

TERROR SUPPORT AND RECRUITMENT

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We analyse a dynamic model linking terrorist activities to popular support through a recruitment mechanism. It is shown that anti-terrorism policies focusing on liberal ideals (reducing repression, increasing economic opportunity) are effective at abating recruitment, thereby affecting the dynamic stability of terrorist attacks. In contrast, deterrence's comparative advantage is in counteracting hard-core members, implying that terror eradication itself requires an emphasis on hard-core membership, rather than popular support for terror activities.

Keywords: Terrorist networks; Anti-terrorist policies; Terrorist recruitment

INTRODUCTION

Terrorism is commonly defined as an act of violence against civilians in order to achieve political or religious goals. Among other objectives, terrorists seek publicity to make their cause known in order to increase its popular support. This paper investigates the relationship between popular support and terrorist activities. The idea is quite simple: popular support makes terrorism stronger and may guarantee its long-run survival. The main resource of any terrorist organization is its militants; membership is generally recruited from the pool of supporters. Therefore, in order to design and propose effective anti-terrorist policies it is essential to understand the determinants of terrorist recruitment and militancy.

A striking example of the resilience of terrorism based on popular support is the case of Palestinian suicide bombings. In 1983, the Shi'I Hizbullah introduced the concept of martyrdom (through suicide bombings) in waging war against the foreign military presence in Lebanon. The bombings proved decisive in ensuring the pullout of US and French troops from Beirut (Haddad and Kashan, 2002). This victory partly explains the introduction of suicide bombings as a strategy in the confrontation between Arabs and Israelis (and in post-Saddam Iraq). However, suicide bombings have ultimately failed to yield a resolution of Palestinian–Israeli territorial disputes. This then begs the question: why have the attacks persisted? One immediate answer to this question is that the attacks persist because they have popular support among Palestinians. According to a July 2001 poll, 58% of Palestinians

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approved of attacks against civilians inside Israel (Wolin, 2003).¹ Although public opinion and attitudes toward terrorist activities differ among different countries, in this paper our analysis is centered on public opinion that supports terrorist attacks.

Currently, strategic analyses of terrorism are broadly divided into two types: the (public) consequences of counter-terrorist policy (e.g., Arce and Sandler, 2005), or the rationality of decisions made by individual terrorists (e.g., Pape, 2003). Our purpose in this paper is to examine a third consideration in the counter-terror equation: the recruitment of human resources for terrorism activity. Indeed, in an alternative context, Intriligator and Brito (1988) identified recruitment as a primary variable in perpetuating *guerrilla* warfare. In this way we are able to assess Frey and Luechinger's (2003) argument that alternative anti-terrorism policies exist that are superior to deterrence for raising terrorists' *opportunity costs*. This is because deterrence – either in the form of hardening targets (Sandler and Arce, 2003) or threats to punish terrorist acts (Schelling, 1960) – raises only the *material costs* to potential terrorists. In order to assess the overall effectiveness of either type of policy, we present a model that recognizes both deterrence and opportunity cost-based policies in terms of each policy's effect on recruitment – the ultimate resource for terrorist activity.

The paper proceeds as follows. In the next section we present a dynamic model that relates public support for terrorism to terrorist recruitment. In contrast to the literature on guerrilla recruitment, where recruitment is essentially a function of the population under guerrilla *control*, our approach focuses on the role of public *opinion* – commensurate with the political nature of terrorism as defined in the opening of the paper. It is shown that the level of terrorist activity is determined by four parameter values: deterrence policy, terrorist militancy, political opinion and the effectiveness of terrorism in influencing recruitment. In the third section we examine the counter-terror policy alternatives posited by Frey and Luechinger (2003) in the context of our model. Specifically, four distinct policies (law enforcement, liberalization of political participation, terrorist opportunity costs and counteracting anti-Western propaganda) are examined in terms of each's primary effect on one of the equilibrium-defining parameters identified in the second section. For example, we assert that the primary impact of law enforcement is on deterrence. In this way we characterize the effectiveness and optimum level of Frey and Luechinger's counter-terror policies. The final section contains brief concluding remarks.

THE MODEL

Intriligator and Brito (1988) identified the essential role of recruitment for perpetuating non-conventional conflict.² Whereas their focus is on guerrilla warfare and its territorial properties, we address the political nature of terrorist recruitment. Specifically, public support for terrorist activities at time t , S_t , is assumed to be a linear function of past terrorist activity, T_{t-1} :

$$S_t = \beta + \lambda T_{t-1} \quad (1)$$

¹ Nachtwey and Tessler (2002) and Tessler and Nachtwey (1998) examine economic and religious considerations in shaping views about the Palestinian–Israeli conflict.

² See also Brito and Intriligator (1989, 1992) and Sandler and Hartley (1995).

where the positive parameter β captures the underlying political support of the terrorist cause independent of terrorist activity. The parameter λ captures the marginal impact of terrorist activities on public support and is also assumed to be positive.³

Participation in any terrorist organization is related to two distinct types of members. First, there are those who are convinced by terrorists to join their ranks because they support the same political cause as the terrorists. Second, there are hard-core types that voluntarily join the organization without being recruited or convinced by its members. These true believers resemble the professional Leninist revolutionaries, who are fully convinced of their cause and therefore fight to achieve their ends regardless of the means. According to Magnus Rainstorp, the director of the Centre for the Study of Terrorism in London, Al-Qaida's recruitment works through 'talent spotters' who pick out potential recruits from certain mosques on the basis of two criteria: their perceived level of commitment to the Islamist cause, and their skill sets and psychological make-up (see Upton, 2004). To prepare as Al-Qaida jihadists, recruits undergo spiritual preparation and basic military and survival training.

New recruits of the terrorist organization, R_t , are gained according to the linear function:

$$R_t = a + bS_t \quad (2)$$

where the parameter a stands for the number of believers that enlist in the terrorist organization (hard-core terrorists). The term bS_t is the number of supporters that are recruited via popular support for terrorist activity, with b capturing the effectiveness of recruitment. In considering equations (1) and (2) together, the difference between terrorist and guerrilla recruitment is highlighted. In models of guerrilla recruitment, interaction between guerrilla forces and the population centers they control is the primary way in which guerrillas can replenish their numbers (Intriligator and Brito, 1988: 236). By contrast, hard-liner recruitment, a , is independent of terrorist activity. Moreover, the political support parameter, β , in equation (1) distinguishes the political nature of terrorist activity – as defined in the introduction – from the predatory nature of guerrilla activity. The difference between guerrilla and terror recruitment is therefore defined in terms of control versus influence. Guerrilla recruitment is coupled with territorial control whereas terrorist recruitment is a byproduct of popular and hard-core support for terrorist activity.

Terrorist attacks, T_t , depend on new recruits plus surviving past recruits. Deterrence, ω (measured in the same units as terrorist attacks), is assumed to decrease terrorist activities.⁴ Terrorist attacks are consequently described by the following equation:

$$T_t = -\omega + \alpha_0 R_t + \alpha_1 R_{t-1} + \alpha_2 R_{t-2} + \alpha_3 R_{t-3} + \dots \quad (3)$$

where the α_i s denote the proportion of recruits at time $t-i$, $i=0, 1$, engaged in attacks at time t . Assuming that the α_i s are all positive and that they decline geometrically as follows: $\alpha_i = \alpha\delta^i$, $i=0, 1, \dots$; where $0 < \delta < 1$ is the membership decay rate, equation (3) is rewritten as:

$$T_t = -\omega + \alpha R_t + \alpha\delta R_{t-1} + \alpha\delta^2 R_{t-2} + \alpha\delta^3 R_{t-3} + \dots \quad (3')$$

³ If we instead examine public *opinion*, rather than support, the sign of λ is not given *a priori*. It is positive for support and negative if the public disapproves of terrorist attacks. For example, one can think of a Catholic in Northern Ireland that wants independence from the UK ($\beta > 0$) but does not consider the violence of IRA as justified ($\lambda < 0$).

⁴ For example, Intriligator and Brito (1988: 241) examine the rule of thumb that regular army members should outnumber guerrillas by a 10:1 ratio. By contrast, as deterrence can take many forms, we examine no specific deterrence/terrorist ratio, but allow for the possibility of comparable units. For example, in characterizing the long-run equilibrium (below) we show that if the number of hard-core terrorists used in attacks is large enough to offset deterrence, terrorism will be a permanent threat.

The Koyck transformation of equation (3') yields:⁵

$$T_t = \alpha R_t + \delta T_{t-1} - \Omega \tag{3''}$$

where $\Omega \equiv \omega(1 - \delta)$, thereby relating deterrence to terrorism through the decay rate of recruit use.

Guerrilla and terrorist recruitment are generally specified in terms of linear state equations (equation (1)–(3) here), that can also be thought of as linear approximations to the long-run equilibrium point of a nonlinear model. We find this approximation by substituting equations (1) and (2) into equation (3''). The model reduces to a first-order linear difference equation for terrorist attacks:

$$T_t = (a + b\beta)\alpha - \Omega + (\alpha b\lambda + \delta)T_{t-1} \tag{4}$$

Equation (4) describes actual terrorist attacks as a function of past terrorist attacks, deterrence, political support, and terrorist membership (recruited and hard-core terrorists).

The general solution of this difference equation is:⁶

$$T_t = (\alpha b\lambda + \delta)^t [T_0 - T_\infty] + T_\infty \tag{5}$$

where T_0 is the initial number of terrorist attacks and

$$T_\infty = [(a + b\beta)\alpha - \Omega] / [1 - \delta - \alpha b\lambda] \tag{6}$$

is the steady state solution [$T_\infty = T_t = T_{t-1}$].

Equation (6) identifies a novel decomposition of the relationship between terrorism and recruitment. The numerator relates hard-core and underlying support for terrorism to deterrence, Ω . The denominator is exclusively defined in terms of terror's potential for creating new recruits through public support. Together, these observations suggest a 'specialization of labor' amongst counter-terror policies targeted on hard-core elements via deterrence versus the opportunity cost of recruits who represent the supply of terrorists convinced by terror activities. We explore below the implications of this observation for the occurrence, stability, and reduction of terrorism.

The number of terrorist attacks converges to the steady state value T_∞ if $|\alpha b\lambda + \delta| < 1$, therefore, the steady state solution, T_∞ , is stable if:

$$-1 - \delta < \alpha b\lambda < 1 - \delta \tag{7}$$

One condition for inequality (7) to hold is if the share of new members allocated in terrorist attacks, α , is small (provided that new recruits need some training to perform the planned attacks).

Despite its simplicity, the model yields a number of insights. Any characterization of T_∞ , in terms of both the level and stability of terrorism, depends on the parameter values of the model. Specifically, as $T_\infty \geq 0$ by definition, its potential characteristics include:

⁵ Lagging equation (3') by one period and multiplying by δ yields: $\delta T_{t-1} = -\delta\omega + \alpha\delta R_{t-1} + \alpha\delta^2 R_{t-2} + \alpha\delta^3 R_{t-3} + \dots$ Subtracting this from equation (3') obtains equation (3'')

⁶ See Tu (1994: 40–2).

- (i) $T_\infty = 0$: $\alpha(a + b\beta) = \Omega$, and $1 - \delta > \alpha b\lambda$ [stable];
- (ii) $T_\infty > 0$: $\alpha(a + b\beta) > \Omega$, and $1 - \delta > \alpha b\lambda$ [stable];
- (iii) $T_\infty = 0$: $\alpha(a + b\beta) = \Omega$, and $1 - \delta < \alpha b\lambda$ [unstable]; and
- (iv) $T_\infty > 0$: $\alpha(a + b\beta) < \Omega$, and $1 - \delta < \alpha b\lambda$ [unstable].

The characterization in (i) is a stable long-run equilibrium where no terrorism exists. By contrast, in (ii) terrorism is pervasive and permanent since it is positive and stable. In this case, even when there is no additional public support for terrorists: $\beta = \lambda = 0$, it is still possible to have a permanent positive terrorist equilibrium if $a\alpha > \Omega$. That is, if the number of hard-core terrorists used in attacks is large enough to offset deterrence, terrorism will be a permanent threat.

Figure 1 depicts characterization (ii) and the convergence towards the steady state value T_∞ from a given initial value T_0 . The number of terrorist attacks starts at a higher value and it decreases monotonically towards T_∞ . One interpretation of this is that higher levels of terrorism are not sustainable given the levels of past terrorist attacks, deterrence, political support, and terrorist membership (Enders and Sandler, 2002, 2005). If terrorist attacks are well above the equilibrium level, they may not attract political support and sufficient recruits to keep attacks at the high level. For example, during the gulf war year of 1991, pro-Iraqi sentiment heightened political tensions and led to an all-time high of 101 terror-related deaths in Israel, which then decreased to a mean of 45 ($\sigma = 12.4$) for 1992–97 (National Insurance Institute, Israel).⁷ The converse occurs when attacks are initially low; they may attract more political support and terrorism membership, strengthening the terrorist organization and boosting the number of attacks.

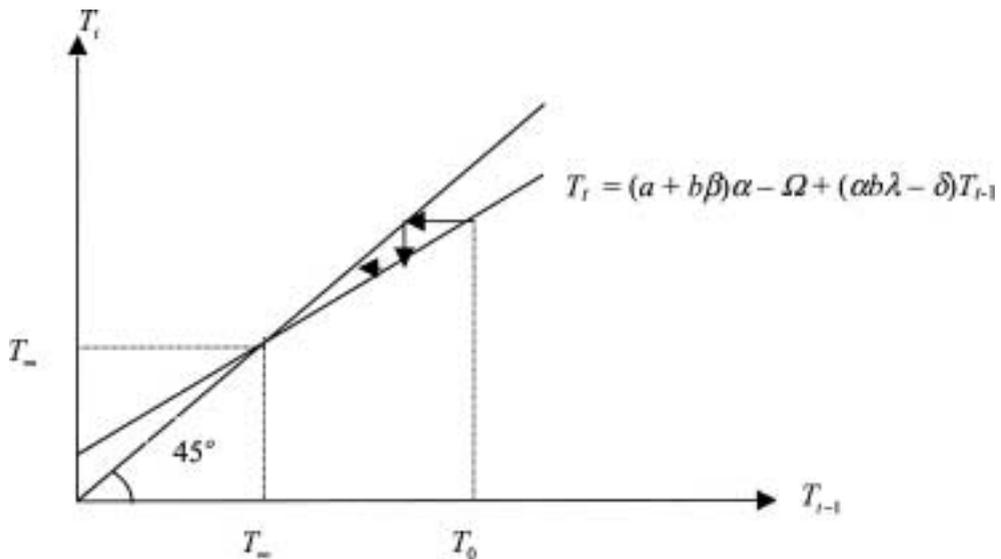


FIGURE 1 Equilibrium (ii) $T_\infty > 0$.

⁷ Recall that the PLO, Libya and Iraq were the only Arab States who opposed the Arab League’s resolution calling for an Iraqi withdrawal from Kuwait.

COUNTER-TERRORIST POLICIES

The steady-state number of terrorist attacks depends on parameters λ , β , Ω and b . Consequently, the government should target policies aimed at reducing the marginal impact of terrorist activities on public opinion (decreasing λ); reducing the underlying political support for terrorism independent of terrorist activity (decreasing β); reducing the effectiveness of terrorist recruitment (decreasing b); and increasing deterrence (increasing Ω). Yet it is unlikely that a government has direct control over the first three of these parameters, and deterrence can take many forms. By the same token, Frey and Luechinger (2003) have suggested that greater consideration should be given to anti-terrorism policies focusing on liberal ideals (democracy, economic opportunity).

In this section we examine four distinct anti-terrorist policies: information, political participation, terrorist opportunity cost, and law enforcement. Although each of these policies may impact more than one of our equilibrium-defining parameters, we conduct comparative statics on the parameter that each policy is most likely to affect. Hence, these policies are evaluated in terms of their primary effect on the parameter in question.

First, consider the role of information policy. Haddad and Khashan (2002) stress the role of mass media in Arab and Muslim countries as a vehicle for transmission of anti-Western sentiment that fuels terrorist support. The role of propaganda in our model is best captured by the parameter λ , the marginal impact of terrorism on public opinion. If anti-Western propaganda positively affects the support for terrorist activities, then fighting anti-Western propaganda may have a negative effect on terrorism support. An effective way to fight propaganda is by supplying countervailing information, which we denote as I . The functional relationship between λ and I , $\lambda = \lambda(I)$, is assumed to be such that

$$\frac{d\lambda}{dI} < 0.$$

An effective way to disseminate credible information is by increasing access to, and the number of, mass-media news providers. As noted by Wright (2004), the diffusion of satellite news coverage and the internet forced the Saudi press to address issues that were previously suppressed. These include stories about crime, drug use and divorce.

Second, the political appeal of terrorists may stem from the absence or instability of democracy (Holmes 2001). If channels of popular expression are closed, the political message tends to be captured by terrorists, who become the voice of popular discontent. In our model, a political agenda repressed by authorities is captured by the parameter β , the undercurrent of support for terrorists' political cause. The greater the political repression, the greater the parameter β is expected to be. Consequently, an increase in freedom, democracy, and popular participation (P) may decrease the political appeal of terrorist organizations. In terms of our model, $\beta = \beta(P)$ with

$$\frac{d\beta}{dP} < 0.$$

Hence, one policy to fight terrorism is to create and provide political channels and to introduce and reinforce democratic institutions.

Third, an increase in the opportunity cost of terrorism reduces the willingness of a (potential) terrorist to engage in terrorist activities. The parameter b in equation (2) captures the effectiveness of terrorist recruitment. Increasing the availability and attractiveness of alternative activities (O) that potential terrorists can undertake makes the recruitment of new terrorists harder:

$$b = b(O), \frac{db}{dO} < 0.$$

Hence, here O refers to a policy that increases a potential terrorist's *income* only by substituting conventional behavior for terrorist activity.⁸ As terrorists are often well-educated, it involves increasing opportunities for the economically or socially disenfranchised.⁹

Finally, the policies above can be seen as *preemptive policies* because they reduce public support for terrorism and thereby the number of terrorist recruits. Yet, they may not be sufficient to forestall terrorist activity in the absence of a deterrence policy. As a result, the role of law enforcement (E) should be taken into consideration. Deterrence is an increasing function of law enforcement,

$$\Omega = \Omega(E), \frac{d\Omega}{dE} > 0,$$

for two reasons. First, law enforcement reduces vulnerabilities that result from the loopholes present in the routinization of practices associated with everyday life (e.g. air travel, border crossings and video surveillance of public areas). Second, the absence of law enforcement in failed states provides a breeding ground for terrorist organizations that provide local public goods such as law enforcement, security and education.

The comparative statics of the steady state solution gauges the effectiveness of each of these policies. Only stable equilibria are considered (Samuelson, 1947), implying the assumptions that the steady state solution (6) and its stability condition (7) hold. Specifically, case (ii) corresponds to a positive level of terrorism, $T_{\infty} > 0$, under the conditions $(a + b\beta)\alpha > \Omega$ and $1 - \delta > \alpha b\lambda$. These conditions imply that an anti-terrorist policy is effective when it reduces the steady state equilibrium value of terrorist attacks:

$$\frac{dT_{\infty}}{dI} = \frac{dT_{\infty}}{d\lambda} \frac{d\lambda}{dI} = \frac{\alpha b[(a + b\beta) - \Omega]}{[1 - \delta - \alpha b\lambda]^2} \frac{d\lambda}{dI} < 0 \quad (8)$$

$$\frac{dT_{\infty}}{dP} = \frac{dT_{\infty}}{d\beta} \frac{d\beta}{dP} = \frac{\alpha b}{[1 - \delta - \alpha b\lambda]} \frac{d\beta}{dP} < 0 \quad (9)$$

$$\frac{dT_{\infty}}{dO} = \frac{dT_{\infty}}{db} \frac{db}{dO} = \frac{\alpha\beta[1 - \delta - \alpha b\lambda] + \alpha\lambda[(a + b\beta)\alpha - \Omega]}{[1 - \delta - \alpha b\lambda]^2} \frac{db}{dO} < 0 \quad (10)$$

$$\frac{dT_{\infty}}{dE} = \frac{dT_{\infty}}{d\Omega} \frac{d\Omega}{dE} = -\frac{1}{[1 - \delta - \alpha b\lambda]} \frac{d\Omega}{dE} < 0 \quad (11)$$

The multipliers (8)–(11) show that all counter-terrorist policies are effective in reducing the steady state equilibrium value of terrorist attacks. Figure 2 depicts the impact of an increase in law enforcement for reducing the steady state equilibrium of terrorist attacks. The initial equilibrium is at ${}_0T_{\infty}$. With greater law enforcement, other things constant, it becomes harder for terrorists to organize and carry out attacks, so there is a reduction in the number of terrorist attacks until the new equilibrium level ${}_1T_{\infty}$ is reached.

In contrast, the speed of adjustment towards the new equilibrium, $\alpha b\lambda + \delta$, does *not* depend upon the marginal impact of enforcement on deterrence. This is because Ω does not figure into

⁸ Our focus is therefore on terrorism supply, rather than the consumption of terror versus ordinary goods. See Anderton and Carter (2004) for the difficulties involved in conceptualizing the opportunity cost of terrorism from a consumption framework.

⁹ Note that such opportunities are not uniquely economic, e.g. redefining the social eligibility for marriage.

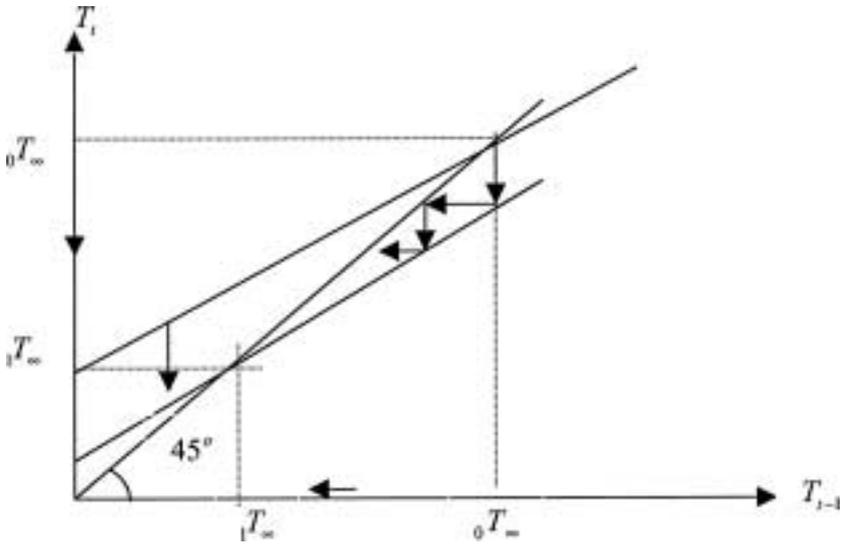


FIGURE 2 The increase in enforcement reduces terrorism from ${}_0T_\infty$ to ${}_1T_\infty$.

the adjustment term. Instead, it is the recruitment of ‘outsiders,’ rather than hard-core members, that increases the speed of adjustment to a low-terror outcome since increasing the availability and attractiveness of alternative activities (O) makes the marginal impact of O on recruitment effectiveness smaller,

$$\frac{db}{dO} < 0.$$

The impact of information, $\lambda = \lambda(I)$, and reduction of repression, $\beta = \beta(I)$, is analogous to our analysis of opportunity cost/alternative activities.

Although the power and optimality of these policies in reducing terrorism can only be assessed with knowledge of the parameter values (which remains an important empirical task), and their relative prices, we are able to characterize the effect of each anti-terrorist policy on the steady state equilibrium value of terrorist attacks. In this sense we use the model as a reference point to heuristically explore anti-terrorist policies that make terrorist activities equal to zero. In practice, the desirability of $T_\infty = 0$ must be weighed against the costs of implementing such a policy.

From this perspective we examine the level of political participation, P , that makes $T_\infty = 0$ for given values of a , b , α and Ω . From equation (6) this implies $\beta(P^*) = (1/b)[\Omega/\alpha - a]$. Facilitating political participation can lead to a level of political support for terrorism, $\beta(P^*)$, that forces the level of terrorism to zero. Totally differentiating this solution with respect to Ω yields $dP/d\Omega = (d\beta/d\Omega)(1/b\alpha)$. As $d\beta/d\Omega < 0$, the optimal quantity of political participation is inversely related to the level of deterrence, Ω , and is directly related to the proportion of recruits involved in terrorism (α). We have therefore established the result that deterrence and decreasing political repression are *strategic substitutes*.

A similar result holds for the optimal quantity of terrorist opportunity cost, O^* , that makes $T_\infty = 0$. From equation (6) this holds when $b(O^*) = (1/\beta)[\Omega/\alpha - a]$. Again, totally differentiating $b(O^*)$ with respect to Ω and solving for $dO^*/d\Omega$ yields $dO^*/d\Omega < 0$. Further, for a given level of deterrence, Ω , it is possible to compare the requirements of democratization, $\beta(P^*) = (1/b)[\Omega/\alpha - a]$, versus opportunity cost, $b(O^*) = (1/\beta)[\Omega/\alpha - a]$. So long as $\Omega \neq \alpha a$,

deterrence does not exactly offset the number of hard-core recruits used in attacks. Consequently, any comparison of the magnitude of $\beta(P^*)$ versus $b(O^*)$ can be accomplished solely in terms of β versus b . That is, we need only compare the initial underlying support for terrorism (β) with the effectiveness of terrorism for recruitment (b) to identify which policy is more effective. Hence, this theoretically verifies Frey and Luenchinger's (2003) claim that it is the *Umfeld* (periphery or outsiders) that matter, as the hard-core terrorist parameter (a) does not affect the comparison of $\beta(P^*)$ and $b(O^*)$.

The optimal level of enforcement is the quantity of enforcement, E^* , that satisfies $T_\infty = 0$. From equation (6), this implies that given the values of a , b , α and β , the optimal E satisfies $\Omega(E^*) = \alpha(a + b\beta)$. Given that b is a positive function of opportunity cost and β is positively related to political participation, the law enforcement/deterrence relationship, $dE/d\Omega$, is inversely related to the *product* $b\beta$. Preemption policies *multiplicatively* reduce the need for deterrence.

Finally, by equation (6) it is clear that there is no value of λ , the marginal impact of terrorism on public opinion, that guarantees $T_\infty = 0$. This implies that *there is no optimal quantity of countervailing information*. That is, counter-terrorist policy designed to fight anti-Western propaganda cannot eradicate terrorism. This conclusion must be qualified by recognizing that we have only examined the effect of information on the primary parameter that it influences, λ . Fighting anti-Western propaganda may also reduce β and a ; hence, these secondary effects must be larger-than-expected for information policy to be advocated as an avenue for eliminating terrorism through its effect on recruitment.

The interrelatedness between optimal levels of P , O and E raise the issue of identifying an optimal policy mix – P' , O' and E' – that can be used to eliminate terrorism. In setting equation (6) equal to zero, any optimal combination of law enforcement, political freedom and opportunity costs is characterized by:

$$\frac{\Omega(E')}{\alpha} - b(O')\beta(P') = a \quad (12)$$

Equation (12) can be satisfied by a wide variety of policy combinations. In general, equation (12) identifies several novel policy implications to be taken into account. First, the effect of deterrence is discounted by the realized recruiting effectiveness, α , of those attacks that are attempted. Second, even if the effects of *Umfeld* recruitment (b) and/or underlying support (β) are nil, hardliners can still maintain activity. Terrorism may be pervasive and permanent if the number of hard-core recruits is large enough to offset deterrence, i.e. if $\Omega(E') \ll \alpha a$. This once again affirms our observation that counterterror policies have specialized implications, with the focus of deterrence on hard-core cohorts. By contrast, popular support itself is not enough to sustain terrorism – from equation (12) there exists an optimal combination, O'' and E'' , which reduces the recruitment of new terrorists from the pool of its supporters to zero: $b(O'') = 0$ and $\Omega(E'')/\alpha = a$. Under these conditions, terrorism can be reduced even if $\beta(P) \gg 0$; popular support does *not* guarantee the long-run survival of terrorism. Opportunity costs must figure into counterterror policy.

CONCLUDING REMARKS

This paper presents a dynamic model linking popular support to terrorist activities. The bridge between the popular support of the terrorist cause and terrorist attacks is given by recruitment. Terrorist organizations recruit part of their militants among the pool of their supporters. The knowledge of the determinants of terrorist militancy is crucial for the design of effective counter-terrorist policies.

The model has several potential characteristics. Among these there is a stable outcome with zero terrorism in the long-run, and another stable equilibrium in which terrorism is pervasive and persistent. It is important to stress that (i) the choice between these two potential equilibrium outcomes depends also on the cost of implementing counter-terror policies, and (ii) if the number of hard-core terrorists is large enough to offset deterrence, terrorism will be a permanent threat, even when there is no popular support for terrorism.

The model analyzes four distinct anti-terrorist policies, aimed at increasing pro-Western opinion (information), political participation, potential terrorists' opportunity costs, and law enforcement (as a form of deterrence). It is shown that all these policies are effective in reducing the steady state equilibrium value of terrorist attacks. The model also characterizes the optimal quantity of each anti-terrorist policy as the quantity that makes, other things constant, the steady-state equilibrium value of terrorist attacks equal to zero. In all cases, it is found that the effectiveness of deterrence is proportionally reduced by the level of recruit participation in terrorist activities, thereby verifying claims that alternatives to deterrence need to be investigated in order to efficiently curtail terrorism. Further, our equilibrium identifies a specialization of resources aspect of counter-terror policies, in which deterrence should be proportional to hard-core membership, and opportunity-costs based policies in proportion to the recruitment effects of terrorism. In this way, political and opportunity-cost based policies must be used in conjunction with each other in order to reduce the effect of terrorism on the supply of socially disenfranchised recruits (*Umfeld*), who are not part of terrorists' hard-core membership.

This final observation has interesting implications for current US counter-terror policy in Afghanistan and Iraq. Specifically, post-9/11 there has been a substantial increase in deterrence policy (particularly at home) and political policy based primarily on the occurrence of elections. Our optimal policy mix suggests that the absence of policies explicitly focused on opportunity cost and the supply of *Umfeld* recruits may be a weak link in securing the reduction of terrorism.

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References

- Anderton, C.H. and Carter, J.R. (2004) On rational choice theory and the study of terrorism. Working paper. Worcester, MA: Department of Economics, College of the Holy Cross.
- Arce M., D.G. and Sandler, T. (2005) Counterterrorism: a game theoretic approach. *Journal of Conflict Resolution* **49**(2) 183–200.
- Brito, D. and Intriligator, M. (1989) An economic model of guerrilla warfare. *International Interactions* **15** 319–329.
- Brito, D. and Intriligator, M. (1992) Narco-traffic and guerrilla warfare: a new symbiosis. *Defence Economics* **3** 263–274.
- Enders, W. and Sandler, T. (2002) Patterns of international terrorism, 1970–1999: alternative time series estimates. *International Studies Quarterly* **46**(2) 145–167.
- Enders, W. and Sandler, T. (2005) Transnational terrorism 1968–2000: thresholds, persistence, and forecasts. *Southern Economic Journal*, **71**(3) 467–482.
- Frey, B. and Luechinger, S. (2003) How to fight terrorism: alternatives to deterrence. *Defence and Peace Economics* **14** 237–249.
- Haddad, S. and Khashan, H. (2002) Islam and terrorism. *Journal of Conflict Resolution* **46** 812–828.
- Holmes, J.S. (2001) *Terrorism and Democratic Stability*, Manchester, UK: Manchester University Press.
- Intriligator, M. and Brito, D. (1988) A predator-prey model of guerrilla warfare. *Synthese* **76**(2) 235–244.
- Nachtwey, J. and Tessler, M. (2002) Islam and attitudes toward international conflict: Evidence from survey research in five Middle Eastern countries. *Journal of Conflict Resolution* **42** 619–636.
- National Insurance Institute (Israel) (various years) <http://www/btl.gov.ir>

- Pape, R.A. (2003) The strategic logic of suicide terrorism. *American Political Science Review* **97**(3) 343–361.
- Samuelson, P.A. (1947) *Foundations of Economic Analysis*, Cambridge, MA: Harvard University Press.
- Sandler, T. and Arce M., D.G. (2003) Terrorism and game theory. *Simulation and Gaming* **34**(4) 319–337.
- Sandler, T. and Hartley, K. (1995) *The Economics of Defense*, Cambridge: Cambridge University Press.
- Schelling, T.C. (1960) *The Strategy of Conflict*, Cambridge, MA: Harvard University Press.
- Tessler, M. and Nachtwey, J. (1998) The political economy of attitudes toward peace among Palestinians and Israelis. *Journal of Conflict Resolution* **46** 260–285.
- Tu, P. (1994) *Dynamical Systems*, Berlin: Springer Verlag.
- Upton, J. (2004) In the streets of Londonistan, *London Review of Books* **26**(2 January) 22.
- Wolin, R. (2003) Are suicide bombings morally defensible? *The Chronicle of Higher Education* 24 October.
- Wright, L. (2004) The kingdom of silence. *The New Yorker*, 5 January 48–73.