

# On Terrorism and Electoral Outcomes

## THEORY AND EVIDENCE FROM THE ISRAELI-PALESTINIAN CONFLICT

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This article investigates the interaction between terror attacks and electoral outcomes in Israel. The authors analyze a dynamic model of reputation that captures the salient characteristics of this conflict. The equilibrium of the theoretical model generates two precise empirical predictions about the interaction between terrorism and electoral outcomes. First, the relative support for the right-wing party is expected to increase after periods with high levels of terrorism and to decrease after periods of relative calm. Second, the expected level of terrorism is higher when the left-wing party is in office than it is during the term of the right-wing party. The authors test these hypotheses by using a newly created data set on terrorist attacks in Israel between 1990 and 2003. The first hypothesis is strongly supported by data culled from public opinion polls about the Israeli electorate's political preferences. The second theoretical hypothesis is strongly supported by the three Israeli governments to which the theory can be applied that served during the studied time period.

*Keywords:* terrorism; electoral outcomes; Israel; Israeli-Palestinian conflict

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Three hundred and ninety terror attacks resulted in more than a thousand Israeli fatal casualties between November 1991 (when the Madrid Peace Conference formally initiated the peace process) and October 15, 2003. Despite its large toll in human lives, the Israeli-Palestinian conflict has not been characterized by continuous and uninterrupted violence. Instead, this conflict exhibits marked fluctuation between periods of relative calm followed by cycles of bloodshed. At the present writing, the conflict is going through an extremely violent period plagued with attacks and retaliations. This latest cycle of violence, which began in September 2000, was preceded by three very quiet years in terms of fatalities—an era that itself was preceded by a violent term that began in 1994, ending the quiet years that followed the first *intifada* (Palestinian uprising).

The number of fatalities is not the only variable that has behaved cyclically since the onset of the peace process. The political affiliation of the Israeli prime minister

seems to sway from right wing to left wing and back whenever the office is up for grabs. In the studied period, a Likud government led by Yitzhak Shamir was replaced in 1992 by a Labor government led by Yitzhak Rabin. This Labor government, in turn, was replaced by a Likud government under Benjamin Netanyahu in 1996, which lost the 1999 elections to Ehud Barak of the Labor Party. Finally, Barak was defeated in 2001 by Ariel Sharon of the Likud.

While the possibility that the level of terrorism might influence electoral outcomes was already mentioned in the Israeli popular press (How many parliament seats 2003), the previous description of events suggests that electoral outcomes influence the level of terrorism as well, thereby creating an interaction between the two variables.

This article investigates, theoretically and empirically, the dynamic interaction between electoral outcomes and terrorism through the prism of the Israeli-Palestinian conflict. It presents, to the best of our knowledge, the first attempt to formally analyze the connection between terrorism and political preferences. Moreover, it measures the reciprocal impact between the two variables using a unique data set containing every terrorist attack in Israel between 1990 and 2003 as well as proxies for the electorate's preferences during the same time period.

We focus on the Israeli-Palestinian conflict because this conflict is especially suited to conduct such a study for several reasons: occupation of territories and terrorism are Israel's most salient issues, democratic elections are held periodically, and political parties' positions on the occupied territories are fairly well known to voters and terrorists alike. Consequently, this case study is likely to expose any empirical relationship that exists between terrorism and electoral outcomes.

We analyze a dynamic model of reputation that captures the salient characteristics of the conflict. In particular, we develop a game in which nature chooses *ab initio* the identity of the Palestinian organization responsible for terror attacks. We differentiate between two types of Palestinian organizations. The main goal of one organization is to establish a sovereign Palestinian state in the West Bank and the Gaza Strip, parts of the territories that Israel occupied in the 1967 Arab-Israeli War. This is a moderate organization that we identify with the Palestinian Authority (PA). The main goal of the second organization is the establishment of a sovereign Palestinian state in accordance with the borders of British Mandate Palestine (i.e., the occupied territories as well as Israel). We identify this organization with extremist terrorist factions. For the purposes of our model, the difference between these organizations is that the PA behaves strategically and engages in costly terrorist

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activity only insofar as this may induce Israel to emancipate the occupied territories. The extremist faction, in contrast, maximizes the expected level of terrorist activity against Israel, irrespective of whether or not emancipation is granted.

At any given period, the sequence of events is as follows. First, the PA chooses whether to aggressively suppress Palestinian terrorists. In practice, the PA can implement policies that aim to thwart terrorism, such as confiscating illegal weapons, actively pursuing and incarcerating terrorists, and dismantling the terrorist infrastructure. The PA incurs a cost for choosing not to suppress terrorists. After observing the PA's choice, Israeli voters elect a party to hold office. Israelis do not know whether the PA or the extremist faction is responsible for the terror attacks.<sup>1</sup> Israelis value the occupation but incur a utility cost from terrorism. Only two parties run for office, Left and Right. The only difference between them is that a left-wing government is more likely to grant emancipation. Hence, Israelis vote for the left-wing party only if, at that particular point in time, their utility from granting emancipation is greater than their utility from continuing the occupation. After observing the Israelis' move, the Palestinian organization that perpetrates the terror attacks chooses a level of effort in pursuit of such attacks. The actual level of terrorism is a random variable; its expected value depends on the level of effort exerted and the PA's self-policing choice. At the end of each period, nature makes two moves. First, the realization of a random variable (the distribution of which depends on the elected Israeli government) determines the political state—occupation or emancipation—in the next period. Emancipation is an absorbing state; once granted, it cannot be taken away. Second, the level of terrorism is realized. Israelis and Palestinians observe these realizations and update their beliefs according to Bayes rule.

The main theoretical result shows that in the unique pure-strategies, Markov-perfect equilibrium of the game, if Israelis believe that they are most likely facing an extremist faction, the PA will try to differentiate itself from the extremists by suppressing terrorism and exerting low effort during the last stage of every period. When sufficient differentiation is achieved, if the territories are still occupied, the PA will choose not to combat terrorism, thereby raising the expected level of attacks. By encouraging an increase in the level of terrorism, the PA seeks to impose costs on the Israelis in order to force them to grant emancipation. In equilibrium, Israelis always vote for the right-wing party if they believe that the perpetrator of the terror attacks is most likely the extremist faction. If Israelis believe that the PA is behind the attacks, they will vote for the left-wing party only when the PA accommodates terrorists and will vote for the right-wing party if the PA cracks down on terrorists.

The intuition behind the equilibrium strategies is as follows. When Israelis believe with high probability that extremists are behind the attacks, they expect a high level of terrorism whether emancipation is granted or not. Therefore, Israelis, who obtain a benefit from occupation, vote for the right-wing party. Within this range of beliefs, the PA cracks down on terrorists and makes little effort to perpetrate

1. Although terrorist groups tend to publicly assume responsibility when any of its members commits an attack, Israelis may not know whether the Palestinian Authority (PA) was able or unable to stop the attack. For the purposes of this article, we say that the PA is responsible for, in control of, or behind an attack if it is able to stop it but unwilling to do so.

terror attacks as it tries to differentiate itself from the extremist faction. That is, the PA wants to establish a reputation as a rational partner for peace. Once such a reputation is established, if the PA continued to suppress terrorism, Israelis would not suffer a cost from maintaining the occupation and would thereby try to perpetuate it. It is for precisely this reason that the PA accommodates terrorism—to impose costs on the Israelis in order to force them to liberate the territories. Israelis expect the continuation of occupation to lead to a stream of high-level terror attacks, not because they are facing an extremist faction but because the PA is not suppressing terrorism. Since the PA's optimal strategy is to suppress terrorism once emancipation is granted, within this range of beliefs, Israelis vote for the left-wing party after observing that the PA is accommodating terrorism.

Thus, our analysis emphasizes that terrorism is mainly used to impose costs on the Israelis to force them to grant emancipation. Although the current costs may be substantial, it is the expectation of severe terrorism in the future that convinces the Israeli electorate that the occupation is not worth maintaining. This provides a formalization of Pape's (2003) arguments. In addition to these arguments, our model also provides an explanation for periods of relative calm. During such periods, the PA attempts to signal to the Israeli electorate that it is able to lower the level of terrorism. Such a signal is important for the PA because the Israeli electorate will not have an incentive to end the occupation if it believes that terror will continue even after emancipation is granted.

The equilibrium of the theoretical model generates two precise empirical predictions about the interaction between terrorism and electoral outcomes. First, we expect relative support for the right-wing party to increase after periods with high levels of terrorism and to decrease after periods of relative calm. Second, perhaps paradoxically, the model predicts that the expected *short-term* level of terrorism will be higher during the left-wing party's term in office than during that of the right-wing party. At the same time, the model predicts that when the left-wing party is elected, the electorate expects a *long-term* decrease in the level of terrorism. Notably, these predictions follow from the Palestinians' strategic considerations and not from different deterrence policies that the Israeli government might implement.<sup>2</sup>

Kydd and Walter (2002) and Bueno de Mesquita (2005) also focus on the Israeli-Palestinian conflict, developing alternative explanations for the observed fluctuations on the level of terrorism. In the framework of Kydd and Walter, extremists engage in terrorism to thwart the implementation of a peace treaty. Accordingly, we should expect a significant short-term increase in the level of terrorism only during a peace process. Bueno de Mesquita developed a complementary framework, in which only moderate terrorist organizations accept the concessions granted by the government, leaving extremists in control of the violent opposition. This accounts

2. In this respect, our empirical analysis is significantly different from most empirical studies of terrorism. In general, empirical studies of terrorism assume that terrorists' utilities are increasing in the level of attacks and that the observed fluctuations are due to the implementation of different deterrence policies (Enders and Sandler 1993, 2002; Brophy-Baermann and Conybeare 1994).

for an increase in the militancy of organizations that engage in terrorist activity and, insofar as counterterrorism fails, for a longer term increase in terror attacks.<sup>3</sup>

While we focus on the same case study, we consider our approach as complementary to those outlined above. Following the implications of the theoretical model, our empirical estimation concentrates on the striking variability in the level of terrorism for periods that precede Israeli elections. Accordingly, the PA's optimal level of terrorism before an Israeli election varies depending on the identity of the incumbent political party in Israel. We would expect to observe a higher level of pre-election terrorism when Labor (the left-wing party) holds office than when the Likud (the right-wing party) is in power. Furthermore, our article also analyzes and quantifies the effects of terrorism on the political preferences of the Israeli electorate, a topic not directly covered by the two aforementioned analyses.

We test the hypotheses that our theoretical model elicits by using a newly created data set on terrorism in Israel and the occupied territories between 1990 and 2003. The first hypothesis is strongly supported by data culled from public opinion polls on the Israeli electorate's political preferences. Accordingly, if the average number of monthly terror fatalities increases by one, the support for the right-wing party will increase by 0.4 percent. The results are not affected when we control for the identity of the incumbent party. Furthermore, whether the prime minister is affiliated with the right-wing party at the time of the attacks has no effect on that party's relative support either.

To determine the validity of the second hypothesis, we use a combination of event study methods and likelihood ratio tests.<sup>4</sup> The main results support our theoretical prediction for the three Israeli governments to which our theory applies in the studied time period. Accordingly, there is a statistically significant increase in the level of terrorism during the left-wing party's term in office and a statistically significant decrease in terrorism during the tenure of the right-wing party. The unity coalition government led by Ariel Sharon between March 2001 and February 2003 witnessed a pattern of terrorism that cannot be analyzed using the framework of our theoretical model because this government was atypical for several reasons.<sup>5</sup> Therefore, we are confident that the results obtained strongly support our theoretical predictions.

At a first glance, the picture that emerges from our empirical findings may lend itself to alternative theoretical explanations. A model that focuses on terrorism deterrence policies, for example, may in principle fit the empirical patterns that we obtained. According to this model, terrorist groups wish to maximize the number of attacks irrespective of the reigning political environment in Israel. There are fewer attacks when the right-wing party holds office simply because this party adopts

3. See Bueno de Mesquita (2003) for a thorough comparison of the two approaches.

4. We empirically test only the part of the hypothesis regarding the observed short-term fluctuations in the level of terrorism. We are unable, however, to test our hypothesis related to long-term fluctuations in the level of terrorism since by *long term*, we refer to a period after a sovereign Palestinian state is created.

5. The coalition government formed between 2001 and 2003 is difficult to characterize. During this period, although the prime minister belonged to the right-wing party, the left-wing party was not only an active partner in the ruling coalition but also was the party with the largest representation in parliament.

tougher antiterrorism policies. It would thus be natural to expect the electorate's preferences to shift rightward during periods with severe terrorism.

It is an empirical fact that deterrence policies have an effect on fluctuations in terrorism (Enders and Sandler 1993, 2002; Brophy-Baermann and Conybeare 1994). The surprising findings of our case study are, however, that left-wing governments were much more aggressive than right-wing governments in applying deterrence policies during the time period at issue—the same time period when there was a significantly higher number of attacks against left-wing incumbents. Available data on the frequency of closures in the West Bank and Gaza Strip on periods that precede Israeli elections show that the left-wing governments of Peres and Barak imposed a total closure on 44 percent and 78 percent of the days, respectively. The right-wing government of Benjamin Netanyahu made much less use of closures—only 5 percent of the days. The coalition government led by Sharon did not impose closures at all during the period leading to the elections in 2003.

The conviction among some Israeli voters that the right-wing party is tougher on terrorism may play a role on their preferences toward the different political parties. Although we do not dispute this, the evidence provided above makes us strongly doubt that the deterrence policy hypothesis can account, by itself, for the observed fluctuations in the level of terrorism. Thus, overall, the evidence obtained leads us to conclude that there is indeed an empirical relationship between terror attacks and electoral outcomes along the lines described in the theoretical model at hand.

## THE THEORETICAL MODEL

This section develops our theoretical model of territorial occupation, terrorism, and emancipation.

### PRELIMINARIES

We consider an infinite horizon environment with two types of agents, Israeli citizens and Palestinians residing in the currently occupied territories. Palestinians are affiliated with either the PA or an extremist faction. We treat all agents of a given group as identical. Both Palestinian groups share the goal of establishing an independent Palestinian state. The PA demands an Israeli retreat to pre-1967 frontiers. The extremists' main objective is the establishment of an independent Palestinian state along the borders of British Mandate Palestine.<sup>6</sup>

Time is discrete:  $t = 0, 1, 2, \dots$ . A nature move selects at the outset the group responsible for terrorism. Let  $\rho_0 \geq 0$  denote the prior probability at time zero that the

6. As an example, article 13 of Hamas's charter states that "[peace] initiatives, the so-called peaceful solutions, and international conferences to resolve the Palestinian problem all contradict the beliefs of the Islamic Resistance Movement. Indeed, giving up any part of Palestine is tantamount to giving up part of its religion. The nationalism of the Islamic Resistance Movement is part of its religion, and it instructs its members to [adhere] to that and to raise the banner of Allah over their homeland as they wage their Jihad" (Mishal and Sela 2000, 183).

PA will be chosen as the perpetrator of the terror attacks.<sup>7</sup> The sequence of events within a period is as follows. At the end of every period, a given level of terrorism is realized. Israelis do not know for certain which group is responsible for the terror attacks. Given a history of attacks, at the beginning of period  $t$ , Israelis assign probability  $p_t$  to the PA being the group that chooses the effort level exerted in terrorism.

The PA then decides whether to attempt to suppress terrorists. We denote this decision by  $k$ ; when  $k = 0$ , the PA cracks down on terrorists; when  $k = 1$ , the PA accommodates terrorists. Choosing not to suppress terrorists inflicts a cost of  $c > 0$  on the PA. Obviously, there are real observable material costs of suppressing terrorism—the use of security personnel, intelligence, weapons, and so on. We contend, however, that the overall observable and unobservable costs of not suppressing terrorism are higher. This may be understood first as a reputation cost. The reputation cost leads to economic costs caused both by Israeli military retaliations and by the reluctance of other countries and international organizations to extend financial support to a regime associated with terrorist activity. A complementary interpretation might stress the inherent risk that the PA government faces for not instituting the rule of law. Accordingly, the existence of several armed factions in PA-controlled territory is a clear source of political instability. Political instability, in turn, dampens economic growth and economic prosperity (Feng 2003).<sup>8</sup>

After observing the PA's decision as well as the entire history of play up to the current period, Israelis elect a government  $g \in \{r, l\}$ . The transition probability from occupation to emancipation is assumed to be greater under a left-wing government,  $Pr(em|oc, g = l)$ , than under a right-wing government,  $Pr(em|oc, g = r)$ . To simplify the notation, we denote  $Pr(em|oc, g)$  as  $p_g$ .<sup>9</sup>

After an Israeli government is elected, the Palestinian organization that perpetrates the terror attacks chooses a level of effort,  $e \in \{\underline{e}, \bar{e}\}$ , in pursuit of such attacks. The Israeli electorate observes only the realized level of terrorism but does not observe the level of effort chosen. Furthermore, it does not know the identity of the group choosing  $e$ . If the PA decided to attempt to crack down on terrorist activity, low effort elicits a low level of terrorism,  $\tau_l$ , with probability  $\alpha \in (1/2, 1)$ . With probability  $1 - \alpha$ , low effort results in  $\tau_h$ . Conversely, high effort yields a low level of attacks with probability  $1 - \alpha$  and a high level of attacks with probability  $\alpha$ . When the PA does not suppress terrorism, it affects the outcome distribution of terror

7. Allowing both groups to commit terror attacks simultaneously, along the lines of Bueno de Mesquita (2005), does not change the results of the article. We choose the current specification just to simplify the main argument of the article.

8. We could relax the assumption above by assuming that accommodating terrorism is more costly than suppressing terrorism only after emancipation is granted. If we think of a sovereign state, the assumption regarding whether it is more costly to suppress terrorism is analogous to the cost-benefit analysis related to the effect of police on crime. Hiring police officers and providing them with the required infrastructure entails real material costs. It has been shown, however, that the benefits obtained from a reliable police force more than outweigh those costs (Di Tella and Schargrodsky 2004).

9. We assume that the transition probability from occupation to emancipation proposed by both parties is exogenous just to simplify the model. An extension of the model, including Israeli voters who have heterogeneous beliefs and political parties that choose their respective  $p_g$  as a function of their supporters' beliefs, would not change any of our results.

attacks.<sup>10</sup> In particular, if the PA chooses to accommodate terrorism,  $Pr(\tau_l | \underline{e}, k = 1) = \gamma \in (1 - \alpha, \alpha)$  and  $Pr(\tau_h | \underline{e}, k = 1) = 1 - \gamma$ .<sup>11</sup>

At the end of each period, the political state is realized. Emancipation is an absorbing state: once granted, it cannot be rescinded, and the previously occupied territories will remain a sovereign state in the future.<sup>12</sup> Israelis and Palestinians next observe the realized level of terrorism and update their beliefs about the identity of the group responsible for the attacks. All players discount the future using the same discount factor  $\beta \in (0, 1)$ .

The Israelis' preferences in each period are represented by a standard von Neumann–Morgenstern utility function  $u^I: \{oc, em\} \times \{\tau_l, \tau_h\} \mapsto \mathbf{R}$  where *oc* is applicable when the territories are under Israeli occupation, *em* is applicable otherwise, and  $\{\tau_l, \tau_h\}$  is the set of feasible terror attacks by the Palestinians, with  $\tau_l < \tau_h$ . We posit that given a level of terrorism, Israelis benefit from continuing the occupation (i.e.,  $u^I(oc, \tau) > u^I(em, \tau)$  for  $\tau = \tau_l, \tau_h$ ) and that utility is decreasing in the level of attacks (i.e.,  $u^I(y, \tau_l) > u^I(y, \tau_h)$ ,  $y = oc, em$ ).

The instantaneous preferences of the PA are represented by  $w^{PA}: \{oc, em\} \times \{\underline{e}, \bar{e}\} \times \{0, 1\} \mapsto \mathbf{R}$ , defined by  $w^{PA}(y, e, k) = w(y, e) - kc$ , where *e* reflects the level of effort exerted by the PA, and *k* is equal to 0 when the PA decides to attempt to suppress terrorism and is equal to 1 otherwise.<sup>13</sup> We assume that for a given level of *e* and *k*, the PA prefers a state of emancipation over a state of occupation (i.e.,  $w^{PA}\{em, e, k\} > w^{PA}\{oc, e, k\}$ ) and that effort is costly; that is, for a given political state and decision about whether to suppress terrorism, the PA would rather exert low effort than high effort (i.e.,  $w^{PA}(y, \underline{e}, k) > w^{PA}(y, \bar{e}, k)$ ). The extremists' payoffs are not defined because this group always puts out high effort.

Several clarifications are in order here. In reality, extremist factions are complex organizations. Like other social and political movements, they have clearly stated goals and make strategic decisions in pursuit of them. Even if one of their main goals is the liberation of historic Palestine by holy war against Israel and the establishment of a Palestinian state on its entire soil, these groups may adjust their behavior to the existing political realities. What counts for the purposes of this article, however, is not these factions' essence as a movement but how the Israeli electorate perceives

10. Assuming that not suppressing terrorist activity also raises the expected number of attacks when high effort is exerted would not change any of the results of the article, as long as the expected level of terrorism when low effort is exerted is always lower than under high effort.

11. The restrictions on the parameters are such that Israelis never learn for sure the type of the Palestinian group responsible for terror attacks. Under the present specification, voters observing the realized level of terrorism for a long number of periods converge to the true beliefs regarding the perpetrator's type. Total convergence will never occur if we assume, along the lines of Mailath and Samuelson (2001), that there is a small positive probability that the group's type changes from one period to the next. Adopting this assumption does not affect the main results of the model.

12. This is not to deny that a territory may be reoccupied. Nevertheless, once emancipation is granted and a new state is established, reoccupation may be extremely costly. Assuming that emancipation is an absorbing state only simplifies the solution of the theoretical model. Allowing for costly reoccupation of previously emancipated territory does not change the nature of any of the theoretical results of the article.

13. To avoid introducing more notation, we restrict  $w(y, e)$  to  $w(y)$  when nature selects the extremist faction, and not the PA, to exert effort level in the pursuit of attacks.



them. In this respect, our assumption reflects the prevailing image of extremist factions among the Israeli electorate as ideologically intransigent and politically rigid groups that are willing to pursue the destruction of Israel at any cost, with no limits or constraints.<sup>14</sup>

The PA, contrary to extremist factions, has adopted a two-state solution approach to the conflict—Israel within its 1967 frontiers and an independent Palestinian state in the West Bank and the Gaza Strip. The divide between extremists and the PA in regard to ultimate objectives and means to attain them is the source of their peculiar relationship of coexistence. At times, their interests collide, and the PA implicitly grants the extremist factions operational freedom to perpetrate terrorist activity. On other occasions, the PA takes measures against extremist factions and its members after determining that terror attacks may undermine its goals (Kimmerling and Migdal 2003).

**EQUILIBRIUM CHARACTERIZATION**

This section characterizes the unique pure-strategy, Markov-perfect equilibrium of this game, in which strategies depend only on the current state of the game.

In the presence of uncertainty about the Palestinians’ type, the state of the system at period *t* consists of the Israelis’ posterior probability that the PA is responsible for terrorism in conjunction with the political state of the territories. The set of possible states is  $S = \{(y, \rho): y \in \{em, oc\} \text{ and } \rho \in [0, 1]\}$ . A Markov strategy for the PA, denoted by  $\sigma^{PA}: S \times \{l, r\} \mapsto \{0, 1\} \times \{e, \bar{e}\}$  is a function of state *S* and the government that the Israelis elect in the current period. This strategy determines whether the PA accommodates or attempts to suppress terrorism and what level of effort exerts on terrorist activities after the elections in Israel. Israelis’ Markov strategy, denoted by  $\sigma^I: S \times \{0, 1\} \mapsto \{l, r\}$  is a function of the state variable as well as of the PA’s self-policing decision. This mapping determines the political party that Israelis choose in the current period. The extremist faction has a trivial strategy, as it makes no choices.

Given the realized level of terrorism  $\tau \in \{\tau_l, \tau_h\}$  and prior beliefs  $\rho$  let  $\varphi(\rho|k, \tau)$  denote the Israelis’ posterior beliefs that the PA is the terror perpetrator, conditional on the PA’s strategy. A pure-strategy, Markov-perfect equilibrium is a tuple

$$\{\bar{\sigma}^{PA}(S|g), \bar{\sigma}^I(S|k), \varphi(\rho|k, \tau)\}$$

such that  $\bar{\sigma}^{PA}$  and  $\bar{\sigma}^I$  are best responses to each other for all *S*, and Israelis use Bayes rule to update their posterior probabilities. Formally, denote by  $w^{PA}(\bar{\sigma}^I(S|k), \bar{\sigma}^{PA}, S)$  the instantaneous utility of the PA as a function of the state *S* and the players’ Markov strategies; define the Israelis’ expected instantaneous utility by

$$U^I(\bar{\sigma}^I, \bar{\sigma}^{PA}(S|g), S) := Pr(\tau_l|\bar{\sigma}^I, \bar{\sigma}^{PA}(S|g), S)u^I(y, \tau_l) + Pr(\tau_h|\bar{\sigma}^I, \bar{\sigma}^{PA}(S|g), S)u^I(y, \tau_h),$$

14. See Kydd and Walter (2002) for a rational choice study of terrorism in which the radical group adopts a nontrivial strategy.

and let  $p_g(\sigma^I, \sigma^{PA}, S)$  denote the transition probability from state  $S$  to state  $(em, \rho')$  as a function of the strategies  $\sigma^I$  and  $\sigma^{PA}$ . Thus, the resulting Bellman equations for each player are

$$V^{PA}(S) = \max_{\sigma^{PA}} \{ w^{PA}(\bar{\sigma}^I(S|k), \sigma^{PA}) + \beta [p_g(\bar{\sigma}^I(S|k), \sigma^{PA}, S)V^{PA}(em, \rho') + (1 - p_g(\bar{\sigma}^I(S|k), \sigma^{PA}, S))V^{PA}(oc, \rho')] \} \tag{1}$$

and

$$V^I(S) = \max_{\sigma^I} \{ U^I(\sigma^I, \bar{\sigma}^{PA}(S|g), S) + \beta [p_g(\sigma^I, \bar{\sigma}^{PA}(S|g), S)V^I(em, \rho') + (1 - p_g(\sigma^I, \bar{\sigma}^{PA}(S|g), S))V^I(oc, \rho')] \}. \tag{2}$$

A pure-strategy, Markov-perfect equilibrium is a strategy combination coupled with posterior beliefs so that  $\bar{\sigma}^{PA}$  solves (1),  $\bar{\sigma}^I$  solves (2), and the posterior beliefs are updated as follows. If the PA exerts high effort, then  $\varphi(\rho|\tau, k) = \rho$ . Alternatively, when the PA strategy is such that  $\bar{\sigma}^{PA}(S|g) = (k, \underline{e})$

$$\varphi(\rho|k, \tau_l) = \begin{cases} \frac{\rho\alpha}{\rho\alpha + (1-\rho)(1-\alpha)} & \text{for } k = 0, \\ \frac{\rho\gamma}{\rho\gamma + (1-\rho)(1-\alpha)} & \text{for } k = 1, \end{cases}$$

and

$$\varphi(\rho|k, \tau_h) = \begin{cases} \frac{\rho(1-\alpha)}{\rho(1-\alpha) + (1-\rho)\alpha} & \text{for } k = 0, \\ \frac{\rho(1-\gamma)}{\rho(1-\gamma) + (1-\rho)\alpha} & \text{for } k = 1. \end{cases}$$

We may characterize the unique pure-strategy, Markov-perfect equilibrium by exploiting several features of the model. First, for any  $S$ , the PA chooses  $e = \underline{e}$ . Any other behavior is simply more costly and cannot, in equilibrium, influence the Israelis' posterior beliefs.<sup>15</sup> Hence, the continuation value (the discounted expected net present value) for the PA after emancipation is realized is

$$V^{PA}(em, \rho) = \frac{w^{PA}(em, 0, \underline{e})}{1 - \beta}$$

since  $w^{PA}(em, 0, \underline{e}) > w^{PA}$ . That is,  $\bar{\sigma}^{PA}((em|\rho)|g) = (0, \underline{e})$  for any  $\rho$  and  $g$ .

Given  $\bar{\sigma}^{PA}$ , the Israelis' continuation value after emancipation is realized is

$$V^I(em, \rho) = \frac{u^I(em, \tau_l)[\rho\alpha + (1 - \rho)(1 - \alpha)] + u^I(em, \tau_h)[\rho(1 - \alpha) + (1 - \rho)\alpha]}{1 - \beta},$$

which increases monotonically in  $\rho$ .

15. More precisely, if in any period the PA were to choose high effort, Israelis would not adjust their posterior in response to the level of terrorism observed that period. Thus, the PA would optimally choose to exert low effort, disrupting the equilibrium.

In what follows, we impose the following two restrictions:

$$\gamma < \frac{[u^l(em, \tau_l) - u^l(em, \tau_h)]\alpha - [u^l(oc, \tau_h) - u^l(em, \tau_h)]}{u^l(oc, \tau_l) - u^l(oc, \tau_h)}, \tag{3}$$

and

$$u^l(em, \tau_l) - u^l(oc, \tau_h) > [u^l(oc, \tau_l) - u^l(em, \tau_h)] \frac{(1 - \alpha)}{\alpha}. \tag{4}$$

The first inequality imposes an upper bound on  $\gamma$ , the parameter that characterizes the expected level of terror attacks when the PA decides not to stop terrorism. This condition ensures that the increase in expected terror attacks when the PA accommodates terrorism is significant enough so that to try to maintain the occupation of the territories is no longer a dominant strategy for the Israelis, irrespective of their beliefs.<sup>16</sup> The second inequality is a technical requirement that guarantees that the range of  $\gamma$  is not empty.<sup>17</sup>

In view of these assumptions, in a state of occupation, contrary to the analysis above, the PA's optimal strategy depends on the Israelis' strategy. At equilibrium, it is clear that Israelis elect a left-wing government whenever the continuation value of emancipation is greater than the continuation value of maintaining the occupation—that is, whenever  $V^l(em, \rho) > V^l(oc, \rho)$ . Otherwise, Israelis elect a right-wing government. Given the Israelis' behavior and beliefs, the PA may find it profitable in certain states to accommodate terrorism to lower the value that Israelis accrue from maintaining the occupation. Note in particular that if the PA cracks down on terrorists  $V^l(em, \rho) < V^l(oc, \rho)$  for every  $\rho$ , implying that  $\bar{\sigma}^l((oc, \rho) | k = 0) = r$ . For a certain range of  $\rho$ , however, if the PA does not suppress terrorism as long as the territories are occupied,  $V^l(em, \rho | k = 0) > V^l(oc, \rho | k = 1)$ ; that is, the PA accommodates terrorism to induce the Israelis to favor emancipation.<sup>18</sup>

For such a strategy to be effective, the PA's threats (not only to continue terror as long as the territories are occupied but also to stop terror if emancipation occurs) need a certain level of credibility. This credibility is captured by  $\rho$ . In other words, for  $\rho$  high enough, Israelis believe that they will suffer in the future a relatively high level of terror attacks as long as the occupation continues. Perhaps

16. Note that the PA always suppresses terrorism if this condition is not satisfied. Within a more general framework where the PA can choose the level of self-policing (i.e., where the decision is not dichotomous), condition (3) is always satisfied endogenously. Otherwise, the PA would not be able to threaten Israelis with cooperation with terrorist organizations, and occupation would be maintained in perpetuity.

17. This condition is not very restrictive either. If we assume, for example, that  $u^l(y, \tau) = f(y) \times (\tau_h - \tau)$  where  $f(em)$  is equal to a constant  $a > 0$  and  $f(oc)$  is equal to a constant  $b > a$ , the second inequality is satisfied whenever  $\frac{a}{b} > \frac{1-\alpha}{\alpha}$  (i.e., when the benefits of continuing the occupation for a given level of terror attacks do not significantly exceed the benefits of granting emancipation).

18. Several researchers posit that this is indeed the main strategy used by terrorists. This behavior is in accordance to Oots (1986), who argues that terrorists use this strategy as an exchange medium for concessions.

more important, they also believe that these terror attacks will stop as soon as emancipation is granted.

More specifically, there exists a unique  $\rho^* \in (0, 1)$  implicitly defined by

$$V^I(em, \rho^*) = U^I(\sigma^I, (1, \underline{e}), (oc, \rho^*)) + \beta[p_g(\sigma^I, (1, \underline{e}), (oc, \rho^*))V^I(em, \rho') + (1 - p_g(\sigma^I, (1, \underline{e}), (oc, \rho^*)))V^I(oc, \rho')]$$

such that for  $\sigma^{PA}((oc, \rho) | g) = (1, \underline{e})$

$$V^I(em, \rho) \begin{cases} < V^I(oc, \rho), & \text{for } \rho < \rho^*, \\ > V^I(oc, \rho), & \text{for } \rho > \rho^*. \end{cases}$$

Since accommodating terrorism is costly, the PA does not indulge in it unless it has an effect on the Israelis' strategy. Since  $\bar{\sigma}^I((oc, \rho) | k) = r$  for  $\rho < \rho^*$  irrespective of  $k$ , then  $\bar{\sigma}^{PA}((oc, \rho) | g) = (0, \underline{e})$  in this range of beliefs. Although accommodating terrorism influences the Israelis to vote for the left-wing party when  $\rho > \rho^*$ , the PA does not always profit by taking such an action. The PA accommodates terrorism within this range of beliefs when the cost of so doing satisfies the following constraint:

$$c \leq \beta(p_l - p_r) \left[ \frac{w^{PA}(em, 0, \underline{e})}{1 - \beta} - V^{PA}(oc, \rho) \right]; \tag{5}$$

that is, the PA refrains from suppressing terrorists whenever  $c$  is less than the benefits of accommodating terrorists. These benefits are a function of the probability of obtaining emancipation under the different political parties and the increase in the PA's value of emancipation relative to occupation. That is, the higher the value of emancipation relative to occupation, the more likely it is that condition (5) is satisfied, thereby giving the PA an incentive to accommodate terrorism.<sup>19</sup>

The proposition below summarizes our characterization of the unique pure-strategy, Markov-perfect equilibrium of the game.

*Proposition 1:* Suppose that conditions (3), (4), and (5) hold. There exists a unique pure-strategy, Markov-perfect equilibrium such that, if the territories are under Israeli occupation:

1. For  $\rho < \rho^*$  the PA suppresses terrorism and does not exert a high effort in the pursuit of terror attacks. Israelis vote the right-wing party into office irrespective of the PA's self-policing decision.
2. For  $\rho \geq \rho^*$  the PA accommodates terrorism but exerts low effort in the pursuit of terror attacks. Israelis vote the left-wing party into office whenever the PA accommodates terrorism and elect the right-wing party when the PA cracks down on terrorism.

If the territories were emancipated in the past, the PA suppresses terrorism and exerts low effort in the pursuit of terrorist activity. Israelis elect either the right-wing or the left-wing party, irrespective of the PA's self-policing decision.

In every case, beliefs are updated according to Bayes rule.

19. Note that the PA accommodates terrorists even if the extremist faction is responsible for the terror attacks. Hence, the decision about whether to suppress or accommodate terrorism does not reveal the identity of the group responsible for terror attacks.

Proposition 1 carries two precise empirical implications. First, repeated realizations of a high level of terrorism amplify Israelis' conviction that the extremist faction is the Palestinian organization behind the attacks. This belief induces the Israeli electorate to shift rightward. That is, the theoretical model predicts that public support for the right-wing party will increase after periods of severe terrorism and will decrease after relatively calm periods. Second, perhaps paradoxically, the model predicts that, as long as the territories remain under Israeli occupation, the expected level of terrorism is higher when the left-wing party is in office than it is during the term of the right-wing party. The reason is that Israelis elect a right-wing government because they consider it highly probable that extremists are behind the terror attacks. In view of these beliefs, the optimal strategy for the PA is to try to lower the expected level of terrorism as much as possible, choosing  $\hat{\sigma}^{PA}(S|g) = (0, \underline{e})$ . In contrast, when Israelis believe that the PA controls the level of terrorism, the PA accommodates terrorism to increase the expected level of terror attacks, thereby decreasing the Israelis' benefits from the occupation. Since the PA's strategy has made the continuation of the occupation less alluring for Israelis, the Israelis elect a left-wing government to increase the probability of granting emancipation.

The next section subjects the validity of the two theoretical implications to empirical assessment.

## EMPIRICAL ANALYSIS

This section tests the implications of the foregoing theoretical model by using public opinion polls and a newly created data set on terror attacks in Israel and the occupied territories between 1990 and 2003.

### DATA

Definitions of terrorism vary widely. A given act may be defined as terrorism in one person's opinion and as a fight for freedom in the views of another. The particular definition of terror attacks that we use for the construction of our data set is the one set forth by the U.S. State Department, contained in Title 22 of the U.S. Code, Section 2656f(d). Specifically, our data set on terrorists' attacks contains daily information on each and every *fatal* terror attack against *noncombatants* that occurred on *Israeli soil* between October 31, 1990, and May 31, 2003.<sup>20</sup> Several explanations about the definition of *terror attack* that we are using are in order.

- a. *Fatal*: due to constraints in the collection procedure, only attacks that claimed the life of someone other than the terrorist were included.
- b. *Noncombatants*: this term is construed as including, in addition to civilians, military personnel who were unarmed and/or not on duty at the time of the incident.
- c. *Israeli soil*: including occupied territories when under Israeli control.

20. Our data set extends back to 1949. We use data from 1990 onward because our theoretical model is suitable only for the period following the beginning of the peace process. See Berrebi (2003) for a more detailed description of the data set and its sources.

The main sources of the data are the Israeli Foreign Ministry, the National Insurance Institute, the Israeli Defense Forces, and the archives of two newspapers (*Ma'ariv* and *Ha'aretz*). To the best of our knowledge, this is the most accurate and comprehensive unclassified data set regarding fatal terror attacks against noncombatants on Israeli soil. The data are shown in Figure 1; Table 1 provides summary statistics by period and type of attack. It is evident from the table that terror attacks on Israeli soil increased significantly in the period at issue compared to the previous decades.

To test the impact of terrorism on the Israeli electorate, we gathered data from public opinion polls on Israelis' political preferences. We collected all the polls published by *Ma'ariv*, a leading Israeli newspaper, during the relevant time period. The published polls were first conducted by Gallup Israel, later on by Market Watch, and after November 2002 by a new polling company named New Wave. Table 2 presents summary statistics on these data. While the average support for the right-wing party is higher than the one obtained by the left-wing party, the difference is strikingly small. Given this parity, even a slight increase in the support for one party may very well decide an election.

Several potential problems with the data are worth emphasizing. First, the data on terror attacks indicate only attacks in which someone other than the terrorist died. Thus, foiled attacks and unsuccessful attacks in terms of producing fatalities are not included. Terror attacks not on Israeli soil were also excluded. Since these types of attacks may affect the Israeli electorate's views, we may be omitting relevant terrorist events. Second, the data culled from public opinion polls do not appear regularly; there is a high frequency of observations before scheduled elections and lengthy intervals without observations shortly following elections. In addition, *Ma'ariv* used several different polling companies during the period at issue. This may introduce additional noise to the results since different companies may use different methods to gather and analyze the data. Finally, the persistence of individuals' political preferences, as reflected in public opinion polls, is likely to cause serial correlation.

Apart from these concerns, we should be particularly attentive to Israel's electoral system when analyzing the effect of the government's ideology on the level of terror attacks. Israel's electoral system is based on nationwide proportional representation, and the number of seats that every list receives in the Knesset (as the parliament is known) is proportional to the number of votes received. The executive branch is not elected directly; instead, the president nominates a prime ministerial candidate who has to obtain the support of a majority of the parliament members in a vote of confirmation.<sup>21</sup> Elections are supposed to take place every four years, but the parliament may decide by an ordinary majority to dissolve itself and call for unscheduled

21. Beginning with the elections in 1996, the Israeli parliament introduced a system of direct elections for the premiership in which each voter cast two ballots: one for an individual prime ministerial candidate and one for the parliamentary list of his or her choice. Given the short and turbulent terms of the three prime ministers who were elected under this system, the direct elections concept was discontinued in 2001, and the previous system was reinstated.

TABLE 1  
Summary Statistics

	Deaths from Terrorist Attacks Since 1949	Deaths from Terrorist Attacks Since October 31, 1991 <sup>a</sup>	Number of Terrorist Attacks Since 1949	Number of Fatal Terrorist Attacks Since October 31, 1991 <sup>a</sup>	Deaths from Suicide Attacks Since 1949	Deaths from Suicide Attacks Since October 31, 1991 <sup>a</sup>	Number of Suicide Attacks Since 1949	Number of Fatal Suicide Attacks Since October 31, 1991 <sup>a</sup>
Daily average	0.0955	0.2283	0.0450	0.0872	0.0276	0.1252	0.0041	0.0182
Daily standard deviation	0.8403	1.4400	0.2264	0.3228	0.6275	1.3377	0.0697	0.1471
Daily max	33	29	3	3	29	29	3	3
Daily min	0	0	0	0	0	0	0	0
Weekly <sup>b</sup> average	0.6683	1.5967	0.3151	0.6099	0.1930	0.8760	0.0285	0.1273
Weekly <sup>b</sup> standard deviation	2.4846	4.3729	0.7109	1.0547	1.7797	3.7363	0.2062	0.4252
Weekly <sup>b</sup> max	41	41	8	8	32	32	3	3
Weekly <sup>b</sup> min	0	0	0	0	0	0	0	0
Monthly average	2.9066	6.9496	1.3706	2.6547	0.8392	3.8130	0.1240	0.5540
Monthly standard deviation	7.2485	12.8826	2.0877	3.2565	5.0076	9.8434	0.5851	1.1110
Monthly max	112	112	23	23	79	79	8	8
Monthly min	0	0	0	0	0	0	0	0
Yearly <sup>c</sup> average	35	76	16	30	10	41	1	6
Yearly <sup>c</sup> standard deviation	52.8152	94.5855	17.0059	27.1862	33.5813	60.7440	4.8833	8.7698
Yearly <sup>c</sup> median	25	51	11	20	0	24	0	3
Yearly <sup>c</sup> max	351	351	89	89	218	218	32	32
Yearly <sup>c</sup> min	0	6	0	4	0	0	0	0
Total	1,898	966	895	369	548	530	81	77

a. Yearly data include the entire year 1991.

b. Weeks start on Sunday and end on Saturday.

c. The year 2003 goes only until May 30.

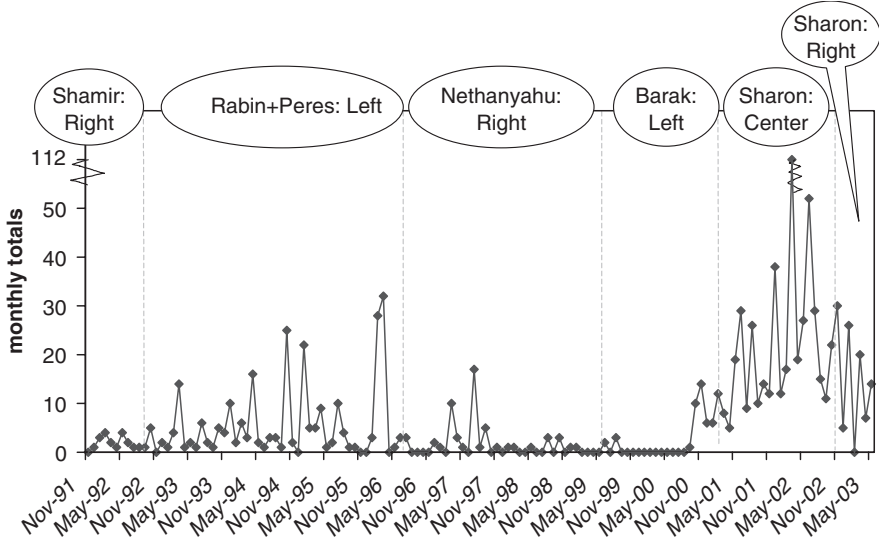


Figure 1: Deaths from Terrorist Attacks

early elections.<sup>22</sup> This means that the timing of elections is endogenous to the political environment. In fact, all Knesset elections during the period at issue preceded their original scheduled dates. In 1992, 1996, 1999, and 2001, the parliament called for early elections, whereas the elections for the Sixteenth Knesset in 2003 were brought forward at the initiative of the prime minister.

The endogenous electoral schedule introduces another complication to our empirical analysis. In the theoretical model, the timing of events within a period is exogenous to the realization of terror attacks. In practice, however, we expect the level of terrorism to be a function not only of the ideology of the current government but also of its perceived stability. Palestinians may raise the level of terrorism to topple a government that they dislike or may impose a period of relative calm to help a government that they favor. Moreover, different political parties have an incentive to behave opportunistically, calling for early elections at a time when they expect to be favored by the electorate (Smith 1996). Our theoretical model does not account for these types of strategies. To solve this endogeneity problem, we confine the estimation of the effect of the government’s ideology on the level of terror attacks to the period between the fall of a government and the scheduled elections for a new one. During this period, we may treat the upcoming elections as exogenously given since their date is announced in tandem with the collapse of a government.

22. When the system with a direct election for the prime minister was in effect, the prime minister, as well as the parliament, could apprise the president of early elections. Now that this system has been abolished, the prime minister may recommend to the president that he or she call for early elections, but the parliament may block any such initiative.



TABLE 2  
 Summary Statistics from Polls (between February 14, 1992, and January 26, 2003)

	<i>Approximate Number of Days between Polls</i>	<i>Percent Support for Left- Wing Candidate<sup>a</sup></i>	<i>Percent Support for Right- Wing Candidate<sup>a</sup></i>	<i>Knesset Seats for Left- Wing Party (According to Poll)<sup>b</sup></i>	<i>Knesset Seats for Right- Wing Party (According to Poll)<sup>b</sup></i>	<i>RSR</i>
Average	21.973	39.16	40.47	39.417	63	0.5180066
Standard deviation	51.519	0.097	0.077	2.503	2	0.1049116
Median	9	41.00	40.00	40.5	63	0.4883721
Mode	7	43.00	41.00	41	63	0.5
Max	595	60.00	63.00	42	65	0.84
Min	2	11.00	25.00	36	58	0.308642

NOTE: RSR is the ratio of the support for the Likud (right) party/candidate over the sum of support for the Likud (right) and Labor (left) parties/candidates from the respective poll.

a. Relevant only between February 14, 1992, and October 4, 2002 (since November 2002, percentages are no longer presented in terms of candidate support but in terms of the number of Knesset of seats for the party).

b. Relevant only between November 15, 2002, and January 26, 2003 (since November 2002, percentages are no longer presented in terms of candidate support but in terms of the number of Knesset of seats for the party).

Despite these limitations, we consider the data to be accurate enough to help us investigate the empirical relationship between terrorism and electoral outcomes.

**EMPIRICAL STRATEGY AND RESULTS**

**The Impact of Terrorism on the Israeli Electorate**

According to the first hypothesis of our theoretical model, we expect that the relative support for the right-wing party increases during periods with high levels of terrorism and decreases during periods of relative calm. This prediction is intuitive and widely recognized in the popular press. This subsection, however, uses rigorous econometric techniques not only to test the validity of the hypothesis above but also to carefully quantify the observed changes in the relative support for the right-wing party as a function of terrorist attacks, while controlling for other variables that may influence the electorate’s preferences.

A simple count of terror fatalities during the five months that immediately preceded each election during the relevant period is quite revealing. This circumstantial evidence shows that the left-wing party (Labor) won every election when fewer than twelve people died in terror attacks during the relevant months and that the right-wing party (Likud) won the elections when the number of terror fatalities during the five months that preceded the election was forty-eight or more. This evidence is far from conclusive, of course, since we cannot conduct a meaningful statistical analysis on the basis of only five observations.

To amass additional observations, we collected the results of public opinion polls about voters’ preferences. The results of the polls serve as a proxy of electorate

outcomes and help us to overcome the difficulty created by the simultaneous relation between terrorism and electoral outcomes. Figure 2a displays the basic data. The figure shows the relative support for the right-wing party in the two-party vote,  $RSR_t$ , and the number of terror fatalities thirty days before the day on which the poll was taken,  $\tau_t$ .<sup>23</sup> These data indicate some extent of a patterned relationship between the two variables of interest. Most notably, the Israeli electorate's support for the right-wing party increases in times of violence and decreases in times of calm.

To conduct a formal statistical analysis, we consider the relative political support for the right-wing party as a function of the level of terrorism and other observed determinants of  $RSR_t$ .

$$RSR_t = \delta_0 + \delta_1 \tau_t + \delta_2 X_t + u_t, \quad (6)$$

where  $\delta_1$  and  $\delta_2$  represent parameters to be estimated, and  $u_t$  are serially dependent shocks following an AR(1) process.

Table 3 provides Prais-Winsten estimates of equation (6).<sup>24</sup> Column (1) reports the estimated coefficients for our basic specification. Column (2) introduces the per capita growth rate of gross domestic product (GDP) in Israel lagged one period, as well as an interaction of lagged per capita GDP growth with a dummy variable that equals 1 during the right-wing party's tenure in office.<sup>25</sup> Column (3) adds to the estimated model a dummy variable that controls for the different polling companies used by *Ma'ariv*, column (4) adds a time trend, and the last estimated model in column (5) includes a dummy variable that equals 1 when the prime minister belongs to the right-wing party together with an interaction of this variable with the number of terror fatalities.

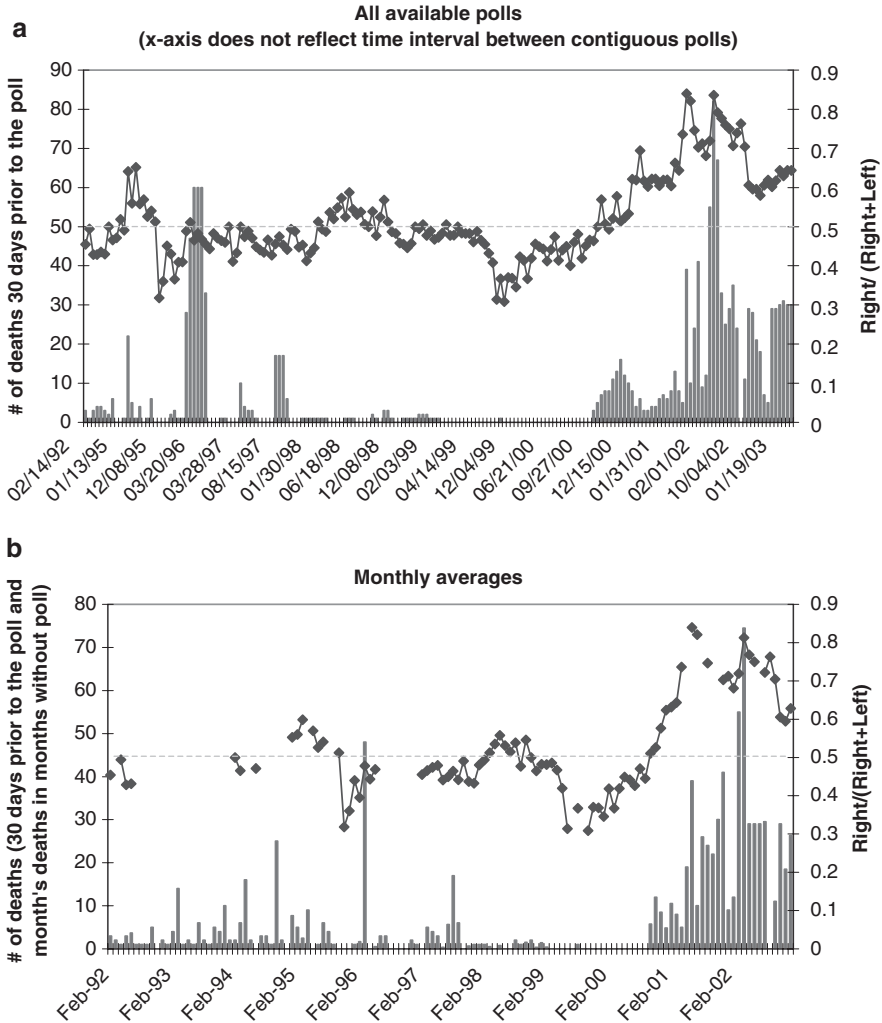
As shown in Table 3, the qualitative prediction regarding the positive effect of terror attacks on the relative support for the right-wing party is supported empirically. According to the obtained results, an increase in the number of terror fatalities from its monthly average of seven to eight causes a statistically significant increase of 0.4 percent in the support for the right-wing party. As shown in column (5), this result is not affected by the identity of the party holding office or whether the prime minister at the time of the attacks belongs to the Likud Party. Using different lengths of time to calculate the total number of terror fatalities does not affect the obtained conclusions.

Another interesting result worth mentioning is that the marginal effect of per capita GDP growth during the left-wing party terms in office (as measured by the

23. In panel (b), we average the polls that were conducted within the same month. The purpose is to create a series of evenly spaced observations that we use to overcome the existent serial correlation in the data.

24. Both the Breusch-Godfrey test and Durbin's alternative test statistic indicate that the residuals follow an AR(1) process. The Prais-Winsten estimator corrects the first-order serially correlated residuals, thus rendering serially independent shocks.

25. This covariate controls for the possible effects of economic conditions on the relative support for the right-wing party, as predicted by the economic voter hypothesis. (See Lewis-Beck and Stegmaier [2000] for a thorough review of this literature.) We control for economic effects even though several studies focusing on the voting behavior of the Israeli electorate found that the security-peace dimension is by far the most influential on Israeli voters (see, e.g., Shamir and Arian 1999).



**Figure 2: Relative Support for the Right and Deaths from Terrorist Attacks**

coefficient on GDP growth) is significantly negative. In contrast, the marginal effect of per capita GDP growth during the right-wing party terms in office (as measured by the sum of the coefficients on GDP growth and GDP Growth  $\times$  No Left Dummy) is not statistically significant. That is, the economic performance while holding office affects the political support for the different parties only during the left-wing party tenure in office. (We obtained similar results for alternative macroeconomic indicators—per capita gross domestic product, unemployment rate, and changes in the unemployment rate.) This lends additional support to our theoretical conclusion

TABLE 3  
 Prais-Winsten Estimates for the Relative Support  
 for the Right-Wing Party in the Two-Party Vote (RSR<sub>t</sub>)

<i>Relative Support for the Right-Wing Party (Monthly Averages)</i>					
	(1)	(2)	(3)	(4)	(5)
Intercept	0.5398*** (0.0337)	0.5367*** (0.0375)	0.5260*** (0.0336)	-0.0645 (0.3051)	0.0014 (0.3314)
Deaths	0.0009** (0.0004)	0.0008** (0.0004)	0.0011*** (0.0004)	0.0011*** (0.0004)	0.0012** (0.0006)
GDP growth		-0.1366*** (0.0373)	-0.1366*** (0.0364)	-0.1368*** (0.0380)	-0.1366*** (0.0377)
GDP Growth × No Left Dummy		1.3473 (0.8559)	1.3132* (0.7925)	1.0690 (0.7104)	1.0391 (0.7356)
Pollster dummy			0.0876*** (0.0316)	0.0847*** (0.0324)	0.0801*** (0.0332)
Time trend				0.0012** (0.0006)	0.0011 (0.0007)
Deaths × No Left Dummy					-0.0003 (0.0009)
No left dummy (yes = 1)					0.0380 (0.0377)
Rho	0.9343	0.9494	0.9405	0.9052	0.9141
Number of observations	86	85	85	85	85
Adjusted R <sup>2</sup>	0.6092	0.6235	0.6720	0.7300	0.7172

NOTE: RSR is the ratio of the support for the Likud (right) party/candidate over the sum of support for the Likud (right) and Labor (left) parties/candidates from the respective poll. GDP = gross domestic product.

\*Significant at the 10 percent level. \*\*Significant at the 5 percent level. \*\*\*Significant at the 1 percent level.

that the electorate chooses the right-wing party for office when the number of terror fatalities increases, and security becomes the main issue dimension.

In view of some of the aforementioned problems with the collected data (irregularity of the polls, use of several different polling companies during the period at issue), much of the observed variability may be due to noise produced by sampling error and not a reflection of true shifts in public opinion. To accurately separate shifts in public opinion from random movements, we follow closely the framework pioneered by Green, Gerber, and De Boef (1999), based on the Kalman filter. This methodology also allows us to gauge the state of opinion during periods when polls were not conducted by interpolating missing observations and calculating their standard error. This is especially important in our estimation in view of the available data set, which has a high frequency of observations before the elections and lengthy intervals without observations as the country moves farther away from scheduled elections.

By using the Kalman filter algorithms, we generate two alternative series of relative support for the right-wing party on the basis of the observed opinion polls: the first series consists of filtered observations, and the second series consists of smoothed observations. To generate filtered estimates, we move forward in time, iterating the polls until we arrive at the last one in our data set. To obtain smoothed

estimates, we use the filtered estimate and the uncertainty estimate for each observation and move backward in time, adjusting the smoothed estimate according to the observed difference between the filtered estimate and the observed poll realization.

We again use the Prais-Winsten estimator to assess the impact of terror attacks on the percentage share of the right-wing party in the two-party vote, now applied to the modified data. The results show that the conclusions adduced from the raw data are sustained. Namely, the effect of fatalities on the relative support for the right-wing party is still significantly positive. Although its coefficient is not as large as before, the observed decrease is not significant. In particular, a marginal increase in terror fatalities causes an increase of 0.3 to 0.35 percent in the support for the Likud, evaluated at the means.<sup>26</sup>

### The Impact of the Elected Israeli Government on the Level of Terrorism

A direct implication of our theoretical model is that the level of terrorism and electoral outcomes are determined simultaneously. In addition, our empirical estimation has to take into account that not only the outcomes but also the timing of elections are endogenous to the level of terrorism. It is for these reasons that we use a combination of event study methods and more conventional likelihood ratio tests to assess the validity of the second hypothesis.

The event study method treats the ideology of the elected Israeli government as exogenous and studies its impact on the level of terrorism.<sup>27</sup> To conduct an event study analysis, we define the day on which the forthcoming election day is announced as the day of the event. Thus,  $t = 0$  is the event day. Our sample contains four events: the elections of 1996, 1999, 2001, and 2003. For each event, we define an *event window* that spans from the day of the event until the end of the tenure of the corresponding government. The event study method basically compares the level of terrorism during the event window with the level of terrorism during a previously specified *estimation window*. We define as our estimation window the event window of the preceding government because this provides a proxy for  $\tau_{t-1}$ .<sup>28</sup>

For each event, we compute the average number of weekly terror fatalities during the estimation window,  $\bar{\tau}$ . For each week in the event window, we calculate the abnormal number of deaths from terrorism,  $AD_t$ , defined as the observed number of deaths minus  $\bar{\tau}$  that is,

$$AD_t = \tau_t - \bar{\tau}.$$

26. The detailed results of the regressions using the filtered and smoothed data can be obtained from the authors upon request.

27. See Campbell, Lo, and MacKinlay (1997) for a general description of event study methods. Abadie and Gardeazabal (2003) and Berrebi and Klor (2005) present an application of this method to study the impact of terrorism on stock returns.

28. As discussed above, the dates of elections in Israel are not always determined exogenously. In fact, only during the period between the fall of a government and scheduled elections for a new one can an upcoming election day be regarded as exogenous, known both by the Israeli electorate and terrorists. Therefore, these are the periods that we use for our analysis as event and estimation windows. Our results do not change when we use the full tenure of each government as the event window, with the full tenure of the previous government serving as the estimation window.

We interpret the abnormal number of deaths from attacks during the event window as a measure of the impact of the ideology of a given government on terrorist activity. We aggregate the abnormal deaths into the cumulative abnormal deaths,  $CAD_T$ , to draw overall inferences. Formally,

$$CAD_t = \sum_{i=0}^T AD_i.$$

If  $CAD_T$  oscillates around zero, then the studied event does not have an effect on the level of terrorism. If  $CAD_T$  is significantly different from zero, we must conclude that the event had an impact on the level of terrorism. In particular, if the theoretical predictions are correct, then  $CAD_T$  should be positive and increasing for a left-wing government that succeeds a right-wing government and negative and decreasing for a right-wing government that succeeds a left-wing government.

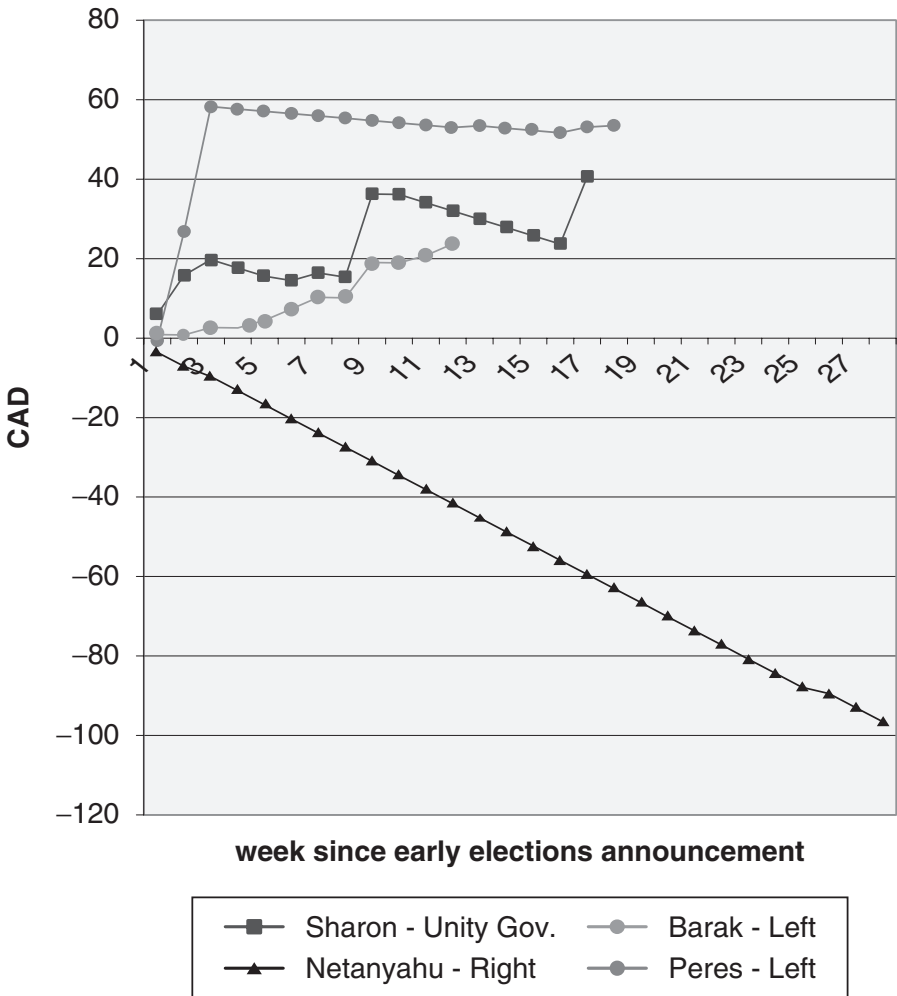
Figure 3 plots the cumulative abnormal deaths for every government during the period at issue compared with  $\tau_{t-1}$ .

The  $CAD_T$ s obtained are largely consistent with the theoretical analysis. The evidence supports the hypothesis that the level of terrorism increases during the tenure of a left-wing government when compared to the  $\tau_{t-1}$  that corresponds to the preceding right-wing government. The opposite results are obtained, for the most part, for right-wing governments. These trends are especially evident in regard to the governments of Peres, Netanyahu, and Barak. The  $CAD_T$  corresponding to the unity coalition government led by Sharon in 2001-2003 shows a pattern contrary to the one expected for a right-wing government. We treat the findings regarding this government cautiously. As already stated in the introduction, this government is difficult to classify because the prime minister belonged to the right-wing party, but the left-wing party was the largest political party in the ruling coalition.<sup>29</sup>

The standard statistical test applied in event studies assumes that  $CAD_T$  is normally distributed. This is clearly not the case in our study since terror fatalities are count data best described by a Poisson distribution. Therefore, we perform the more conventional likelihood ratio test, assuming that deaths from terror attacks do follow a Poisson distribution. For the purposes of this test, we perform pairwise comparisons of realizations of  $\tau$  in the events windows of contiguous governments. In addition, as a robustness check, we compare the level of terrorism during the event window of each government with the average number of terror fatalities between October 31, 1990, and October 30, 1991. Our null hypothesis is that the two compared samples are drawn from a Poisson distribution that has the same  $\lambda$ . The results appear in Table 4.

The findings support the conclusions adduced from the event study analysis. In particular, the likelihood ratio test shows that the level of terrorism is significantly

29. In principle, all necessary information to conduct an econometric analysis should be included in  $\tau_{t-1}$ . Using only the preceding level of terrorism, however, raises identification issues in the empirical estimation. We repeated the event study analysis above using the year preceding October 31, 1991, as the estimation window for every event. This robustness check helps us overcome the possible identification problems because the estimation window consists of an exogenous period, before the beginning of the peace process, that is unaffected by the dynamics of the model. When using this period for the estimation window,  $CAD_T$  should be positive for a left-wing government and negative for a right-wing government. The results, available from the authors on request, are qualitatively identical to those reached in Figure 3.



**Figure 3: Cumulative Abnormal Deaths (CAD)**

NOTE: Comparison period is from the preceding elections (under previous government).

higher when a left-wing party is in office than the level before the beginning of the peace process and the level of the preceding right-wing government. The opposite conclusion is reached in regard to the right-wing government of Benjamin Netanyahu. All these results correspond to those suggested by the theoretical model. Again, the level of terrorism was higher during the tenure of Sharon’s unity coalition government than both the exogenous level and the level observed during the term of the left-wing government that preceded it.

TABLE 4  
Likelihood Ratio Tests

<i>Prime Minister</i>	<i>Event Window</i>	<i>MLE</i>	<i>Joint MLE</i>			
			<i>With Pre-MPC<sup>a</sup></i>		<i>With Predecessor</i>	
			<i>MLE</i>	<i>LR</i>	<i>MLE</i>	<i>LR</i>
Shimon Peres	February 12, 1996, to June 19, 1996	3.5556	1.4347	28.03	1.7954 <sup>b</sup>	23.19
Benjamin Netanyahu	December 21, 1998, to July 7, 1999	0.1071	0.4810	6.89	1.4565	42.81
Ehud Barak	December 10, 2000, to March 8, 2001	2.0833	0.9523	7.04	0.7	18.79
Ariel Sharon	November 5, 2002, to February 28, 2003	4.4706	1.6323	40.17	3.4827	5.32

NOTE: All tests have one degree of freedom. MLE = maximum likelihood estimate; LR = likelihood ratio.  
 a. Pre-MPC stands for the year that preceded the beginning of the peace process at the Madrid Peace Conference. The pre-MPC maximum likelihood estimator is 0.6863.  
 b. The government led by Prime Minister Yitzhak Shamir preceded the one led by Peres. Shamir government's MLE is 0.5769.

### A DISCUSSION OF ALTERNATIVE HYPOTHESES

As noted above, the observed fluctuations in the level of terrorism are also consistent with an alternative model that focuses on terrorism deterrence policies. We are somewhat skeptical about embedding the terrorism deterrence argument within a framework of electoral cycles because of the implications of such a model on the behavior of Israel's political parties. In particular, this alternative approach would indicate that political parties do not value holding office. According to our findings, support for the right-wing party increases in periods of high levels of terrorism even if this party is in office during these periods. It follows that the left-wing party has a greater incentive than the right-wing party to lower the number of terror fatalities. This effect should certainly induce the left-wing party to employ deterrence policies that would minimize the expected number of victims. Not surprisingly, the available data show that this is indeed the case.

Table 5 shows the average number of days during the period between the fall of a government and the scheduled elections for a new one when a total or partial closure was imposed on the West Bank and the Gaza Strip. The evidence in the table seems to contradict some of the premises of the deterrence policy hypothesis. Namely, the left-wing party was much more aggressive than the right-wing party about imposing closures on the occupied territories during the periods at issue in the analysis.<sup>30</sup>

30. We view closures as a proxy for the government's deterrence policy. In reality, the government invokes alternative deterrence measures (such as curfews and administrative detention of civilians) to thwart terror attacks. Unfortunately, since data on these measures are classified, we were unable to obtain information on the use of these alternative measures.



TABLE 5  
Total and Partial Closures Imposed on the West Bank and Gaza Strip

<i>Prime Minister</i>	<i>Event Window</i>	<i>Number of Days</i>	<i>Days of Closure</i>			
			<i>West Bank</i>	<i>Gaza Strip</i>	<i>Partial Closure<sup>a</sup></i>	<i>Total Closure<sup>b</sup></i>
Shimon Peres	February 12, 1996, to June 19, 1996	130	80	85	28	57
Benjamin Netanyahu	December 21, 1998, to July 7, 1999	199	9	9	0	9
Ehud Barak	December 10, 2000, to March 8, 2001	89	49	85	16	69
Ariel Sharon	November 5, 2002, to February 28, 2003	116	0	0	0	0

NOTE: The data for the governments of Shimon Peres and Benjamin Netanyahu were obtained from B'tselem ([www.btselem.org](http://www.btselem.org)). The data for the governments of Ehud Barak and Ariel Sharon were obtained from the Palestinian Centre for Human Rights ([www.pchrgaza.org](http://www.pchrgaza.org)).

a. A siege, enforced through roadblocks, prevents entry and exit from areas, towns, and villages ([www.btselem.org](http://www.btselem.org)).

b. Prohibits the entry of Palestinians into Israel for any purpose; the safe passage between the West Bank and the Gaza Strip is closed; the international border crossings are closed as well ([www.btselem.org](http://www.btselem.org)).

If we accept the view (partly substantiated by Table 5) that the left-wing party adopts tougher deterrence policies, then the increase in terrorism may be explained only by focusing on the Palestinians' strategy. In other words, only an increase in the number of attacks against Israelis under left-wing governments relative to attacks during right-wing governments may explain the documented fluctuations in the level of terrorism. What prompts the Palestinians to perpetrate more attacks when left-wing governments are in office? The deterrence policy hypothesis has nothing to say about this. Our study, on the other hand, presents a new rationale that is consistent with both the documented preferences of Israeli citizens and the observed fluctuations in the level of terrorism.<sup>31</sup>

## CONCLUSIONS

This article studied the interaction between terrorism and electoral outcomes, focusing on the Israeli-Palestinian conflict. The equilibrium of our theoretical model predicted that the support for Israel's right-wing party increases after periods of severe terrorism and that the expected level of terrorism is higher when a left-wing party is in power. We tested these predictions by combining data on Israelis' political

31. In principle, we could add the data depicted in Table 5 as a covariate in our event study analysis. This would allow us to obtain the abnormal number of terror fatalities after controlling for closures as a proxy to counter terrorism policy. We choose not to include these data in the previous analysis to highlight the effect of terror attacks. Note, however, that including the available data on closures to our event study analysis would only strengthen the conclusions reached above.

preferences with a newly created data set on terror attacks in Israel. The findings of the empirical analysis support the theoretical predictions. Namely, a marginal increase in the number of terror fatalities leads to a significant increase in the relative support for the right-wing party. Moreover, event study analyses and likelihood ratio tests show that, generally speaking, terrorism escalates when the left-wing party is in office and decreases when the right-wing party takes over.

A justification is in order with regard to the chosen modeling strategy. The model presents the conflict asymmetrically. Accordingly, Palestinians commit terror attacks and Israelis elect governments. A more accurate reflection of the conflict would note that Israeli violence against Palestinians also influences the Palestinians' political preferences and, therefore, their chosen retaliatory strategy. Although such a model seems plausible theoretically, several difficulties preclude us from being able to estimate its predictions. The most important, perhaps, is the short history of the political system in the Palestinian-controlled territories. Be this as it may, the empirical results in Goldstein et al. (2001) and Jaeger and Paserman (2005) show that whereas Israel responded to Palestinian cooperation and conflict during the time period at issue by reciprocating, Palestinians did not do the same in regard to Israel's actions. This finding casts serious doubts on the empirical validity of this alternative approach.

Although much additional work remains to be done if we are to understand the relationship between terrorism and electoral outcomes, we believe that our approach may be applied, with minor changes, to the study of similar conflicts elsewhere. The conflicts in the Basque country, Northern Ireland, and British Mandate Palestine, to name only a few, resemble our case study in several ways, allowing for the immediate application of the theoretical framework developed here. In all these conflicts, one group resorts to terrorism for the purpose of attaining political emancipation from an occupying force; the group vying for emancipation is divided into two subgroups, moderates and extremists, that have different political objectives; and these groups use terrorism, at least in part, to influence the occupying power's electorate. Obviously, each case has some particularities that must be kept in mind to facilitate rigorous analysis. It is our hope that further research on these and other conflicts will lead us to a broader understanding of the dynamic interaction between terrorism and its political environment.

## REFERENCES

- Abadie, Alberto, and Javier Gardeazabal. 2003. The economic costs of conflict: A case study of the Basque country. *American Economic Review* 93 (1): 113-32.
- Berrebi, Claude. 2003. Evidence about the link between education, poverty and terrorism among Palestinians. Working paper 477, Industrial Relations Section, Princeton University.
- Berrebi, Claude, and Esteban F. Klor. 2005. The impact of terrorism across industries: An empirical study. DP 5360, Centre for Economic Policy Research.
- Brophy-Baermann, Bryan, and John A. C. Conybeare. 1994. Retaliating against terrorism: Rational expectations and the optimality of rules versus discretion. *American Journal of Political Science* 38 (1): 196-210.

- Bueno de Mesquita, Ethan. 2003. Conciliation, counter-terrorism, and patterns of terrorist violence: A comparative study of five cases. Unpublished manuscript, Washington University at Saint Louis, Missouri.
- . 2005. Conciliation, counterterrorism and patterns of terrorist violence. *International Organization* 59 (1): 145-76.
- Campbell, John Y., Andrew W. Lo, and Archie Craig MacKinlay. 1997. *The econometrics of financial markets*. Princeton, NJ: Princeton University Press.
- Di Tella, Rafael, and Ernesto Schargrodsky. 2004. Do police reduce crime? Estimates using the allocation of police forces after a terrorist attack. *American Economic Review* 94 (1): 115-33.
- Enders, Walter, and Todd Sandler. 1993. The effectiveness of antiterrorism policies: A vector-autoregression-intervention analysis. *American Political Science Review* 87 (4): 829-44.
- . 2002. Patterns of transnational terrorism, 1970-99: Alternative time series estimates. *International Studies Quarterly* 46 (2): 145-65.
- Feng, Yi. 2003. *Democracy, governance, and economic performance: Theory and evidence*. Cambridge, MA: MIT Press.
- Goldstein, Joshua A., Jon C. Pevehouse, Deborah J. Gerner, and Shibley Telhami. 2001. Reciprocity, triangularity, and cooperation in the Middle East, 1979-97. *Journal of Conflict Resolution* 45 (5): 594-620.
- Green, Donald P., Alan S. Gerber, and Suzanna L. De Boef. 1999. Tracking opinion over time: A method for reducing sampling error. *Public Opinion Quarterly* 63 (2): 178-92.
- How many parliament seats is a terrorist attack worth? 2003. *Yediot Aharonot*, January 10.
- Jaeger, David A., and M. Daniele Paserman. 2005. The cycle of violence? An empirical analysis of fatalities in the Palestinian-Israeli conflict. DP 5320, Centre for Economic Policy Research.
- Kimmerling, Baruch S., and Joel S. Migdal. 2003. *The Palestinian people: A history*. Cambridge, MA: Harvard University Press.
- Kydd, Andrew, and Barbara F. Walter. 2002. Sabotaging the peace: The politics of extremist violence. *International Organization* 56 (2): 263-96.
- Lewis-Beck, Michael S., and Mary Stegmaier. 2000. Economics determinants of electoral outcomes. *Annual Review of Political Science* 3:183-219.
- Mailath, George J., and Larry Samuelson. 2001. Who wants a good reputation? *Review of Economic Studies* 68 (2): 415-41.
- Mishal, Shaul, and Avraham Sela. 2000. *The Palestinian Hamas: Vision, violence, and coexistence*. New York: Columbia University Press.
- Oots, Kent L. 1986. *A political organization approach to transnational terrorism*. Westport, CT: Greenwood.
- Pape, Robert A. 2003. The strategic logic of suicide terrorism. *American Political Science Review* 97 (3): 1-19.
- Shamir, Michal, and Asher Arian. 1999. Collective identity and electoral competition in Israel. *American Political Science Review* 93 (2): 265-77.
- Smith, Alastair. 1996. Endogenous election timing in majoritarian parliamentary systems. *Economics and Politics* 8 (2): 85-110.