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On the optimal retaliation against terrorists: The paid-rider option*

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Abstract. We examine whether nations, faced with the threat of terrorism, will be motivated to engage in the efficient amount of retaliation against terrorists. We demonstrate that the problem confronting the efforts of nations to achieve an optimal retaliation against terrorists is understated by the traditional free-rider analysis. In particular, nations have the option of actually selling or reducing the public good of retaliation, provided through the efforts of others, by offering safe havens to terrorists in return for the terrorists' pledge to attack elsewhere. This paid-rider behavior is also shown to apply to other public good scenarios.

1. Introduction

Before midnight on the evening of 14 April 1986, eighteen U.S. F-111 fighter-bombers departed British bases at Lakenheath and Upper Heyforth to fly 2,800 nautical miles to bomb targets in Tripoli, Libya.[1] After midnight on the morning of 15 April 1986, fifteen A-6 and A-7 Navy fighter-bombers left the decks of the USS American and the USS Coral Sea, two aircraft carriers stationed in the Mediterranean Sea. At 2 a.m., the F-111s hit destinated targets in Tripoli, while the Navy planes hit targets in Benghazi. The Pentagon had chosen five targets: (1) Qaddafi's Azizyah Barracks in Tripoli; (2) the Jamahiriyah Barracks in Benghazi; (3) the Sidi Bilal Port west of Tripoli; (4) the military side of the Tripoli airport; and (5) the Benina military airfield. According to the Reagan administration, the strike against Libya was a retaliation for alleged Libyan sponsorship of the April 4th bombing of the La Belle Discotheque in West Berlin, which killed three people including two U.S. servicemen and injured 231 including 62 Americans. Even though most of the injured included West Germans, Turks and Arabs, only the U.S. government retaliated. The effects of the raid was somewhat mixed: In the two weeks following the raid, there were at least 42 incidents of transnational terrorism directed at either U.S.

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or British interests. In most of these incidents, those claiming responsibility said that their act was a response to the U.S. air strike of Libya. This unprecedented number of events, which included bombings, assassinations, threats and hoaxes, is approximately five times the number of events targeted at U.S. and British interests during comparable two-week periods in the 1980s (see Mickolus et al., 1988; 1989). After this initial increase in terrorist events, Middle Eastern and Libyan related terrorist attacks decreased significantly during the remainder of 1986 and the beginning of 1987. The number of international terrorist events in Europe fell from 218 in 1985 to 156 in 1986 and 150 in 1987.[2] The raid's long-run ameliorating effects on terrorism appear, on balance, to have outweighed the short-run increases.

Terrorism imposes significant costs on the community of civilized nations, and is rapidly becoming an important means of political expression in the international and domestic arena. Terrorist events are increasing both in number and lethality in recent years: In 1985, 825 people died and 1,217 injured in 782 international terrorist events (U.S. Department of State, 1986: 3, 30). In 1983, there were 485 events; in 1984, there were 598. The costs associated with terrorism can be reduced by taking actions against terrorist groups and the nations that sponsor them. Over some range of action against terrorist agents and surrogates, the marginal benefits derived from reduced terrorism will surely outweigh the marginal costs associated with the action. Some positive level of retaliation against terrorists is, therefore, efficient from the perspective of the victimized countries.

The question addressed here is whether targeted countries will be motivated to engage in the efficient amount of retaliation against terrorists. The efficient level of retaliation, though easy enough to determine at the conceptual level, is difficult to ascertain with precision at the level of actual policy. A large number of factors are relevant, and most of them are hard to quantify. By invoking a few plausible assumptions, however, we are able to develop a simple model that implies that the retaliating response of countries victimized by terrorists will be suboptimal. Associated with this general implication is a number of more specific implications that stand up to the test of casual observation and, by doing so, provide some credibility to the view that retaliation against terrorists is suboptimal.

The results of this paper depends, in part, on the assumption that many of the benefits generated by one nation's retaliation against terrorists extend to the international community and are nonrival in consumption over the countries facing a common terrorist threat. These public benefits are also nonexcludable, since once provided by the retaliatory response of one country, they cannot be denied to other countries. The presence of these public benefits suggests that the incentive to free ride on the retaliatory response of others will lead to a suboptimal level of provision, as is true in the case of other public goods. Moreover, we show that the problem confronting the efforts of nations to

achieve an optimal retaliation against terrorists is *understated* by the traditional free-rider analysis. This follows because the individual countries have the option of not only failing to contribute to the public good, but of actually selling or reducing the public good provided through the contributions of others. When an agent sells or undoes the public good provided by others, the agent is termed a *paid rider*. Such behavior will lead to a position much worse than the standard independent-adjustment equilibrium and may eliminate the incentives of others to contribute anything to the public good. Although we focus our discussion of paid riding on the case of retaliatory strikes against terrorism, the concept can be fruitfully applied to a host of public good situations including defense, crime prevention and environmental management.

The body of the paper consists of four sections. In Section 2, the paid-rider notion is presented and contrasted with free riding. Further implications and observations are presented in the next section. Section 4 indicates other selected examples of paid riding, while Section 5 contains concluding remarks.

2. Paid riding

The impressive superstructure of economics is based on the view that individuals are rational actors who respond in predictable ways to changes in costs and benefits. The view taken here and elsewhere[3] is that the assumption of rationality is just as useful in analyzing terrorist activity as it is in analyzing any other economic activity. A terrorist group, like the Hezbollah, which bombs foreign military barracks and which kidnaps foreign citizens in the hopes of removing foreign troops from their home soil, is perceived as rational, provided that the group responds appropriately to constraints and that its actions might serve to further the group's goal. This rationality assumption allows us to hypothesize that retaliating against terrorists will reduce terrorism, if not in the very short run, surely in the long run. Evidence cited in the introduction supports this assumption.

Retaliation against nations, such as Syria, Libya and Iran, that have sponsored terrorism will surely curb further terrorism since such states' popular support will wane if their citizens are subjected to significant costs owing to their countries' sponsorship of terrorism. Moreover, these countries suffer costs as they must allocate resources to protect against retaliatory strikes. Since the U.S. strikes against Libya, Colonel Qaddafi has been unusually silent in his supportive statements of terrorism. Even Syria has curbed some activities following British and U.S. sanctions and condemnations of Syria for its alleged role in the attempted bombing on 17 April 1986 of an El Al flight LY016, scheduled to depart Heathrow Airport in London (Mickolus et al., 1989).[4]

The benefits from retaliating against terrorists are both public *and* private or country specific. The threat of terrorism imposes costs on all countries

whose citizens or property are at risk, regardless of where a particular terrorist incident is staged. In the case of skyjackings, the people of all nations who fly international routes are at risk. The same is true of armed attacks in international airports. In the Rome and Vienna attacks on 27 December 1985, the dead included five Americans, two Mexicans, three Greeks, one Algerian, two Israelis, and an Austrian. Those wounded involved an even wider range of nationalities (Mickolus et al., 1989). The fact that one nation takes action to protect the citizens against the general threat of terrorism does not eliminate the need for other nations to take similar action. By reducing the general threat of terrorism, retaliation provides terrorism deterrence whose benefits are purely public over a large number of nations.

Retaliation also provides a lessening of country-specific costs, thereby yielding private benefits to the retaliators. By increasing the perceived costs of the terrorists, a retaliating nation will succeed in diverting attacks to other nations and their people and property, when these other countries have not retaliated (see Sandler and Lapan, 1988, for an analytical model). Quite simply, retaliation alters the relative costs perceived by terrorists as they decide where and whom to attack. Other private benefits to the retaliator include favorable world opinion, favorable public opinion of the constituents, and increased training for its military personnel.

Thus, we view retaliation as providing both pure public benefits and private benefits; that is, retaliation yields joint products. Given the huge costs imposed by the threat of terrorism, it is likely that the aggregate public and private benefits derived from retaliation are greater than the associated costs over *some* level of retaliation. Even if a country may gain from unilateral retaliatory strikes, the public benefit component of the joint product will create free-rider temptations that can limit optimality. In extreme cases when the public component dominates, no one may act.

The free-rider problem in the provision of public goods can be overcome through reciprocal agreements and collective action. In the case of the public benefits associated with terrorism reduction, however, the difficulties goes beyond that of overcoming the standard free-rider problem. A country may not only free ride on the terrorist retaliation of others, but it may be what we refer to as a paid rider on such retaliation. In effect, one country can destroy for compensation some of the public good that other countries are providing. For example, the Reagan administration has accused the Greek government of a tacit agreement with Arab terrorists, whereby such terrorists agree not to operate in Greece in exchange for Greek leniency towards terrorists who get in trouble (*The Economist*, 1984: 1). We view the provision of safety to the terrorists as a degree of negative retaliation that reduces the effectiveness of the retaliation of others.

The public good problem with the possibility of paid riders, as it pertains to

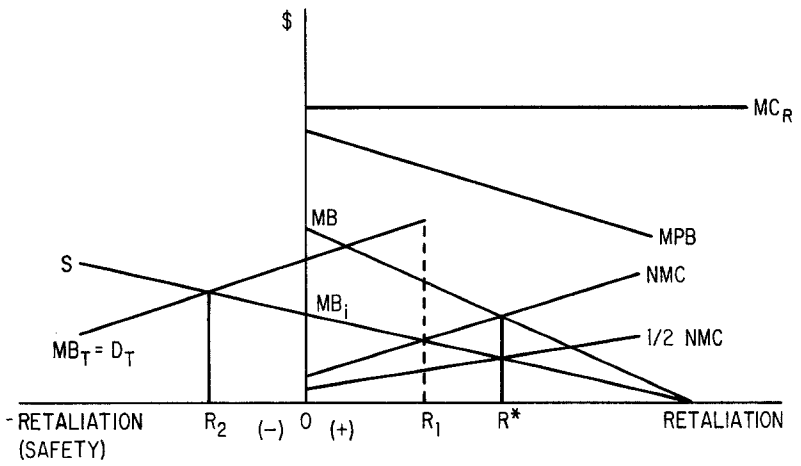

Figure 1. The paid-rider case

realizing the optimal government retaliation against terrorism, can be analyzed diagrammatically. In order to minimize complexity, we limit the analysis to two nations, both of which are assumed identical with respect to the costs and benefits of retaliating against terrorists. Moreover, we assume that retaliation, and its undoing, can be measured along a single dimension. In the first quadrant of Figure 1, the marginal public good benefit, realized by each country from retaliation, is denoted by MB_i, with the vertical summation of this curve over the two countries given by MB. This vertical sum measures the purely public marginal benefits for each level of retaliation. If, say, four nations faced the terrorist threat, then four MB_i curves would be vertically summed to generate MB. In addition to these public marginal benefits, the retaliating nations receive marginal private benefits (MPB). In Figure 1, the downward sloping MPB curve represents these marginal private benefits. Unlike the marginal public benefits which are received by all nations facing the terrorist threat, the marginal private benefits are only received by the retaliators and must be shared between them; hence, only a single MPB curve is drawn, while MB_i curves are drawn for each nation. For simplicity, we assume that retaliation is applied in such a way that the private benefits received by each retaliator remain equal at the margin.[5] The direct marginal cost of retaliation is assumed constant and is given by the horizontal curve MC_R. To obtain the marginal costs of retaliation, net of the marginal private benefits associated with retaliating, MPB must be vertically subtracted from MC_R. This net marginal cost of retaliation is given in NMC in Figure 1. As MPB falls, NMC rises, since NMC is the difference between MC_R and MPB, and MC_R is constant. The optimal retaliation is determined by the intersection between MB and NMC, and is denoted by R* in Figure 1. At this intersection, the following equality is satisfied:

$$\sum_i MB_i + MPB = MC_R, \quad (1)$$

which agrees with the necessary conditions for Pareto optimality in the case of joint public and private benefits (Cornes and Sandler, 1984: 581–584). Alternatively, the optimal retaliation can be located at R* by vertically summing MB ($= \sum_i MB_i$) *and* MPB and then finding the intersection of this sum with MC_R.

Obtaining the optimal retaliation of R* requires joint action based on a cooperative agreement between the two nations. If the direct marginal cost of, and the marginal private benefits from, retaliation are shared equally, then the net marginal cost of retaliation for each nation would be given by ½ NMC = ½ (MC_R – MPB) in Figure 1, and each country would be motivated to retaliate in an optimal fashion. If, however, each nation were left to retaliate on its own, then the incentive faced by each would result in a suboptimal level of retaliation. Consider the net marginal cost of retaliation for, say, nation 1 if it retaliates unilaterally. Since nation 1 would be responsible for all of the direct marginal cost of retaliation, MC_R, the net marginal cost of retaliation curve equals MC_R minus that portion of the marginal private benefits from retaliation received by nation 1. The assumption invoked here, and the one most conducive to nation 1 acting unilaterally, is that it can retaliate in such a way that it secures all of the marginal private benefits from retaliation. In this case, the net marginal cost that nation 1 incurs from retaliation is NMC in Figure 1. In addition, it is assumed that nation 1 has no control over the distribution of the public benefits that its retaliation provides; i.e., the MB_i curve in Figure 1 continues to apply to nations 1 and 2.[6] The maximum amount of retaliation that nation 1 will be motivated to inflict unilaterally on terrorists is R_1, where MB_i intersects NMC.

According to the standard public good analysis, the best that either country can hope for by refusing to contribute to retaliation is, in the situation described in Figure 1, to benefit from a retaliation of R_1 as a free rider. If, for example, country 2 can convince country 1 that under no circumstance would it engage in any retaliation, then, and only then, would it unequivocally pay country 1 to expand retaliation unilaterally to R_1. But this best free-rider or independent-adjustment possibility may not be much better, and indeed could be worse, than the situation that could be realized by joint action – i.e., retaliation R* in Figure 1. This is particularly true given our assumption that nation 2 receives no country-specific, or private benefits as a free-rider. Hence, there would appear to be a strong incentive for the two countries to enter into an enforceable agreement that apportioned retaliation expenses and benefits in such a way (equally in our example) that the optimal retaliation R* is achieved.

The standard public good analysis, however, overestimates the motivation for collective action in the case of retaliation against terrorists. In particular, a victimized country has the option to 'sell' some of the terrorism reduction

being generated by the retaliation of others by accommodating the terrorist group through the offer of a safe haven in return for assurances that the terrorists direct their attacks elsewhere. The safe haven offer offsets the retaliation of others and may even make for a *net* negative level of retaliation when the sanctuaries provide strategic positions from which to strike. In fact, a country may perceive advantage from such a deal with terrorist groups even if no retaliation is being carried out by other countries.

Agents, who sell the public good provided by others, are called paid riders. Returning to Figure 1, we can illustrate the paid-rider behavior with the help of two curves. We begin at the independent-adjustment equilibrium, R_1, for nation 1 in Figure 1 and extend the paid rider's MB_i curve into quadrant II where retaliation (safety) is negative (positive). When country 2 sells safety from level R_1 of retaliation achieved through country 1's effort, country 2 incurs the marginal opportunity cost of foregone marginal benefits, MB_i. The larger is nation 2's offer of safety to the terrorists, the greater the loss of MB_i as overall retaliation falls from level R_1 and eventually becomes negative. In essence, the MB_i curve, when extended to the left from the dashed line R_1, depicts the paid rider's supply of safety curve.

The demand curve for safety, D_T, belongs to the terrorists, who seek the safe haven. This demand curve is drawn to the left from the existing level of retaliation, R_1, and is merely the marginal benefit, MB_T, that the terrorists associated with each level of safety or retaliation amelioration. As is standard, the marginal benefit curve is drawn downward sloping. The paid-rider equilibrium with the terrorists results at R_2 where $MB_i = MB_T$ or demand equals supply. Hence, the paid rider will respond to the opportunities displayed in Figure 1 by reducing effective retaliation from R_1 to R_2. The paid rider benefits from selling the public good (and in the process destroying it) that the retaliator is providing.

In the situation just described, country 1 will obviously have little motivation to continue its retaliation since the paid rider's behavior eliminates the public benefits that country 1 would otherwise receive from retaliation. In the paid-rider scenario, country 1 would have an incentive to retaliate if its marginal private benefit curve was above MC_R over some positive range. Even if MPB is not above MC_R, a positive net level of retaliation may characterize the paid-rider equilibrium, provided that the terrorist MB_T curve was sufficiently steep.

As Figure 1 is constructed, there is an incentive to contribute unilaterally to terrorism reduction through retaliation in the face of free-riding. In the absence of collective action, the likelihood of retaliation is reduced when paid riding is compared with free riding. Even when retaliation does occur through unilateral action, the retaliation will be less with a paid-rider than with a free-rider equilibrium.

3. Further implications and observations

The agents, involved in the policy decisions concerning retaliation, are either elected officials or their surrogates, who are responsive to their elected superiors. Public choice has taught us that such officials will judge the stream of benefits and costs derived from a policy based on a discount rate reflecting their expected office length. Decision makers, whose remaining term is short, will use a high discount rate. The basis for concluding that governments do apply excessively high discount rates is based on the inability to specify and enforce transferable property rights in outcomes of political decisions. Because what might be called 'political capital' is nonmarketable, the political representative who acts so as to provide valued future outcomes cannot 'sell off' the portion of the accumulated value that his decisions have generated at the end of his tenure in office. And, indeed, his tenure in office will depend on satisfying the demands of constituents who similarly cannot sell the enhanced future value that their current sacrifice and political patience could generate.

We have seen in the case of the Libyan air strike that terrorism against U.S. and British interests increased initially, but, at a later date, terrorism against these interests decreased. If governments apply an excessively high discount rate in evaluating tradeoffs between current costs and future benefits, then the lagged benefits from retaliating against terrorists might be given too little weight relative to the immediate costs, costs which include both the direct cost of retaliating and the *temporary* cost of an increase in terrorist attacks. This political myopia will serve to reinforce the suboptimality associated with paid riding. In fact, the paid-riding option represents a 'quick fix' action whose benefits are immediate since incidents will drop as soon as the accommodation is reached. Costs from paid riding are more long term and result when terrorists fail to honor their commitments.

Many terrorists incidents staged in Western Europe are of Middle Eastern origin. The U.S. Department of State (1986: Table 1) reported 74 such incidents in 1985, 61 in 1984, 33 in 1983, 40 in 1982, and 33 in 1981. Terrorist expert Paul Wilkinson (1986: 49, 53) and others have noted the Greek, Cypriot and Italian governments' willingness to accommodate Palestinian terrorists. The same paid-rider behavior has been attributed to the French government with respect to both Palestinian and Basque terrorists (Mickolus et al., 1988, 1989). In the case of France, the government experienced firsthand the costs associated with the terrorists breaking their pledge during a bombing campaign staged in February, March and September 1986 by the Committee for Solidarity with Arab and Middle East Political Prisoners (CSPPA). The CSPPA was demanding the release of three terrorists – George Ibrahim Abdallah, Anis Nakkash and Varadjian Gardijan – jailed in France. In the case of Italy, the *Achille Lauro* hijacking and its aftermath caused the Italian government to reexamine

its handling of suspected terrorists.

Paid-rider behavior is not unique to Europe.[7] In Africa, the African National Congress (ANC), which targets the Republic of South Africa, sought and gained sanctuary in Mozambique during the early 1980s. At the same time, the Mozambican National Resistance Movement (RENAMO), which targets Mozambique, had a paid-rider accommodation with the Republic of South Africa. On 16 March 1984, the Mozambican and the South African governments signed a nonaggression pact, pledging to end one another's provision of safe haven to the ANC and RENAMO, respectively. The nonaggression pact has since broken down; paid riding had won out as the dominant strategy! Yet another example is the safe haven granted by the Ethiopian government to the Sudanese People Liberation Army.

Another important implication of paid riding concerns the mix of private and pure public benefits that countries derive from retaliation. The standard public goods argument would imply that the greater the private benefits that a country receives from retaliation, the greater the incentive that the country has to retaliate. This conclusion may not hold when paid riding is an option. Countries that could receive significant private benefits from reducing terrorism through retaliation might perceive even greater private benefits from selling negative retaliation to terrorists. These perceived tradeoffs depend on the country's share of marginal private benefits (MPB) from retaliating, the terrorists' offers for sanctuary and the associated marginal costs. Paid riding represents a greater source of inefficientcy than free riding.

4. Other examples of paid riding

Although we have focused our discussion on paid-riding behavior as it relates to retaliation against terrorism, the concept is now shown to apply to other public good situations. In the provision of deterrence against military attacks, nations facing a common enemy must decide whether to form an alliance and share the public benefits of deterrence derived from the common arsenal or to go it alone. Nations both inside and outside the alliance may choose to free ride on the defense expenditures of others (Olson and Zeckhauser, 1966). When applied to the provision of deterrence, a paid rider can, for example, accommodate an enemy by permitting its ships to use the paid rider's harbors and territorial waters or by lighting its coastline to assist the enemy in aerial attacks on others. Once again, the paid-rider behavior can destroy the deterrence created by the actions of others. During World War II, Ireland and Sweden were accused of such behavior.

The paid-rider phenomenon also applies to crime prevention. The U.S. and Western European nations have been trying to curb the sale of illegal drugs.

In isolation and, at times, together, these countries have expended resources to deter the trade of illegal drugs. This deterrence is a pure public good to nations wanting to see an end to this drug trade. Other governments, such as Panama, have allegedly been a paid rider to the Columbian drug dealers by giving them safe haven and allowing the drugs to pass through the country.

Paid riders can also surface in regards to environmental management when one agent undoes the pollution removal efforts of others. Suppose that three countries' coastlines border a common sea. Suppose further that the industrial activities in the three countries have caused the cumulative pollution levels in the common sea to surpass levels deemed a health risk. The first two countries may form an agreement to curb their pollution activities and to take steps to clean up the sea, thereby conferring the public good of reduced pollution on the third country. If this third nation refuses to join the pollution-removal pact, then two options remain: free riding and paid riding. As a paid rider, it can clandestinely contract with firms in noncoastal states to dump their pollutants as the pollution levels in the sea are reduced by the actions of the two-nation pact. If the paid rider releases pollutants at a sufficiently slower rate than the clean-up rate, the paid rider's behavior may go undetected. The pact's monitoring abilities are crucial here and may not be up to the task for such nonpoint-source pollution problems. When natural seepage of pollutants are present, the task of catching the paid rider becomes even more difficult. Even when the problem of new pollutants are discovered, each country in the pact may suspect one another!

5. Conclusions

The model of retaliation developed here is admittedly simplistic in several ways. First, a continuous scalar variable has been used to measure retaliation when, in fact, retaliation is best described as a vector of possible actions. Rather than considering the optimal amount of retaliation, a more complete model would address the question of the optimal mix of retaliatory responses. Second, the jointness assumption employed here may, in fact, be more complex, consisting of vectors of private, pure public, and impure public benefits. Third, we have assumed that sufficient intelligence exists to identify who are the responsible terrorists and where they are located. When the U.S. retaliated against Libya for the La Belle Discotheque bombing, the Reagan administration claimed indisputable evidence linking Libya. Evidence, however, gathered in the 29 March 1986 bombing of the German-Arab Friendship Society in West Berlin suggests that Syria, not Libya, may have been behind the discotheque bombing (Mickolus et al., 1989). The intelligence concerning a Syrian connection also came from revelations during the trial of Nezar Hindawi for the 17

April 1986 attempt to blow up El Al flight LY016. Terrorism intelligence is especially difficult since each incident is typically claimed by a host of groups, none of which may be the true culprit.

The first and second problems of our model are easily rectified since our framework can be extended with little difficulty to include these complications. Even if these complications, as well as others, are incorporated into the analysis, there is no reason to believe that the paper's conclusions would be altered. Retaliatory responses will be suboptimal. Moreover, paid riding will still be a strategy that may dominate others including free riding. Surely, the paid-rider strategy has a place in the analysis of collective action. Only when such dominant strategies are understood, can policy be created to overcome them.

Notes

1. The facts from this paragraph are taken from Mickolus et al. (1989).
2. These figures are reported in *The Economist* (1988: 43) from a soon-to-be published U.S. Department of State report.
3. On terrorist rationality see, e.g., Atkinson, Sandler and Tschirhart (1987), Kirk (1983), Lapan and Sandler (1988), Landes (1978), Sandler and Scott (1987), and Sandler, Tschirhart and Cauley (1983). Also see the references cited in these articles.
4. The convicted bomber, Nezar Hindawi, confessed after his arrest that Syrian military intelligence had promised him $250,000 if he planted a bomb aboard the plane. Hindawi hid his bomb in the hand luggage of his pregnant girlfriend.
5. Some allocation of the private benefits is required for purposes of aggregation, and the equal-marginal allocation is a reasonable one in the case of cooperation between two similar countries.
6. Clearly, a country has more influence on the distribution of private rather than public benefits through the type of retaliation that it chooses. To assume that it is possible to break the connection between the provision of private and public benefits from retaliation, as we have done, is admittedly strong. The justification is that it makes the incentive for unilateral action in the face of free riding as strong as possible, which weakens the suboptimal retaliation proposition being put forth in this paper.
7. The facts from the paragraph are taken from Mickolus et al. (1989).

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