account. The model also finds that when an increase in counterterrorism policies leads to an increase in mobilization, the terrorist group will decrease its military attacks and increase their level of club goods provision. This finding helps to explain why terrorist organizations often appear weakened in the short run only to reemerge stronger at a later date.

The government, on the other hand, gains utility from both decreasing the likelihood of a successful attack and from decreasing the level of terrorist support. The model shows that even when the level of support increases with an increase in counterterrorism a government may still increase its counter-terrorism policy so long as the benefit derived from decreasing the probability of success of current attacks is worth more to the government than decreasing the number of supporters. This finding helps to explain why a government finds it difficult to endure a high level of current attacks even if this means less overall strength to the terrorist group in the long run.

3.3.1 Nash Equilibrium

To solve this game, I use backward induction to find the subgame perfect equilibrium. In doing so, I first solve for the proportion of terrorist supporters, taking the first-stage equilibrium behavior of the two adversaries as given. I then solve for these first-stage choices of the terrorist organization
and the government. Since the terrorist organization and the government act simultaneously in the first stage, I find the Nash Equilibrium of this subgame. I show that this Nash equilibrium exists in the appendix. Thus my game has a solution.

Empirically, however, I am less interested in this solution than in the ways in which the actors respond to each others’ decisions in this equilibrium; e.g., how the proportion of terrorist supporters changes with an increase in club goods. This cannot be found by looking at the comparative statics of the game, as club goods are endogenous. As such, I focus my second stage analysis instead on the impact of club goods on the proportion of supporters. Practically, this means that in my analysis of the second stage I concentrate on the change in the proportion of supporters as a function of club goods provision. Similarly, I am interested in the way terrorist groups and the government react to each other; therefore, in my analysis of the first stage I concentrate on the shape of the best response curve of each actor to the actions of the other actor.

3.3.2 The Population

Since backwards induction is used to solve this model, the population of potential supporters of the terrorist organization must be analyzed first. The population is assumed to care not only about the success of the terrorist group but also about the level of public services provided and the economic activities available. I let \( n \) represent the total population from which supporters for the terrorist organization can be drawn. In order to capture heterogenous attitudes towards the terrorist organization, I follow Siquiera and Sandler (2006) and let the supporters be distributed on the unit interval \([0, 1]\) and indexed by \( \sigma \). Those individuals with a higher \( \sigma \) gain a higher level of utility from supporting the terrorist group. The population is therefore characterized by type \( \sigma_i \) because some individuals are assumed to ideologically support the terrorist group more than others.\(^5\) If an individual becomes a supporter of the terrorist organization, she receives a benefit of \( \sigma_i \) from supporting the terrorist organization. A non-supporter receives a benefit of \((1 - \sigma)_i\) from not supporting the terrorist organization. In addition to the utility gained from her preference for the group (denoted by \( \sigma \)), a member of the population also gains utility from the expected

\(^5\)For this model the simplifying assumption is made that type is uncorrelated with economic activity. Allowing this correlation might be interesting for future work.
payoffs associated with the terrorist group’s success or failure. A terrorist supporter gains \( v_s \) from a terrorist group’s success and \( v_f \) from the terrorist’s failure.

The probability of success is assumed to be dependent on the level of counter-terrorism undertaken by the government, \( c \), and the level of military resources invested by the terrorist organization, \( m \). I let \( \psi(c, m) \) represent the probability that the terrorist group is unsuccessful in its goals (and \( (1 - \psi(c, m)) \) represent the probability that the terrorist group succeeds). It is assumed that as the level of counter-terrorism increases, the probability of success decreases and that as the level of military resources invested by the terrorist organization increases the probability of success also increases. The functions are assumed to be concave in \( c \) and convex in \( m \) in order to capture decreasing returns. Mathematically this means \( v_s > v_f, \frac{\partial \psi}{\partial c} > 0, \frac{\partial^2 \psi}{\partial c^2} < 0, \frac{\partial \psi}{\partial m} < 0, \frac{\partial^2 \psi}{\partial m^2} > 0 \). It is also assumed that a supporter gains more utility from success than from failure. Following Siqueira and Sandler (2006), in order to capture the risk terrorists face by exposing themselves when they increase their military actions, the sign of \( \frac{\partial^2 \psi}{\partial c \partial m} \) is positive indicating that an increase in terrorist’s action increases the ability of the government to discover them. White (2003) highlights the fact that a weak opponent gains an advantage by remaining hidden in asymmetric warfare and loses this advantage as they increase the magnitude of their attack.

In addition to gaining utility from success and her innate level of support (\( \sigma \)), a supporter of the terrorist group also obtains utility from the level of social services provided (\( \bar{h}(g) \)). It is assumed that as social services increase, the utility gained from these public services also increases but at a decreasing level \( \left( \frac{\partial \bar{h}}{\partial g} > 0, \frac{\partial^2 \bar{h}}{\partial g^2} < 0 \right) \). Following the logic of Siqueira and Sandler (2006), I assume that a fraction of the club goods are also provided to non-supporters because the supporters and non-supporters cannot be perfectly identified by the terrorist group. I denote this \( \theta \).

Following Bueno de Mesquita (2005a) this model assumes that the government’s counter-terrorism strategy causes damage to the economic environment, which is represented by \( \tau(c) \).\(^6\) I assume that as the counterterrorism strategy increases, the damage also increases but at a decreasing rate \( \left( \frac{\partial \tau}{\partial c} > 0, \frac{\partial^2 \tau}{\partial c^2} < 0 \right) \).\(^7\) This function allows me to capture the two opposing effects of the

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\(^6\)I assume that as the level of counterterrorism increases, the destruction to the economic environment grows stronger \((\tau'' > 0)\). As an example, if a few bombs are dropped, a few businesses may have to shut down. However if an entire city is bombed, the entire economic system shuts down.

\(^7\)As stated earlier, for simplicity it is assumed that type does not impact utility from economic activity. This could
counter-terrorism strategy. On the one hand an increase in counterterrorism increases the likelihood of failure by the terrorist organization (captured by $\frac{\partial \psi}{\partial c} > 0$) and on the other an increase in counterterrorism decreases the utility of being a non-supporter by increasing economic damage. As with a non-supporter, I assume that a fraction of economic activity will be available to a terrorist group supporter (denoted $\gamma$) due to the government’s inability to correctly identify supporters. A terrorist supporter will partake in the economy at a decreased rate because of both exclusion by the government and time spent with the terrorist organization. By including in the utility equation of a supporter both a positive component determined by the probability of success (dependent upon the level of military resources) and a positive component determined by club goods, this utility equation captures the tradeoff between increasing militant efforts or increasing club goods. The marginal impact of both $m$ and $g$ will determine when mobilization increases or decreases following an increase in club goods expenditure.

The utility for a supporter therefore equals $N^T$ where:

$$N^T = \psi(c, m) v_f + (1 - \psi(c, m)) v_s + \bar{h}(g) + \gamma(1 - \tau(c)) + \sigma$$  \hspace{1cm} (3.1)

A non-supporter gains utility from the portion of social services she can receive and from actively participating in economic activity (which she is less able to do if she supports the terrorist organization).

The utility of a non-supporter equals:

$$N^{\sim T}(c, m) = \theta \bar{h}(g) + (1 - \sigma) + (1 - \tau(c))$$  \hspace{1cm} (3.2)

In order to simplify, the budget constraint for the terrorist organization must be taken into account. I assume that the terrorists have a fixed amount of resources, $T$, which can be spent on club goods provision, $g$, and military attacks, $m$, where $\alpha$ represents the per unit costs of the terrorists’ effort directed towards military actions. Thus the budget constraint gives us $g = T - \alpha m$.
Solving for the individual indifferent between supporting and not supporting the organization gives:

\[
\hat{\sigma} = -\frac{1}{2} \left[ h(T - \alpha m) - \psi(c, m)v_f - [1 - \psi(c, m)]v_s + 1 + (1 - \gamma)(1 - \tau(c)) \right]
\]  

(3.3)

where \( h(g) = (1 - \theta)\bar{h}(g) \) and \( \frac{\partial h(g)}{\partial g} > 0, \frac{\partial^2 h(g)}{\partial g^2} < 0 \).

The partial derivative with respect to military resources will allow us to investigate how support for the organization changes with an increase to military expenditure.

\[
\frac{\partial \hat{\sigma}}{\partial m} = -\frac{1}{2} \left[ -\alpha \frac{\partial h}{\partial m} + \psi'(c, m)[v_f - v_s] \right] \leq 0
\]

(3.4)

From this result two cases are found; details are in the Appendix. In the first case, termed “High Success”, the marginal utility a population member gains from increasing the likelihood of a successful attack is greater than the marginal utility gained from club goods consumption. Therefore the overall effect of increasing military expenditures is negative. This means that \( \hat{\sigma} \) decreases in \( m \) and the terrorist group gains support by increasing the level of militant activities. If the opposite situation occurs, called ”Low Success”, the marginal utility gained from club goods consumption is greater than the marginal utility gained from increasing the likelihood of a successful attack. Here \( \hat{\sigma} \) increases and the terrorist group loses support by increasing the level of militant activity. These situations can be summarized as follows:

**Proposition 3.3.1.** When the marginal utility a potential population member gains from increasing the likelihood of a successful attack is greater than the marginal utility gained from club goods expenditure, a terrorist group will gain support by increasing their military actions. When it is not the terrorist group will lose support by increasing their military attacks.

These two cases are interesting because they highlight the fact that not all terrorist groups benefit from increasing club goods provision. In particular, if providing club goods is likely to have a small impact or providing military resources is likely to have a drastic impact, the terrorist organization will increase mobilization by not providing social services and instead increasing militant activities. This situation may occur when the terrorist organization has a concentrated
minority to whom they can administer the club goods to or the terrorist group is already providing a large amount themselves so that the marginal impact of providing an additional unit of goods is small given the decreasing returns. If the terrorist group has few resources to begin with, the marginal effect of providing additional military resources would be large. In a similar argument, if the government is providing public goods to the potential supporters, club goods will have a smaller impact. If, however, the region does not have public goods, the terrorist organization can fill this void by providing club goods. These club goods should have a larger impact on increasing popular support when the terrorist organization is able to meet this needed demand.

Club goods provision may also be non-beneficial when the terrorist is not able to distinguish supporters from non-supporters and is forced to provide club goods to all members of the population. If this is the case, as $\theta$ increases, the disutility from remaining a non-supporter decreases because club goods are able to be obtained without providing support. In this situation, the terrorist group will benefit more from increasing military attacks. This is summarized below.

**Proposition 3.3.2.** When the ability to distinguish terrorist supporters from terrorist non-supporters decreases, the terrorist group will lose support by increasing club goods.

In addition to analyzing whether club goods provision increases or decreases the threshold necessary for mobilization, the role of the government’s counter-terrorism strategy must also be investigated. The partial derivative with respect to counterterrorism magnitude can be used to investigate how support for the organization changes with an increase in counterterrorism.

$$\frac{\partial \hat{\sigma}}{\partial c} = -\frac{1}{2} \psi \frac{\partial \psi}{\partial c} [v_f - v_s] + (1 - \gamma) \frac{\partial \tau}{\partial c}$$  \hspace{1cm} (3.5)

Similarly to the terrorist group, sometimes the government will wish to increase its amount of counterterrorism and sometimes it will wish to decrease it. Details on the cases are included in the Appendix. When the marginal amount of damage caused to the economy is greater than the marginal benefit gained by decreasing the likelihood of success for the terrorists, an increase in counterterrorism will lead to more support for the terrorists because non supporters will be
drastically hurt by the economic damage. This may occur if the government is unable to use targeted attacks and instead hurts the entire population or where the economic opportunities are already low so a small amount of damage has a large negative effect. In this case the government will not wish to increase its counterterrorism strategy. If, however, the damage to the economy is small (perhaps the government launches targeted strikes or damages a small amount in a flourishing economy) the government will wish to increase counterterrorism used against that terrorist group because the relative marginal damage is low. When governments have the ability to correctly identify terrorist supporters, the costs to joining a terrorist organization are larger because economic participation will be lowered. This causes support for the terrorist organization to drop.

These results can be summarized as follows.

**Proposition 3.3.3.** If the damage caused by the counterterrorism campaign is greater than the marginal benefit of increasing the likelihood of failure, an increase in counter-terrorism actions will increase support for the terrorist organization. If this is not the case, an increase in counterterrorism activities decreases support for the terrorist organization.

**Proposition 3.3.4.** When the fraction of economic activity available to a terrorist supporters is lowered, support for the terrorist group decreases.

By taking the counter-terrorism strategy of the government and the social services provision of the terrorist organization as fixed, this section has shown that in some cases the terrorist organization gains mobilization by offering club goods (when the benefit to the population outweighs the loss of effectiveness in attacks) and that sometimes a government benefits from increasing counterterrorism (when this increase causes more damage to the terrorist organization than the economy). Given these impacts, I now turn to the simultaneous decision of the government and the terrorist organization to determine what level of resources they should use/offer.

### 3.3.3 Terrorist Group

The simultaneous game is analyzed by first looking at the terrorist group. The terrorist organization gains utility not only from the level of supporters but also from the probability of a
successful attack. It is assumed that a successful attack generates direct utility for the terrorist organization because any goal the terrorist organization wishes to obtain is assumed by the definition of terrorism to be obtained through violent means. The goals of the terrorist organization can represent anything from gaining concessions from the government to successfully attacking a target. The definition of goals is purposefully left general in order to capture a number of different scenarios. What matters for the terrorist organization is that the violent means must be successful in order to achieve their goal. In addition the terrorist group gains utility from the number of supporters it has (which because of uniform distribution is just $1 - \hat{\sigma}$) and its welfare. The terrorist organization gains utility from the welfare of their supporters because the marginal productivity of the individual is assumed to increase with additional wealth. Bueno de Mesquita (2005a) and Berrebi (2007) show that a terrorist organization often selects those with the highest level of skills. The utility received from the proportion of supporters and their wealth is represented by $\mu$. Since the terrorist organization gains utility from the welfare of their supporters, I assume that $\mu$ is increasing at a decreasing rate in $g$. The terrorist organization receives $S$ from success and $\bar{S}$ from failure.

The utility function for the terrorist organization is:

$$U_T = (1 - \psi(c, m))S + \psi(c, m)\bar{S} + \mu(T - \alpha m, (1 - \hat{\sigma}))$$  \hspace{1cm} (3.6)

We normalize $\bar{S}$ to zero. Thus the utility function becomes:

$$U_T = (1 - \psi(c, m))S + \mu(T - \alpha m, (1 - \hat{\sigma})n)$$  \hspace{1cm} (3.7)

where we let $g = T - \alpha m$ and $p = (1 - \hat{\sigma})$, and $\frac{\partial \mu}{\partial g} > 0, \frac{\partial \mu}{\partial p} > 0, \frac{\partial^2 \mu}{\partial g^2} < 0, \frac{\partial^2 \mu}{\partial p^2} < 0, \frac{\partial^2 \mu}{\partial g \partial p} > 0.8$

The terrorist organization wishes to maximize its utility, and this is found by taking the FOC.

$$\frac{\partial U_T}{\partial m} = -\frac{\partial \psi(c, m)}{\partial m}S - \alpha \frac{\partial \mu}{\partial m} - \frac{\partial \mu}{\partial m} \frac{\partial \hat{\sigma}}{\partial m} = 0$$  \hspace{1cm} (3.8)

8The sign on $\frac{\partial^2 \mu}{\partial g \partial p} > 0$ captures the idea that the need for productive and skilled members increases as the group grows. A larger terrorist organization is able to specialize in attack types and in tasks, and has a need for skilled specialized behavior.
In the FOC the first term is the terrorist’s marginal benefit to attacks from increasing terrorist activity, the middle term is the loss due to not providing goods to finance their supporters, and the third term is the net contribution from the number of supporters (which can be positive or negative). The terrorists will choose their behavior given the costs (loss of $g$ and perhaps $p$) and benefits (gains from $(1 - \psi)$ and perhaps $p$). When providing club goods is beneficial for the terrorist group ($\frac{\partial \hat{\sigma}}{\partial m} > 0$), the terrorist organization will increase club goods provision so long as the benefit gained from increasing both the wealth and the number of the supporters is greater than the cost of decreased success. One might expect this to be the case in situations where the terrorist organization is dependent on the population for cover or when the target countries’ counter-terrorism policies harm the population of potential supporters. This is exactly the case we would expect to find when a regionally concentrated minority group exists, so the same variable which increases the marginal benefit to supporters of club goods also increases the benefit to terrorist groups from gaining those supporters. The model also shows that a terrorist organization’s benefit from club goods with respect to attack success comes from increased size only.\footnote{The terrorist organization also receives utility directly from the provision of club goods due to the increase in supporters’ welfare.} Therefore, once the positive impact of size is accounted for in the probability of success, club goods should not increase the likelihood of an attack. Indeed, if anything, once size has been accounted for, the provision of club goods should actually decrease the likelihood of attacks because resources have been taken away from military attacks. These results can be summarized as follow:

**Proposition 3.3.5.** When providing club goods increases the size of the terrorist group, the terrorist organization will increase club goods provision so long as the benefit gained from increasing both the wealth and the number of supporters is greater than the benefit of increased success if instead those resources were used on military attacks.

**Proposition 3.3.6.** The terrorist organization only benefits with respect to attacks from increased club goods provision due to an increase in its size. Once the effect of size has been taken into account, club goods should decrease the probability of success because these resources can no longer be used on attacks.
Another factor that may be of interest is how the terrorist’s utility changes with an increase in counterterrorism.

\[
\frac{\partial U^T}{\partial c} = -\frac{\partial \psi}{\partial c} S - \frac{\partial \mu}{\partial p} \frac{\partial \sigma}{\partial c} \tag{3.9}
\]

If an increase in counter-terrorism policies decreases support, the terrorist organization loses utility from an increase in counterterrorism. If support increases in response to an increase in counterterrorism policies, the terrorist organization will gain utility only when this increase in support outweighs the loss of attack success. Implicit differentiation is used to determine how the behavior of the terrorist organization will change when the government changes its counterterrorism strategy:

\[
\frac{\partial m}{\partial c} = \frac{\frac{\partial^2 \psi}{\partial m \partial c} S - \alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial c} - \frac{\partial^2 \mu}{\partial p^2} \frac{\partial \sigma}{\partial m} + \frac{\partial \mu}{\partial g} \frac{\partial^2 \sigma}{\partial m \partial c}}{-\frac{\partial^2 \psi}{\partial m^2} S + \alpha^2 \frac{\partial \mu}{\partial g} + \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial m} + \frac{\partial^2 \mu}{\partial p^2} \left(\frac{\partial \sigma}{\partial m}\right)^2 - \frac{\partial \mu}{\partial p} \frac{\partial^2 \sigma}{\partial m^2}} \tag{3.10}
\]

While many cases exist (please see the appendix for a discussion of the cases), a key finding is that if an increase in counterterrorism policies leads to an increase in mobilization for the terrorist group, the terrorist group becomes more likely to increase their level of club goods provisions at the cost of fewer resources devoted to attacks. This finding can help to explain why violence often restarts following an initial period of decrease in intensity for the terrorist group. In the short run the terrorist organization is choosing not to provide resources to terrorist attacks and is instead investing in social provisions. Once the terrorists have increased their support, they may choose to restart their campaign of attacks again now that they are stronger.

**Proposition 3.3.7.** If an increase in counter-terrorism policies leads to an increase in mobilization for the terrorist group, the terrorist group becomes more likely to decrease military attacks and instead provide club goods.

### 3.3.4 Government

While the government is interested in decreasing terrorist attacks, the government must also provide a number of other goods and services to remain in office. To incorporate this, the govern-
ment must pay a cost for engaging in counter-terrorism (denoted $k(c)$). The government also gains some utility from each member of the population who does not join the terrorist (either through their economic activity or through satisfaction from preventing support for terrorists) and I call this $\delta \hat{\sigma}$. The utility for the government from these components is denoted $U^G$ in the model.

$$U^G = \psi(c, m) - k(c) + \delta \hat{\sigma}$$  \hspace{1cm} (3.11)

where $k' > 0, k'' > 0$.

As stated above, to find out the maximal amount of $c$ to use given a level of $m$, the FOC (second order conditions are in the appendix) are used:

$$\frac{\partial U^G}{\partial c} = \frac{\partial \psi}{\partial c} + \delta \frac{\partial \hat{\sigma}}{\partial c} - \frac{\partial k}{\partial c} = 0$$  \hspace{1cm} (3.12)

Taking the FOC shows the government’s optimal amount of $c$ to use given a level of $m$. Even when the level of supporters increases with an increase in counterterrorism ($\frac{\partial \hat{\sigma}}{\partial c} < 0$), so long as the benefit to the government from decreasing the likelihood of current attacks is worth more to the government than the utility from decreasing the number of supporters, the government will increase its counterterrorism levels. This case helps to highlight a key problem faced by particularly a democratic government. As long as the probability of success today is decreased, it is difficult for the government to decrease their level of counterterrorism. Particularly because the terrorist organization will often decrease its magnitude of attacks in response to an increased counterterrorism policy, a democratic government may find it difficult to sacrifice a high level of current attacks today at the benefit of less attacks in the future even if this future benefit is greater.\(^{10}\)

Implicit differentiation is used to analyze exactly how the government’s counterterrorism strat-

\(^{10}\)I plan to allow for this explicitly in future research through a repeated game.
egy will change with an increase in terrorist activity.

\[
\frac{\partial c}{\partial m} = -\frac{\partial^2 \psi}{\partial c \partial m} + \delta \frac{\partial^2 \sigma}{\partial c^2} > 0
\]  

(3.13)

This tells us that the government’s best response curve is positively sloping and that in response to an increase in militant activities the government should increase its counterterrorism efforts.

\[
\frac{\partial U^G}{\partial m} = \frac{\partial \psi}{\partial m} + \delta \frac{\partial \hat{\sigma}}{\partial m}
\]  

(3.14)

When the number of supporters increases with military resource allocation, the government’s utility is decreasing as the terrorist organization increases its military focus. However, when the terrorist organization instead focuses on club goods because this increases the number of supporters, the government may still receive a decrease in utility as long as the decrease to attack strength from losing resources to attacks is less than the loss of utility from decreasing popular support.

### 3.4 Testable Hypotheses

This model generates multiple testable hypotheses, for example propositions 2.1-2.7. I am going to test two of these (proposition 2.1 and 2.6). The first states that public goods provision should decrease the marginal effect of club goods on size. This translates into an expectation of a negative and significant interaction term on public goods\(*\)club goods. The second states that club goods should affect the level of attacks only by increasing the size of the group, and so should not have an independent effect on the number of attacks.

#### 3.4.1 Hypothesis 1: Impact of Club Goods on Group Size

Hypotheses generated from the decision of the population to join or not join the terrorist organization can be examined by looking at the size of the terrorist group. If the proportion of supporters \((1 - \hat{\sigma})\) increases, the size of the terrorist organization should also increase. From Proposition 2.1, when the marginal utility gained from club goods surpasses that of military expenditures, club goods
will increase the proportion of supporters and will therefore be provided. In order to determine when this arises, the conditions under which a group is likely to benefit from club goods provision must be examined. If a government does not provide public goods the terrorist organization can take advantage of this void and provide club goods. Given this, a terrorist organization operating within a country whose government does not provide sufficient public goods should be more likely to benefit from the provision of club goods. On the other hand, a terrorist group operating in a country with sufficient public goods should be less likely to benefit from the provision of club goods. In the statistical model examining the size of the terrorist organization, this means that the interaction term of club goods and public goods should be negative. As the government provides more public goods, the impact of club goods on size should decrease. Since the constituent term of club goods represents the impact of club goods on size when public goods are at zero, I assume that this impact should be positive, indicating that without public goods, club goods will increase the size of the terrorist organization.

**Hypothesis 1.** While the marginal effect of club goods on size is positive for all values of public goods, this effect is strongest when public goods is at its lowest value and declines in magnitude as public goods increases. This translates into an expectation of a negative and significant interaction term on public goods × club goods.

It is difficult to predict the impact of public goods on group size when club goods provision is at zero. According to Siqueiera and Sandler (2006), the size of the terrorist group will often decrease following an increase to public goods provision. The size decreases because the benefit from not supporting the terrorist group increases as the government provides more public goods. On the other hand, Condra et al (2010) explain that increased public goods provision may increase communication among terrorist group members and potential supporters, leading to an increase in recruitment. Given these contrasting theoretical expectations, it is difficult to know whether public goods will increase or decrease the size of the terrorist group.

---

11 Ideally, an alternate test of this hypothesis would examine the same terrorist group over time. The data for club goods provision, newly collected for this paper, only dichotomously categorize the terrorist organization as either a provider of club goods or not and do not change over time. Given this limitation to the data, this test cannot be conducted at this time.
In order to test the above hypothesis regarding the size of the terrorist group, an ordered logit is used due to the categorical dependent variable.\textsuperscript{12} This variable is explained below. The unit of analysis is the terrorist group. The estimation sample covers 411 terrorist groups. All country level variables are collected from 1970 to 2003 and are collapsed to their mean. Standard errors clustered on the terrorist group are used but results are unchanged when using robust standard errors and standard errors clustered on the country.

The statistical model tested is:

\[
\text{size} = \beta_0 + \beta_1 \text{club goods provision} + \beta_2 \text{public goods provision} \\
+ \beta_3 \text{club goods provision} \times \text{public goods provision} \\
+ \text{controls}
\]

with controls = $\beta_4 \log$ of per capita income of home country + $\beta_5$ population of home country + $\beta_6$ democracy of home country + $\beta_7$ democracy squared of home country.

There is no expectation for the sign on the log of per capita income. A population in poverty may be more likely to mobilize in support of the terrorist organization due to decreased economic options. Bueno de Mesquita (2005a) theorizes that economic damage causes all potential supporters to increase their level of support while the terrorist organization selects those with the highest level of skills (Berrebi, 2007). Since more individuals want to join but the terrorist organization may select only a small sample of those increased individuals, the sign on log of per capita income may be positive or negative. Latent support for the terrorist organization will increase in response to a decrease in wealth, but due to selection by the terrorist organization, this may not translate into a larger terrorist group.\textsuperscript{13} The size of the population of the home country is included as a terrorist organization may have an easier time recruiting with a larger population base. The sign on population of home country is expected to be positive. The square of the democracy level is included

\textsuperscript{12} All thresholds are significantly different from each other.

\textsuperscript{13} These contrasting predictions raise a concern with the data on size. If the size of the terrorist organization includes only active terrorist members the expectation is different than a measure that includes all potential supporters. In future research, I hope to collect data on public opinion polls for Palestinian terrorist organizations to create a testable measure more accurate to this theory.
as mobilization should be easier for terrorist groups in semi-democratic countries. In autocratic countries, the terrorist group may be unable to mobilize due to lack of freedom of movement. In democratic countries, a terrorist group may have a harder time generating support due to legal alternatives. In those countries in the middle however, terrorist groups should have an easier time mobilizing.

Data for the size of the terrorist group comes from Asal-Rethemeyer BAAD1-Lethality Terrorism Data and the Terrorist Organization Profiles from the START Terrorism Knowledge Base. The size of the group is coded as a 0 if the group is between 0-100 or if confidence is low, 1 if the group is between 100-1,000, 2 if the group is between 1,000 to 10,000 and a 3 if the group is greater than 10,000. For groups not included in the BAAD1-Lethality Terrorism Data, the Terrorist Organization Profiles were used if available.

Club good expenditure was obtained from the Terrorist Organization Profile in the START Terrorism Knowledge Base. This database provides a verbal description of the activities of 854 terrorist groups. If this description includes a reference to social services, these groups are coded as a 1 for high club goods provision.\textsuperscript{14} This newly collected data greatly expands the dataset used by Berman and Laitin (2008).\textsuperscript{15}

Data on government spending on public goods is proxied through energy consumption obtained from the Correlates of War (COW). In countries with higher public goods provision, energy consumption for that country should also be higher, as electricity itself constitutes a public good.\textsuperscript{16} A robustness check is run using a measure of final government consumption(\% of GDP) provided by the World Bank’s Development Indicators (WDI). All major results remain unchanged.

The democracy measure will be taken from Polity projects policy2 variable (Marshall, Jaggers, and Gurr, 2006), which runs from -10 to 10. Since democracy will have to enter the regression in a non-linear fashion, in particular squared, the polity measure will be transformed to range from 0

\textsuperscript{14}The State Department’s descriptions of Foreign Terrorist Organizations and the ICT Database have been used to double check this coding whenever possible.

\textsuperscript{15}Berman and Laitin (2008) used the ICT database. The ICT database uses the State Department’s Background Information on Foreign Terrorist Organizations. This database provides a verbal description of the activities of 31 terrorist groups.

\textsuperscript{16}The energy consumption is measured in billions of coal ton equivalents.
to 21. Average per capita income also comes from the World Bank data and will be used logged. The measure for the size of the country comes from the Correlates of War (COW) (Singer, Bremer, Stucky, 1972).17

Table 3.1: Estimation results: Ordered Logit

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>(Std. Err.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>club goods</td>
<td>4.198</td>
<td>(1.162)**</td>
</tr>
<tr>
<td>energy consumption</td>
<td>0.620</td>
<td>(0.229)**</td>
</tr>
<tr>
<td>club goods * energy consumption</td>
<td>-0.977</td>
<td>(0.431)**</td>
</tr>
<tr>
<td>log gdp per capita</td>
<td>-0.866</td>
<td>(0.154)**</td>
</tr>
<tr>
<td>population</td>
<td>-1.933</td>
<td>(0.884)**</td>
</tr>
<tr>
<td>democracy</td>
<td>-0.041</td>
<td>(0.087)</td>
</tr>
<tr>
<td>democracy^2</td>
<td>0.004</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Cut 1</td>
<td>-5.993</td>
<td>(1.165)</td>
</tr>
<tr>
<td>Cut 2</td>
<td>-4.486</td>
<td>(1.154)</td>
</tr>
<tr>
<td>Cut 3</td>
<td>-2.321</td>
<td>(1.188)</td>
</tr>
<tr>
<td>N = 411</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 tail test, ** Significant at the 5% level.

The results support the hypothesis that club goods increase the size of the terrorist organization and that a terrorist group will only provide them when they do so. The descriptive statistics show that terrorist organizations do not provide club goods unless they increase their size. 78% of terrorist organizations who provide club goods have at least 1,000 members (categories 2 and 3). Contrasted with only 15.6% overall. No terrorist organization which provides club goods is smaller than 100 members. However, 61% of all terrorist organizations are between 0 to 100 members. 44% of terrorist groups who provide club goods are larger than 10,000 members and for all terrorist groups this size, public goods provision by the government is less than the 25th percentile. In addition, 88% of large terrorist organizations do not provide club goods, indicating that club goods leads to an increase in size instead of size leading to the provision of club goods.

The ordered logit regression (shown in Table 1) provides further support to these descriptives. When public goods provision is zero, the effect of club goods is positive and significant on size. The interaction of club goods and energy consumption is negative and significant as predicted. This

17 The population is measured in millions.
shows that club goods provision has a weaker impact as more public goods are provided, which is predicted by the formal model. Substantively the effect is also quite large. At 5th percentile of public goods, the probability that a terrorist organization is small (between 0 and 100 members) decreases by 64% when a terrorist organization provides club goods. However, at the 95th percentile, the probability that a terrorist organization is small (between 0 to 100 members) only decreases by 45%. Therefore, at a high level of energy consumption (95th percentile), a terrorist organization is 29.7% more likely to be small (between 0 to 100 members). However, even at high levels of energy consumption a terrorist organization that provides club goods is still unlikely to be small. This supports the finding in the model that a terrorist organization will only provide club goods when it is beneficial to do so. On the other side of the spectrum, providing club goods when energy consumption is at the 5th percentile increases the terrorist group’s probability of being at least 10,000 members by 42%. At the 95th percentile, providing club goods only increases the terrorist group’s probability of being at least 10,000 members by 31%. Thus at a high level of energy consumption, a terrorist group is 26% less likely to be at least 10,000 members.

The control variables show that income and population size reduce the size of the terrorist group. An increase in the poverty level of the home country increase the size of the terrorist group. However, given the relationship between poverty and population size with public goods, it is difficult to know how to interpret the results on population. Perhaps a larger population makes coordination among terrorist supporters more difficult as members may be more dispersed. Future research should include a measure of concentration to better understand the impact of population on group size. The level of democracy does not have a significant impact.

3.4.2 Hypothesis 2: Impact of Club Goods on Count of Terrorist Attacks

The second testable hypothesis from the model examines the impact of club goods provision on the likelihood of an attack controlling for size. In the model the only positive benefit from club goods provision comes from an increase in size and an increase to the wealth of an individual. According to this model, once size has been accounted for, an increase in club goods provision

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18 Asal and Rethemeyer (2008) also find no impact of democracy on the origination country.
should decrease the likelihood of an attack. This result follows because the terrorist organization must use resources from military attacks on club goods. In contrast, Berman and Laitin (2008) provide the only alternate explanation. They argue that club goods help to decrease defection, increasing the efficacy of the remaining resources for military attacks. If this is the case, club goods may lead to an increase in militant activity even accounting for size. If my model is correct and club goods only impact the likelihood of attacks through size, club goods should have a negative impact. If Berman and Laitin are correct and club goods impact the likelihood of attacks through decreasing defection, club goods should have a positive impact. If both of us are partially right, the negative and positive effects may cancel each other out and club goods may have no impact once size is accounted.

**Hypothesis 2.** Club goods only impacts the likelihood of an attack by increasing size. As such an increase in club goods alone should not impact the likelihood of an attack.

When examining the second hypothesis, the aggregate count of attacks in analyzed. A likelihood ratio test determined that a negative binomial model is appropriate. Overdispersion occurs both because terrorist acts are a rare event and are unlikely to be independent across terrorist groups.\(^{19}\) The unit of analysis is the terrorist group-country dyad.

To operationalize the magnitude of military actions, the aggregate number of attacks by a particular terrorist group from 1970 to 2003 is used.\(^{20}\) The theory proposed here is applicable to both transnational and domestic terrorism once size is taken into account. In addition the dependent variable needs to measure not only the number of terrorist attacks in a given country year but must also capture the dyadic interaction between the terrorist group and the targeted country. Given this interest in both domestic and transnational dyadic attacks, the Global Terrorism Database by START will be used.\(^{21}\)

Controls are included for both the home country and the target country. The controls for the home country are the same as in the model for hypothesis 1: log of per capita income, population, population.

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\(^{19}\)Thank you to Will Moore for pointing out the group interdependence.

\(^{20}\)Data for 1993 is missing from GTD and is not included here.

\(^{21}\)International Terrorism: Attributes of Terrorism (ITERATE) dataset is commonly used for transnational attacks. Please see (Mickolus et al, 1986), (Mickolus et al, 1993), and (Mickolus et al, 2002) for more information.
and quadratic democracy. The expectation for these controls are the same as for size, as a larger terrorist group is expected to launch more attacks. The controls for the target country are: population, log of gdp per capita, and democracy. Population of the country should positively impact terrorist incidents. In countries with larger populations, the terrorist group has more targets, can gain support from alienated members of the population, and the government has a difficult time with policing (Eyerman, 1998; Li, 2005). Many of the theories regarding the influence of wealth on terrorism focus on the qualities of the home country in generating support for terrorism (Krueger and Maleckova, 2002). While terrorists do need support within the target country, the “breeding ground” argument of poverty is likely to play a smaller role in the target country. For the target country, wealth may also play an important role in increasing the payoffs from terrorism and allowing for a more diverse target pool. Regardless of the mechanism at play, wealth should increase the likelihood of terrorism. The theoretical expectations are contradictory in the literature for the impact of democracy (Eubank and Weinberg, 1994; Eyerman, 1998; Li, 2005). Democracies may lower terrorist attacks because they provide alternative, non-violent means to expressing and resolving their grievances. While support is still needed in target countries, this effect should be largest when thinking about generating support for the terrorist group and the qualities of the home country. Increased democracy makes terrorism easier and less costly by providing political rights and civil liberties. This effect should be larger for the target country.

The results in Table 2 show that once size is taken into account, club goods have no impact on the expected count of attack. This null result provides support for both my model and the argument of Berman and Laitin: club goods act both via increasing size, at the cost of resources to put toward attacks, and via increasing the efficacy of resource use by decreasing the likelihood of defection. As expected, size positively impacts the expected count of attacks.

An increase in population and GDP per capita of the home country decreases the expected count of terrorist attacks. Poor countries are more likely to launch more terrorist attacks. As with the model on size, the negative and significant impacts of population highlights the need for future work to model the relationship between terrorist group size, club goods, public goods, counter-terrorism, and overall population size. Similarly to the previous model, the democracy level
Table 3.2: Estimation results: Negative Binomial Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>(Std. Err.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>1.558</td>
<td>(0.283)**</td>
</tr>
<tr>
<td>club goods</td>
<td>-0.019</td>
<td>(0.917)</td>
</tr>
<tr>
<td>log home country gdp per capita</td>
<td>-0.455</td>
<td>(0.237)*</td>
</tr>
<tr>
<td>home country population</td>
<td>-7.321</td>
<td>(1.695)**</td>
</tr>
<tr>
<td>home country democracy</td>
<td>0.166</td>
<td>(0.158)</td>
</tr>
<tr>
<td>home country democracy^2</td>
<td>-0.011</td>
<td>(0.008)</td>
</tr>
<tr>
<td>target country population</td>
<td>8.260</td>
<td>(1.817)**</td>
</tr>
<tr>
<td>log target country gdp per capita</td>
<td>0.795</td>
<td>(0.158)**</td>
</tr>
<tr>
<td>target country democracy</td>
<td>0.197</td>
<td>(0.031)**</td>
</tr>
<tr>
<td>Intercept</td>
<td>-7.474</td>
<td>(1.809)**</td>
</tr>
<tr>
<td>ln alpha</td>
<td>6.332</td>
<td>(0.076)</td>
</tr>
</tbody>
</table>

N = 63,804

2-tail test, * Significant at the 10% level; ** Significant at the 5% level

of the home country has no impact on the expected count of attacks. The results for the target country are as expected for population and gdp per capita. The positive and significant coefficient on democracy for the target country highlights the importance of separating causal mechanisms for the home and target country. For the target country, freedom of movement appears to be the driving factor.

3.5 Conclusion

I find that most terrorist organizations do not invest in social services because it does not provide the optimal use of their limited resources. Only if the marginal utility gained from providing club goods is greater than the marginal benefit of increasing the likelihood of success of terrorist attacks by providing additional military resources will the terrorist organization invest in social services. This finding is important because it questions whether militant terrorist groups truly have different goals from more politically oriented terrorist groups. The tactics of the two groups are different but this difference arises from the marginal benefits of using either militant resources or providing social services. If these conditions change, the terrorist group will act differently. For example, if a
government provides the social services needed by the supporters of a terrorist organization which focuses on providing social services, this terrorist organization may switch and begin spending its resources on militant activity.

In the same vein, a terrorist group thrust into the role of a primary social service provider may shift away from regular attacks. Similarly, in answer to the question of how counter-terrorism affects terrorist activities, this paper finds that terrorist organizations may decrease their militant activities following an increase in counterterrorism because it benefits the terrorist to do so. The terrorist group instead increases its social services because this leads to an increase in support. Thus, the terrorist organization may appear as a moderate or as a weakened group when the group is instead increasing its strength for the long run. Future research should investigate whether a decline in terrorist militant activity is the result of decreased strength or instead the result of a switch to social services provision.
CHAPTER 4

CLUB GOODS, TERRORIST ATTACKS AND COUNTERTERRORISM: ENDOGENIZING TERRORIST GROWTH

“The main effort at the time went into mustering and attracting young men and setting up military camps ....

The second effort was spreading the word among the people, first, in a bid to raise their morale, and second to instil in them a sense of animosity towards the enemy, coupled with a spirit of resistance” (Hassan Nasrallah quoted by Hala Jaber, Hezbollah Born With a Vengeance, pp. 49-50)

4.1 Introduction

The pattern of terrorism and counterterrorism at times appears as a movement in a Native American grass dance. The two competing actors have mimed each other so well that they appear as one dancer who must mimic the movements of one side of his other body creating perfect symmetry. de Figueiredo and Weingast (2008) write of the “vicious cycles” where violence by one side begets violence by the other. At other times the history appears as a well written drama with the extremist group waiting until the correct moment to launch an onslaught of terror, breaking down the peace negotiations (Kydd and Walter, 2002). Yet at other times the violence acts as a
crescendo, increasing the fervor of the domestic population (Bloom, 2004). This paper builds on these understandings of history by analyzing the interactions between a government, a terrorist group, and potential terrorist supporters. Using a verbal theory, I attempt to endogenize support for terrorism. The terrorist organization faces a choice in the first period on how many resources to provide for military attacks and how many to provide to social goods provision for supporters. The government must respond to these actions by the terrorist organization by deciding how many resources to invest in a counterterrorism campaign. By increasing resources in the counterterrorism campaign, the government decreases the operational capacity of the terrorist organization but may push potential supporters towards the terrorist organization.

This chapter builds on the earlier work in this dissertation by recognizing the dilemma faced by terrorist organizations in regards to resource provision. Mao Tse-Tung famously stated that “the guerrilla must move amongst the people as a fish swims in the sea” (Tse-tun, Mao, 2000). Che Guevara (1998) argued that rebel groups should provide social services in order to gain the support of local villages. Indeed, it seems quite reasonable that terrorist groups should also need popular support in order to reach their goals. Terrorist organizations need to hide among civilians for cover, rely on civilians for information, and perhaps most importantly trust civilians to remain silent. As explained in the previous chapter, recent scholarly work has focused on the competition between the terrorist group and the local government for support of the population and has examined the role social service provision plays in this competition (Ly (2007), Siqueira and Sandler (2006)). In Ly’s paper, he presents a model in which a terrorist’s charitable donation acts as a means to advertise its cause in order to raise popular support. Siqueira and Sandler (2006) demonstrate that the government attempts to curb terrorist support through public spending. However, contrary to this expectation of high support, the number of members varies drastically across groups. Data collected from Asal-Rethemeyer and the Terrorist Organization profiles reveal that around sixty percent of all terrorist organization only consist of zero to one hundred members.

This insight demonstrates the importance of breaking down terrorist supporters into more than one category. Paul (2010) argues that the term “support for terrorist groups” really means two different things in the literature. The first connotation for the term support refers to “feelings or
expression of sympathy” (pg. 489). The second meaning refers to the “actual material support or other direct or indirect aid or abetment” (489). Paul labels this form of support as “sympathetic of” while the second connotation is termed “supporting”. In Cragin et al (2006) the difference is explained in this way: “Participating in militant group activity is a direct form of activity, while endorsing militant activity is much more of an indirect form” (Cragin et al, 2006; pg. 84). This distinction is important because all organizations begin with a core group of supporters. This paper finds that if a government increases its counterterrorism campaign in the first round, it will do so in the second round. By increasing its resources for counterterrorism, the government will decrease the change of success for the terrorist organization but will also increase the underlying level of passive support for the terrorist organization. However, unless the terrorist organization is already large enough to provide resources to both attacks and social goods provision, these groups will be unable to tap into this success. Instead the effect of the counterterrorism campaigns will be a weakening terrorist campaign unable to increase its size. On the other side of the spectrum, terrorist organizations that provide a large level of social services have an incentive to induce demand for these services. As such, terrorist organizations providing a large amount of social services will increase their level of militant resources in round one, in an attempt to create a backlash attack,
and will then respond to this counterterror attack by providing the now needed social goods. This paper highlights the importance of understanding the structural conditions of a society before attempting to predict the behavior of the terrorist organization.

### 4.2 Theoretical Overview and Motivation

This verbal theory focuses on the strategic interaction between a terrorist group and a government. The terrorist group strives to strike at a government who attempts to protect itself through a counterterrorism campaign. Simultaneously, these groups also vie for popular support against each other. The terrorist organization moves first and decides the amount of resources to use on attacks. The terrorist organization can increase the probability of a successful attack by increasing their militant resources, but the terrorist group does this at a cost. As the terrorist organization uses its resources for militant attacks, the terrorist organization must decrease the amount of resources provided to its community of potential supporters. The government moves second and responds to this attack by choosing the level of resources to spend on counterterrorism. The government also faces a key trade-off when making this decision. While increasing the amount of resources spent on counterterrorism attacks will decrease the likelihood of success by the terrorist organization, the passive supporters will move away from the government when the government conducts these actions. Regardless of whether the government conducts a proactive counterterrorism campaign designed to reduce the operational capacity of the terrorist group, such as a direct military campaign against the terrorists, or whether the counterterror campaign is defensive, such as the hardening potential targets (Arce and Sandler, 2005), the government has reduced the probability of a successful attack. If the counterterror campaign is one of proaction, the terrorists are less likely to succeed because their resources and bases have been directly targeted. If the campaign is instead one of defense, the terrorist organization is less likely to succeed because the potential targets will be harder to strike. I assume that the government chooses a mix of proaction and defensive policies when designing a counterterror campaign. The population likewise will increase its support for the terrorist organization following the and counterterrorism campaign, proactive
or defensive, by the government. If a proactive campaign is used, the population may update its beliefs and believe it is facing a government with little concern for the general population (Bueno de Mesquita and Dickson, 2007). If defensive tactics are used, the population of potential supporters will face a increasingly difficult struggle in order to take advantage of economic activities offered by the government. In instances such as ethnic restrictions for employment these opportunities may be completely blocked. As such the opportunity cost of supporting the terrorist is lowered when defensive counterterror tactics are used. In addition, the government is also constrained by its budget. An increase in counterterrorism resources means a decrease in resources for other policy areas. Given this budget constraint, an increase in any counterterror tactic decreases the amount of public goods the government is able to provide to the potential supporters.\footnote{If the terrorist organization is a domestic terrorist group, the government will be in charge of providing public goods for the entire country, including the potential supporters. If it is instead an international organization, the government can compete for support through the use of foreign aid.} This decrease in public goods causes the social services offered by the terrorist organization is providing to increase in value.

Since the actions of the terrorist organization and the government determine future levels of success and support, I look at this interaction in two periods. The first period starts with a current level of support (exogenously chosen) and strength for the terrorist organization, represented through the probability of victory. One key contribution this paper makes is to distinguish between two types of support: passive support and active support. O’Neill (2001) defines passive support as support which comes from those individuals who sympathize with insurgents, often quietly, but who are unwilling to provide any material assistance. Paul (2009) explain that while passive support may appear unimportant, it is necessary for terrorist or insurgent groups. Even if the passive supporters do nothing else other than remain quiet, this seemingly small level of support guarantees that the insurgents will not be betrayed. As such, this passive support base becomes even more important as the government engages in counterterrorism strategies. One key strategy includes acquiring information, especially if the government wishes to utilize discriminant attacks in an attempt to reduce the collateral damage. Ironically, by having the support of these potential collateral victims, the terrorist group is able to limit the ability of the government to acquire this
information. On the other hand, active support, which I term core support in my theory, is the most important form of support because this represents the direct support given to the terrorist groups. Vinci (2006) argues that the first requirement any violent group needs to meet is a pool of people who are willing to fight. Metz and Millen (2004) argue that a terrorist organization needs manpower (including people with special knowledge and skills), funding, material, intelligence, and sanctuary. Core support provides the first four of these while the fifth is provided by passive support.

Allowing for these two distinct groups of supporters explains why so many terrorist organizations only have between zero to one hundred member. While it is certainly true that every terrorist organization needs a core group of followers, the majority of the population does not wish to get directly involved. Clutterbuck (1990) explains that the argument made that the winning side has support of the people is a myth. In reality the majority of the population prefers to stay out of the conflict completely, fearing retribution. In fact, only a very small percentage of the population actively supports the armed group or the army, policy, and local government. Boyle et al (2006) explains that all social movements, including armed movements, must attract participants outside their activist core. Due to these potential pools of support, a key problem for any government is figuring out how much the terrorist group relies on popular support versus dedicated, ideologically committed cadres. Anthony Vinci (2006) explains that the Ugandan government mistakenly took steps to distance the Lord’s Resistance Army (LRA) from local support with standard strategies like creating protected hamlets. The problem however was that the LRA never received a large level of local support and the creation of a protected hamlet did not reduce the LRA’s ability to continue conflict but instead helped to create alienation between the affected population and the Ugandan government (Vinci, 2006; 49).

This paper looks at the tradeoffs a group must make when attempting to survive as a terrorist organization. All armed groups must somehow motivate personnel willing to fight for it. This paper looks at two very different types of potential recruits: those who will function as the core fighting force of the armed group and those who will function in the background, providing housing and supplies and most importantly of all silence. I call the first type of recruit a core recruit and
capture this level of support for the group by looking at the overall level of core mobilization. The second type of recruit is a passive recruit and this type of recruit could also be thought of as a mass recruit, someone willing to join and help out against the government but not because of their own ideological commitment. This second type of recruit supports the terrorist organization not because they believe in the terrorists cause but instead because they desire access to the social services, including safety, provided by the terrorist organization. I capture this level of support by looking at the overall level of passive mobilization. As these definitions show, these two different types of support are influenced differently by the actions of the terrorist organization. Additionally, passive support and active (or core) support are influenced by very different factors. Indeed core support may not be linked to the level of goods provided by the organization in any fashion. For core support, the bonds between the core supporters and the armed group are much stronger. Jemaah Islamiyah (JI) is a small group made up of core supporters. The Jemaah Islamiyah (JI) marries sisters and daughters of other JI members and supporters in order to increase in-group solidarity and spread kinship (Ismail, 2006). In the instance of the JI, the supporters are not choosing to support JI because of a good or social service they are providing but instead are doing so because of their tight ties with the organization. Even in the larger terrorist organizations, one sees similar dynamics. Matthew Levitt argues that Hezbollah receives strong support from close-knit Shi’a communities in Beirut because the community is linked together through family relations and shared neighborhood experiences (Levitt, 2007). On the other hand, the Mao Tsetung quote reminds us that the link between broader social support and an armed movement cannot be overlooked. Recalling the following example from chapter 2, the literature emphasizes the link between terrorist organizations and charitable and humanitarian organizations (Ly, 2007; Flanigan, 2006). Ghandour (2002) reports that Hamas devotes 95% of its budget to maintain a network of NGOs. Jihad Al Bina’a, a Hezbollah charity, provides municipal services, such as garbage removal and drinking water, to south Beirut (Fawaz, 2005). The Islamic Salvation Front provided aid more effectively to victims of an earthquake in October 1989 than the government (Ly, 2007:178).

In this theory, I assume that core members benefit from successful attack while passive members benefit from access to these club goods. There are a number of reasons a terrorist supporter may
benefit from a attack. The probability of a concession may be higher if an attack is successful. Similarly, Bueno de Mesquita and Dickson (2007) look not at the probability of a single successful attack but instead allow the probability to represent the total probability that the armed conflict is won by the terrorist organization. In Ly (2007), a potential supporter gains utility from fostering the goals of the terrorist organization, which include successful attack. In fact, it is the core supporters who are ideologically committed to the organization and desire to foster its goals. These core supporters may also benefit from taking part in a fight against an enemy. Bueno de Mesquita (2005) allows an individual terrorist to gain utility derived from being a successful terrorist. In Faria and Arce (2005) the number of new terrorist recruits is positively related to previous levels of terrorist activity. Additionally, a successful attack may act as an advertisement for the terrorist organization. The passive supporters on the other hand are not ideologically committed to the terrorist organization and instead derive utility from consuming social service goods, including safety.

Given these definitions of passive and core supporters, I return to the first stage of the game, where the terrorist and the government start their interactions amid exogenously chosen levels of passive support, core support and probability of success. As explained, the terrorist organization must make a trade-off between providing social services or providing resources for attacks due to their constrained budget. This means making a trade-off between increasing the support of core attackers and passive supporters. Since core supporters respond to successful attacks, these supporters can be increased by spending more resources on attacks. The core supporters gain utility from seeing their terrorist organization fighting the government However, passive supporters do not care about attack success and instead care about access to social service provisions. Given this, passive support will decrease as resources are used for militant attacks instead of social services. Given the importance of these two groups of supporters, an ideal question is how these supporters change in response to the actions of both the terrorist group and the government.

Since the core members are already ideologically committed to the cause, I assume that the government’s counterterrorism does not impact their level of support. A proactive campaign does not reveal information regarding its type (Bueno de Mesquita and Dickson, 2007) to these core
members. If the government responds with a large counterterrorism response, these core members already anticipated that behavior from the government. Additionally a defensive campaign does not impact the core supporters as these members are active within the terrorist organization and are not taking part in the economic opportunities offered by the government. As such, the transition function for the level of core supporters does not depend on the government’s actions. Instead the transition function depends on the current level of core mobilization and whether there was a successful attack or not. If the terrorist group is successful, the core mobilization level increases. I have assumed this for a couple of reasons. As mentioned above, the core members care about fostering the goals of the terrorist organization and therefore should benefit from increasing that likelihood. Additionally, by the time a member of the population is considering becoming a core member, this member of the population is already committed to the cause and not supportive of the government. As an example, when writing about the higher tier supporters for the Shining path, McClintock (1998) writes that “the guerrillas bemoan the hunger, malnutrition, and generally abject conditions of living and dying in Peru, and they also contend that the Peruvian government is responsible for these conditions” (pg. 273). The question that remains then is not whether to support the government or the terrorist organization, as these core members have already severed ties with the government, but instead is whether the organization you join is actually capable of evoking change. Instances of success demonstrate that while supporting the terrorist organization may be risky, it is not without hope of success.

The transition function for passive support, however, does not depend on the level of success. The passive supporters are those who support quietly without direct participation, particularly because they fear the risk of retribution. If retribution is no longer something to fear (because the terrorist organization is so strong), these supporters would instead think about actively supporting the organization. Therefore the question remains what do the passive supporters care about? As with the core mobilization, the passive support in the future depends on the current level of passive support today. However, it also depends on the benefits gained from supporting the terrorist organization, which is determined by the level of total social services provided by the terrorist organization.
As more social services are available, a passive supporter gains a large benefit from supporting the terrorist organization. Additionally, the level of passive supporters is influenced by the counterterrorism level chosen by the government. As the government increases their counterstrike, this does reduce the resources and capabilities of the terrorist organization, hence lowering the probability of success, but it also increases the chance that collateral damage will occur. The population may be uncertain as to whether an armed struggle is necessary for change or whether an agreement can be made. As the government responds harshly against the population, some of the members will update on the type of the terrorist organization and decide that armed struggle is necessary (Bueno de Mesquita and Dickson, 2007). Even if the government only responds harshly in certain areas (and is able to geographically change their counterterrorism response, an option not allowed in my model), the passive support for the terrorist organization in those areas will increase and support in those areas not attacked harshly will remain the same, leading to an overall increase. In addition to directly impacting the passive supporters, a government counterstrike also impacts these supporters indirectly through the destruction of infrastructure, which will include some social goods, such as hospitals or homes. When the government destroys these resources, the government is creating an opening for the terrorist organization to provide these resources.

4.2.1 Theory

In order to derive hypotheses from this complicated theory, it is important to discuss the timing of these interactions. Each round of play is defined by an environmental state, which is determined by the level of the current probability of success, the current passive mobilization, and the current core mobilization. The actions of the government and the terrorist organization causes each one of these components to get updated. Before going into this in more detail, I will summarize the timing of the interactions:

1. Round 1

(a) State begins: the state is defined by the initial level of resources for the terrorist organization, captured by the initial probability of success \( p_0 \), the initial level of core
mobilization \( m_0^c \), the initial level of passive mobilization, \( m_0^p \), the initial level of social goods available in the country, \( G_0 \).

(b) Terrorist chooses the amount of resources to spend on military attacks, \( a_1 \) and because of the terrorist group’s budget constraint this decision simultaneously determines the additional social services the terrorist organization will provide, \( g_1 \).

Government chooses the amount of resources to spend on \( C_1 \).^2

(c) State gets updated:

The total level of goods available in the environment increases based upon the level of social services provided by the terrorist organization, \( G_1 = G_0 + g_1 \)

The level of core mobilization increases as the terrorist utilizes military attacks:

\[
m_1^c = f(m_0^c, a_1)
\]

\[
m_1^c = m_0^c + Sa_1\text{ where } S = 1 \text{ represents a successful attack and } S = 0 \text{ indicates a failure.}
\]

The level of passive mobilization also updates, increasing when the government provides social services, and therefore decreasing when the government provides resources for militant attacks:

\[
m_1^p = g(m_0^p, a_1, C_1)
\]

The level of underlying success probability increases when the terrorist organization spends more resources on military preparedness and when more core supporters are available to efficiently use those resources and decreases when the government launches a counterterrorism campaign:

\[
p_1 = h(p_0, m_1^c, C_1, a_1)
\]

(d) Payoffs are given:

The terrorist organization benefits from an increase in its chances of success and it also benefits from an increase in passive support:

\[
U_T = p_1(p_0, m_1^c, C_1, a_1) + \alpha m_1^p
\]

Since this is a zero sum game, the government loses utility as the terrorist succeeds and also loses utility when the terrorist gains passive support:

\[
U_G = 1 - p_1(p_0, m_1^c, C_1, a_1) - \gamma m_1^p
\]

^2While the government also faces a budget constraint, and as such faces a trade off between using resources for counterterrorism or other goods, I choose to simplify the theory and ignore this trade off. By focusing on counterterrorism I am able to focus on the key tradeoff the government faces: decreasing the probability of success but increasing passive mobilization.
2. Round 2

(a) Process begins a new.

State begins: \( p_1, m_1^c, m_1^p, G_1, T_1 \)

(b) Terrorist chooses \( a_2 \) (and \( g_2 \))

Government chooses \( C_2 \)

(c) State gets updated:

\[
G_2 = G_1 + g_2 \\
m_2^c = f(m_1^c, a_2) \\
m_2^p = g(m_1^p, a_2, C_2) \\
p_2 = h(p_1, m_2^c, C_2, a_2)
\]

(d) Payoffs are given:

\[
U_T = p_2(p_1, m_2^c, C_2, a_2) + \alpha m_2^p \\
U_G = 1 - p_2(p_1, m_2^c, C_2, a_2) - \gamma m_2^p
\]

4.2.2 Stage 2

To begin thinking about hypotheses from these interactions, I start by looking at the 2nd stage. As previously explained, in this stage the terrorist organization chooses the amount of resources for attacks. Since the terrorist faces a budget constraint, this decision for attacks simultaneously chooses a level of resources for social goods provision, highlighting the key tradeoff the terrorist organization faces. The government responds to the attack by the terrorist organization by choosing the level of resources to spend on counterterrorism. Here the government faces a tradeoff because while increasing the amount of resources spent on counterterrorism attacks will decrease the likelihood of success of the terrorist organization, the passive supporters become more likely to support the terrorist organization. The terrorist organization is aware of this tradeoff and must decide the amount of resources to spend on attacks, keeping in mind that changing its own resources will change the decision choice of the government. In particular, increasing the amount of attacks
has 3 key effects. The first is that an increase in attacks will increase the level of core supporters because the core supporters wish to support a successful terrorist organization. An increase in core supporters will in turn make success more likely as these are the operatives who actually carry out the attack. As Bueno de Mesquita (2005) argued, an increase in core supporters allows the terrorist organization to choose the operatives who best fit the skill that is needed for the attack. The second is that an increase in attacks will increase the probability of victory directly as more resources devoted to attacks will make the attack more likely to be successful. The third is that an increase in resources for attacks will decrease the resources available for social service goods, which will lead to a decrease in passive support for the organization. Thus we see the key tradeoff faced by the terrorist organization: increased attack efficiency but decreased passive support.

However, an increase in attacks also has a fourth effect which is a change in the level of counterterrorism spending by the government. In particular, as the terrorists expose themselves more via attacks and through a larger base of core supporters, the counterterrorism tactics of the government are more efficient. As the terrorist grows in size, the terrorist organization will have a more difficult time maintaining secrecy if for not other reason then a larger geographical demand for a terrorist base camp. The government’s intelligence gathering should be more successful as there are more potential targets to gather intelligence on. Both of these combined causes the counterterrorism campaign of the government to become more effective at damaging the terrorist organization. In addition, as the terrorist launches more attacks the terrorist group continues to expose themselves, increasing the efficiency of the government’s counterterrorism campaign. This causes the government to desire to use more resources for counterterrorism. In addition, an increase in attacks, increases the probability of success. In addition, on the passive mobilization side, increasing attacks also causes the government to benefit from increasing their level of counterterrorism. As attacks are increased, the terrorist organization spends less money on social goods provision. As such the potential passive supporters no longer see the terrorist organization as a viable alternative to supporting the government and as such are not as quick to support the terrorist organization when the government increases the resources for its counterterrorism campaign. Since the passive supporters are always deciding who to throw their support to, the government or the terrorist
Proposition 4.2.1. The government will increase the resources it spends on counterterrorism in response to an increase in the level of resources used for attacks by the terrorist organization.

However, the actions of the government are not only determined by the level of attacks of the terrorist organization, but are also determined by the level of support going into the round. Let’s start by looking at the changes to the level of core mobilization. An increase in the prior level of core support increases the current level of core support. As the level of core mobilization increases, it becomes harder for the terrorist organization to buy additional supporters through successful attacks. The individuals who were cheap to purchase are already core supporters of the terrorist organization. Therefore an increase in core mobilization causes the effectiveness at which resources for attacks translates into increased support to decrease. Since the level of resources used for attacks decreases, based on proposition 1, the government will in turn response with a decrease in its level of counterterrorism. Along the same lines, an increase in the prior level of passive mobilization increases the current level of passive mobilization. As the current level of passive mobilization increases, the counterterror campaign by the government becomes less destructive. The likelihood that an innocent bystander will be harmed by a proactive campaign or even defensive campaign decreases as the pool of passive supporters increases. As more individuals within the community are already supporting the terrorist organization, this means fewer truly innocent targets to hit with a proactive campaign and less additional people to be upset over the loss of economic opportunities if
a defensive campaign is used. An increase in passive mobilization also increases the resources used by the terrorist organization (hence magnifying the increase in resources for counterterrorism by the government by proposition 1) but for a different reason. As the current level of passive mobilization increases (which is caused by the increase in the prior level of passive mobilization), the terrorist organization must pay a premium to gain additional support. Each additional resource spent on social goods provision must be split across an larger pool of passive supporters. Thus the terrorist organization faces diminishing returns to providing additional social goods provision and will use more resources for militant attacks. This leads to propositions two through five (See appendix for proof of two and three. Further work must be completed to prove propositions four and five.).

**Proposition 4.2.2.** An increase in the prior level of core mobilization decreases the resources used for attacks by the terrorist organization.

**Proposition 4.2.3.** An increase in the prior level of core mobilization decreases the resources used for counterterrorism by the government.

**Proposition 4.2.4.** An increase in the prior level of passive mobilization increases the resources the government spends on counterterrorism.

**Proposition 4.2.5.** An increase in the prior level of passive mobilization increases the resources the terrorist organization spends on militant attacks.

### 4.2.3 Stage 1

With the second stage of the theory explained, I now turn to stage one. I start with the government’s decision since the government moves second. Since the government’s actions change the state for the next round, the government needs to worry not only about maximizing stage one utility but must also worry about stage two. The stage one decision is the same as it was in stage two. The government still must choose how to respond to the attack by the terrorist organization by choosing the level of resources to spend on counterterrorism. The government still faces a tradeoff between a lower success probability for the terrorist group or increased passive supporters. However the government’s actions now have two additional effects. The first: increasing
the level of resources used for counterterror in round one, $C_1$, will increase the initial level of passive mobilization in round two. Thus the government pays the cost in the first round in terms of additional support, but by accepting this cost in round one, the cost is lowered in the second round because the initial state has already been paid. In other words, the government does not start from scratch every round. If the government increases passive support for the terrorist through the use of a counterterror attack, that level of support is still there when the government moves into the second round. This allows the government the freedom to spend more on additional counterterrorism in round two, but the government can do so because the sunk cost was paid in round one. Additionally, increasing this level of passive mobilization will also expose the government to more attacks in round two because the terrorist organization was given additional passive support without changing its own actions. The second effect is that increasing counterterror will destroy the infrastructure and as such will also destroy some of the current social goods provided by the terrorist organization, such as housing, medical services, or schools. As such, counterintuitively, this act will benefit the terrorist organization. Since the passive supporters experience diminishing returns as a result of increased social goods, the destruction of these goods by the government allows the terrorist organization to provide them when they are more effective because the total level available has decreased. This combined with the first effect makes it difficult to determine the reaction of the terrorist organization to an increase in counterterrorism by the government in round one. One the one hand, increasing the level of passive mobilization makes providing more social goods less useful but on the other the destruction of social goods by the government creates a need for those goods. However, recall from proposition 1 that the government will increase its actions in response to an increase in the level of attack by the terrorist organization. Given this, a terrorist organization who provides many social services has an incentive to increase their attacks in the hopes of forcing the government to respond with a stronger counterterrorism response in round one. The terrorist organization does because the increased counterterrorism response will destroy the social goods provided by the terrorist organization. Therefore in the next round, the terrorist organization will be able to gain additional passive supporters. These passive supporters were angered by the counterterrorism campaign of the government and are in need of the increase
in social services provided by the terrorist organization. This helps to explain why Hamas and Hezbollah may launch provocative attacks which in turn destroy their resources. Because they were already providing social services to a large proportion of the population and in a large amount, the benefit they gained by increasing or continuing to provide these resources is small. However, if Israel destroys these resources for them, they can turn around and fill a new void. This leads to propositions 7 and 8 (These proofs are not included in the appendix. Further work must be completed to prove propositions 7 and 8).

**Proposition 4.2.6.** Increases in resources used by the government for counterterrorism in the first round should increase the level of counterterror in the second round.

**Proposition 4.2.7.** In a general form it is impossible to sign the response of the terrorist organization in response to increased counterterrorism in round one. One the one hand, increasing the level of passive mobilization makes providing more social goods less useful but on the other the destruction of social goods by the government creates a need for those goods.

**Proposition 4.2.8.** Terrorist organizations providing a large level of social services have an incentive to induce demand for these services. As such, terrorist organizations providing a large amount of social services will increase their level of militant resources in round one and reduce them in the following round (as they are now filling the newly created demand for social services).

### 4.3 Historical Example: Hezbollah

“It is difficult to apportion blame to one party in this profound crisis without also citing the other”. - An editorial in Egypt’s state run al-Ahram al-Massai newspaper (Agence France Presse, July 14) cited by Daniel Fink et al, Reactions in the Middle East to the Israel-Lebanon Crisis

On August 14th, the implementation of the UN Security Council’s Resolution 1701 ended a 33 Day War that was triggered by the abduction of two Israeli soldiers on July 12, 2006 by Hezbollah.³

³This war has also been called the “July War”, the “Sixth War”, the “33 Day War”, the “Two Soldier War”, “Operation Changing Direction”, and “Operation Dependable Promise”. The war has also been said to last 34 days depending on how one counts.
The adoption of Resolution 1701 caused the hostilities at the border to cease but has not provided a sustainable peace between Lebanon and Israel, and this peace appears as if it will remain elusive until the greater Arab-Israel Conflict is settled. The widespread support of Hezbollah during the July Conflict demonstrated that resistance against Israel is supported by the Arab masses and is seen as necessary. Hezbollah has strengthened its support base by appealing to both core supporters and passive supporters. Hezbollah appeals to its core supporters by claiming to fight for Lebanese sovereignty, and indeed the sovereignty of the entire Arab world, through Islamic principles and uses religious language to color its armed resistance as an Islamic Jihad against the unlawful occupation of the Zionist enemy, Israel. Simultaneously, Hezbollah appeals to passive supporters by spearheading a social work program aimed at Shi’i neighborhoods. The 33 Day War provides an illustrative example of proposition 3.2.8. While Hezbollah lost strength and support in the immediate aftermath, a testament to the destructive capability of counterterrorism tactics, just months after Hezbollah repositioned itself in the society. Hezbollah followed the shifting dust and shifted their own gears to capitalize on the rebuilding the the Lebanese society. Recalling the poll released by the “Beirut Center on Research and Information” used in chapter one of this dissertation, by July 26 it was reported that 87% of the Lebanese supported Hezbollah’s actions against Israel, an increase of 29% from a similar poll conducted in February (BCRI, 2006). This case study will proceed as follows. In the first section I will analyze the establishment of the confessional system in Lebanon, explaining how this system led to an increase in anger and distrust and in response, passive support. In the second section I will analyze the events of the Lebanese civil war and explain how these events have provided Hezbollah with reasons to incite the distrust the Lebanese army and with opportunities to demonstrate that Hezbollah is necessary for the safety and sovereignty of Lebanon, allowing Hezbollah to provide the most important social good, safety. In the third section I will investigate the historical events surrounding the reemergence of Amal following the 1978 invasion, the creation of the Lebanese Resistance Movement following the 1982 invasion and explain how this situation helped to create a climate ideal for the birth of a terrorist organization based upon a high level of passive support, in this instance Hezbollah. I will then explain how the development of Hezbollah occurred, from a secret organization focused entirely
on militant resistance and core supporters, into a political resistance movement known for social goods provision.

**Part 1: Lebanon’s Confessional System**

In 1943 Lebanon achieved its independence from France. During this time, Bishara al-Khuri (the Maronite president) and Riyah al-Sulh (the Sunni prime minister) worried about a lack of national unity within the newly autonomous Lebanon. In order to unite the country, the National Pact was created. This verbal agreement stated that the Christians would reject any European protection and all military pacts with the Western powers and the Muslims must agree to set aside any pan-Arab desires and accept Lebanon’s existing geographical borders (Seaver, 2002, pg. 254). In addition to the National Pact, the leaders also created a confessional political system with future Lebanese presidents coming from the Maronite Christians, premiers from Sunni Muslims and the speaker of the Chamber of Deputies from Shi’ite Muslims. The parliament was to represent the Christians and the Muslims in a 6:5 ratio with all civil service appointments and public funding decisions to also be made on a sectarian basis (Seaver, pg. 255).

This National Pact was added as a supplement to the 1926 constitution which was crafted by the French and the Lebanese jurists. This constitution states that a parliament must be popularly elected every four years with confessional groups represented proportionately and then this parliament must elect a president of the republic who will serve a six-year term. The president was to be in charge of appointing the prime minister and the prime minister would then form a cabinet that would hold the confidence of the parliament. Until the end of the 1970s this confessional system appeared to be the compromise to the democratic system that was necessary in the religiously divided Lebanon. However, this seemingly fair constitution also allowed the President veto authority, the power to dissolve the parliament, decree powers, and the authority to appoint and dismiss the prime minister and the cabinet (Seaver, pg. 255).
Part 2: The Lebanese Civil War

These rights led to an accumulation of power within the hands of the Maronite president that was looked upon with suspicion by the Muslim confessional groups. The first indication of a conflict between the Christians who supported the West and the Muslims who supported pan-Arab ideology was in 1958 when a brief civil war erupted. The Muslim and Druze population revolted against the Christians because President Chamoun had attempted to fix the election (Jaber, 1997, pg. 10). In response to the revolt, Chamoun equated President Nsasser’s pan-Arab socialism with communism and requested assistance from the United States. As a result, the US sent Marines and restored order through the election of Fouad Chehab, the leader of the Lebanese army, as president.

However, this election only represented a band aid for the growing enmity between the Muslims and the Christians. Lebanon was dominated by the ruling families known as the “four percent class” (Reilly, 1982; pg. 14), and the growing Sunni Muslim middle class and the neglected Shi’i peasantry began to organize themselves as a challenger to the ruling families. During the Middle East oil revolution of 1973-1974, the disparity between the rich and the poor increased due to rising prices, declining wages, high inflation, and low national production rates (Seaver, pg. 257). The combination of economic deterioration with a deficient political structure unable to distribute the wealth evenly throughout the region led to the social mobilization of this modernizing country.

The Lebanese National Movement (LNM) was established by the Nasserites, pan-Syrian nationalists, the Ba’thists, and the communists all wishing to abolish the confessional government posts and transform Lebanon into a true democracy (Reilly, pg. 14). The Nasserite Movement, whose militia is the Murabitun, was supported by the Sunni Muslim population in Beirut, the Syrian Social National Party (SSNP) was supported by the Orthodox Christians in Beirut and the Kura and Matn mountain regions, the Lebanese Communist Party and the Organization for Communist Action (OCA) were supported by the Shi’i Muslims. The Shi’i Muslims were not only underrepresented in the government but were also neglected by the feudal, landowning Shi’i leaders who were interested only in personal gains (Jaber, pg. 10). These poor peasants had moved from rural areas with rural poverty to Beirut only to live in urban poverty. The slums on the outskirts of Beirut, where the Shi’i Muslims lived, were so rundown that they were called “the belt of misery”. Jaber
(1997) described these as places where:

“piles of garbage, mixed with sewage from burst pipes, littered the streets and emitted an offensive stench. During Lebanon’s torrential winter rainfall the roads flooded, cars sank into the mud and pools of filthy water attracted flies and rats. With each passing season, the areas appeared to have deteriorated” (pg. 145-146).

Then, in 1971, Israel began systematic air and ground attacks against south Lebanon which only worsened the Shi’i conditions. The action by Israel was a response to raids the PLO began making into Israel from South Lebanon beginning in 1968, as predicted by proposition 3.2.1 (Reilly, pg. 15). Following the 1969 Cairo Agreement which pardoned this behavior, the attacks by the Fedayeen (Arab commandos) increased dramatically (Seaver pg. 259). While the Christians feared the existence of the Palestinians would bring about an Israeli invasion, the Sunni Muslims supported the PLO. In response to the raids in Israel and fear of invasion by Israel, the Christian Maronites Phalangist militia began to clash with the Palestinian commandos (Jaber, pg. 12).

As predicted by proposition 3.2.6, in combination with an earlier round of counterterrorism, Israel also increased its violence towards the PLO. In response to this increased violence, Musa Sadr, an Iranian cleric and a naturalized Lebanese, began to demand for protection of the Shiites in the South. He formed Harakat al Mahrumin (Movement of the Deprived) in order to uplift the Shiias into a politically significant force (Pelletiere, 1994; pg. 25). Sadr attacked the sectarian basis of the Lebanese government because it was incompatible with democracy. The Shias, the largest sect in Lebanon, received the fewest patronage spots, and Sadr felt that this was because of their low economic situation. The Shiites either abandoned their villages to escape the fighting or set up training camps to learn to defend themselves. At first Sadr had close relations with the Palestinian resistance, but as the Shiite suffering continued to increase, he began to blame the Palestinians for their suffering (Jaber, pg. 12).

In April 1975, the civil war between the LNM and the Lebanese Front (made up of mostly Maronite Christians) broke out with an armed Phalangist (the Maronite militia) attack against a busload of Palestinian civilians who were passing through a Maronite suburb of Beirut. The
tensions between the Muslims and the Christians had been escalating previous to this event, with an Israeli air attack on a Palestinian camp near Beirut in 1974 and the Lebanese army using force to pacify the fisherman’s strike in Sidon in February of 1975. This tension against the army created the need for a military organization outside of the national government to secure the country, the role that Hezbollah will later claim to fill. The Phalangists were hoping to provoke the PLO so that the Lebanese army would intervene on behalf of the Maronites.

However, the distrust of the Lebanese army, due to the inability to defend against Israel and the death of a pro-Nasserite member of parliament, the former Mayor of Sidon, Maroof Saad, who was killed during the fisherman’s strike by a bullet fired from the same rifle the army uses, caused the government to hesitate on committing the army (El-Khazen, 2000). Following the death of Saad, the south Lebanese Muslim population protested against the army while the Maronite neighborhoods protested for the army. Therefore, the government worried that if it committed the army into the tensions between the Phalangists and the mainly Muslim LNM and PLO, the divide in the country would create a rift within the army. Since the army was not committed, the LNM militias intervened and fought against the Phalangists, thereby increasing the danger to the official Lebanese army and further immobilizing its effectiveness. In order to end this civil war, originally mainly between LNM militias and right wing Maronite officials and after early 1976 the Palestinians, Syria made an effort at mediation in February of 1976 (Reilly, 1982).

This attempt by Syria at negotiation failed however, and in March the Lebanese army broke apart and joined the two different sides involved in the fighting. The Joint Forces, the Palestinians and the LNM militias, gained many victories and by June 1976, they appeared to be triumphant. However, at this time the Syrian army intervened and rescued the Lebanese Front. Once Syria intervened, the Arab summit conferences of October 1976 met in Riyadh and Cairo and recognized the Syrian army as an “Arab Deterrent Force” (ADF) who was in charge of the peace of Lebanon. This sanction allowed the civil war to freeze but never end (Reilly, 1982).

A result of this war however was a further geographical division of the confessions within Lebanon. The Lebanese Front had controlled the regions from east Beirut and along the northern

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4The Palestinians entered into the fray once Dubayya, a Palestinian camp east of Beirut was sieged (Reilly, 1982).
coast almost to Tripoli and within these areas the Lebanese Front had removed a significant portion of Muslims and Palestinians\(^5\) and also removed the SSNP Christians, in support of the LNM, from the Kura region. Likewise, the Joint Forces had removed the territory of west Beirut and the coast of Beirut all the way down to the border of Israel including the mountains of central and southern Lebanon (the Shouf and Upper Galilee). The Syrians controlled the extreme northern parts of the country including the Bekaa valley. Up until the point of intervention, Syria had supported the Joint Forces. However, the Assad regime feared a victory of the LNM in Lebanon because this movement might act as an inspiration to the Syrian public who was dissatisfied with their own government. If Lebanon became radicalized, this Arab nationalism might diffuse through the borders into Syria disrupting the secularism of the Syrian regime (Reilly, 1982).

Following President Nassar’s death in 1970, Syria, along with Iraq, had hoped to become the guardian of the quest for pan-Arabism. However, after Nassar’s death, the idea of pan-Arabism seemed to be failing. The 1973 Yom Kippur War restored Arab pride due to its military achievements, but also divided the Arab nations with Iraq, Libya, and Algeria refusing to recognize Israel as a legitimate state and Jordan, Egypt, Syria, Saudi Arabia, and even Arafat softening their positions due to domestic problems that would only be worsened by continued conflict (Seaver, 2002). In addition, in 1973, Egypt signed a peace agreement with Israel. This is a very important development because this peace agreement left Syria alone to deal with Israel. Syria did not want Lebanon to rise against Israel because this would engulf them in yet another war.

**Distrust of the Lebanese Army and Fear that it is a Protector of Israel**

The Lebanese civil war is extremely important to understanding the current level of support of Hezbollah because it helps to explain how Hezbollah is able to take advantage of the fear that the Lebanese army exists for Israel’s protection. As assumed in my theory, Hezbollah is able to cater to this fear and provide security in the absence of a viable second option. During the civil war, Israel provided assistance to the Maronite rightist camp. Israel feared Lebanon because Lebanon was a protectorate of Syria and was also influenced by Palestinian groups. In order to assuage

\(^5\)Reached its apex during the capture of the Tal al-Zaatar camp (Reilly, 1982).
this fear, in 1976 Israel supported Major Sa’ad Haddad in south Lebanon and Pierre Gemayel and Camille Chamoun in north Lebanon. The Christians, especially in the south, were suffering due to the Palestinian resistance groups (Seaver, 2002). In addition, when the Lebanese army broke up in 1975, Israel could act as the protector of the Christian communities (Reilly, 1982). Prime Minister Yitzhak Rabin’s government wished to create a military force that was capable of standing up to the PLO. Israel would supply the Lebanese Front with light and heavy weapons and munitions (Seaver, 2002). This is an extremely important issue because Hezbollah has been able to gain support by proclaiming that it is their mission is to protect Lebanon’s sovereignty through its armed resistance. The fact that many fear that the Lebanese army is too weak to protect Lebanon from Israel and exists only to protect Israel, much as it did when Rabin used it for protection against the PLO, helps to explain how Hezbollah has been so successful in this tactic.

Indeed, in 1976 Israel took control of the three Christian enclaves that were on the southern side of the Israeli border. Israel would not allow the Syrian army to enter south Lebanon and indeed vetoed a proposal between the Sarkis government and the Arab league to send non-Syrian contingents of the ADF to southern Lebanon in 1977. In addition, Israel attacked the Joint Forces in the south which negated an agreement with Syria, the Sarkis government, and the PLO that allowed for the dispatch of Lebanese government troops to the border and the withdrawal of Palestinian forces from that area. As a result of these actions, Israel gained control of the Christian enclaves in the south and the Joint control remained in control of most of the region (Reilly, 1982).

The attacks by Israel on citizens in Shi’i neighborhoods increased the tension between already strained relationships. In November 1977, Israeli warplanes almost decimated the small Shi’i village of Azziyeh and no Joint Force bases existed near this town (Reilly, 1982). Then, on March 14, 1978 Israel forces invaded southern Lebanon up to the Litani River in response to the seaborne Palestinian commando raid that killed 34 Israeli citizens on the Tel Aviv Haifa coastal highway. Again here we see Israel responding to terrorist violence with increased counterterrorism. According to Reilly (1982), during this invasion Israel killed 100 Palestinian guerrillas and over 2,000 Lebanese and Palestinian civilian deaths creating over 200,000 refugees. United Nations Security Council resolution 425 required the Israeli troops to withdraw, and Israel pulled out. However, when
Israel pulled out a ten km² territory that surrounded the Lebanese-Israeli border was given to the Christians in this area, thus creating a continuous state for the Christians in south Lebanon known as “Free Lebanon”. The governor, former Lebanese army major Saad Haddad, allowed Israeli forces to remain within his territory and never allowed the United Nations Interim Force (UNIFIL), which was in charge of overseeing the evacuation of Israel, into his territory. Therefore, the Israeli invasion of Lebanon began in 1978. The importance of this alliance between the communities of "Free Lebanon" and the Israeli government is that these individuals are seen as collaborators by both the Lebanese government and the resistance movements⁶, and this unity helped to create distrust of fellow citizens.

In addition to further dividing an already divided population within Lebanon, the Israeli alliance with the Phalangist militias increased tensions between Syria and the Phalangist groups. As mentioned previously, when Syria entered in 1976, the Joint Forces were denied what was sure to be a victory over the Lebanese Front. However, the influence of Israel was disturbing to the Syrians and fear of complete control by Syria was disturbing to the Phalangist leadership. Bashir Gemayel, the leader of the Phalangist militias and later the President of Free Lebanon, wished to see a Phalangist dominated government while the Syrian government wished to see a pro-Syrian Lebanese government governed by Sarkis (Reilly, 1982). This conflict of interest led to the Lebanese Front demanding the withdrawal of the Syrian forces. When the Lebanese Front broke ties with Syria, the Lebanese Front also split. The Former President Sulaiman Franjiya had ties with the Assad regime and thus left the Lebanese Front and cleansed his territory, in northern Lebanon, of the Phalangists. In retaliation, the Phalangists killed his eldest son and his family which made reconciliation impossible (Reilly, 1982).

This loss of Franjiya was overcome by closer, open ties to Israel. This caused the Sarkis government and the LNM to denounce Saad Haddad as a traitor, and in response the Phalangists announced that they saw him as the Lebanese authority in the region. This led to major clashes in Beirut between the Lebanese Front and the Syrian army, which the Israeli government used as a reason for increasing its presence in Lebanon, where it was needed to protect the Lebanese

⁶See Qassem (2005), pages 137-140 for an example of this rhetoric.
Part 3: The Reemergence of Amal, the Creation of the Lebanese Resistance Movement, and the birth of Hezbollah

The Reemergence of Amal

The 1978 Invasion had 2 major consequences. The first consequence was the alliance of the National Front with Israel and the second major effect was the reemergence of the political movement of Amal (Awaj al Muqawama al Lubnaniya) because of its consequences on the Shi‘i peasants. As previously stated, Amal followed the charismatic Shi‘i leader Imam Musa Sadr who was Iranian born and was the militia of the Movement of the Deprived. In 1975, before the outbreak of the civil war, Sadr mounted a challenge to the Lebanese government stating the purpose of the Movement of the Deprived as equality for all Lebanese and for defense of South Lebanon, both of which are areas the Lebanese government had failed at (Reilly, 1982).

Until 1978, Amal had remained separated from the fighting forces of the civil war. However, the invasion of 1978 caused the unemployed, poor Shi‘i peasants to become uprooted and forced them to move to the slums of the northern cities or to remain in the war torn, Israeli occupied, south. This new group of core supporters was isolated from the government and looking for an ideological cause, Amal offered hope and dignity. When Sadr disappeared in September 1978, after a visit to Libya, Amal became more politically active and was led by Nabih Barri. Barri saw the 1978 and 1982 invasions as attacks on Lebanese sovereignty that must be resisted against. In addition, prior to the invasion, Barri had become a client of Syria’s President Hafez Assad (Pelletiere, 1994).

In 1979, Israel’s Defense Minister Ezer Weizman “admitted that Israel would engage in ‘preemptive’ attacks against Palestinian forces in south Lebanon” (Reilly, 1982; pg. 19). After this announcement Israel forces and Hadaad began bombing throughout the region including the previously untouched Sidon region. Israel required “withdrawal of Syrian and Palestinian forces from Lebanon and a guarantee of the rights of Lebanon’s ‘Christian Minority’ ” (Reilly, 1982; pg. 19). Hadaad’s militias would attack UNIFIL positions and oppose the attempts made by the Sarkis government to deploy the newly reconstructed Lebanese army with UNIFIL. Indeed, Haddad would
shell and threaten the Lebanese forces that would move with UNIFIL. Israel again showed its strength in the spring of 1981 when it aborted the movements by Syria and the Phalangist militias at creating peace. After the Phalangists clashed with the Syrian forces in the town of Zahleh in the Bekaa valley, the Syrians captured a key mountain area after besieging Zahleh. After this, the Phalangists were willing to have discussions with the Syrians. However, just before the Syrian foreign minister was able to visit, the Begin government shot down two Syrian helicopters in the Bekaa’a valley under the guise of protecting the Christians.

Throughout 1981 the fighting between the Israeli forces and the PLO only intensified. In July 1981, the American negotiated a ceasefire became effective. However, car bomb explosions caused casualties near Palestinian offices in Beirut and Sidon in late 1981 and early 1982 and the PLO and LNM blamed Israel (Reilly, 1982). However, the Palestinians did stop their cross-border attacks following the ceasefire agreement. Nonetheless, Israel was not satisfied with the current situation. The fighting of June and July had given the PLO credibility because the US was forced to negotiate with them directly and the PLO’s military reputation had gained prestige in Lebanon. In addition, it seemed that the alliance between the Phalangists and Israel was wavering. Gemayel declared in September 1981 that the Phalangists did not have dealings with Israel. While this declaration was untrue, it pointed towards the fact that Gemayel was ready to begin negotiations with LNM and Syria since this was the essential precondition.

The 1982 Invasion

When Israel invaded Lebanon on June 6, 1982, the timing seemed ideal to finally oust the PLO. Indeed the invasion to oust the PLO provides a nice example of the benefits to a strong counterterrorism response. As mentioned at the start of this section, while the invasion certainly created passive supporters, the PLO was unable to benefit from this pool because they never utilized the provision of social services. The Lebanese Left was internally divided because the newly strengthened Amal movement sought control of the Shi’i neighborhoods which were currently under control of LNM and Palestinian militias. The LNM was falling apart because of internal disputes and losing ground to the old ruling Muslim families who controlled Lebanon prior to the civil war.
The Phalangists had a firm grip on southern Lebanon which was strengthened by their deafened of Chamoun’s National liberals. The PLO was losing ground because many viewed the Palestinians as the reason for the civil war and for the Israeli invasion of 1978 (Reilly, 1982). Indeed, many felt relieved at getting rid of the Palestinians (Pelletiere, 1994).

Naim Qassem, the current Deputy Secretary General of Hezbollah, provides Hezbollah’s view on the invasion. He explains that Israel knew the time was ideal for an invasion and felt that this invasion would bring about an end of the resistance activity. Therefore, he explains that Israel used the pretext of the armed attack on Shlomo Argov, the Israeli ambassador to the United Kingdom, on July 3, 1982 as a reason for invasion. Then, on July 4, “Israel announced that this attack constituted a breach of the ceasefire accord concluded with the PLO in 1981 and achieved under US auspices” (Qassem, 2005; pg. 87). After this announcement, Israel launched raids on Palestinian targets in Beirut which caused the PLO to respond with missile and mortar attacks on the northern areas of occupied Palestine. As predicted by the theory, Israel increased its counterterrorism campaign in response to both previous attacks by the PLO and in response Hezbollah attempts to use this action as a way to muddy the reputation of Israel and gain support.

On July 6, 1982, Israel invaded Lebanon. Byman (2011) explains that “Israel’s 1982 invasion of Lebanon was meant to end the terrorist threat to Israel from Lebanon forever” (pg. 210). Qassem recalls this key event blaming Prime Minister Menachem Begin. Qassem explains that while invasion was supposed to only expel the Palestinians beyond a distance of 40 kilometres from the internationally recognized border, “Israel’s declared invasion limit was not adhered to” (Qassem, 2005; pg. 88), and the invasion of Lebanon in 1982 represented the beginnings of a 20 year occupation. This interpretation by Qassem is important because it demonstrates Hezbollah’s ability to play at the emotions of the pool of potential supporters. As described by Robert Fisk, author of “Pity the Poor Nation”, many Shiis feared that Sharon intended not only to purge the Palestinians from the border area but to also ally with the Maronite Christian community in Lebanon and thus alienate Lebanon from the rest of the Arab states and take it out of the Arab-Israeli conflict (Fisk, 2002).
The Birth of a Resistance Movement: Lebanese National Resistance (LNR)

In response to the invasion, the resistance movement began. Nabih Berri of Amal announced a call for resistance and during the time of his call, Israel began to form deeper ties with the Christian communities of southern Lebanon. Many of the Shias feared that Sharon wished to have the Christians control southern Lebanon. In response to this fear, recruits for the resistance movement were created. Then on November 11, 1982, in what Qassem terms “the first martyrom attack” (Qassem, 2005; pg. 89), Ahmad Kassire drove a car filled with explosives into the headquarters of the Israeli command in Tyre, South Lebanon, killing seventy-five Israelis and dozens of Lebanese prisoners (Byman, 2011). At first the movement was mainly a core group of Amal militias and civilians and it remained this way until 1983.

It was on October 16, 1983, during the ceremony commemorating Ashura, when an Israeli convey drove into the town and through the crowds. The citizens were greatly angered by this action and began to fight against the Israeli convey. An Israeli truck was overturned and set on fire and two Shi’iis were killed and fifteen injured. Sheikh Mehdi Shamseddin, who was the head of the Higher Shiite Council in Beirut, was angered by this incidence and issued a fatwa calling for “civil resistance” (Jaber, 1997; pg. 18). As more civilians joined the resistance movement, Israel only allowed passage to and from Beirut at only one location in order to stop the influx of resistance fighters from Beirut, thereby isolating South Lebanon. This isolation caused a collapse of Southern Lebanon’s economy. The citizens sold their produce to northern Lebanon and without this movement of goods, an already poor Southern Lebanon became even more poverty stricken. These actions caused the Lebanese National Resistance (LNR) to be formed as the official resistance organization, which was dominated by Amal members.

During the time of the May 17 Accord the distrust of the Lebanese army deepened. The May 17 Accord of 1983 was the result of thirty-five rounds of negotiations between Lebanon and Israel and was hoped to be a way to end the hostilities. However, as far as Hezbollah is concerned, the accord stated that Lebanon must act as a police officer in charge of its occupier’s security (Qassem, 2005). The Lebanese authorities were given control over security measures to prevent ‘hostile activities’ and ‘the introduction into or movement through the Security Region of unauthorized armed men.
or military equipment’ but it was not given full authority over its military preparedness. Qassem points out that item (i) of the Annex states that “the forces, weapons and military equipment that may be stocked, introduced into or transported through the Security Region are only those mentioned in this Annex and its Appendix” (Qassem, 2005; 92).

Per the Accord, the definition of the Lebanese army was limited, being defined as only two brigades and 4,341 individuals with no off-shore or on-land rockets. Qassem explains that this accord was humiliating and that a call for a protest was issued by an assembly of Muslim clerics to take place in the Imam al-Rida Mosque of Beirut. Hezbollah’s presence was felt at this riot even though the Party had not yet officially been declared. It was during this protest that the Lebanese army used shooting signals to dissipate the crowd, killing Muhammad Najdeh. What is most striking in regards to these events was the ability of Hezbollah to capitalize on these undercurrent emotions. During the February 6 uprising of 1984, Hezbollah forces, led by Amal and the Progressive Party, managed to penetrate the Lebanese army barracks causing a loss of credibility for the army and a compromise of the armies control. It was during this time that Amine al-Gemayyel began to lose control of West Beirut and its southern suburbs. The increase in popularity of Hezbollah during 1984 reveals the importance of mixing core support with passive support. Hezbollah utilized core supporters in an attempt to compromise the Lebanese army but then used these actions to sow discomfort with the general population. In the villages of Southern Lebanon, pictures of Ayatollah Khomeini began appearing which indicated a departure towards the religious movement of Islamic Independence as seen in Iran and a departure from the secular approach of Amal.

The Birth of Hezbollah

However, it was not until 1985 that Hezbollah announced its existence and its military wing which was the Islamic Resistance, Muqawama al-Islamiyah. Prior to this time, Hezbollah’s fighters fought under the LNR (Jaber, 1997). The ideologies of Amal and Hezbollah are extremely different. Amal wished to work within the Lebanese political system to create a change. Hezbollah wished to follow the religious path inspired by Khomeini’s revolution. Hezbollah utilized this religious
dimension to attract core supporters. Qassem (2005) argues that the Israeli invasion of June 1982 created a need for a defensive jihad. The Israel goal of evacuating the PLO was accomplished in August under the supervision of multinational forces. Following the evacuation of the PLO, Israel began to withdraw to the Awali River. It was not until February 1985 until Israel had accomplished the first stage of its withdrawal which took the Israeli forces to the Litani River. Once in this region, Israel announced an "Iron Fist" policy over the 900 square mile area it still was in control of (Jaber, 1997).

The region that Israel controlled was home to the majority of Lebanon’s Shiite population. This region had historical links with Iran through both family ties and religion. In this region, Amal’s founder, Musa Sadr, had built a religious school which had hosted many of the men who became key players in the Iranian revolution. Israeli’s initial withdrawal occurred during the same time of the debut of Hezbollah and on the first anniversary of Harb’s murder. Sheikh Ragheb Harb was killed on February 12, 1984 when he was shot in the head with three bullets while he was walking home. He became the first cleric assassinated since the 1982 invasion (Jaber, 1997). The assassination of Harb demonstrates a turning point for Hezbollah. Harb’s assassination also shows the danger a successful counterterrorism strategy contains if used against an organization capable of garnering popular support. Removing Sheikh Harb was a tactical success for Israel. Harb preached against the occupation and called on the people to fight and resist. He supervised the transformation of Jibsheet from an ordinary village into the bastion it currently is today. However, Sheikh Harb remains a powerful figure, remembered for his refusal to shake hands with an Israel commander who visited him. Qassem quotes him as saying: “Our stance is armament, and a handshake would be admission” (Qassem, 2005; 94).

Indeed it was following the death of Harb that martyrs began to be used in battle. On June 6, 1984, Bilal Fahes, an active member in Amal, detonated 150kg of explosives by ramming his car into the Israeli convey on the Zahrani-Tyre coastal road. Khalil Jarradi, a theology teacher in the village of Maarakeh, challenged the Israelis to invade Maarakeh arguing that the resistance was strong and had a right to defend their land. In response to this challenge, Israel brought 800 soldiers into Maarakeh with tanks, trucks, bulldozers and low-flying helicopters. On March 4,
1985, a day and a half after the raid, Jarradi was killed by a bomb that had been planted in the Husseiniyah (Jaber, 1997). Instead of being seen as a tactical success, the invasion of Maarakeh instead came to stand a symbol of resistance. It was following the first withdrawal that Hezbollah officially declared its existence. On February 16, 1985, the day of the first commemoration of Sheikh Ragheb Harb’s assassination, the official party spokesman, al-Sayyed Ibrahim Amine al-Sayyed orated the Open Letter (Qassem, 2005). It was during this declaration that Hezbollah first moved away from the emphasis on core supporters only, as seen during its earlier days with Amal, and began to move toward a political and social program. While, social goods provision was not emphasized in Hezbollah’s charter, beginning in 1984, Hezbollah began to provide social welfare for the Shiite community (Grynkewich, 2008). Jihad al-Binaa (Construction Jihad) and the Islamic Health Committee began operating in 1984 (Jaber, 1997; 150). Then in 1998, Hezbollah expanded their services. Harik (2005) explains that Hezbollah began “daily garbage collection to remove the mountains of refuse that had built up over the years...replacing a basic governmental function in several municipalities” (pg. 83).

Today Hezbollah, unlike the Palestinian militant groups in Lebanon, is a powerful organization known for its political and social power. Early (2006) explains that “Hezbollah was able to provide a higher quality of social service to some communities in the midst of a civil war than they had previously received from the Lebanese state” (pg. 120). This recognition led to Hezbollah creating a massive welfare network which consists of its well known schools, hospitals, and relief centers. Indeed Early goes on to explain that in Lebanon today, Hezbollah is “Lebanon’s largest non-state provider of healthcare and social services and operates schools of such high quality that even non-Muslims send their children to them” (pg. 115). Additionally, after 1989 Taif Accord ended the Lebanese Civil War, Hezbollah was also given special permission to maintain its weapons as the Lebanese army was not powerful enough to engage the Israeli army. This popular support was shown in the summer 1992, when Hezbollah won eight seats in the Bïqa’ Valley and gained support from four other successful candidates (Zisser, 1996). In addition, in 1998, during the municipal elections, Hezbollah won 15 percent of the contested municipalities and then in the spring of 2004, Hezbollah won 21 percent of the municipalities. Since the oration of its Open Letter in 1985, Hezbollah
has been focused on transforming this “terrorist” organization into a functioning resistance and political movement within Lebanon.

### 4.4 Conclusion

The case of Israel provides a nice example of the double sided nature of counterterrorism. Israel at times was very successful in reducing the operational capacity of the terrorist organization but at other times has suffered from increased popular support. Daniel Byman states: “Many of Israel’s problems come down to the issue of tactics versus strategy. The Israeli’s are usually strong tactically...At the same time, however, Israel often blunders from crisis to crisis without a long-term plan for how to solve the problem once and for all” (2011; pg.11). During the early stages of counterterrorism efforts, Israel was facing a Palestinian resistance force made up more of border wars instead of a nationalistic base in Palestine. In response to the 1949 armistice ending the war, Israel interpreted the agreement as a mandate stopping Palestinians from coming back to Israel regardless of whether they were raiders or refugees. After this armistice, many of the refugees did try to go home to Israel. In 1952 the number of attempted infiltrations peaked at sixteen thousand but then continued to fall until the 1956 war. While the majority of these infiltrations were benign, some of the border crossers, former mufti of Jerusalem and the Muslim brotherhood, devoted themselves to violence. In 1954, Egypt and Syria began to use Palestinians to attack the IDF patrols and the Israeli settlements on its borders. At this time period we see a nascent guerrilla group, merged of core supporters from the former mufti of Jerusalem and the Muslim brotherhood, operating with the support of state sponsors and not relying on popular support. As predicted by the model, increased counterterrorism efforts led to decreased strength. Daniel Byman in “A High Price” discusses the autonomy given to the IDF commanders as a strategy which “paid off handsomely”. As expected a group of guerrillas operating without passive support were successfully crushed by the Israeli counterterrorism. The impact of the counterterrorism was stronger at decreasing the probability of success than it was at increasing support for the terrorist organization. The small guerrilla groups were unable to benefit from increased discontent because
they never switched from attracting core supporters to attracting passive supporters. As we saw, this was not the case for Hezbollah who operated from the very beginning in a state of very high passive support. This passive support existed initially out of discontent with both the Lebanese government and the Israeli counterterrorism but overtime was increased through a shrewd mixture of militant attacks combined with a social service program by Hezbollah.
“It is important to emphasize that guerrilla warfare is a war of the masses, a war of the people. The guerrilla band is an armed nuclear, the fighting vanguard of the people. It draws its great force from the mass of the people themselves...The guerrilla fighter needs help from the people of the area. This is an indispensable condition. This is clearly seen by considering the case of bandit gangs that operate in a region. They all have characteristics of a guerrilla army, homogeneity, respect for the leader, valor, knowledge of the ground, and, often, even good understanding of the tactics to be employed. The only thing missing is support of the people; and inevitably, these gangs are captured and exterminated by the popular force” (Guevara, 1998; 52).

This dissertation aimed to investigate the interplay between governments and terrorists for the support of the population. The terrorist organization, as explained in the above quote by Guevara, strives to act as a vanguard of the people, securing both core fighters and underlying support within the community. The government struggles to combat the threat of this violence without alienating those very same supporters. A key strategy utilized by the terrorist organization is one of provocatation. Utilizing the same tactics as the Front de Liberation Nationale (FLN), terrorist organizations hope to use terrorist violence as a means of provoking a harsh counterstrike against both themselves and the surrounding population. The literature has suggested that the terrorist organization will risk a potentially incapacitating and fatal counterattack because the mobilization boost outweighs the cost. This dissertation hopes to take this argument one step
further by investigating the incentives of a government to respond to this provocative attack, if indeed doing so will increase support for the organization.

In the first paper, I investigate this question by looking at the role uncertainty over the terrorist type plays on the government’s reaction. I present a signaling model to examine whether information about the terrorist type is revealed through the terrorist’s decision on the magnitude of the initial strike. The government knows that counterterror strikes will damage the resources of a terrorist organization but they may also increase support for the terrorist organization. After receiving a provocative terrorist attack, the government must choose the type of counterterror response: discriminating or undiscriminating. An undiscriminating counterterror tactic destroys many of the terrorist organization’s resources but also inflicts damage upon the population of potential terrorist supporters. The discriminating counterterror tactic attack does not cause damage to the surrounding population but destroys a smaller amount of terrorist resources. In choosing this tactic, the government must decide whether they are combating a “strong” or “weak” terrorist organization. Since a strong terrorist organization can take advantage of the void for social services following a destructive attack, the government prefers to send a discriminating counterterror attack, minimizing that mobilization boost. On the other hand, a weak terrorist organization cannot rebuild or supply the needed social provisions following a devastating attack, and as such the government prefers to send an undiscriminating attack to a weak organization. The government is not likely to be completely informed regarding the mobilization capabilities of the group, however, and must determine the appropriate response under conditions of incomplete information. As such, unlike the previous literature which investigates the incentives smaller groups have to mimic larger groups in an attempt to temper the retaliatory responses by the government (Overgaard, 1994; Lapan and Sandler, 1993), this model allows incentives to mimic on both sides. Similarly to Overgaard (1994) and Lapan and Sandler (1993), I find that a weak terrorist group has an incentive to mimic the strong terrorists and send a large attack in order to induce a measured counterstrike. However, unique to my model, I find that a strong terrorist group equally has an incentive to mimic the weak terrorist group and send a smaller strike in hopes of provoking a harsh indiscriminate counterstrike.
“Hizbullah paid particular attention to social work. Not one aspect of aiding the poor was neglected as the Party worked towards achieving joint social responsibility, answering to urgent needs and introducing beneficial programmes. Such work was simply considered a Party duty, and concentrated efforts towards raising funds and making available social service resources served towards achieving these goals” (Sheikh Naim Qassem, the Deputy Secretary-General of Hezbollah (2005; 83)).

While the first paper explains why governments respond to provocative attacks suboptimally, it black boxes the population and does not provide details on why the population supporters the terrorist attack. In the second paper, I turn to these details, now asking why most terrorist organizations, in contrast to the words of Sheikh Qassem of Hezbollah, do not provide social services if this allows them to receive a mobilization boost. To answer this question I present a formal model investigating the strategic competition for popular support between a terrorist group and its target government when the terrorist group provides social services. The model illustrates that terrorist groups only increase mobilization by providing social services provisions when the utility a potential supporter gains from those services increases at a faster rate than the probability of a successful attack would increase had those resources been used for military actions instead. This finding helps to explain why social provisions are only provided by a few terrorist organizations, despite the widespread belief that they aid in mobilization. The model predicts that social services are more likely to be provided when the public has great need of these services, such as in the absence of public goods provision by the government. Using originally collected club goods data from the Terrorist Organization Profiles by START, this result is strongly supported. The results strongly support that the provision of social services is more likely to result in a larger group when public goods are provided at low levels by the government. Additionally, once this positive impact on size has been taken into account, I find no further effect of club goods on the likelihood of an attack.

The third paper asks how a terrorist organization attracts both core supporters (those who are the active members of the group) and the more passive population (those who support the group by providing sanctuary but not direct support). The government and the terrorist organization face nuanced tradeoff because only the passive supporters react to counterstrikes or to the provision
of social services. This model finds that actions in the first stage strongly impact the actions in the stages to follow. By increasing their attacks in the first round, the terrorist organization must expose themselves, increasing the efficacy of the government counterterrorism campaign. The government reacts to this increased militancy with additional resources for counterterrorism and pays the cost of increased passive support in the first round. Given this the government further increases their attacks in the second round since the cost to increased attacks, loss of support, was already paid in round one. The terrorist organization now faces a dilemma on how to respond to an increased level of counterstrikes in the first stage. While the provision of social services is less useful, as the government already mobilized the population in support of the terrorist organization, the need for those social services is higher. The model finds that social service providers have an incentive to induce demand for their services by utilizing attacks in the first round and then switching to social services in round 2. This result argues that some organizations will decrease their attacks following a counterterrorism campaign because their strategy all along was to induce demand for social services.

While this dissertation provides key insight into the interplay for popular support and the role of the government, it leaves out many interesting pieces. Future research will focus on three key area: the role of a competing terrorist organization, the role of outside support, and the role of domestic politics for the target government. The terrorist organization responds to a dynamic environment shaped by both the government and fellow terrorist organizations. While the first paper poses many questions regarding the role of credit taking versus the benefit of anonymity, these questions remain unanswered. Additionally, all three papers assume the terrorist organization must increase its strength through increased competition. However, in many circumstances the terrorist operates with support from outside sources, including a diaspora or a state sponsor. Loosening the budget constraint will change the tradeoffs these terrorist organizations face. Lastly, the target government is responsible to his electorate and must take that population into account when choosing his counterterrorism response. Perhaps the government over-relies on offensive counterstrikes because they are more visible to a population who demands a response (Bueno de Mesquita, 2007).
APPENDIX A

MODEL DETAILS AND PROOFS FOR THE STRONG AND WEAK TERRORIST GAME IN CHAPTER 02

A.1 Separating Equilibria

A.1.1 Proof of Proposition i

Proposition i : There exists no PBE when $S(S) = A, S(W) = a$.

In this case the Strong type sends a large attack and the Weak type sends a small attack: $(S_T(S) = A, S_T(W) = a)$ . The belief of the government is $Pr(S|A) = Pr(W|a) = 1$ and $Pr(S|a) = Pr(W|A) = 0$. Given this belief, after observing the large attack $(A)$ the government chooses undiscriminating retaliation only if $EU_U C^G(A) \geq EU_D C^G(A)$. This generates the next condition. For the purposes of this appendix $\alpha = a, \beta = b, \gamma = c, \delta = d$.

\[
    b \geq a - k
\]

This never happens because by assumption $a - b \geq k$. Hence the government always plays discriminating against the Strong type terrorists.

By the same logic, after seeing $a$ the government selects its retaliation level by comparing the payoff between $EU_U C^G(a) \geq EU_D C^G(a)$. This generates the condition $d \geq c - k$. Since by
assumption $c - d \leq k$ this is always the case. The government never wishes to play undiscriminating retaliation against the Weak type.

Given the best response of the government, I now must check to see if playing $A$ is a best response for the Strong type and playing $a$ is a best response for the Weak type. Given the strategy of the government, the Strong type wishes to play $A$ only if $EU^S_A(\text{DC}) \geq EU^S_a(UC)$. This means that the expected utility of playing $A$ while the government plays $\text{DC}$, its best response to $A$, must be greater than or equal to the expected utility of playing $a$ while the government plays $\text{UC}$, its best response to $a$. This generates the condition:

$$-a - c_S \geq -b$$

$$b - a \geq c_S$$

This can never happen because $c_S \geq 0$ and $a > b$ by assumption. Thus there does not exist a separating equilibria where the Strong type chooses a large attack and the Weak type chooses the small attack because this is never a best response for the terrorists.

### A.1.2 Proof of Proposition ii

Proposition ii: There exists no PBE when $S(S) = a, S(W) = A$.

In this equilibria the Weak type terrorist chooses high attack and the Strong type sends low attack such that $Pr(S|a) = Pr(W|A) = 1$ and $Pr(S|A) = Pr(W|a) = 0$. Given the signal $a$, the government knows that the sender is the Strong type, thereby selecting undiscriminating retaliation when $EU^G_C(a) \geq EU^G_D(a)$. This generates the same condition as where the government chooses undiscriminating counter-terror whenever $b \geq a - k$, the same as the condition above, which never holds. The government seeing the signal $A$ knows the the sender is the Weak type and chooses undiscriminating counter-terror when $d \geq c - k$ which as above always holds.

Given the best response of the government, I now must check to see if playing $a$ is a best response for the Strong type and playing $A$ is a best response for the Weak type. Given the strategy of the government, the Strong type wishes to play $a$ only if $EU^S_a(\text{DC}) \geq EU^S_A(UC)$. This means that
the expected utility of playing \( a \) while the government plays \( DC \), its best response to \( a \), must be greater than or equal to the expected utility of playing \( A \) while the government plays \( UC \), its best response to \( A \). This generates the condition:

\[
- a \geq -b - c_S
\]

\[
c_S \geq a - b
\]

Therefore as long as the costs of sending the large attack are larger than the resources which are destroyed by the discriminating counter-terror attack, the Strong type terrorists will choose to play \( a \) while the government plays \( DC \).

Given the strategy of the government, the Weak type wishes to play \( A \) only if \( EU^W_A(UC) \geq EU^W_A(DC) \). This means that the expected utility of playing \( a \) while the government plays \( DC \), its best response to \( a \), must be greater than or equal to the expected utility of playing \( A \) while the government plays \( UC \), its best response to \( A \). This generates the condition:

\[
-d - c_w \geq -c
\]

\[
c - d \geq c_w
\]

However by assumption \( d \geq c \) and thus this cannot be an equilibrium response for the Weak type. Thus there does not exist a separating equilibria where the Strong type chooses a large attack and the Weak type chooses the small attack because this is never a best response for the Weak type.

### A.2 Pooling Equilibria

#### A.2.1 Proof of Propositions iii-x

**Proposition v :** If \( p \geq p^* \), then the following strategies and beliefs are not a PBE: \( S_T(S) = S_T(W) = A \) and \( S_G(A) = dc, S_G(a) = dc, Pr\{S|A\} = p, \) and \( Pr\{S|a\} \geq \tau^* \)
Proposition vi: If \( p \geq p^* \), then the following strategies and beliefs are not a PBE:

\[
S_T(S) = S_T(W) = A \quad \text{and} \quad S_G(A) = dc, \quad S_G(a) = uc, \quad Pr\{S|A\} = p, \quad \text{and} \quad Pr\{S|a\} \leq \tau^*
\]

In this pooling equilibria both types of terrorists send the costly signal such that \( S_T(W) = S_T(S) = A \). Since both types play the same strategy, the government’s prior belief determines the probability of each type such that \( Pr(S|A) = p \) and \( Pr(W|A) = 1 - p \). Given this belief, the government’s expected utilities from undiscriminating and discriminating retaliation are:

\[
EU_G^{UC}(A) = pb + (1 - p)d
\]

\[
EU_G^{DC}(A) = p(a - k) + (1 - p)(c - k) = ap + (1 - p)c - k
\]

Thus the government selects an undiscriminating counterterror policy only if the expected utility from undiscriminating is greater than the expected utility from discriminating counterterror:

\[
pb + (1 - p)d \geq ap + (1 - p)c - k
\]

\[
p \leq \frac{c - d - k}{b + c - a - d}
\]

Thus the governments plays undiscriminating retaliation only if

\[
p \leq p^* = \frac{(c - d) - k}{(b - a) + (c - d)}
\]

This \( p \) value does not explain what happens in the off-equilibrium case where the government does not observe the signal A but instead observes a. In order to analyze this off-path equilibrium, I assign the belief of the government such that \( Pr(S|a) = \tau \in [0, 1] \) thus \( Pr(W|a) = 1 - \tau \). Given these beliefs the government compares its expected utilities for uc and dc:
\[
EU_G^{UC}(A) = \tau b + (1 - \tau)d \\
EU_G^{DC}(A) = a\tau + (1 - \tau)c - k
\]

This generates the same conditions for \( \tau \) to condition for \( p \) that the government adopts high retaliation given the signal \( a \) only when:

\[
\tau \leq \tau^* = \frac{(c - d) - k}{(b - a) + (c - d)}
\]

Given these best responses of the government, I must also check under what conditions this strategy is rational to each type of terrorists. In order to understand the strategy of the terrorists, the expected utilities for the terrorists given \( A \) and \( a \) must be examined:

G plays DC

\[
S : E(A) = -a - c_s \\
E(a) = -a \\
W : E(A) = -c - c_w \\
E(a) = -c
\]
G plays UC

\[ S : E(A) = -b - c_s \]
\[ E(a) = -b \]
\[ W : E(A) = -d - c_w \]
\[ E(a) = -d \]

When \( p \geq p^* \) and \( \tau \geq \tau^* \), a government selects discriminating retaliation regardless of the signal she receives. Given this strategy, both types of terrorists have an incentive not to send a large attack signal because A is more costly than a. Thus no PBE exists under this condition.

When \( p \geq p^* \) and \( \tau \leq \tau^* \) both types compare the payoff of experiencing discriminating retaliation after sending A with the payoff from undiscriminating retaliation with the signal a. Thus, PBE exists only if expected utility for playing A and experiencing DC are greater than the payoffs for playing a and experiencing UC for both types of terrorists. For the strong this means \(-a - c_s \geq -b\).

This holds whenever \( b - a \geq c_s \). However by assumption \( a \geq b \) and \( c_s \geq 0 \) and thus this cannot be an equilibrium response for the Strong type and no PBE exists under these conditions.

Proposition iii : If \( p \leq p^* \), then the following strategies and beliefs are not a PBE:

- \( S_T(S) = S_T(W) = A \) and \( S_G(A) = uc, S_G(a) = uc \), \( Pr\{S|A\} = p \), and \( Pr\{S|a\} \leq \tau^* = (c - d) - k(b - a) + (c - d) \)

Proposition iv : If \( p \leq p^* \), then the following strategies and beliefs are not a PBE:

- \( S_T(S) = S_T(W) = A \) and \( S_G(A) = uc, S_G(a) = dc \), \( Pr\{S|A\} = p \), and \( Pr\{S|a\} \geq \tau^* \) and \( cs < a - b \)

Now let me check if there are any equilibria when \( p \leq p^* \) given the signal A. The government selects undiscriminating retaliation in this case and thus, each type of terrorist receives the payoffs of undiscriminating retaliation. First, let me assume that the government will select discriminating
retaliation if it observes small attack such that $\tau \geq \tau^*$. Given this strategy, PBE exists only if the expected utility for playing $A$ and experiencing UC are greater than the payoffs for playing $a$ and experiencing DC for both types of terrorists. For the strong this means $-b - c_s \geq -a$ or $a - b \geq c_s$. For the weak this means $-d - c_w \geq -c$ or $c - d \geq c_w$. However by assumption $d \geq c$ and $c_w \geq 0$ and thus this cannot be an equilibrium response for the Weak type and no PBE exists under these conditions.

What about when the government always selects undiscriminating retaliation policies even if it observes off the path signal $a$? (i.e. $p \leq p^*$ and $\tau \leq \tau^*$) Under this circumstance, both types of terrorists can deviate and receive the same payoffs without paying the cost of signalling by sending a large type. Thus no PBE exists under these conditions.

**Proposition 9**: If $p \geq p^*$ and $a - b < c_s$, then the following strategies and beliefs are a PBE: $S_T(S) = S_T(W) = a$ and $S_G(a) = dc$, $S_G(A) = uc$, $Pr\{S|a\} = p$, and $Pr\{S|A\} \leq \tau^*$

**Proposition 10**: If $p \geq p^*$, then the following strategies and beliefs are a PBE: $S_T(S) = S_T(W) = a$ and $S_G(a) = dc$, $S_G(A) = dc$, $Pr\{S|a\} = p$, and $Pr\{S|A\} \geq \tau^*$

In this pooling equilibria both types of terrorists send the costless signal such that $S_T(W) = S_T(S) = a$. Since both types play the same strategy, the government’s prior belief determines the probability of each type such that $Pr(S|a) = p$ and $Pr(W|a) = 1 - p$. Given this belief, the government’s expected utilities from undiscriminating and discriminating retaliation are the same as in the previous pooling equilibrium case:

\[
EU^{UC}_{G}(A) = pb + (1-p)d \\
EU^{DC}_{G}(A) = p(a - k) + (1-p)(c - k) \\
= ap + (1-p)c - k
\]
The government prefers undiscriminating retaliation to discriminating retaliation only if the expected utility of former is not less than the later. Thus this results in the same condition as above. The government plays undiscriminating retaliation if:

\[ p \leq p^* = \frac{(c - d) - k}{(b - a) + (c - d)} \]

Once again this \( p \) value does not explain what happens in the off-equilibrium case where the government does not observe the signal \( a \) but instead observes \( A \). In order to analyze this off-path equilibrium, I assign the belief of the government such that \( Pr(S|A) = \tau \in [0,1] \) thus \( Pr(W|A) = 1 - \tau \). Given these beliefs the government compares its expected utilities for \( uc \) and \( dc \):

\[
EU_{G}^{UC}(A) = \tau b + (1-\tau)d \\
EU_{G}^{DC}(A) = a\tau + (1-\tau)c - k
\]

This generates the same conditions for \( \tau \) to condition for \( p \) as before that the government adopts undiscriminating retaliation given the signal \( A \) when:

\[ \tau \leq \tau^* = \frac{(c - d) - k}{(b - a) + (c - d)} \]

Given these best responses of the government, as before I must also check under what conditions this strategy is rational to each type of terrorists. In order to understand the strategy of the terrorists, the expected utilities for the terrorists given \( A \) and \( a \) must be examined:
When \( p \geq p^* \) and \( \tau \geq \tau^* \), a government selects discriminating retaliation regardless of the signal she receives. Given this strategy, both types of terrorists have an incentive not to send a large attack signal because \( A \) is more costly than \( a \). Thus PBE exists under this condition because the terrorists receive the same payoff for sending \( a \) but do not have to pay the cost of sending \( A \). When \( p \geq p^* \) and \( \tau \leq \tau^* \) both types compare the payoff of experiencing discriminating retaliation after sending \( a \) with the payoff from undiscriminating retaliation with the signal \( A \). Thus, PBE exists only if expected utility for playing \( a \) and experiencing DC are greater than the payoffs for playing \( A \) and experiencing UC for both types of terrorists. For the strong this means \( -a \geq -b - c_s \). This holds whenever \( c_s \geq a - b \). For the Weak this means \( -c \geq -d - c_w \) or \( c_w \geq c - d \) which because \( d > c \) and \( c_w \geq 0 \) is always true. As the costs increase this equilibria becomes more likely (\( c_s \) gets larger) and as undiscriminating becomes more effective (closer to the effectiveness of discriminating
for strong) this equilibria also becomes more likely. b would become closer to a if the strong group has difficulty in mobilizing their population.

Proposition 7: If $p \leq p^*$, then the following strategies and beliefs are a PBE: $S_T(S) = S_T(W) = a$ and $S_G(a) = uc$, $S_G(A) = uc$, $Pr\{S|a\} = p$, and $Pr\{S|A\} \leq \tau^*$

Proposition 8: If $p \leq p^*$ and $d - c < c_W$, then the following strategies and beliefs are a PBE: $S_T(S) = S_T(W) = a$ and $S_G(a) = uc$, $S_G(A) = dc$, $Pr\{S|a\} = p$, and $Pr\{S|A\} \geq \tau^*$

Now let me check if there are any equilibria when $p \leq p^*$ given the signal a. The government selects undiscriminating retaliation in this case and thus, each type of terrorist receives the payoffs of undiscriminating retaliation. First, let me assume that the government will select discriminating retaliation if it observes small attack such that $\tau \geq \tau^*$. Given this strategy, PBE exists only if the expected utility for playing a and experiencing UC are greater than the payoffs for playing A and experiencing DC for both types of terrorists. For the strong this means $-b \geq -a - c_s$ or $c_s \geq b - a$ which because $a > b$ and $c_s \geq 0$ is always the case. For the weak this means $-d \geq -c - c_w$ or $c_w \geq d - c$. As the costs increase this equilibria becomes more likely ($c_w$ gets larger) and as discriminating becomes more effective (closer to effectiveness of undiscriminating for weak) this equilibria also becomes more likely. c would become closer to d if the weak group is able to mobilize or if the undiscriminating doesn’t destroy more resources.

What about when the government always selects undiscriminating retaliation policies even if it observes off the path signal A? (i.e. $p \leq p^*$ and $\tau \leq \tau^*$) Under this circumstance, both types of terrorists can deviate and receive the same payoffs but have to pay the cost of signalling by sending a large type. Thus PBE always exists under these conditions.
A.3 Partial Pooling Equilibrium

A.3.1 Proof of Proposition xi

The next equilibrium analyzed is the partial pooling equilibrium where one type always sends one type of attack and the other type mixes between two types of attacks. The first partial pooling equilibrium analyzed is the one where Strong type terrorist always sends the large attack. The type Weak terrorist sends the large attack with probability $q$. If the large attack is sent, the Government responds with the undiscriminating counterattack with probability $r$.

Proposition 11: If $p \geq p^*$, then the following strategies are not a PBE:

$S_T(S) = A, S_T(W) = \{A \text{ with prob. } q\}$ and $S_G(a) = uc, S_G(A) = \{dc \text{ with probability } r\}$

where $q = q^* = \frac{p(-a+k+b)}{(c-k+d)+p(-c+k+a)}$ and $r = \frac{cW}{-c+d}$ and $a \geq -c(a-b)+d+uc+b$

Bayes’ rule implies that $Pr(S|a) = 0$ and therefore the best response for the government following $a$ is to use an undiscriminating counterterror attack because the government knows that $Pr(W|a) = 1$. When $A$ is observed, Bayes’ rule tells us:

\[
Pr(S|A) = \frac{Pr(A|S)Pr(S)}{Pr(A|S)Pr(S) + Pr(A|W)Pr(W)} = \frac{p}{p + q(1-p)}
\]

\[
Pr(W|A) = \frac{q(1-p)}{p + q(1-p)}
\]

Because Government plays a mixed strategy following $A$, he must be indifferent between discriminating or undiscriminating counterterror. This requires that:

\[
(a - k)Pr(S|A) + (c - k)Pr(W|A) = bPr(S|A) + dPr(W|A)
\]

\[
\frac{ap}{p + q(1-p)} + \frac{q(1-p)}{p + q(1-p)} - \frac{k(p + q(1-p))}{p + q(1-p)} = \frac{bp}{p + q(1-p)} + \frac{dq(1-p)}{p + q(1-p)}
\]

\[
q^* = \frac{p(-a+k+b)}{(c-k-d)+p(-c+d+k)}
\]
Since \( q^* \leq 1 \) this requires that:

\[
\frac{p(-a + k + b)}{(c - k - d) + p(-c + d + k)} \leq 1
\]
\[
p \geq \frac{c - d - k}{(b - a) + (c - d)}
\]

Similarly \( r \) must satisfy the indifference condition: the terrorist type \( W \) must be indifferent between \( a \) and \( A \)

\[
-d = r(-c - c_w) + (1 - r)(-d - c_w)
\]
\[
-d + c_w = r(-c + d)
\]
\[
\frac{c_w}{-c + d} = r^*
\]

Since \( r^* \geq 0 \) this means that \( \frac{c_w}{-c + d} \geq 0 \) and thus \( c_w \geq 0 \).

Given these mixed strategies I now need to check that the Strong type of terrorist prefers to play \( A \). If she plays \( a \) she gets \(-b\) and if she plays \( A \) she gets \( r(-a - c_s) + (1 - r)(-b - c_s) \). Thus,

\[
EU_S(A) - EU_S(a) = -ar + (1 - r)(-b) - c_s + b
\]
\[
= -ar + rb - c_s
\]

Since \( a > b \) this difference is always negative and thus the Strong terrorist has an incentive to play \( a \) instead of \( A \).

### A.3.2 Proof of Proposition xii

The second equilibrium analyzed is the one where Strong type terrorist always sends the small attack. The type Weak terrorist sends the small attack with probability \( q \). If the large attack is sent, the Government responds with the undiscriminating counterattack with probability \( r \).

Proposition 12: If \( p \geq p^* \), then the following strategies are a not a PBE: \( S_T(S) = \)

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Bayes’ rule implies that $Pr(S|A) = 0$ and therefore the best response for the government following A is to use an undiscriminating counterterror attack because the government knows that $Pr(W|A) = 1$. When A is observed, Bayes’ rule tells us:

$$
Pr(S|a) = \frac{Pr(a|S)Pr(S)}{Pr(a|S)Pr(S) + Pr(a|W)Pr(W)}
= \frac{p}{p + q(1-p)}
$$

$$
Pr(W|A) = \frac{q(1-p)}{p + q(1-p)}
$$

Because Government plays a mixed strategy following a, he must be indifferent between discriminating or undiscriminating counterterror. This requires that:

$$
\frac{(a - k)Pr(S|a) + (c - k)Pr(W|a)}{p + q(1-p)} - \frac{k(p + q(1-p))}{p + q(1-p)} = \frac{bPr(S|a) + dPr(W|a)}{p + q(1-p)} + \frac{dq(1-p)}{p + q(1-p)}
$$

$$
q^* = \frac{p(-a + k + b)}{(c - k - d) + p(-c + d + k)}
$$

Since $q^* \leq 1$ this requires that:

$$
\frac{p(-a + k + b)}{(c - k - d) + p(-c + d + k)} \leq 1
$$

$$
p \geq \frac{c - d - k}{(b - a) + (c - d)}
$$
Similarly r must satisfy the indifference condition: the terrorist type W must be indifferent between A and \( a \)

\[
-d - c_w = r(-c) + (1 - r)(-d) \\
-d - c_w = -cr - d + rd \\
-c_w = r(d - c) \\
\frac{-c_w}{d - c} = r^* 
\]

Since \( r^* \geq 0 \) this means that \( \frac{-c_w}{-c + d} \geq 0 \) and since \( d > c \), this implies \( c_w \leq 0 \) which is not possible.

Given these mixed strategies I now need to check that the Strong type of terrorist prefers to play A. If she plays \( a \) she gets \( -b \) and if she plays A she gets \( r(-a - c_s) + (1 - r)(-b - c_s) \). Thus,

\[
EU_S(A) - EU_S(a) = -ar + (1 - r)(-b) - c_s + b \\
= -ar + rb - c_s 
\]

Since \( a > b \) this difference is always negative and thus the Strong terrorist has an incentive to play \( a \) instead of A.

### A.3.3 Proof of Proposition xiii

The third partial pooling equilibrium analyzed is the one where Weak type terrorist always sends the large attack. The Strong type terrorist sends the large attack with probability \( q \). If the large attack is sent, the Government responds with the undiscriminating counterattack with probability \( r \).

Proposition 13 : If \( p \geq p^* \) and \( b - a \leq c_s \), then the following strategies are not a PBE: \( S_T(W) = A, S_T(S) = \{A \text{ with prob. } q\} \) and \( S_G(a) = dc, S_G(A) = \{dc \text{ with probability } r\} \) where \( q = q^* \) and \( r = \frac{b-a-c_s}{b-a} \) and \( (b-a+c_s)(-c-c_W) + c_s(-d-c_W) > \)
Bayes’ rule implies that $Pr(W|a) = 0$ and therefore the best response for the government following $a$ is to use a discriminating counterterror attack because the government knows that $Pr(S|a) = 1$. When $A$ is observed, Bayes’ rule tells us:

$$Pr(W|A) = \frac{Pr(A|W)Pr(W)}{Pr(A|W)Pr(W) + Pr(A|S)Pr(S)} = \frac{1 - p}{(1 - p) + qp}$$

Because Government plays a mixed strategy following $A$, he must be indifferent between discriminating or undiscriminating counterterror. This requires that:

$$\frac{qp}{qp + (1 - p)} + \frac{c(1 - p)}{qp + (1 - p)} - \frac{k(qp + (1 - p))}{ap + (1 - p)} = \frac{bqp}{qp + (1 - p)} + \frac{d(1 - p)}{qp + (1 - p)}$$

$$q^* = \frac{(1 - p)(-c + d + k)}{p(a - b - k)}$$

Since $q^* \leq 1$ this requires that:

$$(1 - p)(-c + d + k) \leq pa - pb - pk$$

$$\frac{c - d - k}{(b - a) + (c - d)} \leq p$$
Similarly r must satisfy the indifference condition: the terrorist type S must be indifferent between a and A

\[-a = r(-b - c_s) + (1 - r)(-a - c_s)\]
\[c_s = r(a - b)\]
\[r^* = \frac{cr}{b - a}\]

Since \(r^* \geq 0\) this means that \(\frac{c_s}{a - b} \geq 0\) and thus \(c_s \geq 0\).

Given these mixed strategies I now need to check that the Weak type of terrorist prefers to play A. If she plays a she gets \(-c\) and if she plays A she gets \(r(-c - c_w) + (1 - r)(-d - c_w)\). Thus,

\[EU_S(A) - EU_S(a) = -cr - c_w r - d - c_w + rd + c_w r + c \geq 0\]
\[= c(1 - r) - d(1 - r) - c_w \geq 0\]

Since \(d \geq 0\), this is never a PBE.

A.3.4 Proof of Proposition xiv

The final partial pooling equilibrium analyzed is the one where Weak type terrorist always sends the small attack. The type Strong terrorist sends the small attack with probability q. If the large attack is sent, the Government responds with the undiscriminating counterattack with probability r.

Proposition 14 : If \(p \geq p^*\) and \(b - a \leq c_S\), then the following strategies are not a PBE: \(S_T(W) = a, S_T(S) = \{a\} \) with prob. \(q\) and \(S_G(A) = dc, S_G(a) = \{dc\}\) with probability \(r\) where \(q = q^*\) and \(r = \frac{cr}{b - a}\) and \(cc_s + (-d)(b - a + c_s) < (-d - c_w)(b - a)\)

Bayes’ rule implies that \(Pr(W|A) = 0\) and therefore the best response for the government following A is to use an discriminating counterterror attack because the government knows that \(Pr(S|A) = 1\). When a is observed, Bayes’ rule tells us:
\[
Pr(W|a) = \frac{Pr(a|W)Pr(S)}{Pr(a|W)Pr(W) + Pr(a|S)Pr(S)} = \frac{1 - p}{qp + (1 - p)}
\]

\[
Pr(S|a) = \frac{1 - p}{qp + (1 - p)}
\]

Because Government plays a mixed strategy following a, he must be indifferent between discriminating or undiscriminating counterterror. This requires that:

\[
aPr(S|a) + cPr(W|a) - k = bPr(S|a) + dPr(W|a)
\]

\[
q^* = \frac{(1 - p)(-c + d + k)}{p(a - b - k)}
\]

Since \(q^* \leq 1\) this requires that:

\[
\frac{p(-a + k + b)}{(c - k - d) + p(-c + d + k)} \leq 1
\]

\[
p \geq \frac{c - d - k}{(b - a) + (c - d)}
\]

Similarly \(r\) must satisfy the indifference condition: the terrorist type S must be indifferent between A and a

\[
-a - c_s = r(-b) + (1 - r)(-a)
\]

\[-c_s = r(a - b)
\]

\[
\frac{-c_s}{a - b} = r
\]

\[
\frac{c_s}{b - a} = r
\]

Since \(r^* \geq 0\) this means that \(\frac{c_s}{b - a} \geq 0\) and since \(a > b\), this implies \(c_s \leq 0\) which is not possible. Thus this is not a PBE.
APPENDIX B

MODEL DETAILS AND PROOFS FOR CLUB
GOODS GAME IN CHAPTER 03

B.1 Cases

B.1.1 Impact of increase in military resources: Case 1 and 2

(1a) $\alpha \frac{\partial h}{\partial m} < \frac{\partial \psi}{\partial m} [v_f - v_s]$, then $\frac{\partial \hat{\sigma}}{\partial m} < 0$. This means that an increase in $m$ increases support for the terrorist organization because the indifference threshold is lowered. I call this case “High Success”.

(2a) $\alpha \frac{\partial h}{\partial m} > \frac{\partial \psi}{\partial m} [v_f - v_s]$, then $\frac{\partial \hat{\sigma}}{\partial m} > 0$. This means that an increase in $m$ decreases support for the terrorist organization because the indifference threshold is raised. I call this case “Low Success”.

B.1.2 Impact of increase in counterterrorism strategy: Case 1 and 2

(1b) $-\frac{\partial \psi}{\partial c} [v_f - v_s] < (1 - \gamma) \frac{\partial \tau}{\partial c}$, then $\frac{\partial \hat{\sigma}}{\partial c} < 0$. This means that an increase in $c$ increases support for the terrorist organization because the indifference threshold is lowered. I call this case “High Damage”.

(2b) $-\frac{\partial \psi}{\partial c} [v_f - v_s] > (1 - \gamma) \frac{\partial \tau}{\partial c}$, then $\frac{\partial \hat{\sigma}}{\partial c} > 0$. This means that an increase in $c$ decreases support for the terrorist organization because the indifference threshold is raised. I call this case “Low Damage”.

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Given the possible impacts of an increase in military expenditures by the terrorist organization and counter-terrorism by the government, 4 cases arise:

1. $\frac{\partial \hat{\sigma}}{\partial m} > 0, \frac{\partial \hat{\sigma}}{\partial c} > 0$

2. $\frac{\partial \hat{\sigma}}{\partial m} > 0, \frac{\partial \hat{\sigma}}{\partial c} < 0$

3. $\frac{\partial \hat{\sigma}}{\partial m} < 0, \frac{\partial \hat{\sigma}}{\partial c} > 0$

4. $\frac{\partial \hat{\sigma}}{\partial m} < 0, \frac{\partial \hat{\sigma}}{\partial c} < 0$

### B.2 Second Order Conditions

In order for a Nash equilibrium to exist, both the utility function of the government and terrorist must be concave. The SOC of the terrorist utility function must be taken to ensure this. However since this condition is dependent on the signs of the SOC from the potential supporters’ utility function I will show these conditions here. The associated second order conditions are as follows:

\[
\frac{\partial \hat{\sigma}}{\partial m} = \frac{1}{2} \alpha \frac{\partial h}{\partial m} - \frac{1}{2} \frac{\partial \psi}{\partial m} [v_f - v_s] \tag{B.1}
\]

\[
\frac{\partial^2 \hat{\sigma}}{\partial m^2} = -\frac{1}{2} \left[ \alpha^2 \frac{\partial^2 h}{\partial m^2} + \frac{\partial^2 \psi}{\partial m^2} [v_f - v_s] \right] > 0 \tag{B.2}
\]

Since $h'' < 0, \psi'' > 0, v_f - v_s < 0$, we know this expression is positive.

\[
\frac{\partial \hat{\sigma}}{\partial c} = -\frac{1}{2} \frac{\partial \psi}{\partial c} [v_f - v_c] - \frac{1}{2} \tau' \tag{B.3}
\]

\[
\frac{\partial^2 \hat{\sigma}}{\partial c^2} = -\frac{1}{2} \frac{\partial^2 \psi}{\partial c^2} [v_f - v_c] + \tau'' < 0 \tag{B.4}
\]
\[
\frac{\partial^2 \hat{\sigma}}{\partial c \partial m} = -\frac{1}{2} \frac{\partial^2 \psi}{\partial c \partial m} [v_f - v_s] > 0 \tag{B.5}
\]

Given these SOC I can now check the SOC for the terrorist organization. This is:

\[
\frac{\partial^2 U^T}{\partial m^2} = -\frac{\partial^2 \psi}{\partial m^2} S + \alpha^2 \frac{\partial \mu}{\partial g} + \alpha \frac{\partial^2 \mu}{\partial g^2} \frac{\partial \hat{\sigma}}{\partial m} + \frac{\partial^2 \mu}{\partial p^2} \left( \frac{\partial \hat{\sigma}}{\partial m} \right)^2 - \frac{\partial \mu}{\partial p} \frac{\partial^2 \hat{\sigma}}{\partial m^2} \tag{B.6}
\]

We know that \(\frac{\partial^2 \psi}{\partial m^2} > 0\), thus the first term is always negative. \(\frac{\partial^2 \mu}{\partial g^2} < 0\), making the second term negative, \(\frac{\partial^2 \mu}{\partial p^2} < 0\), thus the fourth term is always negative, \(\frac{\partial^2 \hat{\sigma}}{\partial m^2}\) is positive and \(\frac{\partial \mu}{\partial p} > 0\), so the fifth term is always negative. Therefore the concavity of this function depends on the third term which depends on the sign of \(\frac{\partial \hat{\sigma}}{\partial m}\). If this term is negative, as we might expect when the terrorist organization cannot easily target potential supporters, the third term is always negative and the function is always concave. If this term is positive, as we would expect it to be when the terrorist organization has a concentrated group of potential supporters, the SOC holds if the sum of the other 4 terms is greater than this term. Therefore when \(\frac{\partial \hat{\sigma}}{\partial m} > 0\) and \(2\alpha \frac{\partial^2 \mu}{\partial g^2} \frac{\partial \hat{\sigma}}{\partial m} > \frac{\partial^2 \psi}{\partial m^2} S - \alpha^2 \frac{\partial^2 \mu}{\partial g^2} \left( \frac{\partial \hat{\sigma}}{\partial m} \right)^2 + \frac{\partial \mu}{\partial p} \frac{\partial^2 \hat{\sigma}}{\partial m^2}\) this function is convex and the existence of a Nash Equilibrium is not guaranteed. In the cases mentioned previously, cases 3 and 4 are guaranteed to have a NE and cases 1 and 2 have one if the above inequality does not hold.

**B.3 Proof of Equation 11**

We can also take the first partial with respect to \(c\) to find out if the welfare for the terrorist in increasing or decreasing in \(c\) (it will depend on the sign of \(\frac{\partial \hat{\sigma}}{\partial c}\))

\[
\frac{\partial U^T}{\partial c} = -\frac{\partial \psi}{\partial c} S - \frac{\partial \mu}{\partial p} n \frac{\partial \hat{\sigma}}{\partial c} \tag{B.7}
\]

We know that \(\frac{\partial \psi}{\partial c}\) is positive and hence the first term is negative. We also know that \(\frac{\partial \mu}{\partial p}\) is positive and hence if \(\frac{\partial \hat{\sigma}}{\partial c}\) is positive the second term is negative and hence \(\frac{\partial U^T}{\partial c}\) is negative meaning that the terrorists’ welfare is decreasing as counter-terrorism is increased (in this case the government
is able to recruit potential supporters). If on the other hand \( \frac{\partial \sigma}{\partial c} \) is negative then the second term is positive. If the utility gained from increasing supporters and the government losing them is greater than the decrease in the terrorists’ chance at success then the terrorists’ welfare is increasing as \( c \) increases.

### B.4 Proof of Equation 12

\[
\frac{\partial m}{\partial c} = \frac{\partial^2 \psi}{\partial m \partial c} - \frac{\alpha \partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial c} - \frac{\partial^2 \mu}{\partial p^2} \frac{\partial \sigma}{\partial c} \frac{\partial m}{\partial m} + \frac{\partial \mu}{\partial g} \frac{\partial^2 \sigma}{\partial m \partial c} 
- \frac{\partial^2 \psi}{\partial m^2} S + \alpha^2 \frac{\partial \mu}{\partial p} + \alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial m} + \frac{\partial^2 \mu}{\partial p^2} \left( \frac{\partial \sigma}{\partial m} \right)^2 - \frac{\partial \mu}{\partial p} \frac{\partial^2 \sigma}{\partial m^2} \] (B.8)

Once again the sign of this differentiation depends on which case we are in. We know the denominator is always negative whenever \( \frac{\partial \sigma}{\partial m} \) is negative. Therefore in cases 3 and 4 the terrorist’s response depends on the sign of the numerator. Since \( \frac{\partial^2 \psi}{\partial m \partial c} > 0 \) the first term is always positive. Since \( \frac{\partial^2 \sigma}{\partial m \partial c} > 0 \) we know the fourth term is always positive. If \( \frac{\partial \sigma}{\partial c} < 0 \) then the second term is positive. This means that if an increase in counterterrorism policies leads to an increase in mobilization for the terrorist group, the terrorist group becomes more likely to decrease its best response in return to an increase in counter-terrorism. If \( \frac{\partial \sigma}{\partial c} > 0 \) then the best response curve is still negative assuming that the sum of all three others (given that the third is positive) is greater than this term. The third component is positive when \( \frac{\partial \sigma}{\partial m} \) and \( \frac{\partial \sigma}{\partial m} \) are of different signs. If the other three outweigh this term when it is negative, the best response curve is still negative. If the second and third term are negative and greater than the other two terms (thus causing the best response curve to be positively sloping, then the terrorist group should increase military actions in response to an increase in counter-terrorism. These cases are shown below.

1. \( \frac{\partial \sigma}{\partial m} > 0, \frac{\partial \sigma}{\partial c} > 0 \). If we are in case 1 we know the denominator can be negative or positive.

If we assume the SOC holds and the denominator is negative (therefore that \( 2\alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial m} < \frac{\partial^2 \psi}{\partial m^2} S - \alpha^2 \frac{\partial^2 \mu}{\partial p^2} \left( \frac{\partial \sigma}{\partial m} \right)^2 + \frac{\partial \mu}{\partial p} \frac{\partial^2 \sigma}{\partial m \partial c} \) then \( \frac{\partial m}{\partial c} \) is negative when \( \alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \sigma}{\partial c} + \frac{\partial^2 \mu}{\partial p^2} \frac{\partial \sigma}{\partial c} \frac{\partial m}{\partial m} < \frac{\partial^2 \psi}{\partial m \partial c} S + \frac{\partial \mu}{\partial p} \frac{\partial^2 \sigma}{\partial m^2} \).
2. \( \frac{\partial \hat{\sigma}}{\partial m} > 0, \frac{\partial \hat{\sigma}}{\partial c} < 0 \). If we are in case 2 we know the denominator can be negative or positive. If we assume the SOC holds then \( \frac{\partial m}{\partial c} \) is negative. When the SOC does not hold \( \frac{\partial m}{\partial c} \) is positive.

3. \( \frac{\partial \hat{\sigma}}{\partial m} < 0, \frac{\partial \hat{\sigma}}{\partial c} > 0 \). If we are in case 3, we know the SOC holds and therefore that the denominator is negative. Therefore \( \frac{\partial m}{\partial c} \) is negative when \( \alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \hat{\sigma}}{\partial c} - \frac{\partial \psi}{\partial m \partial c} S + \frac{\partial \mu}{\partial p} \frac{\partial^2 \hat{\sigma}}{\partial m \partial c} \) and is positive when this inequality does not hold.

4. \( \frac{\partial \hat{\sigma}}{\partial m} < 0, \frac{\partial \hat{\sigma}}{\partial c} < 0 \). If we are in case 4 we know the SOC holds and therefore that the denominator is negative. Therefore \( \frac{\partial m}{\partial c} \) is negative when \( \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \hat{\sigma}}{\partial c} S + \alpha \frac{\partial^2 \mu}{\partial g \partial p} \frac{\partial \hat{\sigma}}{\partial m} + \frac{\partial \mu}{\partial p} \frac{\partial^2 \hat{\sigma}}{\partial m \partial c} \) and is positive when this inequality does not hold.

\[
\frac{\partial^2 U^G}{\partial c^2} = \frac{\partial^2 \psi}{\partial c^2} + \delta \frac{\partial^2 \hat{\sigma}}{\partial c^2} - k'' \quad \text{(B.9)}
\]

We know that \( \frac{\partial^2 \psi}{\partial c^2} < 0, k'' > 0 \) so therefore the SOC is \( < 0 \) when \( \frac{\partial^2 \hat{\sigma}}{\partial c^2} < 0 \), which was assumed.

### B.5 Proof of Equation 17

Now that we know the FOC and SOC, we need to use implicit differentiation to figure out how the government will respond to the terrorist’s actions.

\[
\frac{\partial c}{\partial m} = -\frac{\partial^2 \psi \frac{\partial^2 \hat{\sigma}}{\partial c^2} + \delta \frac{\partial^2 \hat{\sigma}}{\partial c^2} - \frac{\partial \mu}{\partial m^2}}{\frac{\partial^2 \psi}{\partial c^2} + \delta \frac{\partial^2 \hat{\sigma}}{\partial c^2} - \frac{\partial \mu}{\partial c^2}} \quad \text{(B.10)}
\]

This is positive because \( \frac{\partial^2 \psi}{\partial c^2} > 0 \) and \( \frac{\partial^2 \hat{\sigma}}{\partial c^2} > 0 \) and from the SOC we know that the denominator is also negative.
B.6 Proof of Equation 18

In terms of the government’s behavior, we also need to know whether the utility of the government is increasing or decreasing in the terrorists level of attacks:

\[
\frac{\partial U^G}{\partial m} = \frac{\partial \psi}{\partial m} + \delta \frac{\partial \sigma}{\partial m} \quad (B.11)
\]

From this we see that when \( \frac{\partial \sigma}{\partial m} < 0 \) then \( \frac{\partial U^G}{\partial m} < 0 \). However when \( -\frac{\partial \psi}{\partial m} > \delta n \frac{\partial \sigma}{\partial m} \) then \( \frac{\partial U^G}{\partial m} < 0 \) and when \( -\frac{\partial \psi}{\partial m} < \delta \frac{\partial \sigma}{\partial m} \), then \( \frac{\partial U^G}{\partial m} > 0 \).
APPENDIX C

MODEL DETAILS AND PROOFS FOR
ENDOGENOUS SUPPORT GAME IN CHAPTER 04

C.1 Model Set-Up and FOC

The timing is as follows:

1. Round 1

   (a) State begins: \( p_0, m_0^c, m_0^p, G_0, T_0 \)

   (b) Terrorist chooses \( a_1 \) (and \( g_1 \) since \( T = a + g \))

       Government chooses \( C_1 \)

   (c) State gets updated:

       \( G_1 = G_0 + g_1, G_1 = G_0 + (T_0 - a_1) \)

       \( m_1^c = f(m_0^c, a_1) \)

       \( m_1^p = g(m_0^p, G_1, C_1) \)

       \( p_1 = h(p_0, m_1^c, C_1, a_1) \)

   (d) Payoffs are given:

       \( U_T = p_1(p_0, m_1^c, C_1, a_1) + \alpha m_1^p \)

       \( U_G = 1 - p_1(p_0, m_1^c, C_1, a_1) - \gamma m_1^p \)

2. Round 2
(a) State begins: \( p_1, m_1, m_1^p, G_1, T_1 \)

(b) Terrorist chooses \( a_2 \) (and \( g_2 \) since \( T = a + g \))

Government chooses \( C_2 \)

(c) State gets updated:

\[
G_2 = G_1 + g_2, \quad G_2 = G_1 + (T_1 - a_2)
\]

\[
m_2^c = f(m_1^c, a_2)
\]

\[
m_2^p = g(m_1^p, G_2, C_2)
\]

\[
p_2 = h(p_1, m_2^c, C_2, a_2)
\]

(d) Payoffs are given:

\[
U_T = p_2(p_1, m_2^c, C_2, a_2) + \alpha m_2^p
\]

\[
U_G = 1 - p_2(p_1, m_2^c, C_2, a_2) - \gamma m_2^p
\]

Using backwards induction, in general function notation, the terrorist problem is to maximize:

\[
U_T = p_2(p_1, m_2^c, C_2, a_2) + \alpha m_2^p \tag{C.1}
\]

subject to:

\[
\max_{C_2} [1 - p_2(p_1, m_2^c, C_2, a_2)] - \gamma m_2^p
\]

\[
a_2 + g_2 = T_2
\]

I start with the governments maximization problem:

\[
\frac{\partial U_G}{\partial C_2} = -\frac{\partial p_2}{\partial C_2} - \gamma \frac{\partial m_2^p}{\partial C_2} \tag{C.2}
\]

Equation (3) implicitly defines \( C_2^* \). Noting that:

\[
\frac{dp_2}{da_2} = \frac{\partial p_2}{\partial a_2} + \frac{\partial p_2}{\partial m_2^c} \frac{dm_2^c}{da_2} + \frac{\partial p_2}{\partial C_2^*} \frac{dC_2^*}{da_2}
\]

\[
\frac{dm_2^p}{da_2} = \frac{\partial m_2^p}{\partial a_2} + \frac{\partial m_2^p}{\partial m_2^c} \frac{dm_2^c}{da_2} + \frac{\partial m_2^p}{\partial C_2^*} \frac{dC_2^*}{da_2}
\]
We can use the equilibrium value in (2) with equation (1) to find the second first order condition.

\[
\frac{\partial U_T}{\partial a_2} = \left[ \frac{\partial p_2}{\partial m_2^c} \frac{dm_2^c}{da_2} + \frac{\partial p_2}{\partial C_2} \frac{dC_2}{da_2} \right] + \alpha \left[ \frac{\partial m_2^p}{\partial C_2} \frac{dC_2}{da_2} + \frac{\partial m_2^p}{\partial a_2} \right]
\] (C.3)

With equation (2) and (3) in hand, I can now find the full stage equilibrium for the second stage, which consists of the pair \((a_2^*, C_2^*)\) along with the resulting \(p_2, m_2^p\) and \(m_2^c\).

### C.2 Proof of Proposition 4.2.1

The way in which the government responds to changes in attacks by the terrorist group is needed in order to understand the decision making of both the terrorist and the government. In order to get at this I need to know how \(C_2^*\) changes when \(a_2\) changes. This requires the equilibrium value \(C_2^*\) from the FOC for the government (equation 2) to be implicitly differentiated.

\[
\frac{d}{da_2} \left[ \frac{\partial U_G}{\partial C_2} \right] = 0
\]

\[
= -\left\{ \frac{\partial^2 p_2}{\partial C_2^2} \frac{dC_2}{da_2} + \frac{\partial^2 p_2}{\partial C_2} \frac{dC_2}{da_2} \right\} - \gamma \left[ \frac{\partial^2 m_2^p}{\partial C_2^2} \frac{dC_2}{da_2} + \frac{\partial^2 m_2^p}{\partial a_2^2} \right]
\]

Solving for \(\frac{\partial C_2}{\partial a_2}\) we find that:

\[
\frac{\partial C_2}{\partial a_2} = -\frac{\partial^2 p_2}{\partial C_2^2} \frac{dC_2}{da_2} + \frac{\partial^2 p_2}{\partial a_2^2} + \gamma \frac{\partial^2 m_2^p}{\partial a_2^2} \frac{dC_2}{da_2} \]

(C.4)

In order to sign this, we need to know assumptions on the functional forms.

Assumptions on Functional Forms:

- probability of success: \(p_2(p_1, m_2^c, C_2, a_2)\)
\[ \frac{\partial p_2}{\partial p_1} > 0, \quad \frac{\partial^2 p_2}{(\partial p_1)^2} < 0 \]
\[ \frac{\partial p_2}{\partial m_2} > 0, \quad \frac{\partial^2 p_2}{(\partial m_2)^2} < 0 \]
\[ \frac{\partial p_2}{\partial C_2} < 0, \quad \frac{\partial^2 p_2}{(\partial C_2)^2} > 0 \]
\[ \frac{\partial p_2}{\partial a_2} > 0, \quad \frac{\partial^2 p_2}{(\partial a_2)^2} < 0 \]
\[ \frac{\partial^2 p_2}{\partial a_2 \partial C_2} < 0 - \text{Terrorists expose themselves as they attack more so increasing } a_2 \text{ increases the effectiveness of } C_2. \text{ Likewise, increasing counterterror creates a tougher environment for terrorists to attack in and this decreases the effectiveness of } a_2. \]
\[ \frac{\partial^2 p_2}{\partial m_2 \partial C_2} < 0 - \text{As the group gets larger, the terrorists start to expose themselves more, hence increasing the effectiveness of } C_2. \text{ Likewise, increasing counterterror, as above, creates a tougher environment and decreases the effectiveness of a larger pool of combatants.} \]

- passive mobilization: \( m_2^p = g(m_1^p, C_2, a_2) \)
\[ \frac{\partial m_2^p}{\partial m_1^p} > 0, \quad \frac{\partial^2 m_2^p}{(\partial m_1^p)^2} < 0 \]
\[ \frac{\partial m_2^p}{\partial C_2} > 0, \quad \frac{\partial^2 m_2^p}{(\partial C_2)^2} > 0 - \text{The second partial assumes that passive mobilization increases at a faster rate as counterterror increases. The logic behind this assumption is that at low levels of counterterror, the potential passive population might understand that the government needs to respond to a terrorist attack. However, as the government increases their counterterror to larger and perhaps even disproportional levels, the passive supporters mobilize against this action.} \]
\[ \frac{\partial m_2^p}{\partial a_2} < 0, \quad \frac{\partial^2 m_2^p}{(\partial a_2)^2} < 0 \]
\[ \frac{\partial^2 m_2^p}{\partial a_2 \partial C_2} < 0 - \text{As the terrorist increases spending on attacks, this is a reduction of spending on club goods. As such the passive mobilization boost from } C_2 \text{ decreases because the terrorist group does not appear to be an valid option to obtain material goods from.} \]

- core mobilization: \( m_2^c = f(m_1^c, a_2) \)
\[ \frac{\partial^2 m_2^c}{(\partial m_1^c)^2} > 0 - \text{As terrorist increases spending on attacks, this allows the more resources for core members to use. As such, an increase in resources for attacks causes the core mobilization members to become more effective, causing the increase of initial core mobilization on the new level of core mobilization to be accelerated.} \]
Returning to $\frac{\partial C}{\partial a_2}$, we can now see that $\frac{\partial C}{\partial a_2} > 0$. In other words, the government will increase their spending on counterterror as the terrorist organization increases their attacks. This makes sense because of the following:

- Numerator: all terms indicate that increasing attacks makes counterterror a more valuable option
  - $\frac{\partial^2 p_2}{\partial C_2 \partial m^c_2} \frac{\partial m^c_2}{\partial a_2}$: increasing attacks increases core mobilization. This in turn exposes the terrorist group and makes counterterror more effective.
  - $\frac{\partial^2 p_2}{\partial C_2 \partial a_2}$: increasing attacks exposes the terrorist groups, making counterterror more effective.
  - $\gamma \frac{\partial^2 m^p_2}{\partial C_2 \partial a_2}$: increasing attacks reduces the amount of spending by the terrorist organization on club goods. As such the terrorist organization becomes less of a viable alternative and the mobilization cost to the government decreases.

- Denominator: both terms in the denominator show that increasing counterterror makes the positive effects smaller (i.e. both denominator terms get larger with an increase in counterterror, decreasing the overall positive impact of the numerator)

- $\frac{\partial^2 p_2}{\partial (C^2)_{a_2}}$: as counterterror increases, it becomes less effective at decreasing the probability of success of the terrorist.

- $\gamma \frac{\partial^2 m^p_2}{\partial (C^2)_{a_2}}$: as counterterror increases, it becomes more effective at angering the population and increasing passive mobilization

### C.3 Proof of Propositions 4.2.2 and 4.2.3

Since:

$$\begin{align*}
\frac{dp_2}{dm^c_1} &= \frac{\partial p_2}{\partial m^c_2} \frac{\partial m^c_2}{\partial m^c_1} + \frac{\partial p_2}{\partial m^c_2} \frac{\partial a_2}{\partial m^c_2} + \frac{\partial p_2}{\partial a_2} \frac{\partial m^c_2}{\partial a_2} + \frac{\partial p_2}{\partial C_2} \frac{\partial a_2}{\partial C_2} + \frac{\partial p_2}{\partial C_2} \frac{\partial C_2}{\partial a_2} \frac{\partial m^c_1}{\partial C_2} + \frac{\partial p_2}{\partial C_2} \frac{\partial a_2}{\partial C_2} \frac{\partial m^c_1}{\partial a_2} \\
\frac{dm^c_2}{dm^c_1} &= \frac{\partial m^c_2}{\partial m^c_1} \frac{\partial m^c_1}{\partial m^c_2} + \frac{\partial m^c_2}{\partial a_2} \frac{\partial a_2}{\partial m^c_2} + \frac{\partial m^c_2}{\partial C_2} \frac{\partial C_2}{\partial a_2} \frac{\partial m^c_1}{\partial C_2} \frac{\partial C_2}{\partial m^c_1} + \frac{\partial m^c_2}{\partial C_2} \frac{\partial C_2}{\partial C_2} \frac{\partial m^c_1}{\partial C_2}
\end{align*}$$
We can find \( \frac{\partial}{\partial m_1^c} \left( \frac{\partial U}{\partial C_2} \right) \):

\[
\frac{\partial}{\partial m_1^c} \left( \frac{\partial U}{\partial C_2} \right) = \frac{\partial}{\partial m_1^c} \left( -\frac{\partial p_2}{\partial C_2} \right) - \gamma \frac{\partial m_2^p}{\partial C_2}
\]

\[
0 = \left[ \frac{\partial^2 p_2}{\partial C_2 \partial m_1^c} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2^c} \frac{\partial m_1^c}{\partial m_1^c} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2^c} \frac{\partial m_2^c}{\partial m_1^c} + \gamma \frac{\partial^2 m_2^p}{\partial C_2 \partial m_1^c} + \frac{\partial^2 m_2^p}{\partial C_2 \partial m_2^c} \frac{\partial m_2^c}{\partial m_1^c} \right]
\]

Thus we see:

\[
\frac{\partial U}{\partial C_2} = -N \frac{\partial m_2^p}{\partial C_2} + \gamma \frac{\partial^2 m_2^p}{\partial (C_2)^2}
\]

where \( N = \frac{\partial^2 p_2}{\partial C_2 \partial m_1^c} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2^c} \frac{\partial m_1^c}{\partial m_1^c} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2^c} \frac{\partial m_2^c}{\partial m_1^c} + \gamma \frac{\partial^2 m_2^p}{\partial C_2 \partial m_1^c} + \frac{\partial^2 m_2^p}{\partial C_2 \partial m_2^c} \frac{\partial m_2^c}{\partial m_1^c} \)

What we see is that a key trade-off exists: \( C_2 \) becomes more effective (or less damaging) from all the cross-partials but becomes less effective (or more damaging) from the second partials.

The sign also depends on \( \frac{\partial a_2}{\partial m_1^c} \) as described below:

- **Cross partials of \( p \)**
  
  \[
  \uparrow m_1^c \rightarrow \uparrow m_2^c \rightarrow \text{more exposure} \rightarrow \text{more effective } C_2
  \]
  
  \[
  \uparrow m_1^c \rightarrow \uparrow \Delta a_2 \rightarrow \text{imagine it leads to } \uparrow a_2 \rightarrow \text{more exposure} \rightarrow \text{more effective } C_2
  \]
  
  \[
  \uparrow m_1^c \rightarrow \uparrow \Delta a_2 \rightarrow \text{imagine it leads to } \uparrow a_2 \rightarrow \uparrow m_2^c \rightarrow \text{more exposure} \rightarrow \text{more effective } C_2
  \]

- **second partial of \( p \)**
  
  \[
  \uparrow m_1^c \rightarrow \uparrow \Delta a_2 \rightarrow \text{imagine it leads to } \uparrow a_2 \rightarrow \uparrow C_2 \rightarrow \text{less effective } C_2
  \]

- **Cross partials of \( m_2^p \)**
  
  \[
  \uparrow m_1^c \rightarrow \uparrow \Delta a_2 \rightarrow \text{imagine it leads to } \uparrow a_2 \rightarrow \text{less spent on club goods} \rightarrow \text{less damaging } C_2
  \]
• second partial of \( m_2^p \)

\[- \uparrow m_1^f \rightarrow \uparrow \Delta a_2 \rightarrow \text{imagine it leads to } \uparrow a_2 \rightarrow \uparrow C_2 \rightarrow \text{more damaging } C_2\]

What we see from this is that the sign of \( \frac{\partial C_2}{\partial m_1^f} \) depends on the sign of \( \frac{\partial x_2}{\partial m_2^p} \).

As shown above, the terrorist problem is to maximize:

\[ U_T = p_2(p_1, m_2^c, C_2, a_2) + \alpha m_2^p \]

\[
\frac{\partial U_T}{\partial a_2} = \left[ \frac{\partial p}{\partial m_2^c} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial p}{\partial C_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial p}{\partial a_2} \right] + \alpha \left[ \frac{\partial m_2^p}{\partial C_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial m_2^p}{\partial a_2} \right]
\]

\[
\frac{d}{dm_1^f} \frac{d U_T}{da_2} = \left[ \frac{\partial^2 p}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial m_1^f} + \frac{\partial^2 p}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \frac{\partial a_2}{\partial m_1^f} + \frac{\partial^2 p}{\partial C_2 \partial m_2^c} \frac{\partial C_2}{\partial a_2} \frac{\partial a_2}{\partial m_1^f} + \frac{\partial^2 p}{\partial C_2 \partial m_2^c} \frac{\partial C_2}{\partial m_1^f} \frac{\partial m_2^c}{\partial a_2} \frac{\partial a_2}{\partial m_1^f} \right] + \alpha \left[ \frac{\partial^2 m_2^p}{\partial C_2 \partial m_2^c} \frac{\partial C_2}{\partial a_2} \frac{\partial a_2}{\partial m_1^f} + \frac{\partial^2 m_2^p}{\partial C_2 \partial m_2^c} \frac{\partial C_2}{\partial m_1^f} \frac{\partial m_2^c}{\partial a_2} \frac{\partial a_2}{\partial m_1^f} \right]
\]

Plugging in \( \frac{\partial C_2}{\partial m_1^f} \) we find that:

\[
\frac{\partial a_2}{\partial m_1^f} = -\frac{N}{\text{Den}}
\]
where

\[
N = (A'B + B'A + C' + \alpha D')(E + \gamma F) - (E' + F')(AB + C + D)
\]

\[
\frac{\partial}{\partial m_1^c} (\frac{\partial C_2}{\partial a_2}) = -\frac{(A'B + B'A + C' + \alpha D')(E + \gamma F) - (E' + F')(AB + C + D)}{(E + \gamma F)^2}
\]

where

\[
A = \frac{\partial^2 p_2}{\partial m_2^c \partial C_2}
\]

\[
A' = \frac{\partial^3 p_2}{\partial (m_2^c)^2 \partial C_2} + \frac{\partial^3 p_2}{\partial m_2^c \partial C_2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^3 p_2}{\partial m_2^c \partial C_2} \frac{\partial m_2^c}{\partial a_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial (m_2^c)^2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial m_2^c \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial (m_2^c)^2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} \frac{\partial a_2}{\partial m_0^c} \frac{\partial a_2}{\partial m_0^c}
\]

\[
B = \frac{\partial m_2^c}{\partial a_2}
\]

\[
B' = \frac{\partial^2 m_2^c}{\partial m_1^c \partial a_2} + \frac{\partial m_2^c}{\partial (a_2)^2} \frac{\partial m_2^c}{\partial m_1^c}
\]

\[
C = \frac{\partial^2 p_2}{\partial a_2 \partial C_2}
\]

\[
C' = \frac{\partial^3 p_2}{\partial (a_2)^2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial m_2^c \partial a_2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial m_2^c \partial a_2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial (a_2)^2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} + \frac{\partial^3 p_2}{\partial m_2^c \partial a_2 \partial C_2} \frac{\partial a_2}{\partial m_0^c} \frac{\partial a_2}{\partial m_0^c} \frac{\partial a_2}{\partial m_0^c}
\]
\[ D = \frac{\partial^2 m_p^2}{\partial a_2 \partial C_2} \]
\[ D' = \frac{\partial^3 m_p^2}{\partial (a_2)^2 \partial C_2 \partial m_1^2} + \frac{\partial^3 m_p^2}{\partial (C_2)^2 \partial a_2 \partial m_1^2} + \frac{\partial^3 m_p^2}{\partial (C_2)^2 \partial a_2 \partial m_1^2} \]
\[ E = \frac{\partial^2 p_2}{\partial (C_2)^2} \]
\[ E' = \frac{\partial^3 p_2}{\partial (m_1^2) \partial (a_2)^2 \partial m_1^2} + \frac{\partial^3 p_2}{\partial (m_1^2) \partial (C_2)^2 \partial m_1^2} + \frac{\partial^3 p_2}{\partial (a_2 \partial (C_2)^2 \partial m_1^2} + \frac{\partial^3 p_2}{\partial (C_2)^2 \partial a_2 \partial m_1^2} + \frac{\partial^3 p_2}{\partial (C_2)^2 \partial m_1^2} \]
\[ F = \frac{\partial^2 m_p^2}{\partial (C_2)^2} \]
\[ F' = \frac{\partial^3 m_p^2}{\partial a_2 \partial (C_2)^2 \partial m_1^2} + \frac{\partial^3 m_p^2}{\partial (C_2)^2 \partial a_2 \partial m_1^2} + \frac{\partial^3 m_p^2}{\partial (C_2)^2 \partial a_2 \partial m_1^2} \]

\[ \frac{\partial}{\partial a_2} \frac{\partial C_2}{\partial a_2} = \frac{- (A'' B + B'' A + C'' + \alpha D'')(E + \gamma F) - (E'' + F'')(AB + C + D)}{(E + \gamma F)^2} \]

where

\[ A = \frac{\partial^2 p_2}{\partial (m_1^2) \partial C_2} < 0 \]
\[ A'' = \frac{\partial^3 p_2}{\partial (m_1^2) \partial a_2} + \frac{\partial^3 p_2}{\partial a_2 \partial m_1^2 \partial C_2} + \frac{\partial^3 p_2}{\partial (C_2)^2 \partial m_1^2 \partial a_2} > 0 \]
\[ B = \frac{\partial m_1^2}{\partial a_2} > 0 \]
\[ B'' = \frac{\partial^2 m_1^2}{\partial (a_2)^2} < 0 \]
\[ C = \frac{\partial^2 p_2}{\partial a_2 \partial C_2} < 0 \]
\[ C'' = \frac{\partial^3 p_2}{\partial (a_2)^2 \partial C_2} + \frac{\partial^3 p_2}{\partial m_1^2 \partial a_2 \partial C_2} + \frac{\partial^3 p_2}{\partial (C_2)^2 \partial a_2 \partial a_2} > 0 \]
\[ D = \frac{\partial^2 m_p^2}{\partial a_2 \partial C_2} < 0 \]
\[ D'' = \frac{\partial^3 m_p^2}{\partial (a_2)^2 \partial C_2} + \frac{\partial^3 m_p^2}{\partial (C_2)^2 \partial a_2 \partial a_2} > 0 \]
\[ E = \frac{\partial^2 p_2}{\partial (C_2)^2} > 0 \]

\[ E'' = \frac{\partial^3 p_2}{\partial a_2 \partial (C_2)^2} + \frac{\partial^3 p_2}{\partial m_2 \partial (C_2)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^3 p_2}{\partial (C_2)^3} \frac{\partial C_2}{\partial a_2} > 0 \]

\[ F = \frac{\partial^2 m_2^p}{\partial (C_2)^2} > 0 \]

\[ F'' = \frac{\partial^3 m_2^p}{\partial a_2 \partial (C_2)^2} + \frac{\partial^3 m_2^p}{\partial (C_2)^3} \frac{\partial C_2}{\partial a_2} > 0 \]

In order to sign this, assumptions on the third partial derivatives are needed. These are as follows:

Assumptions on Third Partial Derivatives:

- \( \frac{\partial^3 p_2}{\partial (m_2)^2 \partial C_2} > 0 \) - This assumption states that the extra exposure terrorists inflict upon themselves with increasing core mobilization gets less damaging as the group gets larger. While the terrorist organization is more exposed at 3,000 then 2,800, the additional exposure is minimal.

- \( \frac{\partial^3 p_2}{\partial a_2 \partial m_2 \partial C_2} > 0 \) - This assumption states that the extra exposure terrorists inflict upon themselves with increasing core mobilization gets less damaging as the group uses more resources. The resources used by the terrorist organization additionally expose the organization, making the exposure from increased size less harmful.

- \( \frac{\partial^3 p_2}{\partial (C_2)^2 \partial m_2} > 0 \) - This assumption states that diminishing returns from increased counterterrorism is less harmful as the terrorist group exposes themselves through increased size, making \( C_2 \) more effective. In other words, the curvature of the function with respect to \( C_2 \) has changed from convex to concave, causing \( C_2 \) to change from diminishing returns to increasing returns.

- \( \frac{\partial^3 p_2}{\partial (a_2)^2 \partial C_2} > 0 \) - This assumption states that diminishing returns from increased attacks is less harmful as the government damages resources through counterterror, making \( a_2 \) more
effective. In other words, the curvature of the function with respect to $a_2$ has changed from concave to convex, causing $a_2$ to change from diminishing returns to increasing returns.

• $\frac{\partial^3 p_2}{\partial (C_2)^2 \partial a_2} > 0$ - This assumption states that diminishing returns from increased counterterrorism is less harmful as the terrorist group exposes themselves through attacks, making $C_2$ more effective. In other words, the curvature of the function with respect to $C_2$ has changed from convex to concave, causing $C_2$ to change from diminishing returns to increasing returns.

• $\frac{\partial^3 p_2}{P_0(C_2)^3} > 0$ - This assumption states that the curvature of the function with respect to $C_2$ has changed from convex to concave, causing $C_2$ to change from diminishing returns to increasing returns. In other words while increasing counterterror has a diminishing impact terrorist size, once the counterterrorism campaign has been increased to a very high level, the counterterror campaign becomes more effective. Imagine a government who has increased their counterror campaign so that have launched a harsh counterstrike and restricted all freedom of movement and assembly. In this case, the increased counterterror response of restricting all freedom of movement and assembly completely cripples the terrorist organization.

• $\frac{\partial^3 m^o}{\partial a_2 \partial (C_2)^2} > 0$ - This assumption states that the increasing returns caused by increased counterterrorism become smaller as the terrorist group becomes a less valid alternative. In other words, the curvature of the curve with respect to $C_2$ has changed from convex (causing increasing returns to passive mobilization with increased counterterror) to concave (where the returns to passive mobilization as a result of increased counterterror now have diminishing returns). This changes occurs because the terrorist organization no longer provides social services for the community and the population becomes less likely to mobilize against the government.

• $\frac{\partial^3 m^o}{\partial (C_2)^3} > 0$ - This assumption states that the increasing returns caused by increased counterterrorism become smaller once a certain level of counterterror has been reached. In other words, the curvature of the curve with respect to $C_2$ has changed from convex (causing increasing returns to passive mobilization with increased counterterror) to concave (where the returns to passive mobilization as a result of increased counterterror now have diminishing
returns). This changes occurs because while the public punishes the government for a disproportionate response which destroys their resources, once the majority of these resources have been destroyed, the population has already moved against the government and the remaining potential supporters no longer express additional outrage, as that point had already been reached.

From this we see that:

\[
\frac{\partial^2 C_2}{\partial (a_2)^2} < 0
\]

Given this, we can plug use \(\frac{\partial^2 C_2}{\partial m_1^2}\) and plug in for \(\frac{\partial C_2}{\partial m_1}\) to find that. It helps to rewrite \(\frac{\partial a_2}{\partial m_1}\) from earlier.

Plugging in \(\frac{\partial C_2}{\partial m_1}\) we find that:

\[
\frac{da_2}{dm_1} = - \frac{N}{\text{Den}}
\]

where

\[
N = \left( \frac{\partial^2 p_2}{\partial m_2^2} \frac{\partial m_2^5}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \alpha \frac{\partial^2 m_2^p}{\partial (m_2^p)^2} \frac{\partial m_2^5}{\partial a_2} + \alpha \frac{\partial^2 m_2^p}{\partial (m_2^p)^2} \frac{\partial m_2^5}{\partial a_2} \right) \left( \frac{\partial^2 p_2}{\partial (m_2^p)^2} \frac{\partial m_2^5}{\partial a_2} \right)
\]

\[
\text{Den} = \left( \frac{\partial^2 p_2}{\partial m_2^2} \frac{\partial m_2^5}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial m_2} \frac{\partial C_2}{\partial a_2} \right) \left( \frac{\partial^2 p_2}{\partial (m_2^p)^2} \frac{\partial m_2^5}{\partial a_2} \right)
\]

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\[
\frac{\partial a_2}{\partial m_i^c}(Den) = -(I + II \frac{\partial^2 C_2}{\partial m_i^c \partial a_2})
\]

\[
\frac{\partial a_2}{\partial m_i^c}(Den) + II \frac{\partial^2 C_2}{\partial m_i^c \partial a_2} = -I
\]

\[
\frac{\partial a_2}{\partial m_i^c} = -\frac{I + IV}{(E + \gamma F)^2(Den) - (III)(II) + \frac{V}{(E + \gamma F)}(VI)(II))}
\]

where

\[I = \left( \frac{\partial^2 p_2}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial a_2} + \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 p_2}{\partial a_2^2} \frac{\partial m_2^c}{\partial a_2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

\[II = \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 m_2^c}{\partial (C_2)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 m_2^c}{\partial C_2 \partial a_2} \right) \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 p_2}{\partial a_2^2} \frac{\partial m_2^c}{\partial a_2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

\[Den = \frac{\partial^2 p_2}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial a_2} \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

\[III = \left( \frac{\partial^2 p_2}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial a_2} \right) \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

\[IV = \left( \frac{\partial^2 p_2}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial a_2} \right) \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

\[V = \left( \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial C_2 \partial a_2} \right) \left( \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right) + \frac{\partial^2 m_2^c}{\partial (m_2^c)^2} \frac{\partial m_2^c}{\partial a_2} \right)
\]

I will start by focusing on the numerator:

- Increasing \( m_i^c \) increases exposure and decreases impact of core mobilization on boosting the probability of success (as this decreases when core mobilization increases). However, it also
increases the ability of the terrorist organization to utilize additional resources effectively. As long as the increase of exposure and decreased impact of probability of success outweigh the benefit of more efficient resources, the numerator will be positive, indicating a decrease of \( a_2 \) in response to an increase in the prior state of core mobilization, \( m_1^c \).

- Mathematically this means the following:

\[
- \frac{\partial^2 p_2}{\partial m_1^c \partial m_2^c} \frac{\partial m_2^c}{\partial a_1} + \frac{\partial^2 p_2}{\partial m_1^c \partial a_2} + \frac{\partial^2 m_2^p}{\partial C_2^2 \partial a_2} > \frac{\partial^2 p_2}{\partial (C_2^2)^2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 m_2^p}{\partial a_2 \partial C_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 m_2^p}{\partial a_2 \partial C_2} \frac{\partial C_2}{\partial a_2}

- and \( D > E \) and \( \left( \frac{\partial^2 p_2}{\partial m_1^c \partial C_2^2} \frac{\partial m_1^c}{\partial a_1} \right) [B(E + D)] < \left( \frac{\partial^2 m_2^p}{\partial m_1^c \partial a_1} \right) [A(E + D)] \)

Looking at the denominator, we find that it is positive (and hence \( \frac{\partial a_2}{\partial m_1^c} < 0 \) when:

- From \( D > E \) we know that \( VI < 0 \) and that \( III < 0 \) when \( \left( \frac{\partial^2 p_2}{\partial m_1^c \partial C_2^2} \frac{\partial m_1^c}{\partial a_1} \right) [B(E + D)] > \left( \frac{\partial^2 m_2^p}{\partial m_1^c \partial a_1} \right) [A(E + D)] \)

- When the threat of exposure is larger then the benefit of a less effective (or more mobilizing) \( C_2 \), the terrorist should be less likely to increase their attacks. Therefore \( V \) is negative when

\[
\frac{\partial^2 p_2}{\partial C_2^2 \partial m_1^c} \frac{\partial m_2^c}{\partial a_1} + \frac{\partial^2 p_2}{\partial C_2^2 \partial m_2^c} \frac{\partial m_2^c}{\partial a_1} + \frac{\partial^2 p_2}{\partial C_2^2 \partial a_2} + \gamma \frac{\partial^2 m_2^p}{\partial C_2^2 \partial a_2} \frac{\partial C_2}{\partial a_2} > \frac{\partial^2 p_2}{\partial (C_2^2)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 m_2^p}{\partial C_2^2 \partial a_2} \frac{\partial C_2}{\partial a_2}

- So long as \( Den > 0 \), the denominator is positive

Given these assumptions we see that \( \frac{\partial a_2}{\partial m_1^c} < 0 \).

Going back to \( \frac{\partial C_2}{\partial m_2^c} \), we now know that \( \frac{\partial C_2}{\partial m_2^c} < 0 \) when decreased exposure of the terrorist group by reducing \( a_2 \) (due directly by using less resources and indirectly through less core mobilization) and hence the more costly (or less effective use of \( C_2 \)) outweighs the benefit from increased exposure directly due to a higher initial level of core mobilization decrease.

Mathematically this means:

\[
\frac{\partial^2 p_2}{\partial C_2^2 \partial m_1^c} \frac{\partial m_2^c}{\partial a_1} + \frac{\partial^2 p_2}{\partial C_2^2 \partial a_2} \frac{\partial m_2^c}{\partial a_1} + \gamma \frac{\partial^2 m_2^p}{\partial C_2^2 \partial a_2} \frac{\partial C_2}{\partial a_2} + \frac{\partial^2 p_2}{\partial (C_2^2)^2} \frac{\partial m_2^c}{\partial a_2} + \frac{\partial^2 m_2^p}{\partial C_2^2 \partial a_2} \frac{\partial C_2}{\partial a_2} \frac{\partial a_2}{\partial m_1^c}
\]
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BIOGRAPHICAL SKETCH

Christine S. Mele was born in Boston, Massachusetts. She received a Bachelor of Science degree in Mathematics from Vanderbilt University in 2005. She attended Claremont School of Theology and received a Master of Arts degree in International Relations and Religion in 2007. In 2007 she enrolled in the doctoral program at Florida State University.

Christine’s research interests include terrorism (both domestic and transnational), civil war, interstate war, ethnic conflict, and formal theory. She is particularly interested in understanding how violent groups generate mobilization and the role government policies play on shaping these incentives.