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Madhumitha Baby Kumar April 13, 2020

State Sponsorship of Terror in Territorial Conflicts: A Game-Theoretic Approach

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Abstract

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With the increasing number of disputed territories and the changing dynamics of conflicts, it is pertinent to look for patterns and find solutions that can help end modern-day conflicts and protect civilians from violence and death. Terrorist groups have been influencing today's conflicts and some are more efficient than others due to sponsorship from their supporting states in the form of power, money, and weapons. This paper addresses such territorial conflicts with state-sponsored terrorism by creating a game-theoretic model inspired by the infinite horizon Rubinstein game. The game addresses the major issue of incomplete and private information by incorporating conviction of sponsorship, audience costs, efficiency of terrorist organizations, and benefits from potential attacks using parameters and probabilities. The equilibrium analysis and comparative statics analysis indicate that when a demanding state is convinced that its competitor is a state sponsor of terrorism, making a more generous demand to avoid conflict and attacks helps restore peace in the region. Furthermore, if the demanding state has to pay a smaller price while making a generous demand, it certainly should for the sake of peace and protection of its civilians. This paper provides real-world evidence by focusing on the India-Pakistan war and using specific conflicts within it that fit the model's presumptions.

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Disclaimer

This thesis is based on a game-theoretic model and uses a real world example to connect parts of the theoretical model to the cases. The results of the model with respect to the cases do not represent the position or the opinion of the author about the conflicts mentioned in the cases. The results found in the model align with facts retrieved from research articles and credible sources.

Introduction

The world is slowly spiraling into chaos as states lose millions of lives and resources over land that they all think belongs to them. Territorial conflicts have had massive consequences breaking down global unity as states take sides based on their national interests quickly turning into an inter-state war (Ghatak et al. 2016). States continue bargaining for a better outcome, not hoping that they win but hoping the other one gives up first. Third-party organizations like the UN and Amnesty International work to decrease the fighting with a fair outcome sooner than later to prevent the extent of damage from a longer conflict. In today's world, states take extreme measures to increase their bargaining power and cause damage to their enemy. One such measure is sponsoring a terrorist organization to make the damage unpredictable. A fundamental question that this raises is whether and how the state sponsorship of a terrorist group can change the most favorable outcome of the conflict for every state active in the conflict.

International relations research argues that territorial issues are one of the most frequent sources of war between states and competing governments are less likely to resolve disagreements over territory than any other issue (Walter 2003). Furthermore, contiguous states are 35 times more likely to go to war than non-contiguous states (Bremer 1992). Empirically, there have been several cases in which territorial conflicts over lands rich in resources have been settled with an agreement and some cases where the conflict continued until clear defeat was declared. Argentina gave up oil-rich land of Rio de la Plata river banks to Uruguay but fought in the Falklands War against the British. Saudi Arabia settled disputes with several of its neighbors even though the disputed land was rich in oil (Huth 1996). In fact, Huth (1996) argues that the strategic value of the contested land is sometimes unrelated to whether or not a government wants to fight for it, but Walter (2003) argues that along with the value of the land, the signaling of high cost can reduce the likelihood of further conflict for territory. The differences in the

outcomes and reasons for these disputes can also be explained by several factors like military strength, third-party interventions, regime type, and costs of war (Holsti 1991; Diehl 1999; Lacina 2006). In real-world conflicts, strengths and power can be difficult to observe and measure, it is likely that states hold private information over them, thus bringing in uncertainty (Sanchez-Pages 2012). In a way, all these factors can be reduced to the distribution of power and costs of fighting when it comes to bargaining with uncertainty (Powell 2004).

Powell (2004) argues that when there is uncertainty with the costs of continuing the conflict, the actors are more likely to settle with an agreement. But when there is uncertainty over the distribution of power between the states, the conflict lasts longer so the states can gain more information about each other's' powers. Formal theorists have used game theory, particularly the Rubinstein (1982) model, to establish the conditions under which territorial conflicts end with either agreement over the distribution of land or with continued fighting (Kennan & Wilson 1993; Muthoo 1999; Slantchev 2003). They chose game theory as a tool in order to establish theoretical conditions that can prove causality and can include application. Such a causality can also be established with an experiment but implementing such an experiment with real-world conflicts and leaders is not plausible. Along the lines of the Rubenstein expansion models, this paper will extend Rubinstein's (1982) model and Powell's (2002; 2004) theory by including the costs and benefits received from a terrorist group that is sponsored by one of the actors in the territorial conflict. Terrorist groups tend to make the distribution of power unclear when they are in conflict with one state, and this can lead to the conflict lasting longer as the state hopes to show resolve (Kydd and Walter 2006). Private information between actors can be defined as information that is not common knowledge among players during a game and can include key information such as types of players, outcomes,

payoffs, and information that the opponent has (Carter 2012). Any important private information – in this paper, information about the sponsorship of a terrorist group – can cause the conflict to continue in conjunction with impatience and the ability to make a counteroffer while bargaining (Leventoğlu and Tarar 2008). The privacy of the information can also affect the perceived costs of the targeted state because having a strong and active sponsor of a terrorist group as an enemy can be better than a weak sponsor because it starkly increases the uncertainty, making negotiations much more complicated for the target (Carter 2012).

Since the literature lacks a comprehensive explanation for how state-sponsored terrorists influence the outcomes of conflict in today's world, it is necessary to evaluate this and contribute to the field as it impacts several world conflicts. This paper specifically focuses on state-sponsored terrorists because several conflicts in today's world, such as India-Pakistan and Israel-Palestine-Lebanon and Iran-Israel, involve terrorist groups taking lives using the resources and direction of a state (Byman 2005). It is important to understand what the sponsor's motivation is behind this action. In this paper, this can be seen through how large costs or benefits have to be in order to suspend sponsoring a terrorist group. It can also be beneficial to see under what circumstances the actions of supporting a terrorist group can be advantageous to ending the conflict with an agreement and peace. There are other cases like civil wars with rebel groups sponsored by outside states and these can be analyzed as an expansion of this paper. This paper's research will be restricted only to state-sponsored terrorists, as they are controlled by a state and do not operate independently. Specifically, the model will calculate the costs of each state when admitting to sponsoring a terrorist group and the costs of waiting for a better offer. By comparing this to the value of the disputed land itself, the sponsoring state will choose to accept the offer or reject and attack the enemy state using the terrorist group.

The theory and intuition behind this are explained as follows. If two states are fighting over a piece of land and one of the states has an option of using an outside resource, such as a terrorist group that the state can influence and to an extent, control, it will choose to use it. Such a terrorist group is an outside resource to the state and not a third party actor because of the high-level control the sponsor has over the group and because the terrorists and sponsor privately fight as a team (Carter 2012). A terrorist group that is independent can launch random and unpredictable attacks that none of the states know about. More specifically if this action can benefit them by weakening the other state, the sponsoring state will choose to use the terrorist group. It will only not choose it if the benefit of using the terrorist group is none or less than none and if the negative benefit (cost) and other costs from the domestic audience, from losing international credibility, and from waiting to negotiate are larger than what the states are fighting for. There is no point in fighting and wasting resources for something that will hurt a state more than benefit it.

My model differs from that of Powell's (2002; 2004) in that there is a probability between 0 and 1 with which the terrorist attack can cause damage instead of the probability that a state can collapse causing the end of a game. In this paper, the conflict can only end with an agreement, whereas Powell's (2004) game can end with either agreement or fighting in an all-out war that destroys a state. This choice was made to acknowledge that most conflicts in today's world are limited rather than absolute (Sanchez-Pages 2012).

To illustrate this thinking, I point to Pakistan, "the world's most active sponsor of terrorist groups" as an example (Byman 2005). India claims that the Mumbai attacks in 2006 were orchestrated by Pakistani terrorist group, *Lashkar-e-Tayyeba,* but sponsored by Pakistan and its intelligence agency ISI. Other efforts by different groups have also been claimed to be

sponsored by Pakistan, for example, the December 2001 attack on the Indian Parliament, and the multitude of other everyday attacks in Kashmir (Byman 2005). The value of Kashmir – strategic, economic, and ideological – is very important to Pakistan as well as India. Both states decide to wait for better offers because neither wants to give up a significant portion of Kashmir. The cost of waiting is high since each state can become more capable of causing damage to the other. This strategy can be seen through this paper's model as 'Pakistan chooses to reject any offer to negotiate and attack using the terrorist group in order to increase costs to India'.

Pakistan also denies any involvement in sponsorship of the terrorist group, even after an attack. A good example is the 1986 negotiations, when Rajiv Gandhi, the then Indian Prime Minister canceled his visit to Pakistan and ended negotiations due to tensions in Punjab because of a Sikh terrorist group allegedly sponsored by Pakistan (Makeig 1987). To indicate a more recent example, Indian Prime Minister Narendra Modi spoke at the UN General Assembly in 2014 and announced that he would be ending negotiations with Pakistan about Kashmir until it agreed to talks in "an atmosphere of peace without a shadow of terrorism" (Rashid 2019). This model would be an effective way of explaining why this conflict that began in 1947 with both their independence from Britain remains to be an ongoing conflict with no end in sight.

Powell's model cannot be used to explain the India-Pakistan case effectively as the costs of rejecting an offer are different from choosing to fight to the finish (Powell 2004). It is key to note the damage that the terrorist attacks inflict on India are not measured in Powell's (2004) model. Several intriguing questions arise from this case of India and Pakistan: Why has Pakistan continued to sponsor terrorist groups over the years? What would happen to the conflict if Pakistan admitted to the sponsorship? Was the Mumbai 2006 attack a result of failed bargaining? Did the Mumbai 2006 attack itself result in the failure of all previous bargaining efforts? How

did the terrorist attacks on India in other parts of the country impact the conflict in Kashmir itself? The model proposed in this paper aims to explain these questions using the India-Pakistan conflict which motivated this paper, and will serve as evidence to support the hypotheses arising from the model.

Another critical example that can highlight the utility of the model in this paper is the conflict between Israel and Lebanon. Lebanon has been considered a haven for terrorist groups such as the Shiite Hezbollah, the Palestinian Hamas, Palestinian Islamic Jihad and several other anti-Israel groups (Abrams 2007). Hezbollah which is the largest out of all these groups is headquartered in Beirut and has received massive support from Syria and weapons and training from Iran (Abrams 2007). Hezbollah is an extreme example of a state-sponsored terrorist group as it holds several seats in the Lebanese parliament (Abrams 2007). The Lebanese president, Michael Aoun has defended Hezbollah on multiple occasions claiming that it is Lebanon's right to resist Israel and foil its attacks. Lebanon has received a lot of criticism for publicly supporting Hezbollah by the Arab League, UK, USA, Saudi Arabia, and the United Nations (Barrington 2017). This is a case of how high international audience costs can impact the equilibrium offers derived from the model. Lebanon is also said to be a proxy state for Iran to launch its terrorist attacks but the point that Lebanon still controls the terrorist group and allows the group to thrive in its own government indicates sponsorship but is still not public information (Barrington 2017).

Northern Ireland has been a historical case for terrorism where its terrorists justify their actions using Irish nationalism. The IRA was a terrorist organization that was rumored to be supported by the Republic of Ireland (Faoleán 2019). During its 25-year guerrilla conflict, popularly known as "the troubles," the IRA has killed nearly 1,800 people (Stevenson 1996). The IRA thinks that the region should be a part of the Republic of Ireland (Stevenson 1996). After

the end of the ceasefire in 1996, the IRA detonated several bombs across London to cause havoc (Faoleán 2019). The IRA was a terrorist organization that was rumored to be supported by the Republic of Ireland (Faoleán 2019). Most parties were vehemently opposed to them but the notion that some members of these parties dissented sparked rumors that parts of Ireland could have been sponsoring the IRA (Faoleán 2019). This serves as a great case for private information in the model described below which can impact the offer made by the other state in the first round to satisfy the sponsor. As history suggests, negotiation and counter-terrorism helped heavily minimize the impact of the IRA which can be used as evidence that appropriate bargaining can end the conflict with peace (Faoleán 2019).

These examples are evidence that state sponsorship is occurring (Hezbollah) and it is highly skeptical if there is any government involvement (IRA). The model's equilibrium can help understand how the certainty of whether or not a state is sponsoring a terrorist group can impact the offers and actions proposed by each state in the bargaining process through the lens of the India-Pakistan conflict. The theory suggests that this depends on the costs of admitting to sponsoring the group and the credibility of the evidence of state sponsorship. The examples can also help identify the optimal period and circumstances at which a satisfactory offer must be made to end the conflict and avoid a terrorist attack.

A Model for a Two-State Territorial Conflict with a State-Sponsored Terrorist Group

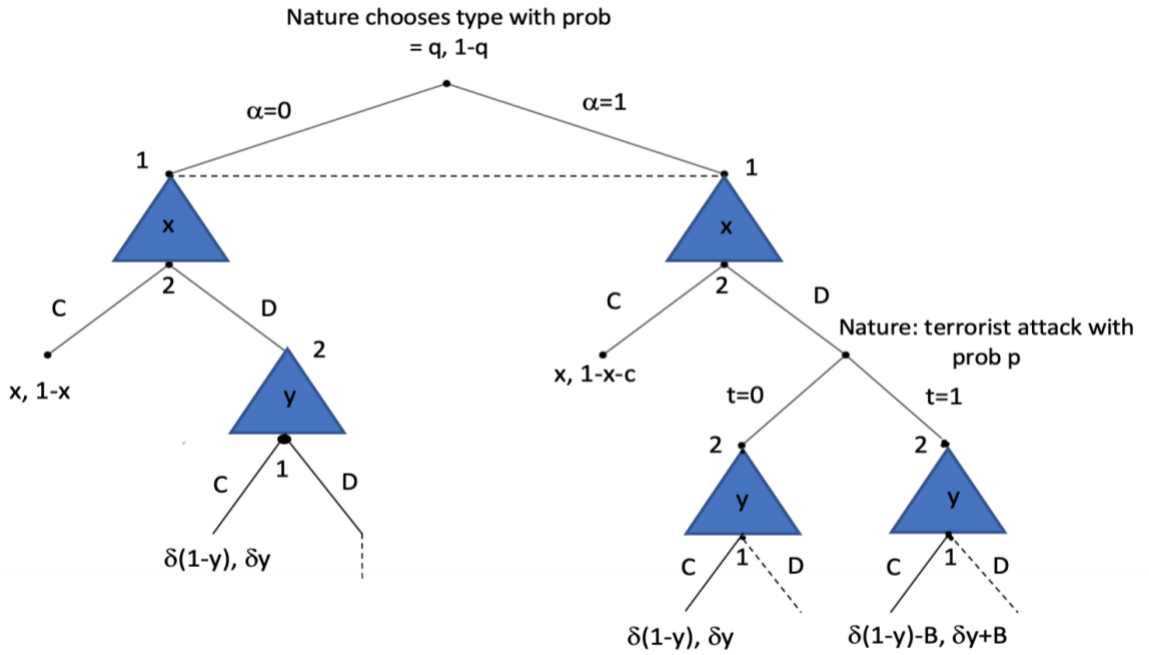

Figure 1: Game Tree of a Two-State Territorial Conflict with a State-Sponsored Terrorist Group

Most of the influential works in formal theory in international relations represent war as a bargaining game. A prime discovery was Rubinstein's infinite horizon game (1982) in which two actors wish to split a pie over an infinite number of periods, making alternate offers. In such an infinite horizon game, Rubinstein (1982) finds that the game ends in the first period as both actors realize that the value of the whole pie decreases as they take longer to come to an agreement. Thus, to get the most favorable share of the pie, the first actor makes an offer that the second actor cannot refuse, and the game ends. Several territorial conflicts are modeled as Rubinstein's infinite horizon bargaining game where the contested land is considered to be the pie. Expanding on the original Rubinstein model to include special real-world characteristics will provide new solutions and insights that can help better understand the real-world conflicts.

This paper argues that admitting to the sponsorship of a terrorist group and attacking the enemy state through a terrorist group is a Rubinstein game with two states – States 1 and 2 – who

alternatively make offers to split the contested land with a value of 1 over *n* periods. The model will include only two states, as most conflicts began as two-state conflicts. The results of this model can also apply to games with more than two actors. State 2 is a potential sponsor of a terrorist group; the true type is decided by the state of nature, where 2 is not a sponsor if $\alpha = 0$ with probability $q \in (0,1)$ and it is a sponsor if $\alpha = 1$ with probability $1-q$. Since the involvement of the state with the terrorist group is private and thus unimportant to quantify in the model but State 1 observes q and not α. Furthermore, it is also difficult to find empirical data that can show the extent of state sponsorship of a terrorist group.

The information revealed by State 2 can be credible or non-credible, and it could happen before or after bargaining over the land. The truth of sponsorship is private information and only available to State 2 until the information is revealed in a period. In this paper, the model will only be exploring a two-state conflict where State 2 will reveal the credible private information of sponsorship after a terrorist attack. I choose to not analyze the model when the private information of sponsorship is not credible because doing so assumes that the state sponsor may have no control over the terrorist group, thus bluffing and potentially making the terrorist group a third actor in the conflict. I also choose to not analyze the model when the private information of sponsorship is revealed before bargaining since the model can then be treated as a classic Rubinstein model where all information is public and where the incentive to make the terrorist group attack or not is random for State 2. I choose to create a model that will be analyzing an interesting expansion of the Rubinstein model where previously private information in the form of probability is made public and a new set of findings can be gathered about the states' strategies and outcomes.

Although the Rubinstein game has an infinite set of periods, the payoffs and equilibrium can be found after the 2nd period through backtracking from a particular period *k*. The model focuses on the following steps to calculate the payoffs and equilibrium:

1. Nature chooses State 2's type $\alpha \in \{0,1\}$ with probability $q \in (0,1)$ that $\alpha = 0$ and $1-q$ that $\alpha = 1$ and reveals it to 2.
2. State 1 makes an offer to 2 of $(x,1-x)$.
3. If $\alpha = 0$, there are no extra benefits or costs attached to the payoffs since 2 is not a state sponsor of a terrorist group. 2 can either accept the offer to end the game or reject it and make a new offer of y to 1.
    a. If 2 accepts the offer, the game ends with $(x,1-x)$
    b. If 2 rejects the offer, 2 can make a new offer of $(1-y,y)$ and a similar process continues
4. If $\alpha = 1$, then State 2 has credible information that 2 is certainly a state sponsor of a terrorist group which is unknown to 1. Let *c* be the costs associated with the admittance of sponsorship and audience (domestic and international costs). Let *b* be the benefits gained by the sponsoring State 2 when the terrorist group attacks 1.
    a. If 2 accepts the offer, the game ends with $(x, 1- x -c)$
    b. If 2 rejects the offer, then nature chooses the possibility of a successful terrorist attack on 1 with $t \in \{0,1\}$ with probability of success $p \in (0,1)$ that $t=1$ and $1- p$ that $t=0$.
        i. If $t=0$, then the game continues with 2 making an offer $(1-y,y)$ and the game continues on to the next period.

ii. If *t=1*, then with probability *p*, the terrorist group attacks and the game continues with 2 making an offer *(1-y,y)* and the game continues on to the next period. *B* is the benefit gained by 2 and lost by 1 (inclusive of several factors) from the terrorist attack which will be incorporated into the payoffs.

This is an extension of the standard Rubinstein game with nature choosing the type and the probability of one action, i.e. the possibility of a terrorist attack. The assumption used to calculate payoffs is that each player wants to make an offer the other cannot refuse in order to prevent the player from rejecting it. The entire game involved negotiating over a territory of value 1 and the subsequent negotiations made in the game with regard to *x* are also territorial. However, further concessions and exchange such as *c* and *B* are not restricted to territory and can be policies, material, and finances, etc.. In the standard Rubinstein game, State 1 cannot get higher than *x* as State 2 will reject any offer lower than *1-x*. If State 2 rejects it, they can make a counteroffer where State 1 receives *1-y* and State 2 receives y but each state's payoff reduced by a discount factor δ. The Rubinstein solution gives $y = \frac{1}{1+\delta}$ *and 1-y* $= \frac{\delta}{1+\delta}$.

In this expansion of the game, the probability of a successful terrorist attack *p*, the benefit *B* and cost *c* need to be incorporated into the payoffs to find what criteria will allow State 1 to make an offer that State 2 cannot refuse, thus pointing at the equilibrium. The payoff for each state when State 2 accepts the offer is similar to the Rubinstein solution. The payoff of each state when State 2 rejects the offer is found by what the next offer is that the State 2 can make in order to get the most out of the contested land remaining after discounted by δ that State 1 will accept.

The payoffs when $\alpha = 0$ are given by:

$U_1 = x$, *if 2 accepts*

or

$= \delta(1-y) = \frac{\delta^2}{1+\delta}$, *if 2 rejects*

$U_2 = 1-x$, *if 2 accepts*

or

$= \delta y = \frac{\delta}{1+\delta}$, *if 2 rejects*

In order to make State 2 indifferent between accepting and rejecting State 1's offer, the two possible payoffs have to be set to equal. That is,

$1 - x = \frac{\delta}{1+\delta}$

$\Rightarrow x^* = \frac{1}{1+\delta}$

Hence, when the *x* is set to this value or anything lower by State 1, State 2 is better off accepting the offer over rejecting it. State 1 will not want to give away anything more than x as that would reduce 1's share of the land. Hence, the optimal value is when $x = \frac{1}{1+\delta}$. Note that this is the same payoff value that an actor gets in the classic Rubinstein game. This shows that when State 2 is not a sponsor, that is the left side of the decision tree in Figure 1, the states follow the same path of bargaining as they would in a normal Rubinstein game with no terrorist group or type sets.

When $\alpha = 1$, the payoffs are given by:

$U_1 = x$, *if 2 accepts*

and

$\delta(1-y) = \frac{\delta^2}{1+\delta} - pB$, *if 2 rejects and*

$U_2 = 1 - x - c$ *if 2 accepts*

and

$\delta y = \frac{\delta}{1+\delta} + pB$, *if 2 rejects*

Strategies and Expected Utilities

We know from Rubinstein's solution that State 1 will have to offer State 2 $1 - x = \frac{\delta}{1+\delta}$ in order to receive the highest possible portion of the land with agreement from State 2, regardless of whether or not State 2 is a sponsor. That is, for State 2 when it is a sponsor, admitting that it is a sponsor is a better option when

$$1 - x - c \geq \frac{\delta}{1+\delta} + pB$$

$$\Rightarrow x \leq 1 - c - \frac{\delta}{1+\delta} - pB$$

$$\Rightarrow x \leq \frac{1}{1+\delta} - c - pB$$

When State 2 is not a sponsor, it is optimal for State 2 to accept any demand where

$$x \leq \frac{1}{1+\delta}$$

In order to find what State 1 should demand to hold on to the highest portion of the land, we calculate the expected value that State 1 gets when State 1 makes each of the above offers.

$$EU_1 (x = \frac{1}{1+\delta}) = q (\frac{1}{1+\delta}) + (1-q)(\frac{\delta^2}{1+\delta} - pB) \quad \text{...Equation 1.1}$$

When State 1 makes this demand of x_a i.e., the aggressive offer, and State 2 is not a sponsor, it can be accepted with probability q and State 1 will receive $q (\frac{1}{1+\delta})$. When State 2 is a sponsor with probability $1-q$, it rejects this demand and thus State 1 receives $(1-q) (\frac{\delta^2}{1+\delta} - pB)$ which is State 1's payoff after the conflict, terrorist attack, and State 2's demand. The demand made in the latter case is not satisfactory to State 2 because State 2 has the opportunity to get

more of the pie when State 2 can make its own demand along with the potential gains from a terrorist attack. The expected value of State 1, as mentioned in Equation 1.1 is thus the sum of these payoffs multiplied by each of their probabilities of occurring. State 2's expected value is calculated with the same equation:

$$EU_2(x_a = \frac{1}{1+\delta}) = q\left(\frac{\delta}{1+\delta}\right) + (1-q)\left(\frac{\delta}{1+\delta} + pB\right) \quad \text{...Equation 2.1}$$

State 1 can also make a generous demand, x_g, to make sure State 2 accepts it and the game ends. When State 1 makes this demand, it is satisfactory to State 2 in both cases - when State 2 is a sponsor and when it is not. When State 1 demands $x_g = \frac{1}{1+\delta} - c - pB$, the expected utility for State 1 is

$$EU_1(x_g = \frac{1}{1+\delta} - c - pB) = \frac{1}{1+\delta} - c - pB$$

...Equation 1.2

State 2 cannot receive more by rejecting and continuing the game either with bargaining or with a successful terrorist attack and thus the game ends in both realities. The expected utility that state 2 receives is

$$EU_2(x = \frac{1}{1+\delta} - c - pB) = \frac{\delta}{1+\delta} + c + pB \quad \text{...Equation 2.2}$$

From equations 1.1 and 1.2, the following inequality and implication will rise:

1. *If* $EU_1(x_a = \frac{1}{1+\delta}) = q\left(\frac{1}{1+\delta}\right) + (1-q)\left(\frac{\delta^2}{1+\delta} - pB\right) > EU_1(x_g = \frac{1}{1+\delta} - c - pB) = \frac{1}{1+\delta} - c - pB$, *then State 1 makes the second,* ***aggressive demand*** x_a *and State 2 continues the conflict and rejects it to compete with probability 1-q. Furthermore, State 2 launches a terrorist attack with the probability of success p.*

2. *If* $EU_1(x_a = \frac{1}{1+\delta}) = q\left(\frac{1}{1+\delta}\right) + (1-q)\left(\frac{\delta^2}{1+\delta} - pB\right) < EU_1(x_g = \frac{1}{1+\delta} - c - pB) = \frac{1}{1+\delta} - c - pB$, *then State 1 will make the second, more* ***generous demand*** x_g *to avoid conflict and rejection of the demand by State 2.*

Equilibrium

The equilibrium values of the exogenous variables *q* and *c* are derived by making States 1 indifferent between the two demands - aggressive and generous - and calculating the optimal values q^* *and* c^* where $EU_1(x_a = \frac{1}{1+\delta}) = EU_1(x_g = \frac{1}{1+\delta} - c - pB)$. The solutions provide insight into how the optimal values of the two variables can change as other parameters and variables change, using comparative statics. The insights are then supported by case study examples from the India-Pakistan conflict.

The equilibrium values are derived as follows:

$$EU_1(x_a = \frac{1}{1+\delta}) = q\left(\frac{1}{1+\delta}\right) + (1-q)\left(\frac{\delta^2}{1+\delta} - pB\right) = EU_1(x_g = \frac{1}{1+\delta} - c - pB) = \frac{1}{1+\delta} - c - pB$$

1. $q^* = \frac{-1 + c + \delta}{-1 - pB + \delta}$
2. $c^* = 1 - \delta + q(-1 - pB + \delta)$
3. $B^* = \frac{1 - c - q - \delta + q\delta}{pq}$
4. $p^* = \frac{1 - c - q - \delta + q\delta}{Bq}$
5. $\delta^* = \frac{1 - c + q + Bpq}{-1 + q}$

Propositions

Proposition 1: *For the values of the probability of not being a state sponsor, q, lower than*

$q^* = \frac{-1+c+\delta}{-1-pB+\delta}$ *, there is no conflict or terrorism observed and for values of q greater than or equal to* q^* *, conflict is observed with probability (1-q) and terrorist attack is observed with probability p.*

This result indicates that weak signs of sponsorship of terrorist groups cannot make a convincing threat of a terrorist attack in the background which would trigger an aggressive demand of x_a from State 1 to call State 2's bluff. With this demand, State 2 can be peaceful and accept the aggressive offer with probability q or reject it with probability $1-q$ and then launch a successful terrorist attack with probability p. If this probability q is lower than q^*, then State 1 will take the risk and make the aggressive demand mentioned above. If q is higher than q^*, then it becomes clearer to State 1 that State 2 is a state sponsor and it will want to avoid conflict and violence by offering the generous demand x_g. Furthermore, at $q=q^*$ Even though the game itself does not include signaling the strength of the sponsorship, in today's world, it is easy to estimate the probability of sponsorship q from historical events, public statements, media coverage, and intelligence gathering. The graph below plots the probability of conflict (i.e. rejection of State 1's demand by State 2) against the probability of not being a state sponsor q and highlights the optimal cutoff at q^* *above* which conflict occurs with probability $1-q$. If State 1 is convinced about strong sponsorship, it should make the generous demand to avoid further attacks.

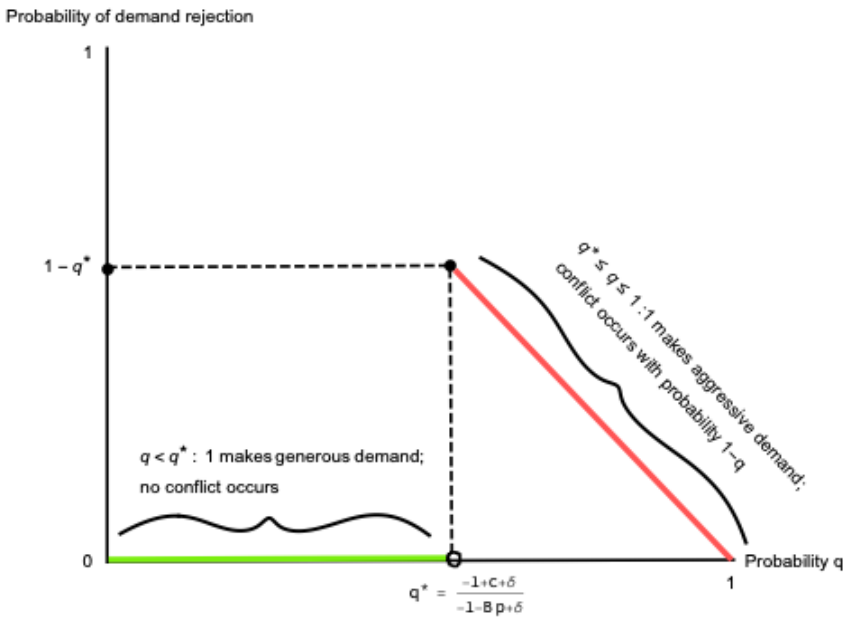

Figure 2: The Probability of Offer Rejection vs The Probability of not being a State Sponsor "q"

Proposition 2: *For values of cost of admission of sponsorship, c, lower than the equilibrium value* $c_* = 1-\delta + q(-1- pB+\delta)$*, there is no conflict or terrorism observed and for values of c greater than or equal to* c_**, conflict is observed with probability (1-q) and a terrorist attack is observed with probability p.*

This hypothesis defines how states that are accused of sponsoring terrorists have accepted deals before without facing as much backlash from within their state or from the international community through diplomatic deals. If the audience cost is lower than c_*, then State 1 is more likely to provide a generous demand x_g and avoid conflict for a low price. Since in the generous demand, State 1 is providing an extra benefit in the form of *c*, so that State 2 accepts it to make up for the audience cost it would have lost and ends the conflict without a terrorist attack, it will want this c to be optimal or lower than the optimal amount to maximize its utility. If *c* is higher than c_*, then State 1 would prefer to take the risk and make the aggressive demand x_a that does not depend on *c* directly. State 2 may accept this aggressive demand with probability *q* and end

the game or it can reject it with probability *1-q* to make a counter-demand along with a successful terrorist attack with probability *p.* The graph below plots the probability of conflict (i.e. rejection of State 1's demand by State 2) against the audience cost highlighting the optimal cutoff $c*$ and the outcome above and below it. This proposition suggests that when State 1's price of a generous demand i.e. c is low enough, it should make the generous demand for peace.

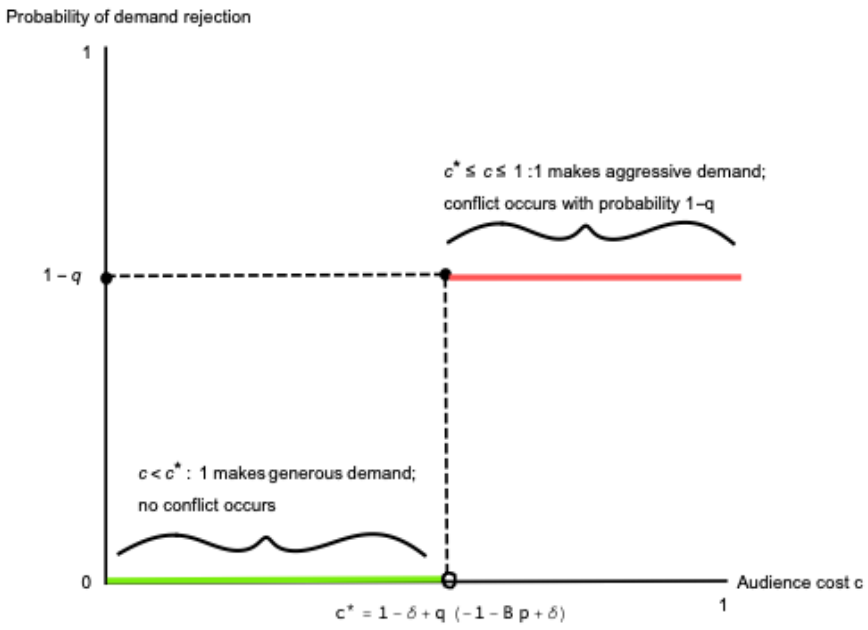

Figure 3: Probability of Offer Rejection vs Audience cost "c"

Comparative Statics and Properties of Equilibrium Values q*and c*

Varying the parameters against the equilibrium values provides properties of the equilibrium values and suggest how they behave when evidence for the parameters change and circumstances differ. Appendix A, a supplementary Mathematica pdf file, includes graphs that compare the equilibrium values with the other parameters and graphs that indicate how the partial differential of the equilibrium value with respect to each parameter behaves as well. This section selects some key graphs that provide specific patterns to help support the case study's evidence.

Properties of q^*

The equilibrium value q^* decreases

a. *At a linear rate as the audience cost c increases*
b. *At a non-linear rate as the value of the potentially attacked land B increases*
c. *At a non-linear rate as the probability of a successful terrorist attack p increases*
d. *At a non-linear rate as the discount factor, or willingness to wait for a better demand, δ increases*

The properties show that as the other parameters increase, the equilibrium value q^* decreases which means that the threshold past which State 1 makes an aggressive demand, rejection of demand by State 1, and conflict with a terrorist attack shall decrease. It shows that less evidence is needed for State 1 to make an aggressive demand. However, it is necessary to remember that as the probability of not being a state sponsor increases past the threshold, i.e. when the value of $q > q^*$, the probability of the rejection of demand, and thus conflict decreases. The probability of rejection of the demand is the greatest at the equilibrium value.

A specifically interesting property among these is when p increases, which is when there is a non-linear decrease of q^*. The graph below in Figure 4(a) indicates the non-linear decrease in q^* when the other parameters are held constant. When the chances of a successful terrorist attack sponsored by State 2 is high, the threshold at which State 1 decides to make an aggressive demand is lower. This threshold decreases at a slower rate as p increases as seen in Figure 4(b) which shows a non-linear increasing graph of the rate of change of q^* with respect to p *(which is* $\frac{\partial q^*}{\partial p}$ *)* against p when the other parameters are held constant. Sponsoring an effective terrorist organization and leaving more evidence behind could thus lead to both states receiving lesser utility than if there was either no sponsorship or if the sponsorship was very secretive. This

specific property is discussed in the case of India and Pakistan where the effectiveness of the sponsored terrorist organizations differs in two separate conflicts - one involving JKLF and the other involving Lashkar-e-Tayebba.

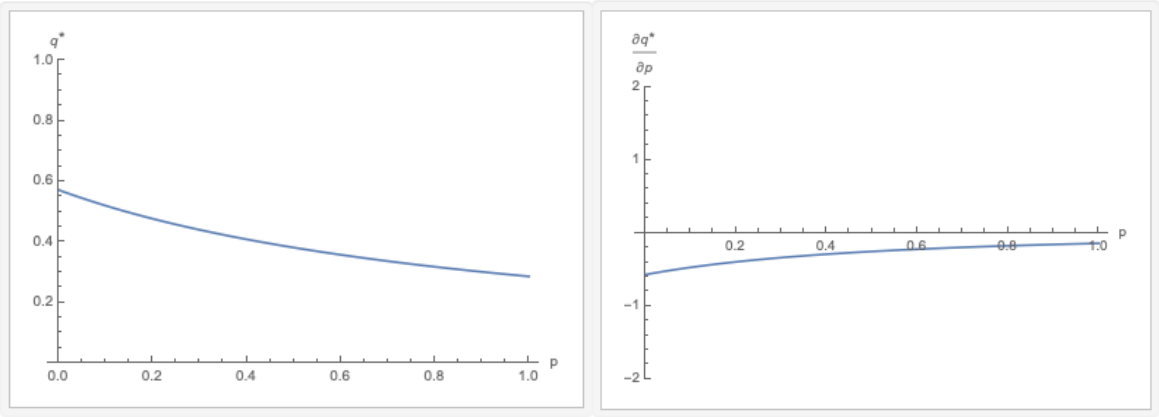

Figure 4: c = 0.3, B = 0.7,δ= 0.3 (a) Graph of q against p; (b) Graph of* $\frac{\partial q^*}{\partial p}$ *against p*

*Properties of c**

The equilibrium value c decreases*

a. *At a linear rate as the probability of not being a state sponsor q increases*
b. *At a linear rate as the value of the potentially attacked land B increases*
c. *At a linear rate as the probability of a successful terrorist attack p increases*
d. *At a linear rate as the discount factor, or willingness to wait for a better demand, δ increases*

The effect on the equilibrium value *c** by increasing the other parameters is similar to that on *c** in that it decreases. But the rate of decrease is constant and thus the graphs of *c** against the other parameters are all linear. The threshold at and after which State 1 makes an aggressive demand that may lead to rejection by State 2 and later a potential terrorist attack decreases. If the stakes of the conflict and potential damage from it are high, then the threshold for equilibrium audience

cost c^* is low. When the audience cost is higher than the equilibrium value, the probability of rejection of demand remains constant at *1-q*, as noted in earlier sections. If c^* is lower due to higher parameters, State 1 would make an aggressive demand that may lead to rejection earlier than if c^* was higher.

The fourth property that shows the impact of increasing the discount factor δ on the equilibrium c^* is important because of how the patience of State 1 can influence the costs it incurs from making a generous demand. If State 1 is patient enough and shows a strong resolve to its population and State 2 that it is strong enough to win the contested land in the long run, the threshold of c^* being low would mean that it would not mind paying a very low price for peace initially. But if the real-time cost c is higher than c^*, then it would be willing to risk it and make an aggressive demand. The graph in Figure 5(a) shows that c^* decreases linearly as δ increases and the graph in Figure 5(b) dives deeper into the linearity of the rate of change of c^* with respect to δ (which is $\frac{\partial c^*}{\partial \delta}$). Furthermore, observing the differential $\frac{\partial c^*}{\partial \delta}$ itself, which is *q-1* indicates that the rate of change is dependent only on the probability of not being a sponsor q and not on B and p. The rate of change of c^* with respect to δ decreases at a higher but constant rate for a lower value of q when it is held constant for any value of B and p.

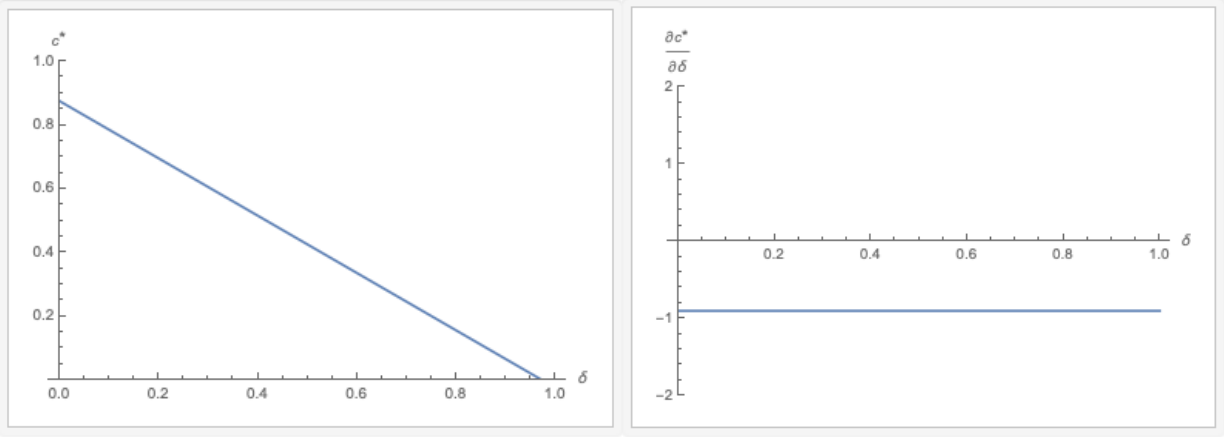

Figure 5: $q = 0.1, B = 0.5, p = 0.5$ (a) Graph of c^* against δ; (b) Graph of $\frac{\partial c^*}{\partial \delta}$ against δ

Case Study: India-Pakistan Conflict

Historical Background

The Indian-subcontinent before 1947, also known as British India, included present-day India, Pakistan, and Bangladesh. British India became independent from colonial rule in August 1947 but with the country divided between West Pakistan along with East Pakistan (now Bangladesh) as a Muslim state and India as a secular but majority Hindu state (Kaw 2010). The partition, which was brutal and bloody, created well-defined borders except for the Kashmir region which is a mountainous and thus strategic region in the north. The Greater Kashmir region, which was previously a princely state, has been fragmented into India controlled Jammu and Kashmir State (J&K) and Pakistan controlled Azad Jammu Kashmir (AJK) (Kaw 2010). The Greater Kashmir region is majority Muslim but was ruled by a Hindu king, the Maharaja, before independence, and he sought for Kashmir to be independent from both countries (Byman 2005). Due to mass violence and support from some Kashmiri leaders to join West Pakistan, the Pakistani government invaded Kashmir with its troops (Byman 2005). This compelled the Maharaja to appeal to India for help which triggered India to deploy forces and claim the territory. Thus, the J&K and AJK regions were controlled by India and Pakistan respectively and a Line of Control (LoC) was drawn as a ceasefire line to separate the forces of the two countries (Byman 2005).

After the communal strife weakened and the death toll reduced, India promised Kashmir a unique and autonomous status to Kashmir in 1952, which gave its citizens several tax, property, and title privileges (Byman 2005). With increasing political instability among the

leadership in Kashmir, Pakistan refused to accept India's control over J&K and this led to another war in September 1965 to challenge India's goal of integrating Kashmir entirely into its state (Byman 2005). The war was inconclusive, but in 1971, India helped East Pakistan gain independence from West Pakistan and establish itself as Bangladesh, during which Pakistan was unable to gain more territory in the Kashmir region (Byman 2005). The subsequent Simla Agreement between India and Pakistan in 1972 made the ceasefire line of control more formal along with India gaining some forward positions that Pakistan controlled prior to the 1971 war (Byman 2005).

However after India set up more social, educational, and mobility reforms in the region and gained more support, it attempted to curtail this support when the Congress Party forced Kashmir to accept its political dominance (Byman 2005). The notion of greater autonomy was reduced when the federal influence increased and attempted to erode Kashmir's legitimacy of its weak institutions (Byman 2005). A nationalist movement rose and gained credibility among the masses in Kashmir but nationalist party coalitions gained little political ground due to mass vote-rigging and arrests of nationalists (Byman 2005). The nationalists gave up on a peaceful political process to independence and some turned to violence with the establishment of the Jammu and Kashmir Liberation Front (JKLF) in 1977, which began operations on Pakistan's side of LoC in 1989 (Byman 2005). The JKLF's rise is associated with the kidnapping of the daughter of a prominent Indian politician in December 1989, following which violence erupted in Kashmir that cost 60,000 lives. The JKLF, although a weak militant group, was limitedly supported by Pakistan for a brief period (Byman 2005). The interactions between India and Pakistan during this period will serve as a piece of evidence to support the model presented in this paper where the probability of not being a state sponsor is high but conflict still erupted over Kashmir.

1988-1994: JKLF's Impact on India-Pakistan Relations
(Aggressive Demand by India, accepted by Pakistan: high q)

As the 1980s began, insurgent violence was rising in Kashmir and several terrorist groups like the JKLF, Hizb-ul-Mujahedin, Al Baraq and others (Byman 2005). Indian authorities had singled out JKLF as being responsible for internal violence in Kashmir in June 1988 but did not have significant evidence that Pakistan was sponsoring it. General Zia, the 6th President of Pakistan, had established the Inter-Services Intelligence (ISI) as their major intelligence institute and had been known to play a role in Afghanistan (Schofield 2003). Indians had some but very little evidence that ISI was active in Kashmir as well and were not strongly suspecting JKLF to be sponsored by ISI or Pakistan (Byman 2005; Schofield 2003). JKLF was considered a secular and locally focused terrorist organization that did not have intentions of uniting with Pakistan (Byman 2005). Although it began operations on Pakistan's side of LoC, it resisted Pakistan's efforts to impose its will on the movement of the organization (Byman 2005). According to Behara (2006), there was little information, apart from Pakistan's offer to help JKLF, that there was an inflow of support and sponsorship from Pakistan. In the context of the model presented in this paper, indicates that the probability of not sponsoring the terrorist group, *q*, is high. Thus, India had little evidence to be completely convinced that Pakistan was a state sponsor at this time.

In August 1988, following the death of General Zia, Benazir Bhutto was elected Prime Minister of Pakistan (Schofield 2003). Her father, Zulfikar Ali Bhutto was ousted with a military coup led by General Zia and later sentenced to death, later hanged in April 1979 for the murder of a political opponent, despite being found not guilty (Schofield 2003). She met with Indian Prime Minister Rajiv Gandhi in Islamabad in December 1988 to attempt to relieve Indo-Pak tensions which was seen by several as a new era of diplomacy (Schofield 2003). During the

talks, India did not seem to budge due to the insurgency and came to an agreement with Pakistan to respect the Simla Agreement of 1971 (Schofield 2003). This agreement serves as evidence that a high q, much greater the equilibrium point q^*, led to India making an aggressive demand x_a, that could have been rejected by Pakistan with probability $1-q$. Pakistan, however, accepted this aggressive demand, for which it would face some audience cost c. The audience cost was in the form of the opposition party targeting Bhutto as "pro-India" and pressure for the Bhutto government to support the riots and Kashmiri insurgents (Byman 2005; Schofield 2003). In the view of the model, the game ended with Pakistan accepting India's demand and incurring the audience cost as mentioned above thus serving as evidence for the model. However, in reality, the conflict continued as the JKLF kidnapped an Indian politician's daughter in 1989 which caused mass violence and terrorism in the Kashmir region, and the Bhutto administration was politically forced to then support the Kashmiri insurgents in 1989 to not appear weak (Byman 2005). This development in Pakistan's support for terrorists provides a different setting for the model's equilibrium analysis in the conflict discussed in the next section.

One of the properties highlighted in the previous section was that as the probability of a successful terrorist attack p increases, the equilibrium value q^* decreases. JKLF had become increasingly popular and was the leading Kashmiri resistance group (Byman 2005). This shows that p was generally high and thus the equilibrium q^* was lower which means that the threshold probability for making an aggressive demand was low. India needed extremely low q (i.e., high $1-q$) and needed to be convinced of state sponsorship to make a generous demand to Pakistan. However, since evidence for sponsorship was low (i.e., q was high and past the low threshold q^*), India decided to make an aggressive demand and take the risk of rejection. Due to its high military capabilities, India was able to attack JKLF and other terrorist groups on its own without

involving Pakistan and destroyed the group in 1996 (Byman 2005). The JKLF itself had also lost credibility by that time because it had renounced violence in 1994 that had caused mass infighting in the group as well (Byman 2005).

2003-2005 India and Pakistan "Hand of Friendship"
(Generous Demand by India, Accepted by Pakistan - low q)

Fast forward to 2003, India and Pakistan were still competing for Kashmir and the conflict of 1989 had simmered down (Byman 2005). Internal stability in Kashmir was still in shambles and elections were often met with violence (Byman 2005). After the fall of JKLF and similar groups, Pakistan turned to sponsor terrorist groups with an Islamist agenda like Jaish-e-Mohammad, Harkat-ul-Mujahedin, and Lashkar-e-Tayyeba, whose goals aligned with Pakistan's of uniting Kashmir with Pakistan (Byman 2005). The support was in the form of political and diplomatic support as well as sanctuary, arms, and training using the apparatus set up in the 1980s to help the anti-Soviet *mujahedin* in Afghanistan (Byman 2005). Byman (2005) argues that Islamabad clearly was aware of terrorist attack plans and had accepted that terrorism would occur as a part of their support for the overall insurgency. The crisis had also destabilized in 1999 when Pakistan's military occupied over 100 Indian military posts in the Kargil mountains, leading to a direct war between the two countries' forces, and ending with Pakistan's withdrawal due to international pressure (Byman 2005).

Terrorist sponsorship by Pakistan was widely known, especially after the 2001 Indian Parliament attack and multiple other terrorist attacks within and outside of Kashmir against India (Behera 2006). This means that there was a lower value of the probability of not being a sponsor (low q) and a higher value of the probability of a successful terrorist attack (high p) due to the increased efficiency of the terrorist groups seen through various attacks. The Hindu-nationalist

party BJP in India had control over the national government in 2003 and was led by A B Vajpayee, who renewed the peace process despite his party's strong beliefs (Behera 2006). He offered a "hand of friendship" to Pakistan and over his tenure, he called on Pakistan to end sponsorship of terrorism and unveiled a series of progressive measures that led to peace at the moment (BBC News 2005). Celebrating their independence day together, implementing a ceasefire at the border, resumption of direct air links, and regional summits were all strong steps towards peace (BBC News 2005). In the context of the model, India made a generous demand to Pakistan, regardless of its state sponsorship, and Pakistan accepted the offer because the benefits made up for the potential audience costs it would have faced.

In detail, Pakistan's q was lower than the equilibrium value/threshold, meaning India was aware of the terrorism sponsorship. The model suggests that for a q lower than q^*, then the demand should be generous and the sponsoring state would accept it. A key property that plays a role in this instance, is the decrease of q^* due to higher p which suggests that India had to have been very sure of the sponsorship to make a generous demand to Pakistan. Another equilibrium value that also hints at a generous offer is that of the audience cost c^*, which was not as high in this conflict. The price that India had to pay for peace through the generous demand was low (lower than c^*) since most of the initiatives did not take away land or control over the Kashmir region from India. It simply bolstered peace efforts and served to set a foundation for future Kashmir negotiations. The property where c^* decreases linearly as δ increases is also a useful perspective to recognize India's patience for long-term negotiations. Setting up the foundational and peaceful initiatives meant that India had intentions of continuing peace talks with Pakistan. After BJP and Vajpayee lost the next Indian election, the new Prime Minister Manmohan Singh did not pivot the Kashmir policy (BBC News 2005). He pledged to make relations better and

build the peace process further with a nuclear test ban treaty, cricket diplomacy, and withdrawal of some troops from Kashmir which Pakistan welcomed. This analysis of the conflict suggests that India's generous demand due to a low *q* and low *c* was accepted by Pakistan, which would end the game in the model. The conflict occurring after and the subsequent terrorist attack would have to be treated as a separate game and more evidence is needed to suggest whether it would be consistent with the model's premise of demands preceding terrorist attacks.

Further Evidence

Peace continued for several years and it was not until 2008 that relations deteriorated swiftly due to the deadly Mumbai 2008 terrorist attacks carried out by Lashkar-e-Tayyeba members from Pakistan (Rabasa et al. 2009). India accused Pakistan's ISI of sponsoring the attacks which Pakistan's civilian government denied initially, and only later admitted that the captured attacker was Pakistani (Rabasa et al. 2009). It pledged to help India with the investigation and to capture terrorists of Lashkar-e-Tayyeba and other groups (Rabasa et al. 2009). Due to the civilian government's lack of control over ISI and the intelligence apparatus, which is the key sponsor, Pakistan was unable to take strong steps which resulted in a sluggish response (Rabasa et al. 2009). Evidence and details surrounding the negotiations right before the 2008 attacks suggest that the demands made by India could be seen as generous and aggressive (Rabasa et al. 2009). If more evidence suggests that the demand was generous, then this particular case may be used to falsify the model. However, if it turns out to be an aggressive demand, then the rejection of the demand (which is unclear) and the following terrorist attack may fall in line with the aggressive demand part of the model presented in the paper.

Shortcomings and Further Research

Although the model has the capability to be adapted and generalized for other conflicts such as Israel-Palestine-Lebanon and Northern Ireland-IRA as briefly mentioned earlier, these conflicts have additional factors that may suggest more international actors influencing the conflict. An expansion of this model to include international actors, proxy war factors can help alleviate such issues and would increase the generalizability of the model. The model and the case discussed in this paper specifically address the most basic form of a conflict with two actors and a terrorist group. The India-Pakistan conflict's evidence can suggest that more than one terrorist group was sponsored, but since each bargaining attempt discussed in the previous section had a primary terrorist group and a primary demand, additional terrorists operating in the region would not have a significant impact on the general outcome.

Further research needs to address the issues of low evidence and time inconsistencies of the cases. Since the implementation of demands and acceptance or rejection of them varies from case to case, the effects of the outcome can be seen in different instances. For example, a fair argument can be made that the JKLF conflict in 1989 and Pakistan's consequent support for it can be seen as a contradiction to the model. But since the demand made by India was initially accepted by Pakistan and the pressure from the violence instigated by JKLF later caused Pakistan to pivot from its position (Byman 2005). An empirical research model along with data collection of conflicts with state-sponsored terrorists can provide a database of cases that can be used to support the model along with more concrete evidence for each case's fit and timeline. Focusing on conflicts in which terrorist attacks occur even after demands are accepted may also provide key insights to improve the model's structure and flow.

Conclusion

The recent conflicts in the world have evolved from being a traditional war on battlefields to covert terrorist and insurgent attacks in surprise locations. The unpredictability of these attacks adds a layer of incomplete information to conflicts making peace less likely to stabilize regions sooner. Models such as the chicken game and the grim trigger game have brought attention to the application of game theory to international relations. This paper takes this further to create a unique model that addresses modern-day warfare and territorial conflicts by expanding the simple Rubinstein infinite horizon model. The model involves two states, where the second state has the potential of sponsoring a terrorist group, competing to control a disputed territory. Incomplete and private information complicate all games and conflicts, but the model in this paper allows for the states to be transparent which can lead to peace.

The equilibrium analysis and comparative statics of the model show that when the demanding state is surely convinced that the competing state is sponsoring a deadly terrorist group, it is certainly beneficial to make a generous demand and push for peace if the price of generosity is modest. After all, a state's responsibility is to protect its civilians and by avoiding a terrorist attack as well as all-out war, the state would be fulfilling its responsibility of protecting and promoting peace. The analysis also shows that when the evidence of sponsorship is not compelling enough, states should stand up for its beliefs and bargain for better offers, while fighting the terrorists without risking an all-out war with its competitor. The paper uses the case of the India-Pakistan conflict, where both states have revived and destroyed the peace process, to select specific negotiations that support the model and its propositions. The hope is that this model and future expansions of it can help states promote long-term peace in disputed regions by prioritizing intelligent evidence and the lives of their people rather than short-term political benefits and electoral wins.

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