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Panteion University Department of International and European Studies Master's Thesis

Games that Regimes Play with Observed Terrorist Activity: Underreporting Bias as Signal Jamming

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## 1 Introduction

Do authoritarian regimes manipulate information concerning terrorist events or is terrorism genuinely rare under totalitarian governance? A main empirical finding, within the applied terrorism field, is the concentration of terrorist attack events in countries with democratic regimes.<sup>1</sup>

Two causal hypotheses have been provided in the literature to account for this empirical finding. The first hypothesis asserts that the probability of terrorist events increases monotonically as the level of democracy increases.<sup>2</sup> This causal relation is attributed to the particular characteristics, such as civil liberties and other constraints to counterterrorist action, of democratic political orders.<sup>3</sup> As Jeffrey Ross notes: "In general, the lion's share of terrorism takes place in democracies due to the strengths and limitations of this type of political system."<sup>4</sup>

**Proposition 1** Countries with democratic regimes experience higher frequencies of terrorist events, caused by a set of features particular to liberal governance.

An alternative hypothesis asserts that the observed high correlation between democratic regimes and terrorist events is attributable to underreporting bias, meaning the "suspicion that *observed* terrorist events might well not correspond to the *actual* number of attacks, as only the events that found their way into open sources, such as the media, have actually been *reported*."<sup>5</sup> (Emphasis in the original). The debate on the possibility that the datasets on terrorism are biased, because of underreporting, has a long history

<sup>1.</sup> See for example William Eubank and Leonard Weinberg, "Does Democracy Encourage Terrorism?" *Terrorism and Political Violence* 6, no. 4 (1994): 417–443; William Eubank and Leonard Weinberg, "Terrorism and Democracy: What Recent Events Disclose," *Terrorism and Political Violence* 10, no. 1 (1998): 108–118; William Eubank and Leonard Weinberg, "Terrorism and Democracy: Perpetrators and Victims," *Terrorism and Political Violence* 13, no. 1 (2001): 155–164; Quan Li, "Does Democracy Promote or Reduce Transnational Terrorist Incidents?" *Journal of Conflict Resolution* 49, no. 2 (2005): 1–20.

<sup>2.</sup> Konstantinos Drakos and Andreas Gofas, "The Devil you Know but Are Afraid to Face: Underreporting Bias and its Distorting Effects on the Study of Terrorism," *The Journal of Conflict Resolution* 50, no. 5 (October 2006): 715.

<sup>3.</sup> See for example Li, "Does Democracy Promote or Reduce Transnational Terrorist Incidents?"

<sup>4.</sup> Jeffrey Ian Ross, "Structural Causes of Oppositional Political Terrorism: Towards a Causal Model," *Journal of Peace Research* 30, no. 3 (1993): 321.

<sup>5.</sup> Drakos and Gofas, "The Devil you Know," 715.

in the literature of applied terrorism studies.<sup>6</sup>

In their recent work, Drakos and Gofas treat underreporting bias in a systematic fashion, by formalizing the problem and proposing a method to estimate its presence and impact on the dependent variable.<sup>7</sup> The two authors attribute the bias to the differences in the levels of press freedom among different countries.<sup>8</sup> In other words, the authors propose that states with the capacity to control the press prevent the publication of terrorist activity.

**Proposition 2** States with the capacity to control the press will prevent the publication of information concerning a terrorist event.

Is this proposition logically justified? To measure underreporting bias, Drakos and Gofas utilize the concept of the "inclusion probability," meaning the probability that an event will be publicized in the press.<sup>9</sup> In their words, the authors distinguish between the actual random process that generates the data, and a secondary "thinning process," which essentially selects (or filters) the data points that are reported and, consequently, observed.<sup>10</sup> The essence of the research problem lies within the political foundations of the inclusion probability. Why would a government attempt to prevent the publication of information concerning a terrorist attack? Proposition 2 implies that the state enjoys some form of utility from censoring information. Why should authoritarian states enjoy utility from censoring information related to terrorist attacks important enough, to warrant censorship by authorities with the capability to interfere in the press?

The thesis applies the excellent insight, provided by Fudenberg and Tirole, on signal jamming by incumbent companies to the market of violence. In that paper, compa-

<sup>6.</sup> For a summary of the evolution of the debate on underreporting bias see Konstantinos Drakos and Andreas Gofas, "Evidence for the Existence of Under-Reporting Bias in Observed Terrorist Activity: The Message in Press Freedom Status Transitions," *Democracy and Security* 3, no. 2 (2007): 141-145.

<sup>7.</sup> Drakos and Gofas, "The Devil you Know"; Drakos and Gofas, "Evidence for the Existence of Under-Reporting Bias."

<sup>8.</sup> Drakos and Gofas, "The Devil you Know"; Drakos and Gofas, "Evidence for the Existence of Under-Reporting Bias."

<sup>9.</sup> Drakos and Gofas, "The Devil you Know," 722.

<sup>10.</sup> Ibid., 723.

nies interfered with an entrant's inference about its future profitability.<sup>11</sup> Similarly, we argue that low rates of attacks signal to speculating agents, who are interested in engaging in anti-government activities, that the distribution of power favors the state's law enforcement capacity. The argument extends the one developed by Edmond in his paper concerning signal jamming by authoritarian states in the context of global games of regime change.<sup>12</sup>

**Hypothesis 1** A state with the capacity to censor the press, will misrepresent the rate of attacks to boost the deterrent value of its law enforcement capacity.

The thesis draws on a variety of models and theories to deductively substantiate this hypothesis. At first, the thesis draws upon the Theory of Moves and the strategically equivalent Rivalry Game to represent the decision making process regarding entry into anti-government activities, and the effect of different information sets on preference formation.<sup>13</sup> This deductive step aims to apply the sharp logic of Mor and Maoz to showcase the value of information to agents considering entry into some form of anti-government activity.

In the second deductive step, the thesis draws upon the Dominant Indicator theory to argue that the number of terrorist attacks serves as a quantitative indicator of the level of terrorist capability that can survive the state's law enforcement apparatus.<sup>14</sup> Some scholars have argued, that the output of a terrorist organization is a signal of its strength.<sup>15</sup> Inversely, total terrorist output is an indicator of the weakness of the state's law enforcement capacity. This is especially true at the aggregate level; the total number of attacks (when caused by many terrorist organizations) signals more evidence about the

<sup>11.</sup> See Drew Fudenberg and Jean Tirole, "A "Signal Jamming" Theory of Predation," The RAND Journal of Economics 17, no. 3 (1986): 366-376.

<sup>12.</sup> See Chris Edmond, Information Manipulation, Coordination and Regime Change, Working Paper (New York University, 2008), http://pages.stern.nyu.edu/~cedmond/Edmond%20Information%2 OManipulation%202008.pdf.

<sup>13.</sup> Steven J. Brams, *Theory of Moves* (New York: Cambridge University Press, 1994); Ben D. Mor and Zeev Maoz, "Learning and the Evolution of Enduring International Rivalries: A Strategic Approach," *Conflict Management and Peace Science* 17, no. 1 (1999): 1–48.

<sup>14.</sup> Cf. Scott Sigmund Gartner, Strategic Assessment in War (New Haven: Yale University Press, 1997). 15. Harvey E. Lapan and Todd Sandler, "Terrorism and Signalling," European Journal of Political Economy 9 (1993): 383-397; Per Baltzer Overgaard, "The Scale of Terrorist Attacks as a Signal of Resources," The Journal of Conflict Resolution 38, no. 3 (September 1994): 452-478.

power of the law enforcement establishment, rather than the capability of the terrorist organizations. Finally, the number of attacks combines the effects of both the terrorists' capacity and the effects of the state's law enforcement campaign against the terrorists. Numbers of arrests and total body count are meaningless if they are not reflected in reduced terrorist output.

This thesis argues that instead of signaling the terrorists' strength, the level of attacks is an indicator of the capacity of the state to collect intelligence and disarm its opposition. This information serves as important input to speculating agents interested in entering some form of anti-government activity (including terrorism). In this context, the state has an incentive to misrepresent the levels of terrorist activity, to manipulate the beliefs of these agents, and deter them from engaging in anti-government activity.

The thesis is divided in seven parts. In section 2 below we scour the literature on terrorism to locate hints, ideas, and evidence concerning the informational content of terrorist attacks. In section 3, we combine the ideas of a subset of these models to represent terrorism as an investment problem, within an ordinal framework, and showcase the value of information to a potential investor in anti-government violence. In section 4 we summarize the Dominant Indicator theory, which argues that decision makers observe the movement of a set of quantitative indicators to form beliefs about their environment. In section 5, we combine the arguments of the previous sections to provide the logical foundations of the underreporting bias hypothesis. Specifically, we argue that the state needs to control the rate of attacks to signal strength to potential investors in anti-government activities. Section 6 conducts an empirical probe to estimate the plausibility of the hypothesis. The thesis concludes in section 7 with a summary of the argument and some implications for future research.

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## 2 Three Types of Signal

Signal jamming has been applied to explain state propaganda within the context of a family of models known as global games of regime change.<sup>16</sup> Essentially, these are coordination games of incomplete information in which there is a discrete change in the status quo, given that a critical number of agents support the change. Agents are uncertain about some aspect  $\theta$  of the underlying structure of the game (e.g. the power of the regime). After receiving a signal x, agents choose to either *attack* the status quo or *abstain* from attacking. The regime collapses if a sufficient number of agents attack it. In these models, beliefs play a central role in the coordination of anti-regime action.

In this context, Chris Edmond argues that authoritarian states apply signal jamming technology to prevent constituent populations from coordinating around the revolutionary equilibrium.<sup>17</sup> Edmond specifically deals with state propaganda and provides a method through which regimes can take "hidden action" to manipulate information concerning their type  $\theta$  (in his model  $\theta$  represents the power of the regime).<sup>18</sup> At the beginning of the game, agents draw a signal  $x := \theta + \alpha + \epsilon$  ( $\epsilon$  is the noise - independent of  $\theta$ ) which informs them both about the regime type  $\theta$  and hidden action  $\alpha$ .<sup>19</sup>

Edmond argues that signal jamming produces a signal distribution, concerning  $\theta$ , whose mean is artificially high.<sup>20</sup> Specifically, signal jamming "shift[s] the mean of the distribution from which individuals sample so that individuals receive information that at face-value suggests the regime is difficult to overthrow."<sup>21</sup> Edmond does not go into details concerning the elements of the random variable  $\theta$ , which is taken as the aggregating parameter describing regime power.

21. Ibid., 2.

<sup>16.</sup> For global games of regime change see, among others, Hans Carlsson and Eric Van Damme, "Global Games and Equilibrium Selection," *Econometrica* 61, no. 5 (1993): 989–1018; Stephen Morris and Hyun Song Shin, *Global Games: Theory and Application*, Discussion Paper 1275R (Cowles Foundation), http://cowles.econ.yale.edu/P/cd/d12b/d1275.pdf; Christophe Chamley, "Coordinating Regime Switches," *The Quarterly Journal of Economics* 114, no. 3 (August 1999): 446–466; George-Marios Angeletos, Christian Hellwig, and Alessandro Pavan, "Dynamic Global Games of Regime Change; Learning, Multiplicity, and Timing of Attacks in a Dynamic Global Game of Regime Change," *Econometrica* 75, no. 3 (May 2007): 711–756.

<sup>17.</sup> Edmond, Information Manipulation, Coordination and Regime Change.

<sup>18.</sup> Ibid., 2.

<sup>19.</sup> Ibid., 4.

<sup>20.</sup> Ibid., 3.

Why would the state be, however, interested in manipulating the distribution of information concerning terrorist events? And why would the state specifically be interested in lowering the *frequency* of terrorist attacks?

Scholars have, explicitly or implicitly, offered a variety of propositions concerning the informational value of the level of terrorist violence. One strand of research posits that the level of violence informs a series of agents, who are speculating of entering a rebellion against the state, of the level of anti-government sentiment within society.<sup>22</sup> In this model, the total level of terrorist violence is given by the formula:  $v = t + \theta + \eta$ , where t represents total terrorist effort,  $\theta$  the level of anti-government sentiment in society, and  $\eta$  represents noise.<sup>23</sup> The level of violence produced by terrorists is informative because Bueno de Mesquita considers the total terrorist output as a linear combination of terrorist effort and total anti-government sentiment. If the population holds prior beliefs about the level of terrorist effort  $t^*$ , then it is possible to form beliefs concerning the level of anti-government sentiment within society.<sup>24</sup>

In the context of this model, signal jamming has a clear purpose. If terrorist events contribute to the probability of a revolution, the state has every reason to censor the publication of information concerning terrorist activity, thus lowering the *perceived* levels of terrorist violence v:

**Hypothesis 2** States with the capacity to censor the press will attempt to lower the perceived levels of violence to affect beliefs concerning the total level of anti-government sentiment.

Another strand of research advocates that terrorist violence holds informational content about the strength of the terrorist organization. These models focus on the interaction between the government and a terrorist organization.<sup>25</sup>

Lapan and Sandler model a situation where the government is ignorant of the resource

<sup>22.</sup> Ethan Bueno De Mesquita, "Regime Change and Revolutionary Entrepreneurs," American Political Science Review 104, no. 3 (2010): 446-466.

<sup>23.</sup> Ibid., 449.

<sup>24.</sup> See ibid., 450-451.

<sup>25.</sup> Lapan and Sandler, "Terrorism and Signalling"; Overgaard, "The Scale of Terrorist Attacks."

endowment of the terrorist organization.<sup>26</sup> The terrorists draw a resource endowment from a known distribution g(N).<sup>27</sup> Terrorists enjoy vast knowledge of the strategic environment. Specifically, they know the beliefs held by the government about their level of resources, the way the government changes these beliefs, and the strategic choices of the government.<sup>28</sup> The terrorists select a level of attacks R for the first period of the game, which the government observes and then decides whether it will capitulate to the terrorists' demands or not.<sup>29</sup>

In this sense, the terrorist level of violence contains informational content for the government, which has to observe the output before it decides whether or not it is rational to surrender.<sup>30</sup> The government compares the costs of surrender S to the costs of more attacks  $R_2$  to decide on the rationality of the option to capitulate.<sup>31</sup>

Per Baltzer Overgaard's model follows a different logic. This model assumes that there is uncertainty in both sides about the the "motives, resources, and ex ante commitment of the opponent."<sup>32</sup> Each period, the terrorists generate a level of resources, which they can deploy to peaceful uses or to apply violence against the government.<sup>33</sup> Since the terrorist organization can apply its resources to peaceful ends, conducting a terrorist campaign is costly.<sup>34</sup>

The result, under symmetric information, is straightforward: the government will concede to a group with large resources, and stand firm against a group with small resources.<sup>35</sup> In other words, under full information, the level of resources is an adequate signal of eventual outcomes and, therefore, no attacks need to take place.<sup>36</sup> Under asymmetric information, as Overgaard notes, the outcome of the interaction crucially depends on the flexibility of the government to react to terrorist demands.<sup>37</sup>

- 33. Ibid., 454.
- 34. Ibid.
- 35. Ibid., 455.
- 36. Ibid.
- 37. Ibid., 475.

<sup>26.</sup> Lapan and Sandler, "Terrorism and Signalling," 386.

<sup>27.</sup> Ibid.

<sup>28.</sup> Ibid.

<sup>29.</sup> Ibid.

<sup>30.</sup> Ibid., 389.

<sup>31.</sup> Ibid.

<sup>32.</sup> Overgaard, "The Scale of Terrorist Attacks," 453.

In a more recent paper, Arce and Sandler posit a model where the government is uncertain as to the level of militancy of the terrorist organization it is facing.<sup>38</sup> In this context, the government's problem is to ascertain the "subsequent threat that the group poses in terms of its resources and proclivity for future attacks."<sup>39</sup>

Terrorist organizations are split into two groups: M-types denotes the more militant groups, whereas P-types denotes the politically motivated organizations.<sup>40</sup> In this context, there are two effects of incomplete information. Firstly, P-types have an incentive to mimic M-types, so that they may quickly gain concessions from the government.<sup>41</sup> Conversely, M-types may wish to mimic the behavior of P-types, so that the government reduces its investment in defenses.<sup>42</sup> Government behavior is conditioned on a threshold probability, where its belief concerning the type of the opposition it is facing exceeds a given level.<sup>43</sup>

In the context of these signaling games, the value of censorship is dubious. The government clearly does not need to censor the publication of the behavior of the terrorist organization, since it is completely irrelevant. The models do not include any impact of the selected levels of violence on anyone besides the government itself.

One can only find a possible implicit hypothesis in the Overgaard model.<sup>44</sup> If the government's flexibility is exogenously determined (for example by public opinion) then the government might have an incentive to either censor the publication of information concerning terrorist events, or even exaggerate the terrorist threat.

Another class of models looks at the question from the perspective of the government. These models offer an alternative proposition concerning signal jamming. Terrorist violence can spread.<sup>45</sup> The real question, however, lies in the micro-foundations of the spread of violence. Why, and how, would one decide to form a terrorist organization or other

<sup>38.</sup> Daniel G. Arce M. and Todd Sandler, "Terrorist Signaling and the Value of Intelligence," British Journal of Political Science 37 (2007): 573-586.

<sup>39.</sup> Ibid., 573.

<sup>40.</sup> Ibid., 574.

<sup>41.</sup> Ibid.

<sup>42.</sup> Ibid.

<sup>43.</sup> Ibid., 578.

<sup>44.</sup> Overgaard, "The Scale of Terrorist Attacks."

<sup>45.</sup> Manus I. Midlarsky, Martha Crenshaw, and Fumihiko Yoshida, "Why Violence Spreads: The Contagion of International Terrorism," *International Studies Quarterly* 24, no. 2 (June 1980): 262–298.

form of anti-government organization?

In a very interesting paper, Kai Konrad investigates the problem of terrorism from the perspective of prospective "investors."<sup>46</sup> The problem, that Konrad tackles, is the strategic logic of the formation of a terrorist organization. Developing a terrorist network requires the investment of time, effort, and material resources.

Konrad models an extensive game of incomplete information with two players: a. the state S and b. the potential terrorists  $T^{47}$  In the first period of the game, terrorists have to decide whether to undertake costs e and invest in the formation of a terrorist network.<sup>48</sup> In the second period, T demands a given "level of independence"  $x \in [0, 1]$  from  $S^{49}$  The state (which is uninformed about T's decision in the first period) decides to capitulate or not.<sup>50</sup> If the state capitulates, the game ends. If it, however, decides not to give in to T's threats, then the terrorist organization mechanically carries out its attacks (at no further cost) in period 3 of the game.<sup>51</sup> Once the investment into an effective "punishment mechanism" has been revealed, the government capitulates in all future periods of the game.<sup>52</sup>

Konrad's analysis closes with a fundamental addition to this model, concerning the possibility that the state can deploy retaliatory technology to destroy the terrorist network's investment.<sup>53</sup> This ability fundamentally alters the model's logic. If the state can successfully deploy technology to destroy the terrorist network, then the benefits of investment evaporate.<sup>54</sup> The state's probability to destroy the investment in a terrorist network should, therefore, be prominent in the decision-making process of speculating "investors" in terrorism.

Konrad's model provides fundamental insights on the decision problem that confronts speculating agents interested in entering the market of anti-government violence. The

48. Ibid., 451.

51. Ibid.

- 53. Ibid., 454-455.
- 54. Ibid., 454.

<sup>46.</sup> Kai A. Konrad, "The Investment Problem in Terrorism," Economica 71, no. 283 (2004): 449-459.

<sup>47.</sup> For the complete description of the game summarized in this paragraph see ibid., 451-454.

<sup>49.</sup> Ibid.

<sup>50.</sup> Ibid.

<sup>52.</sup> Ibid., 452.

model, however, does not provide a method for calculating the probability of success of state counter-terrorist technology. Neither does it provide a cognitive model of how terrorists collect, evaluate, and combine evidence and information to calculate the probability of successful counter-terrorist state action (or, for that matter, the success of their terrorist campaign).

In a paper on efficient trial organization, Gordon Tullock provides the strategic structure of competitive interactions known as a Tullockian contest.<sup>55</sup> In this model, agents A and B invest resources in a competitive endeavor (in the case of this article a trial), which given a level of exogenous parameters, produces a relative probability of success. The probability of success of agent A is determined by the relative effort  $X_A$ , that the agent exerts, to the total level of effort invested by both players  $X_A + X_B$ :

$$P_{Success}(A) = \frac{X_A}{X_A + X_B} \tag{1}$$

Drawing upon the concept of a Tullockian contest, Cadigan and Schmitt have provided a model of strategic entry deterrence of terrorist organizations.<sup>56</sup> In their baseline model, agent X selects a level of effort with constant marginal cost C. In the second stage of the game, agent Y decides to participate in the contest (by paying a fee F) or to abstain. Agent Y's decision is based on the probability of victory given by the contest success function:

$$P_y = \frac{1}{1+x} \tag{2}$$

In the context of the models by Konrad, and Cadigan and Schmitt, the purpose of signal jamming is also clear. The state wishes to misinform agents that are considering investing, in one form or another, in forming a terrorist network, so that it may deter their strategic entry into the market of violence. The main way to achieve this is to manipulate the levels of terrorist violence, so that perceptions about the relative probability of success

<sup>55.</sup> Gordon Tullock, "On the Efficient Organization of Trials," Kyklos 28, no. 4 (1975): 745-762.

<sup>56.</sup> John Cadigan and Pamela M. Schmitt, "Strategic Entry Deterrence and Terrorism: Theory and Experimental Evidence," *Public Choice* 143, nos. 1-2 (2010): 3-22.

change:

**Hypothesis 3** States with the capacity to manipulate the press will attempt to lower the reported levels of terrorist violence so that they may manipulate perceptions concerning the relative effort of their law enforcement capacity.

In the next section, we draw upon the Theory of Moves, and strategically equivalent models from the field of International Conflict, to recast these models in a way that demonstrates the value of information concerning the capability of the state's law enforcement capacity to an agent interested in "investing" (per Konrad) in anti-government activities.

### **3** The Value of Information

In the previous section, we scoured the relevant literature for hints concerning the strategic value of information about the levels of terrorist violence. We found plenty of hints, ideas, and evidence dispersed in many models, which aim to represent facets of the interaction between a terrorist organization and the government. Ethan Bueno De Mesquita's model linked terrorist levels of violence to the possibility of wider revolt against the government.<sup>57</sup> In this context the state would censor information about terrorists, to reduce the perceived levels of terrorist violence.

Kai Konrad's model provided an alternative view of the question; terrorism requires investment of risk, resources and effort.<sup>58</sup> As such, it is not a decision to be taken lightly; the probability of success of a terrorist endeavor is a fundamental concern when deciding about investing in terrorism. As Konrad notes, this is especially true given the fact that the state possesses the means to destroy terrorist networks and infrastructure.

Cadigan and Schmitt's model elaborates this point.<sup>59</sup> In their model, the game between terrorists and governments is represented as a Tullockian contest, i.e. a model where a player's probability of success is given by the ratio of his effort to the total effort

<sup>57.</sup> Bueno De Mesquita, "Regime Change and Revolutionary Entrepreneurs."

<sup>58.</sup> Konrad, "The Investment Problem in Terrorism."

<sup>59.</sup> Cadigan and Schmitt, "Strategic Entry Deterrence and Terrorism."

expended by both players. The state can lower the probability of success, relevant to the costs of entry in the contest, and achieve deterrence of entry of a terrorist organization into the "market" of violence. In this context, manipulation of perceptions would be linked to the effort and capability levels of the state law enforcement apparatus; propaganda must be targeted to shift beliefs concerning state power. In other words, Edmond's main point also applies to the case of strategic deterrence of terrorists.<sup>60</sup>

In this section, we draw upon equivalent models from the field of International Conflict to recast the last class of models in an ordinal framework, that aims to showcase the value of information to agents, that must form preferences over outcomes, in order to act rationally within the context of the strategic interaction they are participating.

In every political system, there exist elements that would contest the state's authority and the power of its law enforcement apparatus. Under what conditions do these elements decide to engage in anti-government activity, and how does the quantity and quality of their information affect this decision?

### 3.1 A Model of Rivalry

In similar work within the field of International Conflict, Mor and Maoz deploy the Theory of Moves to analyze the puzzle of international crisis initiation and agent learning within the context of enduring rivalries, which is similar in substance and strategic structure to the question presented above.<sup>61</sup>

The Theory of Moves (TOM), developed by Steven Brams, is a dynamic theory of strategic interaction, based largely on game theory, but with significant changes to the rules of play. A central concept in TOM is a state, i.e. a pair of strategies. Each game begins at a given state; players have to decide whether they wish to change their strategy, thus altering the state of the game. TOM is based on the familiar concept of backwards induction; players calculate the rationality of switching strategies by thinking ahead about the consequences of their actions.<sup>62</sup> In other words, players think about the

<sup>60.</sup> Edmond, Information Manipulation, Coordination and Regime Change.

<sup>61.</sup> Cf. Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries."

<sup>62.</sup> Brams, Theory of Moves, 27-34.

reaction their shift in strategy will cause to the other player, then the impact of a possible counter-move to the reaction, then a counter-move to a counter-move etc.<sup>63</sup> In its plain version, TOM operates based on six rules:

- 1. Play starts at an outcome, called the initial state.<sup>64</sup>
- 2. Either player can unilaterally change his strategy.<sup>65</sup>
- 3. The other player can respond by unilaterally changing his strategy.<sup>66</sup>
- The sequence of play continues until one of the players decides to not change his strategy.<sup>67</sup>
- 5. A player will not depart from the initial state if the move either leads play to terminate at an inferior state or back at the initial state.<sup>68</sup>
- 6. Given complete information about each other's preferences, players will use backward induction to determine the actual sequence of play and, thus, the rationality of switching strategies. The player with the incentive to switch strategy moves first.<sup>69</sup> In the case that both players have an incentive to switch strategies, the player with "order power"<sup>70</sup> moves first.

Mor and Maoz model strategic learning within the context of an evolving enduring international rivalry.<sup>71</sup> An enduring international rivalry is a subtype of the dyadic relationships between states, that exhibits patterns of repeated conflict.<sup>72</sup> Agents in this model do not only base their crisis initiation decision on the value they enjoy from the preservation of the status quo; they also calculate the probability of success of an attempt to alter it.<sup>73</sup> Furthermore, agents are capable of experiential learning.<sup>74</sup>

72. Ibid., 1.

74. Ibid.

<sup>63.</sup> Brams, Theory of Moves, 1.

<sup>64.</sup> Ibid., 24.

<sup>65.</sup> Ibid.

<sup>66.</sup> Ibid.

<sup>67.</sup> Ibid.

<sup>68.</sup> Ibid., 27.

<sup>69.</sup> Ibid., 28. 70. Ibid., 121-138.

<sup>71.</sup> Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries."

<sup>73.</sup> Ibid., 2.

Maoz and Mor present a generic  $2 \times 2$  rivalry game, where each participant has the choice to either initiate or not initiate a crisis.<sup>75</sup> Their generic game is depicted in Table 1.

		Column State	
		Non-Initiation (C)	Initiation (D)
Row State	Non-Initiation (C)	Status Quo Maintained (CC)	Column Wins (CD)
now State	Initiation (D)	Row Wins (DC)	Escalation (DD)

#### Table 1: Generic Rivalry Game

Source: Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries," 10.

As it is evident from the game matrix, there are four possible states to the game:<sup>76</sup>

- 1. Status Quo (CC): No player initiates conflict.
- Column Wins (CD): Column initiates conflict and Row surrenders to its demands.
   Column changes the status quo according to its wishes.
- 3. Row Wins (DC): Row initiates conflict and Column accepts its demands. Row changes the status quo according to its interests.
- 4. Escalation (DD): None of the players capitulates to the other's demands. The situation escalates into crisis or war.

There are many ways in which this game may be structured, depending on the preference orderings of both players. What determines, however, the preferences of the players of the rivalry game? Mor and Maoz follow the standard wisdom and stipulate that preferences are defined by the level of satisfaction and the distribution of capabilities.<sup>77</sup> The two authors make a set of assumptions about the effect of the two parameters on player preferences.<sup>78</sup> The authors then provide a lexicographic combination of all the assumptions to present a set of five possible player types:<sup>79</sup>

<sup>75.</sup> Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries," 10.

<sup>76.</sup> Ibid.

<sup>77.</sup> Ibid.

<sup>78.</sup> Ibid., 11-12.

<sup>79.</sup> The following list provides a summary of the player types provided by Mor and Maoz: ibid., 12-13.

- 1. Satisfied without capability: CC > DC > CD > DD.
- 2. Satisfied with capability (I): CC > DC > DD > CD.
- 3. Satisfied with capability (II): DC > CC > DD > CD.
- 4. Dissatisfied without capability: DC > CC > DD > CD.
- 5. Dissatisfied with capability: DC > DD > CC > CD.

This generic formulation of rivalry, together with the elegant representation of the effects of satisfaction and power on preferences, can be very usefully applied to the specific situation of interest to this thesis. In the following paragraphs, we apply this formulation to combine ideas from both Kai Konrad's presentation of the problem of investment, as it relates to terrorism, and Cadigan and Schmitt's model of strategic entry deterrence of terrorist organizations.

The presentation serves as an important logical step in a wider attempt to deductively substantiate the claim that the underreporting bias phenomenon is a product of the predatory behavior of states with the capacity to censor the press. The aim of the logical step is to showcase, within an ordinal preferences environment, the value of information to the determination of rational solutions within a specific framework of strategic interaction.

Below we divide the presentation into two subsections, each representing a special case of interaction between players of different preference profiles, according to the analysis of Mor and Maoz, which was summarized above.

The first subsection deals with a game of Rivalry between a powerful state and a set of weak investors. With perfect information the investors accurately foresee their eventual defeat and abstain from investing in a terrorist organization. In the second case, the tables are turned. The investors foresee that the state will submit to their demands, given the great capacity of the terrorist organization that they can create.

In the final subsection, we present the conclusions of the previous subsections to showcase the importance of information to the players in the games presented, and reshape the question into a learning problem, as an intermediate transition to the next section, where we analyze the propositions of the Dominant Indicator theory, to see how decision makers transform the dynamic movement of quantitative indicators into beliefs about their environment.<sup>80</sup>

#### **3.2 Case 1: Powerful Regime**

In this case the state is assumed to have a powerful law-enforcement apparatus, capable of delivering heavy punishment to agents who challenge the authority of the state. It is also assumed to be facing weak potential terrorists. Furthermore, the regime's (state and regime will be used interchangeably to designate the same player) capability is assumed to be common knowledge. Finally, we assume that the regime is satisfied with the status quo, and prefers this state to chasing down terrorists.

In the framework of Mor and Maoz, presented above, the state is considered to be *Satisfied with capability* (*I*), whereas the potential terrorists are *Dissatisfied without capability*. (Investor and terrorist will be used to describe the same player - this does not mean, however, that terrorism is the only possible anti-government activity modeled here. It is simply used for purposes of presentation.) Table 2 showcases the game matrix. The game is an instance of Brams' game 29, or Mor and Maoz's game xvii.<sup>81</sup>



Table 2: Powerful Regime (Game 29, xvii)

Paralleling the Rivalry Game, we assume that there are two players, the Regime (R) and the Investors (I). Investors have two strategies: a. they can Challenge (C) the regime, or they may abstain  $(\bar{C})$ . Conversely, the state may attack (A) the organization or it may abstain  $(\bar{A})$ .

<sup>80.</sup> Cf. Gartner, Strategic Assessment in War.

<sup>81.</sup> Brams, Theory of Moves, 218; Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries," 14.

The interpretation of the ordinal preferences of the players is straightforward:

- 1. Peace: Peace is the best outcome for the regime, and the second best outcome for the investors, given the distribution of capability.
- 2. I Wins: This is the investors best state. In this they form an anti-government organization and challenge the state, which responds by accepting their demands. This state can encompass a variety of activities and a variety of responses on the part of the regime. For example, challenging the authority of the regime might mean forming a clandestine organization to organize a revolution, a strike, a terrorist group, a criminal organization etc. Responses can include anything from giving in to demands to simply pretending the criminal organization does not exist.
- 3. R Wins: This is the second best outcome for the state, since it entails having to expend resources to enforce its will. Since the state is satisfied with the present status quo, it sees expending resources to get a marginal change in its favor as wasteful, especially since resources are fungible and can be deployed more profitably elsewhere. This is the investors' second best outcome, since they concede to the state before expending resources. If concession is inevitable, the investors prefer to concede without conflict.
- 4. **Conflict**: This is the worst state for the investors, simply because they both suffer and lose. The regime also views this state as a wasteful expense of resources profitably deployed elsewhere.

The game has a single Non-Myopic Equilibrium, which is Peace. To see this, assume the game begins at Peace. The investors are contemplating whether or not they should switch their strategy to C from  $\overline{C}$ . By backwards induction the investors calculate the following sequence of play:

In words, the investors foresee the following sequence of play. If they choose to switch to a confrontational strategy, they move the game from state (3,4) to state (4,1). The regime, being in its worse state and capable of obtaining a better outcome by switching its own strategy does so, moving the game to state (1,2). State (1,2) is the worst possible outcome for the investors, who immediately switch strategy, moving the state to (2,3). The regime, seeing that terrorists flee its onslaught, ceases operations and returns to (3,4), which is its best outcome. State (3,4) is the original state of the game; by rule number five, the investors, foreseeing a return to the original state of the game, are deterred from switching into a confrontational strategy in the first place.<sup>82</sup> To state this in another way, terrorists foresee that the state will defeat them, and thus they see violence as pointless.

#### **3.3 Case 2: Powerful Challengers**

In this scenario, the tables of the previous game matrix are turned. Investors now possess the capacity to build a superior instrument of coercion, capable of heavily punishing the regime, should it not comply with their demands. For example, terrorists could possess weapons of mass destruction or crack operatives and networks of collaborators. The following story, taken from Konrad (who in turn has borrowed it from Bernard Lewis), is an illustrative example:

"Even more startling is a story told by Kamal al-Din on the authority of his brother: 'My brother (God have mercy on him) told me that Sinan [the Assassin leader at that time] sent a messanger to Saladin (God have mercy on him) and ordered him to deliver his message only in private. Saladin had him searched, and when they found nothing dangerous on him he dismissed the assembly for him, leaving only a few people, and asked him to deliver his message. But he said: 'My master ordered me not to deliver the message [unless in private].' Saladin then emptied the assembly of all save two Mamluks, and then said: 'Give your message.' He replied: 'I have been ordered only to deliver it in private.' Saladin said: 'These two do not leave me. If you wish,

<sup>82.</sup> For the Theory of Moves Rule 5 see Brams, Theory of Moves, 27.

deliver your message, and if not, return.' He said: 'Why do you not send away these two as you sent away the others?' Saladin replied: 'I regard these as my own sons, and they and I are as one.' Then the messenger turned to the two Mamluks and said: 'If I ordered you in the name of my master to kill this Sultan, would you do so?' They answered yes, and drew their swords, saying: 'Command us as you wish.' Sultan Saladin (God have mercy on him) was astounded, and the messenger left, taking them with him. And thereupon Saladin (God have mercy on him) inclined to make peace with him and enter into friendly relations with him."<sup>83</sup>

Following Mor and Maoz's formulation, in this section we assume that the state is *Satisfied without capability*, whereas the investors are *Dissatisfied with capability*. This pair of preferences produces the following game matrix, which is Brams' game 5, and Mor and Maoz's game xxi.<sup>84</sup>

		Regime	
		$ar{A}$	Α
Invoctors	$\bar{C}$	$2\ ,\ 4$	1, 3
Investors		Peace	R Wins
	C	4, 2	3, 1
		I Wins	Conflict

Table 3: Powerful Challengers (Game 5 - xxi)

The interpretation of the ordinal preferences of the players is, again, straightforward:

- 1. **Peace**: This is the second worse state for the investors. They prefer this state to making concessions to the regime, but know that they can improve their situation with conflict. This is the regime's best state.
- 2. R Wins: This is the state's second best outcome, whereas the investors consider conceding to the regime the worst state of affairs.

<sup>83.</sup> Bernard Lewis, *The Assassins: A Radical Sect of Islam* (London: Weidenfeld & Nicolson, 1967), 116n in Konrad, "The Investment Problem in Terrorism," 449-450.

<sup>84.</sup> Brams, *Theory of Moves*, 217; Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries," 14.

- 3. I Wins: This is the investors' best state, since they prefer not having to actually expend any effort on coercing the regime. In other words, they prefer that the state immediately grant them their demands. This is the second worse position for the state, since it doesn't have to suffer the damages of a conflict with the group before complying.
- 4. **Conflict**: This is the second best case for the terrorists, and the worst outcome for the state. Investors would prefer not to expend effort and people on challenging the regime. The state does not wish to fight a powerful group, since it calculates that the damage they can cause exceeds its capability to absorb it.

In this situation, the dominant strategy for the investors is to challenge the state, since they get their best two outcomes by selecting this strategy. The regime's best response to this is to capitulate to the terrorists demand, rather than face their wrath. State I Wins is, thus, both a Non-Myopic Equilibrium and a Nash Equilibrium.

To see this, assume that the game begins at Peace. Investors calculate the following sequence of play:

In words, the regime knows that once the investors have created their instrument of coercion and challenged the state, capitulation is the only rational response.

#### 3.4 The Decision Problem

So far in this section, we presented two very simple cases of strategic interaction between the state and a terrorist organization. A major source of simplification was the fact that both players were absolutely certain about every aspect of the game, including the expected outcome of conflict. In the first case, terrorists rejected the use of violence, since it was guaranteed that the state would prevail. Conversely, in the second case, the state preferred negotiating with terrorists, because it was certain that the terrorist organization was capable of delivering heavy punishment for non-compliance. Lets restate these facts from the perspective of the potential investor. A speculating agent (e.g. conspirator, potential recruit, terrorist financier) needs to calculate the probability of success, so that it may be possible for him to form preferences over outcomes, as presented in the theoretical framework of the rivalry game above (see 3.1). In our simplified presentation above, he faces two potential states of the world. In the first state, the failure of his plot is virtually guaranteed (Powerful Regime case). In the second, his success is certain (Powerful Challengers case). A potential terrorist clearly prefers to engage in terrorism when confronted with the second state of the world, rather than the first.

Neither of these two models can, however, be commended for their verisimilitude to actual strategic interaction between the state and a terrorist organization; such games rarely offer the privilege of complete and perfect information. In other words, in real life situations, participants can rarely foresee the actual outcome of conflict. Players are faced with the problem of forming beliefs about the game they are participating in. How do actual agents form beliefs about their strategic environment? To answer this question, we must draw on parts of the literature of strategic learning.

In his excellent overview of the learning literature within the field of International Relations, Jack Levy makes a distinction between two forms of learning: a. *diagnostic* learning and b. *causal* learning:

"'Causal learning' refers to changing beliefs about the laws (hypotheses) of cause and effect, the consequences of actions, and the optimal strategies under various conditions. 'Diagnostic learning' refers to changes in beliefs about the definition of the situation or the preferences, intentions, or relative capabilities of others."<sup>85</sup>

Mor and Maoz's model lies within the diagnostic type of learning. The authors propose a supergame containing all possible game configurations (i.e. combinations of types of players); they conceive of this as the set of all *subjective* games, i.e. representations of

<sup>85.</sup> Jack S. Levy, "Learning and Foreign Policy: Sweeping a Conceptual Minefield," International Organization 48, no. 2 (Spring 1994): 285.

how the participating players analyze the situation.<sup>86</sup> In this context, agents learn by collecting the behavioral history of the other player; if the player behaves according to the predictions of the subjective game, then this fact confirms the focal agent's subjective beliefs about the structure of the game.<sup>87</sup>

The two authors assume that players infer preferences from strategy choices:

"For example, if a player expects its opponent to be satisfied and to lack capabilities, the preference structure derived from this expectation would be one in which the opponent had a dominant non-initiation strategy. Given that, in reality, the opponent did initiate, the focal actor is assumed to ask: 'What kind of perceptions of satisfaction and/or capabilities would render conflict initiation rational for the opponent?"<sup>88</sup>

As such, observations of the opponent's behavior categorically rule out subsets of possible games.<sup>89</sup>

How is this learning algorithm applied in the potential investor's decision problem? The space of games generated by all the possible combinations of players is large. For the sake of a simple exposition, we will limit the possible games to the two cases presented above. As we've already noted, the potential conspirator has to choose whether or not to engage in conflict against the state. To be able to decide, the conspirator has to have beliefs about the preferences of the regime, which are a function of its satisfaction with the status quo and the relative capabilities of the state's law enforcement apparatus. The assumption that the regime is, at least partially, satisfied with the status quo seems like a safe foundation for the potential terrorist's calculations. So the real question turns to the perception about the distribution of capabilities.

Following Mor and Maoz's reasoning, the potential terrorist has to test the waters. To form beliefs, the potential conspirator has to challenge the state and observe the reaction. The regime's reaction reveals its private information about the distribution of

<sup>86.</sup> Mor and Maoz, "Learning and the Evolution of Enduring International Rivalries," 13-15.

<sup>87.</sup> Ibid., 16.

<sup>88.</sup> Ibid., 17.

<sup>89.</sup> Ibid.

capabilities. This approach, while feasible and very useful, creates several challenges for the terrorist's belief formation process.

First of all, the regime's reaction reveals *its beliefs about the balance of power*. There is no guarantee that the regime's beliefs about the balance of power are accurate. Secondly, this approach is risky. What happens if the regime, perceiving a positive balance of power, reacts violently? And more importantly, what happens if the regime is right? In this case the conspirator is faced with a situation that resembles Case 1 (3.2). In this case, the rational choice is not to initiate a conflict; lack of information has led the player to initiate a process, through which he only stands to lose. In a more general example, what if an observer, with no capability in challenging the state wishes to know the prevailing state of nature? Is there no alternative to trial-and-error available to an agent speculating about the relative success of different strategies?

The answer lies in the alternative type of learning proposed by Jack Levy: causal learning. In the next section, we draw upon the Dominant Indicator Theory, to show that all interested observers, including potential conspirators, observe the dynamics of a quantitative indicator, namely the number of attacks, as an important aggregator of information concerning the relative distribution of power; thus, the agent may be in a position to make better judgments concerning the surrounding state of nature.

### 4 Dominant Indicator Theory

Dominant Indicator theory draws upon the theoretical work of three related fields of research, namely organizational studies, rational choice theory, and bounded rationality, to develop an elegant and complete framework of how decision-makers interact with the environment and develop their beliefs about a given situation.<sup>90</sup> Specifically, it argues that organizations observe the dynamic movement of quantitative indicators, to make inferences about the relative success or failure of their selected policy.<sup>91</sup> In other words, agents are hypothesized to draw upon the data, generated by the policy under consideration, to

<sup>90.</sup> Gartner, Strategic Assessment in War, 27-42.

<sup>91.</sup> Ibid., 42-57.

make decisions about the policy's efficiency.

In any competitive environment, a decision-maker can distinguish between two states of nature; in the first state, his preferred strategy leads him to victory and gains, whereas in the second to defeat and losses. Gartner models this situation as a simple extended game between nature and the decision-maker.<sup>92</sup> Figure 1 showcases this game.



Victory Defeat Defeat Victory Figure 1: Gartner's Game against Nature

Source: Gartner, Strategic Assessment in War, 38

The extended form of the game, makes the decision problem explicitly clear. Assume that the agent has selected strategy A. The success of the strategy crucially depends on the node the player is on. If Nature has selected W, the player will be victorious; conversely, in the event that Nature has selected L, the player's strategy selection will be defeated. The player, however, is not informed about Nature's move, and so he has to make an estimate of the probability that Nature selects between W and L. In other words, the player has to form beliefs about Nature's previous move.<sup>93</sup> How does the decision maker estimate the probability P, that he is standing on the left node of his information set?

As it was noted in the previous section, the determination of Nature's selection is, essentially, a learning problem. The Dominant Indicator Theory is an instance of Levy's causal learning process. Gartner's argument is simple and can be summarized in the following causal and logical chain:

- 1. Organizations are created to resolve certain tasks.
- Organizations designate these tasks, together with the expansion of their resources, as their mission.<sup>94</sup>

<sup>92.</sup> Gartner, Strategic Assessment in War, 38.

<sup>93.</sup> For Gartner's own description of this extended game see ibid., 37-42.

<sup>94.</sup> Ibid., 28-33.

3. Based on this mission specification, organizations select a set of quantitative indicators that serve as the basis, upon which to base the judgement of the relative effectiveness of the available set of strategies in pursuing the organization's mission.<sup>95</sup>

"Indicators are quantitative, time-specific measures of complex information, and they are employed by a variety of organizations to assess policy performance."<sup>96</sup> Their purpose is simple. Indicators aggregate a lot of information about reality into a short format of delivery. As such, they act as "cognitive shortcuts employed by actors in the face of an overwhelmingly complex reality."<sup>97</sup>

How are indicators translated into beliefs about performance? Gartner argues that an indicator's *movement* holds informational content that is relevant to judgements about policy efficiency.<sup>98</sup> Specifically, it is rapid changes in quantitative indicators that provide information about shifts in the environment:

"In particular, given noise, decision makers know that indicators will rise and fall (leading to changes in velocity). Actors will ignore this fluctuation, associating it with the anticipated noise. Dramatic change for the worse will capture their attention precisely because it is unlikely that such changes would occur if the strategy were working. I believe that in order to capture this perception of dramatic change, we need to examine the acceleration and change in acceleration with which an indicator moves."<sup>99</sup>

More formally, Gartner proposes that, in order to observe shifts in efficiency, agents look at the second and third derivatives of quantities of interest.<sup>100</sup> Gartner provides an ordinal system to account for all the possible combinations of rates of change. Each derivative can be in three separate conditions at each point in time: a. it can increase, b.

<sup>95.</sup> Gartner, Strategic Assessment in War, 42-57.

<sup>96.</sup> Ibid., 43.

<sup>97.</sup> Robert Jervis, "The Drunkard's Search," in Shanto Iyengar and William MacGuire eds., Explorations in Political Psychology (Durham, N.C.: Duke University Press, 1993) in ibid.

<sup>98.</sup> Ibid., 50. 99. Ibid., 51.

<sup>100.</sup> Ibid., 61.

it can exhibit no change, c. it can decrease. As such, there are nine possible combinations of possible directions of change for the second and third derivative of a given quantity of interest.<sup>101</sup>

Gartner proposes that two of these possible combinations trigger a satisficing or dissatisficing behavior on the part of decision makers.<sup>102</sup> In the first case, when both the acceleration and the rate of change of the acceleration achieve record increases, and the decision maker aims at maximizing the relevant indicator, decision makers are expected to find the results satisfying.<sup>103</sup> Conversely, if the indicator is falling at an unprecedented rate, then the decision maker is expected to be dissatisfied with the policy.<sup>104</sup>

As Gartner notes:

"In a rational choice perspective, I am arguing that decision makers' subjective probability beliefs about being at state "W" approach one when their indicators suggest that a policy is improving at an increasing record rate, and zero when their indicators suggest that the policy is decreasing at an increasing record rate."<sup>105</sup>

In the next section, we deploy this logic to form the hypothesis about the microfoundations of the underreporting bias hypothesis.

### 5 The Signal Jamming Hypothesis

The purpose of this thesis is to offer a deductively sound and empirically plausible hypothesis for the micro-foundations of the underreporting bias phenomenon. In the introductory section of the thesis, we noted that its main argument is that states with the capacity to censor the press reduce the rate of attacks to bolster the deterrent value of their law enforcement mechanism.

<sup>101.</sup> Gartner, Strategic Assessment in War, 52-54.

<sup>102.</sup> Ibid., 54.

<sup>10</sup>**3**. Ibid.

<sup>104.</sup> Ibid.

<sup>105.</sup> Ibid.

In section 2, we scoured the related literature for hints concerning the informational content of terrorist events. We found plenty of hints, ideas, and evidence scattered across many models. Specifically, we noted that the literature argued that terrorist events contained at least three types of signal.

The first signal concerned the distribution of preferences in society. In this context, the terrorist organization conducts a terrorist campaign, which informs a large audience of citizens about the general levels of anti-government sentiment within society. The level of violence served as an input to a large set of decentralized decisions about participation in a revolution against the regime. In this context, we ascertained that the state would interfere to diminish the level of attacks to misinform the observing citizens about the level of anti-government sentiment in society and, by extension, obstruct their coordination around the revolutionary equilibrium.<sup>106</sup>

The second signal concerned the strength of the terrorist organization; the signal's audience was the target government, which observed the level of attacks to make inferences about the strength of the terrorist organization. In this context, signal jamming does not serve an important purpose. Conversely, these models suggest that the state's intelligence collection capacity offers great value, since it can assist the government in making inferences about the terrorists, and minimize regret.<sup>107</sup>

The third kind of informational content was implied by a series of models, and has served as the logical foundation for this thesis. Several models considered terrorism from the perspective of the participating terrorists. In this context, terrorism is an investment problem, since it requires the the sacrifice of scarce resources (e.g. effort, lives, time, and money), in an attempt to build an instrument of coercion to blackmail the government. The probability of success is an important parameter in these models. More importantly, per the Tullockian contest model, the level of effort on the part of the state is an important parameter of the game.<sup>108</sup>

<sup>106.</sup> In this paragraph we refer to the model of Bueno De Mesquita, "Regime Change and Revolutionary Entrepreneurs."

<sup>107.</sup> In this paragraph we refer to the following models: Lapan and Sandler, "Terrorism and Signalling"; Overgaard, "The Scale of Terrorist Attacks"; Arce M. And Sandler, "Terrorist Signaling and the Value of Intelligence."

<sup>108.</sup> In this paragraph we refer to the following models: Konrad, "The Investment Problem in Terrorism";

In section three, we combined and recast Konrad's and Cadigan and Schmitt's ideas with the Theory of Moves and the Game of Rivalry, drawn from the literature on international conflict, to represent the informational problem of prospective investors in anti-government activity. In that context, the agent's main problem was the need to form preferences over outcomes, and infer the preferences of the regime. To achieve both ends, the agent needed to be able to form beliefs about the regime's level of satisfaction with the status quo, and the distribution of power between the two players. Since the regime's satisfaction with the status quo is easier to infer, the main informational problem is the calculation of the distribution of capability. The agent would, therefore, value all information, that would help him discern the current state of the distribution of capability.

In section four, we summarized the Dominant Indicator theory, which posits that agents, interested in making inferences about the relative success of the strategies they are pursuing, observe the movement of a set of quantitative indicators; record rates of change are a signal of success (or failure - depending on the direction of change) of the strategy.

This belief formation algorithm is applicable to the decision problem presented in section three. To see this, one has only to reformulate Gartner's extended game against Nature to incorporate two possible states: one in which the regime is strong, and one where it is weak. Figure 2 depicts this transformation.



In this formulation, the movement of the number of attacks can act as an indicator of the branch the potential Investor is standing on. Record rates of change in the rate of attacks signal a deterioration of the capabilities of the security apparatus, whereas rapid Cadigan and Schmitt, "Strategic Entry Deterrence and Terrorism." deterioration signals significant positive change in the state's capacity.

The state's law enforcement capacity is not relevant only to Investors interested in participating in terrorism (e.g. potential recruits, financiers, or even agents considering the formation of new organizations). It is also of interest to a series of other Investors, interested in participating in anti-government activity that is *similar*, in many respects to terrorism.<sup>109</sup> For example, all activities that depend on a working clandestine network to support their activities may find any indicator of the state's intelligence collection and law enforcement capacity interesting.

How does the potential informational content of the rate of change in the rate of attacks affect the state's incentives to censor the press? The effect is evident if we replace Nature with the Regime in the Investor's problem, as depicted in Figure 2. A state with the capacity to censor the press can control the information that potential Investors receive. Figure 3 shows the state's signal jamming game.



I: Investor, C: Challenge,  $\overline{C}$ : Not Challenge

By backward induction, we can easily see that the state prefers to signal strength, since it will deter potential Investors in anti-government activities from selecting C. To achieve this, according to Dominant Indicator theory, the state has to interfere in the press, so that the rate of change of the rate of attacks does not move in a record-setting manner. In other words, the regime has to interfere so that the rate of change at a given

<sup>109.</sup> For the concept of similarity and the way it may apply to belief formation and decision making see Amos Tversky, "Features of Similarity," *Psychological Review* 84, no. 4 (July 1977): 327-352; Itzhak Gilboa and David Schmeidler, *A Theory of Case-Based Decisions* (Cambridge: Cambridge University Press, 2001); Itzhak Gilboa and David Schmeidler, "Inductive Inference: An Axiomatic Approach," *Econometrica* 71, no. 1 (January 2003): 1-26; Itzhak Gilboa, *Theory of Decision under Uncertainty* (New York: Cambridge University Press, 2009), ch. 19; Itzhak Gilboa and David Schmeidler, "Case-Based Prediction: Introduction," in, *Case-Based Prediction*, ed. Eric Maskin (World Scientific Press, Forthcoming), http://www.tau.ac.il/~igilboa/pdf/Gilboa\_Schmeidler\_CBP\_Introduction.pdf.

time T, does not exceed the maximum rate of change up to time T - 1.<sup>110</sup>

Nature, however, does not generate all the terrorist attacks in the same batch; terrorist events are spread across time. The distribution of terrorist attacks over time makes the prediction of the total level of attacks, over a statistically relevant period of time, impossible to foresee.<sup>111</sup> The state, therefore, has an incentive to censor all the generated terrorist events, thus pushing the total number of attacks towards zero.

This incentive is magnified by the fact that censoring terrorist events has no real marginal cost for the state. A regime that has already invested resources and coercive capacity to controlling the press, does not have to pay costs for any specific act of censorship.

To recap, the signal jamming hypothesis for the underreporting bias phenomenon is a product of two factors, whose combination is sufficient to provide a strong incentive for the state to censor the publication of information in the press. Table 4 summarizes these factors.

Variable	Description
Independent Variable	Informational value of $\#$ of attacks
×	×
Facilitating Variable	Capability to Censor
$\downarrow$	$\downarrow$
Dependent Variable	Reduced n. of attacks

Table 4: Hypothesized Causal Logic

The first factor is the value of the rate of attacks to a host of decision makers. As was presented in Figure 3, the regime has a strong incentive to signal strength, by maintaining a steady rate of change of terrorist attacks. In other words, the regime has a strong incentive to present information that avoids surprising the observers. The second factor is a facilitating variable. The incentive to censor is further compounded by the low costs and risks of censorship.

In the next section, we conduct a plausibility probe to get a first estimate of the em-

<sup>110.</sup> For the brief technical presentation of this see Gartner, Strategic Assessment in War, 61.

<sup>111.</sup> On the selection, by decision makers, of an appropriate time frame to control for noise see ibid., 47-49.

pirical validity of the proposed hypothesis. To achieve greater leverage, we have selected a case that, due to its particular attributes, minimizes the expectation of signal jamming behavior.

### 6 Plausibility Probe

Is the number of attacks a valuable enough indicator to warrant manipulation by public officials interested in signaling strength? The main argument of this thesis is that the rate of attacks is valuable enough, to create a powerful incentive for manipulation. To test this argument we deploy an empirical plausibility probe.

In this test, we follow a different, yet complementary, inferential strategy to the statistical tests conducted by Drakos and Gofas. The main approach is to shift the level of analysis to the micro-foundations of the behavior, evident in the statistical tests of Drakos and Gofas, and to test for the presence of purposeful altering of the record on the part of public officials.

The method deployed will be congruence testing. To maximize leverage, we have selected a case, where the presence of signal jamming is not likely, given the conditions that are prevalent within the case. In this context, the presence of signal jamming behavior in these adverse circumstances enhances our faith in the plausibility of the proposed hypothesis.

#### 6.1 Inferential Strategy

The thesis argues that the *informational value* of the rate of attacks creates a *powerful incentive* for states with the capacity to censor the press, to reduce the number of published terror events. The causal logic is straightforward: the incentive is hypothesized to have a causal effect on state behavior, provided that the state can control the press. This logic is depicted in the following table.

Our interest in this section is to test the relative strength of the incentive to censor the press. Bearing this in mind, the inference strategy aims to increase the leverage of

Variable	Description
Independent Variable	Informational value of $\#$ of attacks
×	×
Facilitating Variable	Capability to Censor
$\downarrow$	↓ ↓
Dependent Variable	Reduced n. of attacks

Table 5: Hypothesized Causal Logic

this probe by conducting a congruence test on an empirical foundation that is least-likely to confirm the proposed causal logic.

The universe of cases, that are relevant to this test, is the set of all instances of conflict between a central authority and a sub-national organization. From this universe, the thesis will conduct a congruence test, with the purpose of seeking empirical evidence of signal jamming, in the case of contemporary US operations in Afghanistan.

This case selection increases the inferential leverage of the strategy for two reasons. First of all, it allows for the isolation of the impact of the independent variable on the outcome. The US government does not possess the capability to control the press, and monitor what is published about the conflict in Afghanistan. In other words, this test isolates the effect of the independent variable from the compounding effect of the facilitating variable.

Secondly, the liberal democratic environment raises the costs of signal jamming, and the probability that one will be caught engaging in such activity. The potential for heavy consequences of public officials, who are caught lying, either on their career prospects and/or their credibility is significantly greater in liberal democracies than in authoritarian regimes. Furthermore, the probability that officials will be caught lying is also greater, since the verification process is easier and less risky than under totalitarian authority. In other words, there are significant countervailing effects on the strength of the incentive to engage in signal jamming. This allows for a better evaluation of the impact of the high informational value of the rate of attacks on the incentive to censor.

In the following subsection, we assess the level of the informational value of the rate of attacks, within the context of contemporary US operations in Afghanistan.

#### 6.2 The American Mission in Afghanistan

President Obama's decision to increase the US troop presence in Afghanistan in late 2009 was a signal of the shift in American strategy in the region. The change was a product of an operational shift in the political and military strategy at the level of US operations in Afghanistan, and not a grand strategic shift in preferences. The main instigator of the change in approach was General McChrystal, whose *Commander's Assessment* described the failures of the previous approach, and urged for major changes in the way the United States approached the issue of Afghanistan.<sup>112</sup>

The main goal of the United States in the region is to engineer a self-reliant and operational political system in Afghanistan, whose macro-political outputs will serve the greater US goals in the region.

The situation in Afghanistan can best be described as a contest between two competing political systems, for the support, and - by extension - the political integration of the population of Afghanistan. On the one side stand the United States and the Government of Afghanistan (GOA). On the other side stands the Islamic Emirate of Afghanistan, which was the dominant political and military group in the country before the American invasion of 2001.

As General McChrystal noted:

"The situation in Afghanistan is serious; neither success nor failure can be taken for granted. Although considerable effort and sacrifice have resulted in some progress, many indicators suggest the overall situation is deteriorating. We face not only a resilient and growing insurgency; there is also a crisis of confidence among Afghans – both in their government and the international community – that undermines our credibility and emboldens the insurgents. Further, a perception that our resolve is uncertain makes Afghans reluctant to align with us against the insurgents."<sup>113</sup>

<sup>112.</sup> Cf. Stanley A. McChrystal, *Commander's Initial Assessment*, REDACTED (Kabul: International Security Assistance Force, 2009).

<sup>113.</sup> Ibid., 1-1.

To prevail in this contest, the United States' military and political strategy must achieve a double goal. First, it must prevent the contesting forces from gaining access to the population of Afghanistan, which will expose them to the prospect of coercion. The main goal here is to produce the necessary security environment so that normality, as represented by expected social, political, and economic interactions, can flourish. This is evident in the Mission Statement of the International Security Assistance Force:

"ISAF, in support of GIRoA, conducts operations in Afghanistan to reduce the capability and will of the insurgency, support the growth in capacity and capability of the Afghan National Security Forces (ANSF), and facilitate improvements in governance and socio-economic development, in order to provide a secure environment for sustainable stability *that is observable to the population*."<sup>114</sup> (Emphasis has been added.)

The emphasis on the perceptions of the population is ubiquitous:

"The new strategy redefines the nature of the fight. It is not a cyclical, kinetic campaign based on a set 'fighting season.' Rather it is a continuous, year-long effort to help GIRoA win the support of the people and counter insurgent coercion and intimidation."<sup>115</sup>

The importance, in the thinking of the former commanding General of Allied forces in Afghanistan, of the support of the people as an objective is better illustrated in the following passages of his *Assessment*:

"The people of Afghanistan represent many things in this conflict – an audience, an actor, and a source of leverage – but above all, they are the objective. The population can also be a source of strength and intelligence and provide resistance to the insurgency. Alternatively, they can often change sides and provide tacit or real support to the insurgents. *Communities make deliberate* 

<sup>114.</sup> McChrystal, Commander's Initial Assessment, 2-2.

<sup>115.</sup> Ibid., 2-3.

choices to resist, support, or allow insurgent influence. The reasons for these choices must be better understood."<sup>116</sup> (Emphasis has been added.)

And:

"Creating a perception of security is imperative *if the local population is to 'buy-in' and invest* in the institutions of governance and step forward with local solutions."<sup>117</sup> (Emphasis has been added.)

The General further argues, that the insurgency also targets the perceptions of the population:

"Major insurgent groups use violence, coercion and intimidation against civilians to control the population. [...] The major insurgent groups target GIRoA and ANSF to dissuade cooperation with the government and to *show that* GIRoA is ineffective."<sup>118</sup> (Emphasis has been added.)

How does the United States plan to win the support of the local population? The military approach advocates population defense:

"In a country as large and complex as Afghanistan, ISAF cannot be strong everywhere. ISAF must focus its full range of civilian and military resources where they will have the greatest effect on the people. This will generally be in those specific geographical areas that represent key terrain. For the counterinsurgent, the key terrain is generally where the population lives and works. This is also where the insurgents are typically focused; thus, *it is here where the population is threatened by the enemy and that the two sides inevitably meet.* ISAF will initially focus on critical high-population areas that are contested or controlled by insurgents, not because the enemy is present, but because it is here that the population is threatened by the insurgency."<sup>119</sup> (Emphasis has been added.)

<sup>116.</sup> McChrystal, Commander's Initial Assessment, 2-4.

<sup>117.</sup> Ibid., 2-12.

<sup>118.</sup> Ibid., 2-7.

<sup>119.</sup> Ibid., 2-19 - 2-20.

The content of the General's message is simple. The central government, supported by ISAF, is in a contest to win the support of the local population. A main tool to complete this objective is high levels of security, which will operate as an enabler for the political integration of the local population.

In this context, the rate of attacks conducted by the insurgency seems as a very relevant and valuable indicator of the level of security achieved over a geographical area. It is relatively easy to see how perceptions in a given area can change if there is a record setting increase (or decrease) in the rate of insurgent attacks.

Given these observations, we can assess that the informational value of the rate of attacks as a quantitative indicator of relative security is high. In the following paragraphs, we turn to instances of public communications by high ranking officials, in an attempt to see how they handle the dynamic movement of this indicator.

### 6.3 Signal Jamming in Afghanistan?

In the previous subsection, we argued that the rate of attacks is a very relevant and appropriate indicator to assess the relative distribution of capability between the central authority and the insurgents in a given geographical area. In other words, we assessed a strong presence of the hypothesis' independent variable.

In the following paragraphs, we attempt to assess the presence of instances of signal jamming behavior in the public communications of US officials, relating to the situation in Afghanistan. The presence of such instances of behavior is not expected, given the premises of the hypothesis. As we noted in the subsection on the inferential strategy a variety of factors combine to significantly reduce the strength of the incentive to censor or manipulate the press. Furthermore, the test can help us assess the relative impact of the two input variables, since it allows for the separation of their causal effects.

An analysis of a recent instance of public communication by high ranking US officials on the situation in Afghanistan shows that these officials attempted to communicate an interpretation of reality that was, at best, unwarrantedly positive.

#### 6.4 Feeling the Effects?

On July 28 2011, ISAF spokesperson Navy Lt. Cmdr. Colette Murphy announced that the Taliban are "feeling the effects" of the selected ISAF strategy.<sup>120</sup> USA Today, citing ISAF, reported that "[i]n May and June, insurgent attacks were down about 2% compared with the same period last year."<sup>121</sup> The newspaper further reports ISAF's interpretation of this data: "Commanders credit a reinvigorated counterinsurgency strategy to protect towns and villages and relentless raids, which have *devastated* the Taliban's leadership, for the progress."<sup>122</sup> (Emphasis has been added.)

In the same article, however, the newspaper also prints the following:

"The number of high-profile attacks increased 28% between April and June of this year, over the same time in 2010, ISAF says. And the use of improvised explosives has increased 19%. By contrast, the number of 'complex attacks,' in which small units of militants launch assaults directly on coalition or Afghan forces, declined 20% in the first half of this year over the same time last year."<sup>123</sup>

These conclusions were repeated by Admiral Mike Mullen, Chairman of the Joint Chiefs of Staff, during his visit in Afghanistan, on July 31 2011:

"The Taliban have not been able to mount a big military campaign in Afghanistan, the chairman said, which has led to a series of assassinations and spectacular attacks in the country. The coalition counterinsurgency campaign is on track, he said, pointing out that 'it is still very much a part of what we have to do.' 'The feedback I got publicly and privately was that (the counterinsurgency strategy) was working, particularly in security,' he said. 'The security bubble, as it gets created, just provides opportunity for development and for governance and for getting at the corruption piece. That's the point where we are

<sup>120.</sup> Jim Michaels, "Coalition Show," Holds Taliban Attacks, Data Line on USA http://www.usatoday.com/news/world/afghanistan/ Today, July  $\mathbf{29}$ 2011, 2011-07-28-taliban-attacks-afghanistan-surge\_n.htm, accessed August 2011. 121. Ibid. 122. Ibid.

<sup>1</sup>**23.** Ibid.

in the overall strategy. Right now, I think it's working and headed in the right direction.'<sup>"124</sup>

The evidence suggesting that the narrative, that was provided by senior US and ISAF officials, is not representative of reality is strong. The general levels of violence (based on number of attacks) in Afghanistan have *inreased* by 42%, when compared with the second quarter (Q2) of 2010, and by 119% when compared to June 2009, which was the starting point of the surge of American forces in Afghanistan.<sup>125</sup>

As the Afghanistan NGO Safety Office further notes: "The monthly attack rate for June 2011 surpassed the peak of the conflict last year, which was seen around the September parliamentary elections, and *has established a new record high*."<sup>126</sup> (Emphasis has been added.)

Concerning May, which was cited by ISAF as a month that saw a reduction in militant activity (when compared to the same period of 2010), independent data collection by the Afghanistan NGO Safety Office (ANSO) shows that May 2011 registered a record high rate of attacks (since 2008) with just below 1600 incidents of Armed Opposition Groups (AOG) attacks; this number is definitely higher than May 2010.<sup>127</sup>

Furthermore, the situation in Southern Afghanistan (which was the focal point of Allied efforts) does not seem - given the ANSO data - to have changed significantly. In Q2 of 2009, 18% of total insurgent attacks took place in regions under the authority of Regional Command South (RCS).<sup>128</sup> In Q2 2011, the same percentage is 16%.<sup>129</sup> Conversely, the level of attacks in Regional Command Southwest have increased, from 9% in Q2 of 2009 to 20% in Q2 2011.<sup>130</sup> Especially within the Helmand province, which was the epicenter of Allied operations, the frequency of attacks of anti-government forces has

<sup>124.</sup> Jim Garamone, "Chairman Pleased with Afghan Progress, Concerned about Corruption," *Ameri*can Forces Press Service, July 31 2011, http://www.defense.gov/news/newsarticle.aspx?id=64869, accessed August 2011.

<sup>125.</sup> The Afghanistan NGO Safety Office, ANSO Quarterly Data Report: Q2 2011 (Kabul, 2011), 7, http://www.ecoi.net/file\_upload/1788\_1311851412\_anso-q2-2011.pdf.

<sup>126.</sup> Ibid.

<sup>127.</sup> See the graph in ibid.

<sup>128.</sup> Ibid., 9.

<sup>129.</sup> Ibid.

<sup>130.</sup> Ibid.

increased by 448%, from 261 attacks in Q2 2009 to 1430 in Q2 2011.<sup>131</sup>

### 6.5 Probe Conlusion

The plausibility probe, conducted in this section, was designed to measure the impact of the informational value of the dynamic movement of the rate of attacks on the incentive to engage in signal jamming. To achieve this, we selected a case that zeroed out the impact of the facilitating variable (the capability to censor), and contained strong counterincentives against engaging in the manipulation of perceptions.

Despite these countervailing factors, the probe detected behavior that was suspicious for signal jamming intentions and effects. Specifically, as it was shown in the previous section, we can document a significant discrepancy between official claims and open source data. US officials claimed a decrease in levels of violence for Q2 2011. Contrary to this assertion, data collected by the Afghanistan NGO Safety Office suggested an actual *increase* in violence across the board.

While outright lying or fraud cannot be substantiated, the discrepancy between the data, shows at least a tendency to provide an overly positive narrative for the given data set. As Nic Lee, director of the Afghanistan NGO Safety Office, stated to the Wall Street Journal: "The military's reports of progress against the Taliban are 'at best misleading and at worst gravely irresponsible."<sup>132</sup> It is possible, therefore, to claim that one can detect a strong impact of the informational value of the rate of attacks on the incentive to, somehow, control perceptions concerning the value of the indicator.

This result adds plausibility to the signal jamming hypothesis in two important ways. First, it adds some empirical support concerning the impact of the informational value of the rate of attacks on the incentive to engage in signal jamming. Secondly, it shows why the incentive to manipulate the content of the indicator translates into actual distortion in the databases concerning states with the capacity to censor the press. In other words, it illustrates the causal effect of the *absence* of the facilitating variable. While the US

<sup>131.</sup> Office, ANSO Quarterly Data Report, 9.

<sup>132.</sup> Dion Nissenbaum, "Differing Data Shape Views of Surge," *The Wall Street Journal*, September 6 2011, http://online.wsj.com/article/SB10001424053111904480904576498352990708180.html, accessed September 2011.

officials may have attempted to spin the data or select favorable indicators from among the available set, they did not actively engage in censorship; US forces in Afghanistan have not blocked independent data collection, censored the press, prevented publication of dissenting views, or even actively distorted their own data reports. To state this in another way, the plausibility probe was able to detect the suspicion of signal jamming behavior *because* of the absence of the causal effects of the facilitating variable. If no independent data collection were allowed within Afghanistan, it would have been impossible to attempt to detect the presence of signal jamming behavior. This finding is important, because it points to the causal effect of the capability to censor the press, which was a major variable in the argument presented, and the statistical tests conducted, by Drakos and Gofas.<sup>133</sup>

The case of spin by officials of the United States' Government by no means settles the question of the empirical validity of the signal jamming hypothesis presented in this thesis. The case, however, lends empirical support to the *plausibility* of the hypothesis and, possibly, paves the way for more empirical testing, refinements and qualifications. The hypothesis has several implications for future research, which are described in the final section below.

### 7 Conclusions and Implications

The thesis' goal was to articulate, and deductively and empirically substantiate a hypothesis for the underreporting bias phenomenon. The crux of the puzzle is the fact that authoritarian states exhibit lower frequencies of terrorist events, than do states with democratic regimes.

To explain this phenomenon, the thesis drew upon a large set of previous theoretical work to form a hypothesis about the micro-foundations of this behavior. Prior to this thesis, several theorists had modeled the decision problem of agents that are speculating to form a terrorist organization and contest the authority of the state. These authors

<sup>133.</sup> Drakos and Gofas, "The Devil you Know"; Drakos and Gofas, "Evidence for the Existence of Under-Reporting Bias."

proposed that the probability of success of a terrorist campaign was of fundamental importance to the decision to invest in the formation of a terrorist organization. One model specifically applied the concept of a Tullockian contest to propose that the probability of success for a terrorist organization is a product of the level of effort that the state invests in the contest against this organization.

The thesis drew upon theoretical work on crisis initiation to recast these models into a simpler ordinal framework. The purpose was to highlight the speculating agent's belief formation problem; to invest in a terrorist network, an agent has to have beliefs about the state's law enforcement capability. One way, that the agent can resolve this problem, is to observe the movement of the rate of terrorist attacks; rapid changes in the dynamics of the rate of attacks suggest a change in the relative capacity of the state's law enforcement apparatus.

These arguments led the thesis to argue that states, with the capacity to censor the press, have a strong incentive to reduce the rate of terrorist attacks because of its informational value in determining the state's law enforcement capacity. In other words, we hypothesize that the underreporting bias phenomenon is caused by the combined effect of the informational value of the rate of attacks and the capacity to censor the press.

**Concluding Proposition 1** The informational value of the rate of attacks as an indicator of the state's law enforcement capacity, when combined with the capability of some states to censor the press, form a set of **sufficient** conditions for the explanation of the underreporting bias phenomenon.

In the previous section, the thesis conducted an empirical probe to test the plausibility of this proposition. The two conditions were separated, in an attempt to isolate the causal effect of the informational value of the rate of attacks on the incentive to engage in signal jamming. Furthermore, the selected case contained attributes (such as the risk of detection) with a countervailing effect on the incentive to manipulate information, so as to increase the leverage of the probe. The test detected evidence of a discrepancy between the data transmitted by US government officials, and the interpretation of that data, and the data collected by independent organizations, and the narrative that they supported.

This discrepancy lends plausibility to the hypothesis that the informational value of the rate of attacks contributes to the incentive to manipulate the content of this indicator. Furthermore, the lack of outright censorship, and the presence of alternative means to collect data, even further boosts the plausibility of the concluding proposition. The reason is simple. As the proposition stipulates, it is the combination of the two factors that is sufficient to cause the underreporting bias hypothesis. In other words, in the US case, there was no underreporting bias, due to the lack of active censorship.

All the above lead to at least two implications for further research:

- 1. The informational value of the rates of attack needs to be further investigated: While the logic presented here, together with the empirical evidence, suggest that the informational value of the rate of attacks is high enough to warrant manipulation by central authorities, this is – at this stage – by no means a certain proposition. Further testing, particularly of the effects of the rate of attacks on the decision making of observing audiences, is necessary.
- 2. The rate of attacks may be a valuable input for a wider range of audiences: In this thesis, we based our argument on the value of the rate of attacks on agents considering engaging in anti-government violence. This might not be the only, even not the dominant, audience interested in forming beliefs about the distribution of power between the state and active terrorist organizations.

### References

Angeletos, George-Marios, Christian Hellwig, and Alessandro Pavan. "Dynamic Global Games of Regime Change: Learning, Multiplicity, and Timing of Attacks in a Dynamic Global Game of Regime Change." *Econometrica* 75, no. 3 (May 2007): 711–756. Arce M., Daniel G., and Todd Sandler. "Terrorist Signaling and the Value of Intelligence." British Journal of Political Science 37 (2007): 573–586.

Brams, Steven J. Theory of Moves. New York: Cambridge University Press, 1994.

- Bueno De Mesquita, Ethan. "Regime Change and Revolutionary Entrepreneurs." American Political Science Review 104, no. 3 (2010): 446-466.
- Cadigan, John, and Pamela M. Schmitt. "Strategic Entry Deterrence and Terrorism: Theory and Experimental Evidence." *Public Choice* 143, nos. 1-2 (2010): 3-22.
- Carlsson, Hans, and Eric Van Damme. "Global Games and Equilibrium Selection." Econometrica 61, no. 5 (1993): 989–1018.
- Chamley, Christophe. "Coordinating Regime Switches." The Quarterly Journal of Economics 114, no. 3 (August 1999): 446-466.
- Drakos, Konstantinos, and Andreas Gofas. "Evidence for the Existence of Under-Reporting Bias in Observed Terrorist Activity: The Message in Press Freedom Status Transitions." Democracy and Security 3, no. 2 (2007): 139–155.
- ——. "The Devil you Know but Are Afraid to Face: Underreporting Bias and its Distorting Effects on the Study of Terrorism." The Journal of Conflict Resolution 50, no. 5 (October 2006): 714–735.
- Edmond, Chris. Information Manipulation, Coordination and Regime Change. Working Paper. New York University, 2008. http://pages.stern.nyu.edu/~cedmond/ Edmond%20Information%20Manipulation%202008.pdf.
- Eubank, William, and Leonard Weinberg. "Does Democracy Encourage Terrorism?" Terrorism and Political Violence 6, no. 4 (1994): 417–443.
  - ——. "Terrorism and Democracy: What Recent Events Disclose." Terrorism and Political Violence 10, no. 1 (1998): 108–118.
    - —. "Terrorism and Democracy: Perpetrators and Victims." Terrorism and Political Violence 13, no. 1 (2001): 155–164.

- Fudenberg, Drew, and Jean Tirole. "A "Signal Jamming" Theory of Predation." The RAND Journal of Economics 17, no. 3 (1986): 366-376.
- Gartner, Scott Sigmund. Strategic Assessment in War. New Haven: Yale University Press, 1997.
- Gilboa, Itzhak. Theory of Decision under Uncertainty. New York: Cambridge University Press, 2009.
- Gilboa, Itzhak, and David Schmeidler. A Theory of Case-Based Decisions. Cambridge: Cambridge University Press, 2001.
- ———. "Case-Based Prediction: Introduction." In. Case-Based Prediction, edited by Eric Maskin. World Scientific Press, Forthcoming. http://www.tau.ac.il/~igilboa/pd f/Gilboa\_Schmeidler\_CBP\_Introduction.pdf.
- Konrad, Kai A. "The Investment Problem in Terrorism." *Economica* 71, no. 283 (2004): 449–459.
- Lapan, Harvey E., and Todd Sandler. "Terrorism and Signalling." European Journal of Political Economy 9 (1993): 383–397.
- Levy, Jack S. "Learning and Foreign Policy: Sweeping a Conceptual Minefield." International Organization 48, no. 2 (Spring 1994): 279–312.
- Li, Quan. "Does Democracy Promote or Reduce Transnational Terrorist Incidents?" Journal of Conflict Resolution 49, no. 2 (2005): 1–20.
- McChrystal, Stanley A. Commander's Initial Assessment. REDACTED. Kabul: International Security Assistance Force, 2009.
- Midlarsky, Manus I., Martha Crenshaw, and Fumihiko Yoshida. "Why Violence Spreads: The Contagion of International Terrorism." International Studies Quarterly 24, no. 2 (June 1980): 262–298.

- Mor, Ben D., and Zeev Maoz. "Learning and the Evolution of Enduring International Rivalries: A Strategic Approach." Conflict Management and Peace Science 17, no. 1 (1999): 1–48.
- Morris, Stephen, and Hyun Song Shin. Global Games: Theory and Application. Discussion Paper 1275R. Cowles Foundation. http://cowles.econ.yale.edu/P/cd/d12b/d12 75.pdf.
- Office, The Afghanistan NGO Safety. ANSO Quarterly Data Report: Q2 2011. Kabul, 2011. http://www.ecoi.net/file\_upload/1788 1311851412 anso-q2-2011.pdf.
- Overgaard, Per Baltzer. "The Scale of Terrorist Attacks as a Signal of Resources." The Journal of Conflict Resolution 38, no. 3 (September 1994): 452–478.
- Ross, Jeffrey Ian. "Structural Causes of Oppositional Political Terrorism: Towards a Causal Model." Journal of Peace Research 30, no. 3 (1993): 317–329.
- Tullock, Gordon. "On the Efficient Organization of Trials." *Kyklos* 28, no. 4 (1975): 745–762.
- Tversky, Amos. "Features of Similarity." *Psychological Review* 84, no. 4 (July 1977): 327–352.



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