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Abstract

We use economic analysis in a simple game-theory framework to ascertain under what circumstances a government would want to precommit itself to a no-negotiation strategy. From the government viewpoint, we examine both the choice of deterrence expenditure (i.e., expense meant to reduce terrorist logistical success during incidents) and whether to negotiate or not.

Disciplines

Economic Theory | International Economics | Other Economics

THE POLITICAL ECONOMY OF TERRORISM[†]

To Bargain or Not To Bargain: That Is The Question

By Harvey E. Lapan and Todd Sandler*

In November 1986, news media revelations disclosed that the Reagan Administration had deviated significantly from its stated policy of never negotiating with terrorists when it traded arms to obtain the freedom of three Americans—Rev. Benjamin Weir in September 1985, Rev. Lawrence Jenco in July 1986, and David Jacobsen in November 1986. On January 26, 1987, terrorists, posing as policemen, kidnapped an Indian and three American professors at the American University of Beirut, thereby replacing the three Americans previously bartered away. Accepted wisdom, heard almost daily in newscasts, maintains that one should never bargain with terrorists since such negotiations encourage more hostage taking by making it a profitable activity; recent events in Beirut seem to support conventional views. Yet even the staunchest supporter of the no-negotiation strategy of precommitment, the Israelis, has made noteworthy exceptions in the case of the school children taken hostage at Maalot in May 1974,[1] and during the hijacking of TWA Flight 847 in June 1985. Another exception involved the Israelis' release of 1,150 Arab prisoners, including Kozo Okomato, in a negotiated swap for three Israeli soldiers in May 1985 (*The Economist*, 1987, p. 29). Okomato, a Japanese Red Army Faction member, was the sole surviving terrorist in the Lod Airport massacre of 1972, which left 27 people dead and 78 injured.

We use economic analysis in a simple game-theory framework to ascertain under what circumstances a government would want to precommit itself to a no-negotiation strategy. From the government viewpoint, we examine both the choice of deterrence expenditure (i.e., expense meant to reduce terrorist logistical success during incidents) and whether to negotiate or not.

Our analysis demonstrates that the beliefs and the resolve of the terrorists are crucial in identifying the rather restrictive scenarios in which a no-negotiation strategy is desirable in the case of a credible precommitment.[2] When governmental declarations are not completely credible and uncertainty characterizes the government's costs of not negotiating, then never negotiating is likely to be time inconsistent and not a plausible policy. In a multiperiod model, reputation effects may not be sufficient for a government to maintain a policy of never negotiating with hostage-taking terrorists owing to public choice considerations. Perhaps surprising, the conventional wisdom regarding the no-negotiation strategy does not withstand theoretical scrutiny except in a limited number of contrived cases.

I. Basic Structure of the Models

The analysis focuses on terrorist incidents that involve the taking of hostages (for example, skyjackings, kidnappings) for the purpose of gaining concessions (for example, ransoms, prisoners releases). There are two agents in the game—the terrorist group and the government; hostages are treated as exogenous participants. Initially, we present

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[1] Descriptions and details of transnational terrorist events between 1968 and 1979 are drawn from Edward Mickolus (1980).

[2] On terrorist rationality, see Scott Atkinson, Sandler, and John Tschirhart (1987).

□ Government Chooses Deterrence
Expenditure (D_t)

□ Given Their Beliefs, Terrorists Decide
Whether to Attack

No Attack $1 - \Omega_t$

Attack Ω_t

$\begin{pmatrix} 0 \\ H(\theta_t) \end{pmatrix}$

Logistical Failure θ_t

Logistical Success $1 - \theta_t$

$\begin{pmatrix} -c \\ a + H(\theta_t) \end{pmatrix}$

Government Capitulates p_t

Government Does Not Capitulate $1 - p_t$

$\begin{pmatrix} m \\ h + H(\theta_t) \end{pmatrix}$

$\begin{pmatrix} \ell \\ n_t + H(\theta_t) \end{pmatrix}$

to Period t + 1
and
Reputation Effects

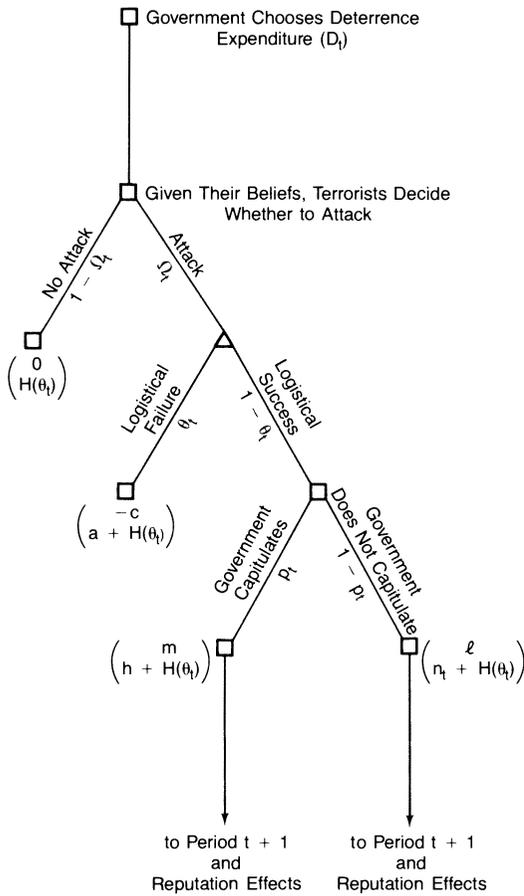to Period t + 1
and
Reputation Effects

FIGURE 1. GAME TREE—PERIOD t

the underlying structure for a multiperiod sequential game that degenerates readily to a single-period game. In each period, the government has two potential strategic variables: how much to expend to deter an attack, and whether to negotiate or not in the event of a terrorist logistical success, whereby the terrorists manage to secure one or more hostages. The terrorists need to decide whether to attack. In Figure 1, the extensive form for this sequential game is displayed, complete with payoffs. First, the government chooses its tth period expenditures, D_t, to deter an attack; second, the terrorists decide whether to attack; and third, the government determines whether to negotiate in the event of a terrorist logistical success. The optimal strategy for each agent depends on its payoff

in each state and the beliefs that it holds as to the likelihood attached to each state. For any given state, the top number in the payoff vectors of Figure 1 denotes the terrorists' net benefit or cost, while the bottom number depicts the government's cost.

In period t, the terrorists receive 0 if they do not attack. In the event of an attack, three outcomes are possible: (i) the attack fails; (ii) the attack succeeds but the negotiation fails; and (iii) the attack and negotiation succeed. We assume that outcome i imposes a *net cost* of c on the terrorists, whereas outcomes ii and iii yield a *net benefit* of l and m, respectively, to the terrorists. The net benefit for a logistical success that does not produce concessions may be positive or negative. For a media-attracting skyjacking, publicity for a terrorist cause might make l positive even when concessions are zero. In the case of kidnappings, however, l is more apt to be negative, since the capture and subsequent maintenance of a hostage in a secret location is usually an expensive operation. The expected payoff (Z_t) to the terrorists from an attack also depends upon the probability (θ_t) that the terrorists attach to a logistical failure and the probability (p_t) that they attach to government capitulation.[3] Hence, from Figure 1, the terrorists' expected payoff from an attack is equal to

$$(1) \quad Z_t = (1 - \theta_t)\left[p_t m + (1 - p_t)l \right] - \theta_t c,$$

where $m > l > -c$ and $m > 0$. The terrorists will attack whenever their expected payoff is positive; that is, whenever

$$(2) \quad c \leq c^* \equiv \left[(1 - \theta_t)/\theta_t\right]$$
$$\times \left[p_t m + (1 - p_t)l \right].$$

From (2), the likelihood of an attack increases as either the probability of success $(1 - \theta_t)$ or the perceived likelihood of government capitulation (p_t) increases. Equation (2) indicates that even a *credible* policy

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[3] The time subscripts are introduced to allow subsequent generalization to a multiperiod setting.

of precommitment never to negotiation, which in turn implies that $p_t = 0$, may be insufficient to deter an attack if the terrorists derive net benefits from logistical success ($l > 0$), from, say, publicity, even in the absence of concessions. The no-negotiation precommitment may also be insufficient to deter attacks when the cost associated with a logistical failure is low or negative.

In fact, terrorist groups that perceive benefits from logistical failure and logistical success ending in negotiation failure ($l > -c > 0$) will attack regardless of a credible precommitment strategy. The Hezbollah, a pro-Iranian Shiite Fundamentalist terrorist group operating out of the Bekaa Valley in Lebanon, places a high value on martyrdom and could be placed in this category of groups. Not only does martyrdom give the victim a high perceived benefit, it assists the group to recruit. In a U.S. Department of State (1986, p. 19) report, the Hezbollah was said to hold many of the hostages taken in recent years in Beirut. Furthermore, the Hezbollah has been connected to the suicide bombings of the U.S. Marine barracks in October 1983, the U.S. Embassy in Beirut in April 1983, and the U.S. Embassy in Kuwait in December 1983. For the Hezbollah, the conventional wisdom regarding negotiations would not hold, since net benefits are derived under any outcome. A credible precommitment policy would, however, deter attacks if the group was solely motivated by concessions.

Turning to the government behavior, we denote its expenditure on deterring (and foiling) terrorist attacks as D_t. This expenditure will determine, along with nature, the terrorists' perceived probability of failure (θ_t) and will be incurred in all states. Government costs depicted in Figure 1 indicate that if no attack occurs, the government incurs no additional costs, but if an attack occurs and fails, the government incurs an additional cost of a (≥ 0). If, however, an attack succeeds, the government must then decide whether to capitulate or not. The (current) cost of not capitulating is denoted by n_t and reflects the cost associated with hostage lives and resources expended. If the government does capitulate, it incurs a cur-

rent cost h, which may include perceived political cost and the cost associated with the consequences of freeing terrorists or augmenting terrorists' resources. Nevertheless, neither n_t nor h include *reputational* effects associated with negotiating at this juncture. In a true multiperiod setting, the government must consider how its negotiating behavior will affect its reputation by influencing the terrorists' perceived p_t, and hence the likelihood of an attack in the future. Moreover, a government must be concerned whether it can take current actions to alter terrorists' beliefs about the government's willingness to negotiate. One such posture that is often suggested is a *precommitment* policy never to negotiate, which we term credible provided that $p_t = 0$ for all future t.

The government influences the terrorists' perceived failure rate through its expenditure on deterrence, in which

$$(3) \quad \theta_t = K(D_t) \quad \text{or} \quad D_t = K^{-1}(\theta_t) \equiv H(\theta_t),$$

where $H(0) = 0$, $\lim_{\theta_t \to 1} H(\theta_t) = \infty$, $H' > 0$, and $H'' > 0$. We further assume that the government does not know the resolve or fanaticism of the terrorists so that $c \geq 0$ is a random variable with a probability density function of $f(c)$. From the government's perspective, the probability of an attack is the likelihood[4] that $c < c^*$ (see (2)), that is

$$(4) \quad \text{prob}\{c < c^*\} = \Omega_t = \int_0^{c^*} f(c)\,dc.$$

Since c^* in (4) depends on terrorists' beliefs concerning capitulation and logistical success, the likelihood of an attack clearly depends on these beliefs, (i.e., $\Omega_t = F(\theta_t, p_t)$). By reducing the likelihood of a logistical success, increased deterrence expenditure would lower the perceived probability of an attack. Furthermore, an increase in terrorists' belief regarding government capitula-

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[4]An alternative, but qualitatively similar, interpretation is to assume that there are many (N) terrorist groups with the distribution of their values given by $f(c)$. Then Ω_t represents the proportion of groups that attack; $\Omega_t N$ is the number of such attacks.

tion encourages terrorist strikes. These re-
sults follow from partially differentiating (4)
and the assumptions invoked thus far.
Throughout, the two agents are assumed to
have identical beliefs of the likelihood of
attack.

II. Single-Period Model:
No Reputational Effects

In the single-period model, the govern-
ment ignores reputation effects and takes as
given the terrorists' belief, p_t, that the
government will negotiate. If the negotiation
decision is made *ex post*, the government
would minimize its cost by negotiating if,
and only if, capitulating is less costly (i.e.,
$n_t > h$). Hence, *ex post* cost in the event of a
logistical success is $\min(n_t, h)$. From an
ex ante perspective, expected cost to the
government is

$$(5) \quad E[TC_t] = H(\theta_t) + \Omega_t \theta_t a$$
$$+ \Omega_t(1 - \theta_t)E\left[\min(n_t, h)\right],$$

where n_t is a random variable with a density
function $g(n)$, and $E[\cdot]$ is the expectations
operator. The government determines its op-
timal level of deterrence by choosing θ_t
ex ante to minimize (5). If h lies inside
the range of n_t, then it is easy to show
that $E[\min(n_t, h)] < \min[E(n_t, h)]$. This fact
proves helpful when identifying costs associ-
ated with the precommitment strategy of
never negotiating.

We denote θ_t^* as the argmin $E[TC_t]$ and
TC_t^* as minimized expected cost. A simple
comparative static analysis of the first-order
conditions of (5) indicates that the optimal
level of deterrence increases as (*i*) the likeli-
hood of attack goes up, (*ii*) the expected
cost of successful attacks rises, and (*iii*) the
ability to deter attacks increases (i.e., $\Omega_{\theta_t} =
\partial\Omega_t/\partial\theta_t$ rises).[5] Furthermore, since the like-
lihood of attack is an increasing function of
p_t, the optimal level of deterrence is also an
increasing function of the government's be-

liefs of the terrorists' own beliefs concerning
the government's willingness to capitulate.
Finally, one might wonder where the ter-
rorists' beliefs concerning capitulation are
derived. If the terrorists know how the
government behaves and if they further know
the true distribution of the government cost
from not capitulating, then consistency of
expectations implies that $p_t = \text{prob}[n_t > h]$.

We are now prepared to examine the de-
sirability of precommitment never to negoti-
ate when deterrence expenditure is also a
choice variable. In this case, $\tilde{\Omega}$ denotes the
ex ante probability of an attack when pre-
commitment is credible ($\tilde{\Omega}_t = F(\theta_t, 0)$). If the
government adheres to its pledge, its ex-
pected costs are then

$$(6) \quad T\tilde{C}_t = H(\theta_t) + \tilde{\Omega}_t \theta_t a + \tilde{\Omega}_t(1 - \theta_t)E(n_t)$$

where $E(n_t)$ indicates the expected cost of a
successful attack, given that negotiations
cannot occur. A comparison of (5) and (6)
indicates that if a policy of precommitment
eliminates all attacks (i.e., $\tilde{\Omega}_t = 0$ when
evaluated at θ_t^*), then precommitment dom-
inates the *ex post* decision. When, however,
precommitment does not eliminate all at-
tacks, precommitment would imply higher
ex post costs from inflexibility in those inci-
dents where costs would be minimized by
capitulating (i.e., $E(n_t) > E[\min(n_t, h)]$).
Thus, precommitment, even when credible,
may not be optimal. In addition, when $\tilde{\Omega}_t > 0$
and an attack occurs, the government may
face a time consistency problem since hold-
ing firm to its policy may be more costly
than capitulating. To compare the optimiz-
ing level of deterrence expense with and
without precommitment, the first-order con-
dition associated with (6) should be evaluated
at the cost-minimizing deterrence level θ_t^*
for no precommitment. Such a comparison,
while giving no definitive conclusions, im-
plies that optimal deterrence expense under
precommitment is apt to exceed that with no
precommitment when either inflexibility
costs are high or $\tilde{\Omega}_t$ is near Ω_t in value. In
the latter case, precommitment does not sig-
nificantly alter the likelihood of attack. Ben-
efits from precommitment comes from its
ability, if any, to change terrorists' beliefs,

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[5] A more technical version of this paper, available
upon request, contains the comparative statics details.

p_t, and hence alter the probability of attack. Terrorist groups that do not believe the government's statement or its resolve will not be swayed. As long as $n_t > h$ for some realizations, the time consistency problem can always surface as recent events in Lebanon have shown. Constitutional constraints or congressional hearings imposing huge perceived cost on those officeholders who capitulate may be the only means of raising h sufficiently to make precommitment time consistent.

III. Multiperiod Models and Reputational Effects

In the context of hostage-taking incidents, reputational effects refer to the influence that the current government's negotiating behavior has on the beliefs of the terrorists concerning the government's willingness to grant concessions in the future. As before, p_t denotes the terrorists' beliefs concerning government capitulation in period t, and p_{t+1} represents their next-period beliefs. We assume the following updating behavior: (i) $p_{t+1} = p_t$ if there is no opportunity to negotiate in period t; (ii) $p_{t+1} = p_{t+1}^N \leq p_t$ if the government refuses to capitulate after a successful attack; and (iii) $p_{t+1} = p_{t+1}^c \geq p_t$ if the government capitulates in period t. Let $J_{t+1}(p_{t+1})$ represent the (minimized) expected cost, from the current government's perspective, of an optimal program starting at $t+1$, with terrorist beliefs p_{t+1}. Since an increase in p augments the likelihood of attack, and therefore costs, $dJ_{t+1}/dp_{t+1} > 0$.

Public choice considerations are important when analyzing reputation effects. For example, governments that cannot or do not expect to be reelected would be unconcerned about reputation cost unless they are altruistic towards their successor. Even in the latter case, reputation may be nontransferable when terrorists do not believe that the current government's toughness will set the negotiation posture for the succeeding administration. To capture this aspect, we discount reputation costs by the probability π that the current government is in office in the ensuing period. The undiscounted future cost associated with a government capitula-

tion is

$$(7) \quad \Delta_{t+1}(p_t) = J_{t+1}(p_{t+1}^c) - J_{t+1}(p_{t+1}^N)$$
$$\geq 0.$$

Given an attack, the government will negotiate *ex post* if, and only if, $n_t > [h + \pi\delta\Delta_{t+1}]$, where δ denotes the natural discount rate. Deterrence expenditures are chosen *ex ante* to minimize[6]

$$(8) \quad TC_t = H(\theta_t) + \Omega_t\theta_t a$$
$$+ \delta[(1 - \Omega_t) + \Omega_t\theta_t][\pi J_{t+1}(p_t)$$
$$+ (1 - \pi)J_{t+1}(p_0)] + \Omega_t(1 - \theta_t)$$
$$\times \{\delta[\pi J_{t+1}(p_{t+1}^N)$$
$$+ (1 - \pi)J_{t+1}(p_0)]$$
$$+ E(\min[n_t, h + \pi\delta\Delta_{t+1}])\},$$

where p_0 is the reputation inherited by a new government. Equation (8) assumes the states of the world depicted in Figure 1, as well as the possibility of reelection or defeat for the government in the ensuing period. On the right-hand side of (8), the first term is the deterrence cost; the second is the additional expense (exclusive of reputation cost) to the government in the event of a terrorist attack failure; the third is the reputation cost in the event of no negotiation opportunities; and the fourth is the reputation costs in the situation of negotiation opportunities. If the government does not expect to be in office ($\pi = 0$), the *ex post* negotiation rule and the cost-minimizing deterrence choice associated with (8) would be equivalent to the single-period case where reputation is unimportant.

Another case where reputation does not matter is that of exogenous expectations, or Nash-Cournot behavior, where $p_{t+1} = p_t$ for

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[6]Equation (8) also provides the recursive equation for determining $J_{t+1}(\cdot)$.

all t. That is, the terrorists do not use period t outcomes and observations to modify their beliefs about the government's willingness to capitulate. Since p_{t+1} is then independent of time t outcomes, Δ_{t+1} is identically zero. Equation (8) then implies that the government's time-consistent solution is to negotiate if, and only if, $n_t > h$, as in the single-period model. The cost-minimizing choice of θ_t is also unchanged from that of the single-period model.

This solution is not so naive since what really matters is not reputation per se, but rather the government's ability through its words and acts to alter that reputation. If terrorist groups believe that they have perfect information concerning h and the distribution of n_t, there is no reason for them to modify their beliefs due to time t events. If the terrorists are convinced that the government adheres to the time-consistent rule of capitulating when $n_t > h$, then, with perfect (perceived) information, the terrorists will set $p_t = \text{prob}[n_t > h]$. Moreover, under the circumstances, this *will be* the optimum negotiating rule for the government. Hence, we conclude that reputational effects are important *only under imperfect information*.

Nihilistic terrorist groups (for example, Japanese Red Army, Direct Action in France) have a strong distrust of the government's words and deeds and may well operate under the perception, false or otherwise, of perfect information. If such is the case, then, unless precommitment can eliminate attacks, and there is no assurance of that, the government faces time-inconsistency difficulties when they precommit.

When, however, terrorist groups learn so that their future beliefs are shaped by the government's current behavior, current capitulation by the government will increase future attacks ($\Delta_{t+1} > 0$), thereby raising

costs from negotiations. With these reputation costs, the government will negotiate *ex post* only if $n_t > [h + \pi \delta \Delta_{t+1}(p_t)]$. Hence, the *ex ante* true probability that the government will negotiate is $\sigma_t = \text{prob}[n_t > (h + \pi \delta \Delta_{t+1})]$. Hence, an increase in π or Δ_{t+1} will, *ceteris paribus*, decrease the likelihood of capitulation. Since reputation depends on terrorist beliefs, p_t, and the updating rule, the optimizing choice for deterrence depends upon initial conditions and the way in which terrorists learn or modify their beliefs. Thus, an analytical solution is not possible.

If the terrorists have access to the same information set as the government, both agents will know the true probability that the government will capitulate and $p_t = \sigma_t$. Since σ_t will then be independent of $t-1$ events, σ_{t+1} (and hence p_{t+1}) will, by induction, be independent of time t events. Under full information, there are consequently no reputation issues involved in the negotiation decision. The only consistent means of modeling reputation is to assume that the terrorists are uncertain about some aspect of the government information set. Strategic behavior then enters when subsequent events are used to modify the terrorists' priors.

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