

Collective versus unilateral responses to terrorism

TODD SANDLER

School of International Relations, University of Southern California, Von Kleinsmid Center 330, Los Angeles, CA 90089-0043, USA (E-mail: tsandler@usc.edu)

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Abstract. Global terrorism presents collective action issues for targeted nations. Proactive measures (e.g., preemptive strikes) against terrorists create external benefits for all at-risk nations. In contrast, defensive actions deflect attacks to softer targets, thereby giving rise to external benefits to protected foreign residents and external costs to venues abroad. Coordinated antiterrorism measures are particularly difficult to achieve when many nations must participate and nonparticipants can undo the efforts of others. Thus, freezing terrorists' assets or abiding by a no-negotiation pledge pose difficult collective action problems. These same concerns do not plague decisive action against domestic terrorism.

1. Introduction

Terrorism is the premeditated use or threat of use of violence by individuals or subnational groups to obtain a political or social objective through intimidation of a large audience beyond that of the immediate victims. Terrorists try to circumvent the normal political process through violence perpetrated on a public who may then pressure the government to concede to the terrorists' demands. On 11 September 2001 (henceforth, 9/11), the four hijacked planes graphically illustrated the havoc and destruction that terrorists can wreak on society. If a targeted government views its future (discounted) costs from a sustained terrorist campaign as greater than that of conceding to terrorists' demands (including reputation costs), then a government may grant concessions (Lapan & Sandler, 1993). In the absence of caving in, governments must institute antiterrorist measures.

The modern era of transnational terrorism began in 1968 with terrorists traveling between countries and maintaining a presence in multiple countries to achieve their greatest impact. A watershed transnational terrorist event was the 22 July 1968 hijacking of an El Al Boeing 707 en route from Rome to Tel Aviv with 10 crew members and 38 passengers, including three hijackers identified with the Popular Front for the Liberation of Palestine (PFLP) (Mickolus, 1980, pp. 93–94). This event is noteworthy for a number of reasons. First, there was clear evidence of state-sponsorship after the plane landed in Algiers, because Algeria took advantage of the situation and held some of the hostages until 1 September 1968 when a deal was finally struck.¹ Second, the incident forced the Israelis to negotiate directly with the Palestinian terrorists

(Hoffman, 1998, p. 68). Third, massive media coverage demonstrated to other terrorists that such events could capture worldwide attention. Fourth, one of the terrorists helped land the plane in Algiers; hence, 9/11 was not the first instance where a terrorist flew a hijacked airplane (Mickolus, 1980, p. 94). Fifth, a ransom of \$7.5 million was paid by the French to the hijackers and 16 Arab prisoners from the 1967 Arab-Israeli war were released by Israel. The hijackers were flown to a safe location with their ransom; two of the hijackers subsequently were involved in hijackings in 1972 (Mickolus, 1980). This incident clearly depicts the *transnational externality* (i.e., uncompensated interdependency involving multiple countries) that modern terrorism can imply where, e.g., a grievance in the Middle East affects a flight leaving a European airport. To protect against such events, airports must institute adequate security measures against the spillover of terrorism from abroad. The news coverage resulted in an externality in the form of additional hijackings. Moreover, paid ransoms encouraged further incidents worldwide owing to the promise of high rewards.

More recently, the skyjackings of 9/11 created transnational externalities because the deaths and property losses at the World Trade Center (WTC) involved upwards of 80 countries. Subsequent efforts to bolster security in the United States and Europe appear to be shifting attacks to developing countries – e.g., Indonesia, Morocco, Saudi Arabia, Kenya, Turkey and Malaysia (Sandler, 2005). The devastation of 9/11 raised the bar in terms of the kind of carnage that a future terrorist act must produce to capture similar news coverage. That, in turn, induces the terrorists to innovate in order to find new means to cause even greater destruction. This innovation process is an *intertemporal* externality that today's terrorists impose on tomorrow's victims.

Modern-day transnational terrorism raises some essential dilemmas. Terrorists appear able to address their collective action concerns through cooperation among themselves, while governments are less adept at collective responses and primarily resort to unilateral (suboptimal) responses. For transnational terrorism, there is a propensity for nations to focus on defensive rather than proactive countermeasures. Defensive actions may merely deflect attacks to less-protected venues, leading nations to work at cross-purposes (Arce & Sandler, 2005; Sandler & Lapan, 1988; Sandler & Siqueira, 2003). Moreover, there is a clear tendency for at-risk nations to rely on a prime-target nation to carry the burden for direct action against the terrorists. In contrast, governments appear properly motivated to strike the right balance between defensive and proactive responses against domestic terrorism.

The primary purpose of this paper is to explain the collective action failures that plague targeted countries in their efforts to respond to global terrorism. To accomplish this task, I employ some simple game theory to examine alternative antiterrorism responses to a common transnational terrorism threat. Three game forms are prevalent: prisoners' dilemma, asymmetric dominance and

stag hunt. The last is particularly germane for analyzing cases where a degree of coordination is required to accomplish some gain. For example, countries that do not freeze terrorists' assets can greatly undo the actions of those that do. I address the asymmetries between governments and terrorists that underlie many collective action concerns, driven by opposing externalities relevant to today's networked terrorists who harbor common grievances. Terrorists' own actions may foster efforts for nations to address collective action concerns. As the severity of attacks escalates, nations become more willing to follow the lead of prime-target nations to take actions such as freezing terrorists' assets. I also underscore some of the public choice dilemmas where political freedoms provide a favorable environment that some terrorists may exploit.

2. Preliminaries

At the outset, domestic terrorism must be distinguished from transnational terrorism. The former is solely a host country affair where its citizens resort to terrorist attacks on other citizens or their property with the intention of furthering a domestic political or social agenda through violence and intimidation. The bombing of the Alfred P. Murrah Federal Building in Oklahoma City on 19 April 1995 was a domestic terrorist event, because Timothy McVeigh and his accomplices were American citizens, as were the victims of the blast. Moreover, this bombing did not have ramifications for other countries.

By virtue of its victims, targets, institutions, supporters, terrorists' demands, or perpetrators, transnational terrorism involves more than a single country. The train bombings in Madrid on 11 March 2004 were transnational terrorist incidents because many of the terrorists were foreign nationals who came to Madrid to stage their attack. Moreover, the bombing victims included some non-Spanish citizens. In addition, the bombing had far-reaching implications for other European countries that then had to take precautions against similar attacks. The four hijackings on 9/11 also were transnational terrorist acts with global consequences as to their victims, security concerns, and financial impact. Although domestic terrorism is far more prevalent than transnational terrorism (National Memorial Institute for the Prevention of Terrorism, 2004), the latter generates cross-border externalities that are difficult to address, and leads to collective action failures when unilateral responses by governments work against global welfare. For example, US efforts to secure its borders have transferred most terrorist incidents against US interests to foreign venues. Although 40% of all transnational terrorist attacks are against US people or property, few have occurred on US soil in recent years (Sandler, 2003). Transnational terrorism, as practiced by Al-Qaida and its loose network of affiliates, poses a greater threat than domestic terrorism to world security as fundamentalist groups seek maximum carnage and financial repercussions (Hoffman, 1998).

Counterterrorism consists of government actions to inhibit terrorist attacks or curtail their consequences. There are two main categories of antiterrorism policies – proactive and defensive. Proactive or offensive measures target the terrorists, their resources, or their supporters directly. By weakening the ability of terrorists to operate, proactive policies reduce the frequency and prevalence of attacks against all at-risk targets. Such actions include attacking terrorist camps, assassinating terrorist leaders, freezing terrorist assets, retaliating against a state-sponsor, gathering intelligence, and infiltrating a terrorist group.

Defensive or passive policies try to protect a potential target against an attack or to ameliorate the damage in case of an attack. Defensive measures may involve the installation of technological barriers (e.g., bomb-sniffing devices, metal detectors, or biometric identification), the hardening of targets (e.g., barriers in front of federal buildings), the deployment of security personnel (e.g., sky marshals on commercial flights), and the institution of terrorist alerts. While some proactive policies may provoke a terrorist backlash, defensive measures usually do not have this potential downside (Rosendorff & Sandler, 2004). By reducing the terrorists' probability of success and increasing their operations' costs, defensive actions attempt to dissuade terrorists by reducing their expected net benefits from attacks. If, however, the authorities make one type of attack harder without affecting the costliness of other types of attacks, then such partial measures can merely induce terrorists to *substitute* one mode of attack for another relatively cheaper one – e.g., the installation of metal detectors at airports reduced skyjackings but increased other types of hostage-taking missions (Enders & Sandler, 1993, 1995, 2004; Enders et al., 1990). Similarly, defensive actions that make one country more secure may merely transfer attacks to less-secure venues abroad.

3. Asymmetries Between Nations and Terrorists

To appreciate the collective action problems posed by transnational terrorism, one must recognize the asymmetries that distinguish the behavior of targeted nations and their terrorist adversaries. These asymmetries provide tactical advantages to terrorists who target assets from powerful nations.

Nations must guard everywhere, while terrorists can identify and attack the softest targets. Efforts by nations to harden targets induce terrorists to redirect their attacks to less-protected venues. As rich countries mobilized their defensive measures following 9/11, the developing world stayed the venue of choice from which to attack Western interests. In 2003, there were 190 transnational terrorist attacks, with none in North America and 24 incidents in Europe.² There were, however, 70 attacks in Asia, 53 in Latin America, and 37 in the Middle East. Although there were no transnational attacks in the United States in 2003, there were 82 anti-US attacks on foreign soil: 46,

Latin America; one, Eurasia; two, Africa; six, Asia; 11, Middle East; and 16, Western Europe. During 2002, there were 198 transnational terrorist incidents, with none in North America and only nine in Western Europe. Asia was the preferred venue with 101 attacks.

Nations are target-rich; terrorists are target-poor. Terrorists may hide in the general population in urban centers, thereby maximizing collateral damage during government raids to capture them. Nations have to be fortunate on a daily basis, while terrorists only have to be fortunate occasionally.³ As such, terrorists can sit back and pick the most opportune time to strike, as they did on 9/11. Unlike liberal democracies that are constrained in their reaction to terrorist threats, terrorists can be unrestrained in their brutality, as demonstrated by attacks perpetrated by fundamentalist terrorists in recent years. Nations are not well-informed about terrorists' strength, whereas terrorists can easily discover how many governmental resources are being allocated to antiterrorist activities. In the United States, this information is a matter of public record. This asymmetric information is amply illustrated by US estimates of al-Qaida strength as "several hundred to several thousand members", reported by the US Department of State (2001, p. 68) just five months before 9/11. The 7 October 2001 invasion of Afghanistan indicated that Al-Qaida had far more members than the State Department's upper-bound estimate. Such misleading figures not only hamper the military in terms of planning antiterrorist operations, but they also make it more difficult to convince other countries to contribute troops to preemptive raids on training camps and terrorist infrastructure.

Another asymmetry concerns the organizational structure adopted by governments and terrorists. Governments are hierarchical, whereas terrorist organizations are nonhierarchical with loosely tied networks of cells and affiliated terrorist groups (Arquilla & Ronfeldt, 2001). Terrorist cells and groups can operate independently of one another. Moreover, captured terrorist leaders can provide only limited intelligence owing to the looseness of the network and the virtual autonomy of many of its components. Recent espionage scandals indicate that government informants can do much damage to the integrity of an intelligence organization.

Beyond some point, government size can limit its effectiveness in waging an antiterrorist campaign. Also, a larger government has more targets to protect and can create greater grievances from taxes used to finance the bureaucracy. In contrast, a larger terrorist group can engage in a more effective campaign that may signal to the government that an accommodation is less costly. Hirshleifer (1991) introduced the notion of the "paradox of power" in conflict situations, where smaller forces may have a strategic advantage over larger, militarily superior forces. In particular, small insurgencies, including terrorists, can cause more damage per operative insofar as some technologies of conflict favor the small force that can hide and strike large targets.

A final asymmetry is the most essential for understanding why nations have greater difficulty in addressing their collective action problem than the terrorists. National strength provides a false sense of security, thereby inhibiting governments from appreciating the need for coordinated action. Nations also do not agree on which groups are terrorists – e.g., until fairly recently, the European Union (EU) did not view Hamas as a terrorist organization despite its suicide bombing campaign. In democracies, leaders' interests in the future are limited by the length of the election cycle and their likelihood of reelection. Agreements made with leaders of other countries to combat terrorism may be rather short-lived if a government changes. For example, the new Spanish Prime Minister Zapatero pulled the country's troops out of Iraq following his surprise win in the national elections stemming from the alleged link between the 11 March 2004 train bombing and Spanish support for the US-led war on terror. This short-term viewpoint limits intergovernmental cooperative arrangements that could follow from a repeated-game analysis, based on a tit-for-tat strategy. Because many counterterrorism actions among governments abide by a prisoners' dilemma game structure (see Section 4), a myopic viewpoint works against solving the problem through repeated interactions, unless agreements can have a permanency that transcends a change in governments. The high value that governments place on their autonomy over security matters also inhibits their addressing collective action issues successfully.

A much different situation characterizes the terrorists who have cooperated in networks since the onset of modern-day terrorism. From the late 1960s, terrorist groups have shared personnel, intelligence, logistics, training camps and resources (Alexander & Pluchinsky, 1992; Hoffman, 1998). More recently, Al-Qaida forged a loosely linked network when Osama bin Laden began franchising other Islamic groups (Raufer, 2003; Hoffman, 2003). Despite different political agendas, terrorist groups share similar opponents – e.g., the United States and Israel – that provide some unity of purpose. For example, the left-wing terrorists groups in Europe during the 1970s and 1980s were united in their political orientation and their goal to overthrow a capitalistic system (Alexander & Pluchinsky, 1992). Terrorist groups cooperate because of their relative weakness compared with the well-armed governments that they confront. Given their limited resources and grave risks, terrorists have little choice but to cooperate to stretch resources. Terrorist leaders tend to be tenured for life so that they view intergroup interactions as continual. This long-term orientation means that terrorist groups can successfully address prisoners' dilemma interactions through punishment-based tit-for-tat strategies. The temptation to renege on an agreement with another terrorist group for a short-term gain is tempered by the long-run losses from the lack of future cooperative gains. Terrorists appear to place less weight than governments on their autonomy, provided that shared actions further their goals. Unlike their

government adversaries, terrorists are motivated to address their collective action concerns.

4. Proactive Versus Defensive Policies

As a generic proactive policy, I examine efforts to preempt a terrorist group by, say, attacking the terrorists' bases and training camps. I then compare and contrast preemption with a generic defensive policy – i.e., actions to deter an attack by fortifying vulnerable targets.

4.1. Preemption

In panel a of Figure 1, a symmetric preemption game is displayed for two targeted countries (i.e., nations 1 and 2), each of which must decide whether or not to launch a preemptive strike against a common terrorist or state-sponsor threat. The attack is meant to weaken the terrorists and limit their future actions. Given the common threat posed by the terrorists, each preempting country provides a pure public benefit of B for itself and the other at-risk nation. More benefits are achieved when both countries attack the terrorists, as combined action does more harm to the terrorists.

In each cell of the 2×2 game matrix, the left-hand payoff is that of nation 1 and the right-hand payoff is that of nation 2. The cost of preemption is c for each preemptor, where $c > B$. I assume that isolated action results in less benefits than costs so that a collective action problem occurs.⁴ If nation

		nation 2	
		Preempt	Status quo
nation 1	Preempt	$2B - c, 2B - c$	$B - c, B$
	Status quo	$B, B - c$	Nash $0, 0$

a. Symmetric prisoners' dilemma ($2B > c > B$)

		nation 2	
		Preempt	Status quo
nation 1	Preempt	$2B_1 - c_1, 2B_2 - c_2$	Nash $B_1 - c_1, B_2$
	Status quo	$B_1, B_2 - c_2$	$0, 0$

b. Asymmetric dominance ($B_1 > c_1$ and $2B_2 > c_2 > B_2$)

Figure 1. Alternative preemption scenarios.

1 preempts alone and nation 2 maintains the status quo, then nation 1 nets $B - c < 0$, while nation 2 receives the free-rider benefit of B . These payoffs are interchanged when the nations' roles are reversed in the bottom left-hand cell. When both nations join forces, each nets $2B - c$ from the two preemption actions, where $2B$ is assumed to be greater than c . All-around inaction gives payoffs of 0 to both nations. Given these assumptions, each nation's dominant strategy is to do nothing, because $B > 2B - c$ and $0 > B - c$. The underlying game is a prisoners' dilemma with a Nash equilibrium of mutual inaction. If the symmetric case is extended to n nations with each preemptor providing B in benefits for all at-risk nations at a provision cost of $c > B$ to the preemptor, then the outcome is for no nation to act. A repeated-game version is not promising owing to the short-run view that nations take of such interactions with other governments.

A more optimistic case arises in the asymmetric version in panel b of Figure 1, where benefits and costs are tailored by subscripts to the two nations. Nation 1 is a prime target of the terrorists with more to gain from any action that weakens the terrorists. Suppose that nation 1 receives a benefit of B_1 from its own preemptive action or that of nation 2. Moreover, B_1 exceeds its preemption costs of c_1 . Since $B_1 > c_1$, nation 1's dominant strategy now is to preempt, which is analogous to the United States after 9/11. Nation 2 is in an analogous situation to that in panel a; thus, $2B_2 > c_2 > B_2$ and nation 2's dominant strategy is still to do nothing. As each nation exercises its dominant strategy, the Nash equilibrium results in nation 1 preempting unilaterally. The underlying game is one of "asymmetric dominance". With the United States sustaining 40% of transnational terrorist attacks worldwide, its willingness to preempt alone or to lead a coalition is easy to understand. By focusing so many attacks on US interests, the terrorists motivate US proactive responses. If terrorists had not concentrated their campaign on a couple of nations, there would be even fewer proactive measures against terrorism. The Nash equilibrium in panel b is not necessarily the social optimum (based on the compensation principle) insofar as the sum of benefits from mutual preemption may exceed that of the Nash equilibrium. Matrix b can be extended to n nations with m prime targets and $n - m$ nonprime targets. As such, the subset of prime targets is motivated to take aggressive actions against the terrorists.

Next suppose that some at-risk nation adopts proactive measures (even symbolic ones) to support a prime-target nation's actions, as Spain and Japan did in the US war on terror. Their supportive efforts put their people in greater jeopardy. In this scenario, nation 2's assumed inequality changes to $c_2 > 2B_2$ in panel b of Figure 1. Nation 2's dominant strategy is to do nothing – as illustrated by Spain's withdrawal from Iraq following the 11 March 2004 train bombing where this inequality became apparent. Terrorists have a clear motive to attack countries that bolster the proactive measures of prime-target countries.

		nation 2	
		Deter	Status quo
nation 1	Deter	Nash $b - C - C_1, b - C - C_2$	$b - C, -C_2$
	Status quo	$-C_1, b - C$	0, 0

$(C + C_i > b > C), i = 1, 2$

Figure 2. Deterrence: Symmetric prisoners' dilemma

4.2. Defensive measures

Next, I consider deterrence as a means to limit terrorists' success by hardening a target at an expense of C to the deterrer. In Figure 2, such action provides a benefit of b greater than C for the deterrer. Unlike preemption with its public benefits, defensive measures have a public cost of C_i because the attack may be deflected to country i as country j takes precautionary actions. If nation 1 deters alone, then it gains $b - C$, while nation 2 suffers a cost of $-C_2$ as it becomes a more desirable target. When nation 2 deters alone, the payoffs are reversed with nation 1 sustaining a deflection cost of $-C_1$. No action gives 0 payoffs, while mutual deterrence provides payoffs of $b - C - C_i$ for nation i , $i = 1, 2$. Since $b > C$, the dominant strategy in the game matrix is for both countries to deter. As each nation plays its dominant strategy, the Nash equilibrium of this prisoners' dilemma is for everyone to deter, which gives both nations a negative payoff based on the parameters assumed. The payoffs for mutual deterrence include $-C_i$ because I implicitly assume only two countries and that the terrorists are bent on attacking some target no matter how well protected. Thus, matching deterrence upgrades leads to net costs, so that $C + C_i > b$, as assumed. The deterrence game is analogous to the problem of the commons, with all players trying to achieve a gain while ignoring the external-cost consequences of their actions.

If this game is extended to n nations with analogous parameters, then the suboptimality of the Nash equilibrium worsens as more nations take defensive measures to shift the attack elsewhere. In today's world of globalized terrorism, the game's outcome is that the terrorists will stage their attacks in those nations with the least defensive measures – the so-called soft targets. In these venues, the terrorists will hit the interests of those nations against which they have the greatest grievances. Thus, the paucity of attacks in North America and Europe in 2002–2003 is consistent with this prediction, as is the large percentage of attacks against US people and property abroad.

Shoring up the softest target implies its own collective action problem. Bolstering the defense of soft targets provides purely public benefits to all

nations whose people or property are in jeopardy. In a globalized world, this may involve improving many nations' defensive capabilities. The underlying symmetric game for shoring up the softest target is surely a prisoners' dilemma with no action at the equilibrium. With nonsymmetric players, the prime-target nations have the most to gain from increasing the capabilities of soft targets. Thus, one of the four pillars of US counterterrorism policy is to improve the antiterrorism abilities of those countries that seek assistance (US Department of State, 2004). No country – not even the United States – has the requisite resources to enhance all countries' counterterrorism activities. Since 9/11, the United States has been spending large amounts on its own proactive and defensive responses, which limits its capacity to help others. There is also a moral-hazard problem associated with strengthening another country's capabilities, since the latter may purposely use this money for domestic concerns and not protect the providing country's interests. Thus, US aid to country *X* might either be used to protect non-US targets in *X* or else replace *X*'s usual security expenditures.

4.3. *Choice between preemption and deterrence*

Even though preemption implies public benefits and private costs, while deterrence implies public costs and private benefits, the prisoners' dilemma applies to both situations in their symmetric presentation. What would happen if a nation has three strategic options: deter, status quo, and preempt? Arce and Sandler (2005) examined this question and found that the deter strategy dominates in two-nation symmetric scenarios. Ironically, the mutual-deter Nash equilibrium provides the smallest summed payoff in the associated 3×3 game matrix. These authors vary the game form for the embedded preemption game (e.g., chicken is allowed) but uncover a robustness of their results. Even when a fourth policy choice – deterring *and* preempting – is included, the deter choice dominates.

For domestic terrorism, nations are able to balance proactive and defensive measures. Israel clearly applies both in its domestic struggle against Hamas and Hezbollah. In their fight against leftist terrorists in the 1970s and 1980s, countries in Europe used proactive and defensive campaigns. The former resulted in the capture of Direct Action in France, the Red Brigades in Italy, and the Combatant Communist Cells in Belgium in the 1980s (Alexander & Pluchinsky, 1992). Why do tactics to combat domestic terrorism generally differ from those used by non-prime-target nations to fight transnational terrorism? First, the host nation is the only target of domestic terrorism. Defensive actions are not applied to transfer the attack abroad as in the case of transnational terrorism. Any transference of domestic attacks takes place among targets within the nation. A centralized government can internalize any transference externality when deciding defensive allocations for the country.

There is no centralized supranational government to serve the same purpose for transnational terrorism. Second, the benefits of a proactive campaign against domestic terrorism are *private* to the venue nation. As such, the nation cannot free ride on any other nation's efforts, since other nations are not in jeopardy. For domestic terrorism, the central government removes much of the strategic maneuvering that characterizes policy decisions for transnational terrorism.⁵ Third, defensive measures require protecting *all* potential targets, while proactive responses only necessitate intelligence-based raids against the terrorists or their resources. There is a cost-effectiveness in instituting a focused proactive campaign; defensive action may lead to virtually limitless spending.

5. Coordination Dilemma: Freezing of Terrorists' Assets

Obviously, other game forms can apply to countermeasures in the war on terror. A common game form for some policy choices is a "stag-hunt" assurance game, where both parties are best off if they take identical measures. When a player takes the measure alone, this player receives the smallest payoff and the player who does nothing earns the second-greatest payoff. This kind of scenario is descriptive of a host of counterterrorism policies where two or more nations must act in unison for the best payoffs to result. Examples include freezing terrorist assets, denying safe haven to terrorists, applying sanctions to state-sponsors, or holding to a no-negotiation policy. Even one nation that breaks ranks can ruin the policy's effectiveness for all others. To illustrate such scenarios, I use freezing terrorist assets as a generic example and begin with a two-nation symmetric case.

Matrix a in the top of Figure 3 displays this scenario where the highest payoff of F results from mutual action, followed by a payoff of A from doing nothing either alone or together. The smallest payoff, B , comes from freezing assets alone since the terrorists can merely transfer their assets elsewhere, leaving the acting country with some banking losses but few safety gains. Since $F > A > B$, there is no dominant strategy. There are, however, two pure-strategy Nash equilibriums: both countries freeze assets or neither freezes assets.

A third Nash equilibrium involves mixed strategies in which each pure strategy is played in a probabilistic fashion. To identify this mixed-strategy equilibrium, I determine the probability q of nation 2 freezing terrorist assets that make nation 1 indifferent between freezing terrorist assets and doing nothing. Similarly, I derive the probability p of action on the part of nation 1 that makes nation 2 indifferent between the two strategies. Once p and q are identified, equilibrium probabilities for maintaining the status quo simply equal $1 - q$ and $1 - p$ for nations 2 and 1, respectively. The relevant probabilities are indicated for matrix a besides the respective column and row. The

		nation 2		
		Freeze	Status quo	
nation 1	Freeze	F, F	B, A	p
	Status quo	A, B	A, A	$1 - p$
		q	$1 - q$	

a. Freezing assets: Scenario 1

		nation 2		
		Freeze	Status quo	
nation 1	Freeze	F, F	B, E	p
	Status quo	E, B	A, A	$1 - p$
		q	$1 - q$	

b. Freezing assets: Scenario 2

Figure 3. Alternative freezing assets scenarios.

calculations for q (or p not shown) go as follows:

$$qF + (1 - q)B = qA + (1 - q)A, \quad (1)$$

from which we have

$$q = (A - B)/(F - B). \quad (2)$$

when q exceeds this value, cooperation in the form of both countries freezing terrorist assets is the best strategic choice. An identical expression holds for p owing to symmetry. The ratio in (2) represents the *adherence probability* that each nation requires of the other to want to coordinate its freeze policy.⁶ A smaller equilibrium probability favors successful coordination, because a nation requires less certainty of its counterpart's intention to freeze assets in order to reciprocate.

From Equation (2), either a larger gain (F) from a mutual freeze or a smaller status-quo payoff (A) promotes the coordination equilibrium by reducing the required adherence probability. An event like 9/11 not only raises F but lowers A as nations realize the benefits from limiting terrorists' resources and the catastrophic consequences that inaction may have for all. As terrorists escalate the carnage to capture the media's attention, nations are increasingly drawn to coordinate counterterrorism activities when unified action is required. Following 9/11's unprecedented casualties, many more nations participated in

freezing assets,⁷ but participation is by no means universal. Differentiating the right-hand side of (2) with respect to B shows that a decrease in the payoff associated with unilaterally freezing assets inhibits cooperation by raising p or q .⁸

This game scenario can be readily generalized to n homogeneous nations, where at least n nations must freeze assets if each participant is to receive a payoff of F . For less than n freeze participants, each adherent receives B for cooperating and the nonadherents get A . If nations are uncertain about the intentions of other nations, then freezing assets is a desired policy provided that a nation believes that the $n - 1$ required additional participants will follow through with a collective probability greater than q . This then implies that each nation must be expected to cooperate by at least the $n - 1$ st root of q , which for even modest groups may require near certainty. This is not an encouraging finding. If, however, the required number of adherents for coordination gains can be limited, then this decreases the assurance probabilities. For an agreement to freeze assets, this is best accomplished by first unifying some of the major financial-center nations – i.e., the United States, the United Kingdom, Switzerland, Japan and Germany. A concern with this strategy is that some near-catastrophic terrorist acts are not very costly – e.g., the 1993 WTC bomb cost just \$400 and caused \$500 million in damages (Hoffman, 1998) – so that near-universal freezes may be required.

In matrix b in Figure 3, an alternative scenario is displayed where not freezing assets, when the other nation freezes, gives the second highest payoff to the noncooperator, so that $F > E > A > B$. This scenario implies that the nation that does not join the freeze can profit by providing a safe haven for terrorists' funds. The nation may be motivated to do so if it does not view its own people or property as likely targets of the terrorists. The two pure-strategy Nash equilibriums are for a mutual freeze or no action along the diagonal of the matrix. For the mixed-strategy Nash equilibrium, the adherence probabilities are now:

$$p = q = (A - B) / [F - B + (A - E)], \quad (3)$$

which are greater than those in (2), because $(A - E) < 0$. Hence, coordinating a freeze becomes more difficult owing to profitable opportunities available to less scrupulous nations that can greatly limit gains from action to freeze assets, eliminate safe havens, or abide by no-negotiation pledges (see, e.g., Lee, 1988).

Policies that penalize noncompliance can reverse the ranking of A and E , so that $A > E$. As a consequence, adherence becomes easier to achieve. There are two practical problems: (i) to identify nations that accept terrorists' funds and (ii) to convince nations to punish nonadherents. Since nations hide their

bad behavior, singling out nations for punishment is not so easy. Imposing sanctions is itself a prisoners' dilemma game that presents its own collective action concern.

In Figure 4, a final freeze scenario allows for asymmetry where nation 2 has more potential nonadherence profits but fewer gains from acting alone than its counterpart. That is, I assume that $F > E_i > A > B_i$, $i = 1, 2$, where $E_2 > E_1$ and $B_1 > B_2$. The pure-strategy Nash equilibriums are still the matching-behavior outcomes along the diagonal of the matrix in Figure 4. For the mixed-strategy equilibrium, the adherence probabilities are:

$$p = \frac{A - B_2}{F - B_2 + (A - E_2)} > \frac{A - B_1}{F - B_1 + (A - E_1)} = q. \quad (4)$$

To act, nation 2 needs greater assurance than nation 1 that the other nation will freeze assets. Such asymmetry is likely to work against consummating a freeze.

When coordination is required for a counterterrorism measure, many factors work against getting sufficient action. A crucial consideration is the minimum number of nations required for coordinating antiterrorism activities. As this minimum increases, nations must have greater assurance that others will cooperate for them to follow suit. Any policy action that limits this minimum bolsters cooperation. As the threat of terrorism escalates, coordination of counterterrorism is encouraged because cooperative outcomes have greater payoffs and unilateral action has smaller payoffs. The application of technology to track money flows can identify duplicitous nations that hamper other nations' actions by providing safe havens to terrorists' assets. Retribution against these "spoiler" nations can foster more fruitful coordination by sending a clear signal that profiting from terrorism has consequences. Efforts by the International Monetary Fund and World Bank to assist countries in tracking asset transfers can lower the costs of unilateral action, thereby boosting efforts to freeze terrorists' assets.

		<i>nation 2</i>		
		Freeze	Status quo	
<i>nation 1</i>	Freeze	F, F	B_1, E_2	p
	Status quo	E_1, B_2	A, A	$1 - p$
		q	$1 - q$	

$$F > E_i > A > B_i, i = 1, 2; E_2 > E_1 \text{ and } B_1 > B_2$$

Figure 4. Asymmetric freezing assets scenario.

6. Public Choice Dilemma

The recent terrorism literature has shown that there appears to be a positive association between terrorism and democracy (Eubank & Weinberg, 1994, 2001; Li & Schuab, 2004; Schmid, 1992). This association is traced to factors in a liberal democracy that can provide a favorable environment for transnational terrorist activities. For example, freedom of the press allows terrorists to publicize their cause through news coverage of terrorist attacks. Media coverage of ghastly events also serves terrorists' needs to create an atmosphere of fear where everyone feels at risk. File footage is reshowed periodically on anniversaries of events and when related incidents occur, so that these events remain in the public consciousness. Restraints on governments' powers limit the ability of authorities to hold terrorist suspects or to gather intelligence. Obviously, 9/11 has eroded some of these restraints as civil society became more willing to trade away some civil liberties for greater security. Freedom of association also provides an environment conducive to terrorism. Modern democratic states are not only target-rich, but also present opportunities for funding and military training. Information is also readily available on building bombs and guerrilla tactics in an open society. In contrast, an autocracy is a less supportive environment for terrorism. If a terrorist group in an autocracy wants to publicize its cause, then it may stage incidents in democracies where news coverage is more complete and the environment is more supportive. Crossing borders is generally easier in a liberal democracy than in an autocracy which, in turn, encourages the export of terrorism and the prevalence of transnational externalities.

This association between democracy and transnational terrorism presents a real public choice dilemma. Usually, democratic ideals work in a country's favor – e.g., democratic countries do not tend to go to war with one another. There are a number of research issues that require further empirical analysis to understand the public choice implications of transnational terrorism. First, the staging of terrorist events in liberal democracies requires study. To date, there has been no careful and convincing study on whether transnational terrorism is originating in or spilling over to democratic countries. The level of this alleged externality needs to be investigated in order to determine the appropriate policy response. For example, enhanced border security can address some spillover terrorism. Second, the influence of the type of democracy on the level of terrorism requires analysis. Which kind of democratic system – proportional representation or majoritarian system – is more conducive to terrorism? Since proportional representation gives more views, even extreme ones, a presence in government, terrorism may be less prevalent under proportional representation than under a majoritarian system. The impact of the type of democratic system on the level of terrorism has not been investigated.⁹ Third, the role of rent seeking as a motive for terrorism

requires further analysis. A paper by Kirk (1983) argued that government size encourages more terrorism because of greater potential rents to capture. His analysis probably does not apply in today's world where fundamentalist-based terrorism is the driving force, since these terrorists' goals do *not* appear to be distribution driven. Many fundamentalist groups – e.g., Al-Qaida – view all nonbelievers as enemies and want an Islamic state (White, 2003). In those countries where there are *rival* terrorist groups, a rent-seeking explanation of terrorism may be appropriate. Each terrorist group is in a contest with other groups for the provision of a public good in the form of a political change that favors the group's constituency. Rent-seeking costs are the expense of the terrorist campaign that promotes the terrorists' demands. Such costs represent a lower bound on the expense that the campaign imposes on society, because damage to the latter must also be included.

7. Concluding Remarks

The paper applies elementary noncooperative game theory to explore the collective action dilemmas that confront nations as they address a global terrorist threat. Although incentives are conducive for terrorists to form networks and cooperate, incentives are less supportive for targeted nations to coordinate their counterterrorism policies. Both proactive and defensive measures often imply an underlying prisoners' dilemma game in which insufficient action characterizes offensive efforts and too much action characterizes defensive responses. For proactive measures, a prime-target country is anticipated to act. By concentrating their attacks on a couple of target countries, terrorists motivate these countries to strike back and privilege all at-risk countries with their actions to weaken the terrorists. If countries realize that defensive measures may merely divert attacks abroad where their people and property are still targeted, then there will be a smaller tendency to overspend on defensive measures. For domestic terrorism, there is a better balance struck between proactive and defensive responses because a central government can internalize the externalities among targets that plague responses at the transnational level.

Collective action concerns may be particularly troublesome for counterterrorist actions requiring sufficient transnational coordination, where nonparticipating countries can severely undermine the efforts of the cooperators. Such coordination concerns apply to efforts to freeze terrorists' assets, eliminate terrorists' safe havens, deny terrorists' weapons, and maintain a no-negotiation policy. As the number of participants required for cooperative gains to be realized increases, the associated assurance probabilities also increase. Thus, in the case of freezing terrorists' assets, a few nations that safeguard these assets can provide terrorists with the means to engage in some large-scale attacks. This is especially true because deadly events may be relatively cheap to finance. Sanctions for nonparticipants can improve coordination possibilities

but raise a collective action problem of their own, since sanctions provide purely public benefits. By targeting countries and their interests at home and abroad, today's terrorists worsen the coordination problem for at-risk countries. As terrorists escalate the damage from their acts, they, however, increase the likelihood of coordination success on the part of targeted countries. Following 9/11, many more countries started to freeze terrorists' assets.

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Notes

1. The Algerians immediately freed the 23 non-Israeli passengers. On 27 July 1968, they released the Israeli women and children hostages (Mickolus, 1980, p. 94). The remaining hostages were held at an Algiers military base under the "protection" of the Algerian government.
2. The figures in this paragraph come from US Department of State (2004, pp. 176–181).
3. This asymmetry paraphrases what Irish Republican Army (IRA) terrorists said in a letter after they learned that their 12 October 1984 bombing of the Grand Hotel in Brighton had narrowly missed killing Prime Minister Margaret Thatcher. Their letter said, "Today, we were unlucky. But remember we have only to be lucky once. You will have to be lucky always." See Mickolus et al. (1989, vol. 2, p. 115).
4. If $B > c$, then the dominant strategy is for both nations to preempt – a scenario that we virtually never see for multiple countries.
5. Before 9/11, airlines tried to save money in their employment of security personnel. The deployment of federally trained screeners removes this strategic option.
6. Another interpretation for mixing is that p and q denote the uncertain beliefs that the nations have for the likelihood that the other country will act.
7. Since 9/11, \$200 million of alleged terrorist assets have been frozen (White House, 2003).
8. $dq/dB = dp/dB = (A - F)/(F - B)^2 < 0$, so that a smaller B is associated with greater adherence probabilities.
9. Recently Reynal-Querol (2002) showed that the incidence of civil wars is lower with proportional representation than with majoritarian systems. Her analysis can be applied to the incidence of transnational terrorism.

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