ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Konrad, Kai A.

Working Paper

Terrorism and the state

WZB Discussion Paper, No. FS IV 02-15

Provided in Cooperation with:
WZB Berlin Social Science Center

Suggested Citation: Konrad, Kai A. (2002) : Terrorism and the state, WZB Discussion Paper, No. FS IV 02-15, Wissenschaftszentrum Berlin für Sozialforschung (WZB), Berlin

This Version is available at:
https://hdl.handle.net/10419/51065

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

WZB

WISSENSCHAFTSZENTRUM BERLIN
FÜR SOZIALFORSCHUNG

SOCIAL SCIENCE RESEARCH
CENTER BERLIN

discussion papers

FS IV 02 – 15

Terrorism and the State

Kai A. Konrad

September 2002

ISSN Nr. 0722 - 6748

Forschungsschwerpunkt
Markt und politische Ökonomie

Research Area
Markets and Political Economy

Zitierweise/Citation:

Kai A. Konrad, **Terrorism and the State**, Discussion Paper FS IV 02-15, Wissenschaftszentrum Berlin, 2002.

Wissenschaftszentrum Berlin für Sozialforschung gGmbH,
Reichpietschufer 50, 10785 Berlin, Tel. (030) 2 54 91 – 0
Internet: www.wz-berlin.de

ABSTRACT

Terrorism and the State

by Kai A. Konrad*

This paper considers terrorism as an extortion activity. It uses tools from the theory of extortion and from conflict theory to describe how terrorism works, why terrorism is a persistent phenomenon, why terrorism is a violent phenomenon, and how retaliation affects the outcome. The analysis highlights the importance of information aspects and discusses some aspects of the organizational design.

Keywords: Terrorism, extortion, credibility, retaliation, Ismaili
JEL classification : C72, D72, D74

ZUSAMMENFASSUNG

Terrorismus und der Staat

Anhand der frühen terroristischen Organisation der Ismaili aus dem 11. bis 13. Jahrhundert wird deutlich, dass zwischen Schutzgelderpressung und Terrorismus keine klare Trennlinie existiert. Die Ismaili waren zeitweise als Staat organisiert, teilweise eine Organisation ohne eigenes Territorium. Sie nutzten die gleichen Instrumente zur Durchsetzung politischer, religiöser und rein finanzieller Ziele. Diese strukturelle Äquivalenz wird genutzt, um einige Ergebnisse aus der Theorie der Schutzgelderpressung für das Verständnis der Funktionsweise von Terrorismus abzuleiten. Die formale Analyse konzentriert sich dabei auf ein fundamentales Informations- und Glaubwürdigkeitsproblem, das anhand der Berichte über die Ismaili deutlich wird. Dieses Informationsproblem kann erklären, weshalb Terrorismus ein mehrperiodisches Phänomen ist, warum Terrorismus mit Gewalt einhergeht, weshalb Terroristen eine öffentliche Sichtbarkeit ihrer Anschläge bevorzugen und wie Gegenschläge und Versuche der Zerschlagung einer terroristischen Organisation in diesem Zusammenhang zu bewerten sind. Kurz werden weitere Aspekte diskutiert, die für das Verständnis von Terrorismus wichtig sind, in der formalen Analyse aber ausgeblendet werden.

* I thank Helmut Bester, Frank Cowell, Amihai Glazer, Mats Lundahl and Stergios Skaperdas and the participants in presentations in Berlin and Venice for comments and suggestions. The usual caveat applies.

1 Introduction

An increase in the frequency and the scale of terrorism[1] in the US and Israel, rumors about further attacks in other Western countries, the attempt to retaliate in Afghanistan, and various changes in privacy laws and restrictions on human rights have recently generated much interest in terrorism in the various branches of social sciences. However, terrorism is an old, even ancient phenomenon, going back more than a thousand years, and the scientific study of terrorism is also not new.

I will define terrorism with the words of Thomas Schelling (1984, 315) who writes "My dictionary defines terrorism as 'the use of terror, violence, and intimidation to achieve an end'. And to terrorize is 'to coerce by intimidation to achieve an end'." I will focus on an interest group exerting violence and intimidation vis-a-vis single states and I will not be more specific as regards the ends, except that the state can grant them at some cost.

Drawing on reports about the *Ismaili* (also called *Assassins*), an ancient, and extremely successful terrorist organization that was active in the Middle East for about two hundred years during the Crusades, I will show that, in structural terms, terrorism resembles an extortion activity. The history of the Ismaili will reveal that no clear dividing line can be drawn between ordinary extortionary threats of violence used by well-organized groups such as the Mafia, bandits, or robber barons, and ethnic or religious groups that commit terrorist acts, with respect to both the extortion mechanism applied, and the ends pursued by these groups.

I will therefore use earlier results on extortion to describe terrorism in economic terms. The analysis highlights problems of observability, credibility, and commitment on the side of both the terrorist group and the state that may consider retaliating. These problems explain a number of stylized facts about terrorism. First, terrorism is violent. Second, terrorism is a persistent phenomenon in which threats, terrorist attacks, and retaliation occur repeatedly. Third, terrorist groups may dissolve after a massive strike against them, may disappear for some time and re-appear, or dissolve after achieving many of their goals. Fourth, the terrorist group benefits from a successful attack, particularly if there is no retaliation. Given these insights, one can then ask the policy question of how terrorism can be fought. Once

[1] The quantitative importance of terrorism is difficult to assess, but it is clearly an empirically relevant phenomenon. For instance, the homepage of the International Policy Institute of Counter-Terrorism (http://www.ict.org.il/inter_ter/frame.htm) provides a data set that counts 1173 terrorist incidents world wide between 1988 and spring 2002, and 868 with at least one person killed. Among these, the more frequent types of attacks were bombings (298 of the total), kidnappings (154), and shootings (354).

again, drawing on the literature on extortion will be useful.

Although this is not a survey of terrorism research, some main sources of references should be mentioned here. A most comprehensive survey on terrorism research is by Enders and Sandler (1995) who look at both empirical and theoretical work on terrorism. Henderson (2001) provides an interesting reference guide. The main issues in the empirical work are which macro factors can explain terrorist attacks (Enders and Sandler 2000, Sandler and Enders 2002, O'Brien 1996), the role and effectiveness of prevention measures, and the economic consequences of terrorism, e.g., for tourism (Enders and Sandler 1996, Enders, Sandler and Parise 1992, Abadie and Gardeazabal 2001). Some theoretical aspects are related to issues such as the terrorists' target selection problem, free riding strategies of countries in an international environment (Lee 1988), negotiations with terrorists (Lapan and Sandler 1988), or the terrorist's choice problem of whether to become a hijacker (Landes 1978). The analyses that are most closely related to the ideas about extortion are those of Scott (1989, 1991), who considers terrorists who are uninformed about the type of government they try to threaten, and Lapan and Sandler (1993), who consider terrorists who have private information about their total stock of arms and use part of this in a first attack, and for signalling their strength. Since they consider a signaling game, they are faced with a major equilibrium selection problem.

In the extortion game considered here, no signaling occurs. A crucial difference to standard credibility problems with type uncertainty is that the terrorist group's type is endogenous and is chosen by the group. Although, with exogenous types, state intelligence that uncovers the terrorist group's type is useful, such intelligence can also be harmful, and lead to an equilibrium with terrorism which would not exist without this intelligence.

In the next section (section 2) I will briefly review aspects of one of the perhaps most successful terrorist groups in human history which illustrate the structural equivalence and similarity between terrorism and extortion. In section 3 I will consider the simple extortion game and will show why problems of observability of endogenously chosen types cause violence and why terrorism and extortion work only in repeated relationships. The aim is a better understanding of the actual interplay between a terrorist group and a state as two players, one of which extorts the other. Section 4 considers the more general infinite horizon case. Section 5 discusses the aspect of retaliation. Section 6 discusses several shortcomings and omissions in the main analysis, and section 7 concludes.

2 The assassins: terrorists or extortionists?

Consider terrorist groups and their behavior vis-a-vis the state. One party T threatens to inflict some harm on some other party S if party S does not deliver some more or less precisely articulated favors to party T. In some cases of terrorist acts, this relationship is perfectly obvious, for instance, if a terrorist group takes hostages and demands ransom, or an exchange of the hostages with prisoners of the state, threatening to kill the hostages. With bombing or assassinations, the case is slightly less straightforward, as there are no immediate demands tied to the bombing or assassinations. However, there seems to be a fairly clear understanding as regards what are the demands of, e.g., the ETA in Spain and France, or the IRA in Northern Ireland, and in which direction policy had to move in order to comply with their demands.

The close connection between terrorist threats and extortionary demands can be studied well with one of the oldest and most successful terrorist groups: the *Assassins* or Ismaili. Rapoport (1984), who compares this group with two other long-lasting ancient terrorist groups, describes this one, who was active almost for two centuries from 1090 to 1275, as a group that "seriously threatened the governments of several states, especially those of the Turkish Seljuk Empire in Persia and Syria." Their purposes were numerous. They used their threats to prevent other leaders from conquering their territory, and to influence other political leaders in religious matters, particularly leaders from the Muslim world. Last, but not least, they used their threats for extorting tribute from other political leaders of their time. For instance, the Christian King of Jerusalem is reported to have been a victim of their extortionary threats (Lewis 1967).

The Assassins' tools of extortion were simple but effective. Their leader could rely on a group of well educated and highly skilful young people who were able to make their way into the sphere of the political leaders of their time and who were willing to kill the respective leaders in public if the leader of the assassins orderer them to do so. The public element in terrorist attacks is important, because it enables the assassins to inform not only the state that is the actual victim of the attack about the group's power, but also other groups which could be extorted from as well. While I concentrate here on the case where the same state can be extorted from repeatedly, in Konrad and Skaperdas (1997) we concentrated on the case of many victims, which makes public observability of actual violence more effective. The recent literature on terrorism has emphasized the role of the modern mass media for spreading the information about successful attacks. However, the Assassins' example shows that a clever choice of terrorist attacks can achieve a similar publicity

without modern mass media.[2]

The Assassins typically found ways to gain access to their targets, and to become their trusted officers, ministers or servants. What is even more important, they gained the reputation of being able to attain, or to already have attained, positions among the intimates of the leader who was the target of extortion.

The mere existence of the following anecdote reported by Lewis (1967, p.116n.) illustrates their reputation very well:

> Even more startling is a story told by Kamal al-Din on the authority of his brother: 'My brother (God have mercy on him) told me that Sinan [the Assassin leader at that time] sent a messenger to Saladin (God have mercy on him) and ordered him to deliver his message only in private. Saladin had him searched, and when they found nothing dangerous on him he dismissed the assembly for him, leaving only a few people, and asked him to deliver his message. But he said: "My master ordered me not to deliver the message [unless in private]." Saladin then emptied the assembly of all save two Mamluks, and then said: "Give your message." He replied: "I have been ordered only to deliver it in private." Saladin said: "These two do not leave me. If you wish, deliver your message, and if not, return." He said: "Why do you not send away these two as you sent away the others?" Saladin replied: "I regard these as my own sons, and they and I are as one." Then the messenger turned to the two Mamluks and said: "If I ordered you in the name of my master to kill this Sultan, would you do so?" They answered yes, and drew their swords, saying: "Command us as you wish." Sultan Saladin (God have mercy on him) was astounded, and the messenger left, taking them with him. And thereupon Saladin (God have mercy on him) inclined to make peace with him and enter into friendly relations with him.'

The case of the Assassins illustrates a number of further relevant aspects of terrorism. First, terrorism can last a long time. In the case of the Assassins, the group was active and successful for about 200 years. Second, credibility

[2] The symbiosis between terrorists and the media has been noted by many researchers (see, e.g., Slone 2000, and Nelson and Scott 1992). An early policy response has been formulated by Frey (1999), who suggests that the authorities always name several, preferably conflicting groups as possibly responsible for the act of terrorism, because this makes an individual terrorist attack less rewarding for each individual interest group.

is crucial for its working, and the source of such credibility is investment in an effective organization combined with visible violent acts of punishment. As Lewis (1967, p.128) writes,

> There were many such sects and groups before the Ismailis [Assassins], but theirs was the first to create an effective and enduring organization.

Further, Lewis (1967, p.131) writes

> There had to be an organization capable both of launching the attack and surviving the inevitable counter-blow; there had to be a system of belief – which in that time and place could only be a religion – to inspire and sustain the attackers to the point of death.

The example shows that the working of terrorist threats is similar to the working of extortion, and studying how extortion works may help in understanding terrorism. I will pursue this goal by addressing the following questions.

First, how does the terrorist threat work in a static and in a dynamic context? In particular, I will show that repeated threats are the more effective. Indeed, terrorism is a persistent phenomenon.[3]

Second, what are the credibility and commitment issues? What are the relevant information problems?

Third, can the picture that results from such an analysis map the violent behavior of terrorist groups, the interaction of terrorism and politics, the slow process of political change, etc.? Violence is a distinctive feature of terrorism.[4]

[3]For instance, The Basque Fatherland and Liberty group (ETA) was founded in 1959 and continues to exist. Similarly, the IRA was formed in 1919 and is the clandestine armed wing of Sinn Fein, a legal political movement dedicated to removing British forces from Northern Ireland and unifying Ireland. These conflicts had considerable economic cost, but political change can be observed in both the Basque region and Northern Ireland that is in line with the official aims of the political branch of the terrorist groups. These groups are fairly new compared to ancient successful terrorist groups. As reported in Rapoport (1984), the *Thugs* existed in India in the seventh century and were still active in the 13th century; as discussed above, the *Assassins* were active for almost two centuries (1090-1275).

[4]The killing of others, destruction of property, or suicidal terrorist attacks reduce aggregate wealth or welfare and should therefore not occur in a perfect Coasian world. Hence, it is important to isolate causes for violence from both a positive and a policy oriented point of view.

Fourth, an analysis needs to clarify the role of retaliation. Is retaliation and destruction of the terrorist network in the interest of the victim of extortion, and does it increase welfare?

3 Basic aspects of extortion

The analysis starts with a simple static benchmark structure of extortion that is a variant of the structure analysed in Konrad and Skaperdas (1997, 1998a).

3.1 The full information one-period benchmark case

Suppose there are two parties, T(errorist) and S(tate) involved in a game that is described as follows. In STAGE 1 player T chooses whether to invest or not to invest in building up a network or an organization that allows T to carry out damaging acts to player S with zero further cost. The investment cost required for this punishment strategy is e. That is, T chooses its investment expenditure from the set $\{0, e\}$. In STAGE 2 player T approaches player S and demands a particular favor that benefits T by x if player S complies. The size of x is exogenously determined and not a matter of T's choice. In STAGE 3 player S decides whether to comply or not. If S complies, S has a cost of $C(x)$, and the game ends. If S does not comply, then, in STAGE 4, player T carries out a terrorist attack, if and only if, T has invested in stage 1 in building up an appropriate organization for carrying out the punishment at zero cost. If the punishment is carried out, it causes damage to player S equal to $D > C(x)$. It is straightforward to observe the following

Proposition 1 *In the full information one period benchmark case, investment and successful extortion takes place in the equilibrium if, and only if,* $x > e$ *and* $D > C(x)$.

The relationship between terrorists and states is complicated by a number of unobservability problems. For instance, the state, or the politician, or party who grants some rights knows the true size of this sacrifice, $C(x)$, or the actual cost incured in the terrorist act, but the terrorist typically does not. How big is the sacrifice for those who do not want to give in to IRA demands? What are the costs for Spain and for the Spanish government of granting more autonomy to the Basque region? Given that T has developed some credible extortionary threat, it may be able to choose its demand x and thus impose a straightforward rent extraction problem. If there is only one extortion period, as in the benchmark structure, and if T expects that the costs of compliance

are distributed according to some given distribution function, the solution is a straightforward maximization problem as discussed in Konrad and Skaperdas (1998a). With several extortion periods, the problem becomes more involved and player T faces a ratchet problem (see Konrad and Skaperdas 1998b). This ratchet problem may explain why extortionary threats lead not to major policy jumps, but to gradual adjustment processes. The ratchet problem may also explain if the state appears extremely restrictive with respect to the terrorists' demands initially, but may make concessions over time.

Second, the terrorist group must make an investment choice knowing that the government cannot observe this choice. The government must form an opinion about whether a terrorist group is forceful and long-lived or not. In line with Konrad and Skaperdas (1997), I will take the decision to form and maintain a terrorist network as endogenous. The terrorist group chooses its ability to carry out an act of punishment at no further cost, but the state cannot observe this choice, and the actual choice can be revealed only in the event of a punishment act.[5]

3.2 Unobserved investment - the choice of one's type

Suppose that, unlike the benchmark case, T's investment choice in stage 1 is unobserved by S. Then S must have some expectation about whether T has made the investment. In this case it becomes a dominant strategy for T not to invest, regardless of how small (but positive) the investment cost e is, and this makes it optimal for S not to comply with any demand made by T. This can be stated as

Proposition 2 *Extortion breaks down in the one-period context if the investment choice is unobservable.*

However, repeated interaction, even if finite, can make the extortion equilibrium re-emerge. Konrad and Skaperdas (1997) have shown this in a context in which a sequence of victims is approached by the extortionist, where the victims that are approached later observe whether the victims that were approached earlier complied or not, and whether they were punished in case of non-compliance. Here I consider the intertemporal problem in which a terrorist can extort from a state in successive periods. That is, period 0 is

[5] As mentioned in the introduction, Lapan and Sandler (1993) discuss whether and how terrorists can signal their true strength – defined as their exogenously given resource endowment– by using some of these resources in a deliberate terrorist attack, and Scott (1991, 1993) considers reputation mechanisms on the side of the government in line with Kreps and Wilson (1982).

as described in the one-period game, but there are future periods $t = 1, ...$ in each of which the stages 2 to 4 repeat.

The intuition can be made clear where there are two periods in which extortion can take place, where, for simplicity, I disregard any discounting, and assume that the investment can take place only at the beginning of period 0. These two assumptions will be relaxed later on. The reason why the no extortion result breaks down is as follows. In a no extortion equilibrium the payoff for T is zero. If T deviates from the no-extortion equilibrium and invests, the payoff is at least equal to $-e + x$. To see this, notice that S will comply in one period at least as non-compliance in both periods is not time consistent. If S does not comply in period 1, it is punished, and, from then on, knows that T has invested and is ready to again punish non-compliance in period 2. Therefore, if S does not comply in period 1 it complies in period 2. In any period which follows a period in which S had refused to comply, S has learned whether T can and will punish; hence, S complies if T had invested, and refuses to comply if T had not invested. The following proposition characterizes the 2-period equilibrium.

Proposition 3 *Let $x > e$ and $D > C(x)$. A perfect equilibrium in a two-period set-up with unobserved investment is characterized by a probability q_0 with*

$$q_0 = \frac{2C(x)}{C(x) + D} \tag{1}$$

by which T invests, a probability p_0 with

$$p_0 = \frac{e}{x}, \tag{2}$$

by which S refuses to comply in period 0 and where S refuses to comply in period 1 if, and only if, it refused to comply in period 0 and was not punished.

For a proof consider the investment probability that makes S indifferent whether to comply or not in period 0. The costs of compliance are $2C(x)$. The expected costs of non-compliance are $q_0(D+C(x))$. Equating these terms and solving for q_0 yields (1). Note that this q_0 is sufficiently high to make S strictly prefer to comply in period 1 if it has complied in period 0, as the indifference probability for compliance in period 1 is simply equal to $C(x)/D$ and is smaller than (1). Now consider p_0 that makes the terrorist indifferent between investing in period 0 or not. T's expected payoff from not investing is $(1 - p_0)2x$. The expected payoff from investing is $-e + (1 - p_0)2x + p_0x$. Investment reduces the payoff by the investment cost, but pays an additional x with a probability of p_0 because with this probability S refuses to comply

in period 0. In this case T receives zero when no investment occurred, and T receives zero in period 0 and x in period 1 if T has invested. □

According to Proposition 3, S refuses to comply with higher probability if the investment cost e is higher, or if x is lower. The result for repeated extortion has three features that map terrorism in the real world. First, if terrorist groups show up they are typically long-lived. The result here shows that repeated interaction is needed for terrorism to emerge, but (even finite) repeated interaction can solve a credibility problem in the extortion game. Second, the result also shows that violence is an equilibrium phenomenon. It is needed in order to reveal the terrorists' ability to carry out harmful acts. Third, the result shows that an actual terrorist act is valuable for the terrorist group. Apart from the self-confidence which is outside the scope of this paper, it reveals that the group's threat is credible and this is valuable. For instance, in the two-period game above, full information from the very beginning increases T's payoff from $(2x - 2e)$ to $2x - e$, whereas the payoff of S in both types of equilibrium is equal to $-2C(x)$.

The problem at hand straightforwardly generalizes to $N > 2$ extortion periods. However, with many periods, the assumption that the opportunity to build up an organization occurs once and for ever becomes less plausible, and discounting becomes a more important issue. An issue I will address first, however, is the choice of the terrorist's demands.

3.3 Endogenizing the demands

So far, the demand x of the terrrorist group has been considered exogenous, and constant over time. This may, but need not, be the case. In the context of T's observability problems, the endogeneity of x involves serious complications.

Consider period 1. If T was challenged in period 0, the outcome is clear: there will be non-compliance if it turned out that T was unable to punish, and there will be compliance up to a demand $\hat{x}$ with $C(\hat{x}) = D$ if T proved to be able and willing to punish in period 0. This reveals that a terrorist group, which has indeed a functioning organization, benefits from having the opportunity to carry out a punishment action.

If T has not been challenged in period 0, things are more complicated. No new information has been revealed. There will be many equilibria. Any demand $x_1 \in [0, C^{-1}(D)]$ can be an equilibrium. This can be seen as follows. Suppose that S thinks that a terrorist who makes a demand other than x_1 has not invested for sure, and refuses any such demand $x \neq x_1$. It may comply with x_1, however, if x_1 is not too high. Given these beliefs, the terrorist will never ask for any amount other than x_1 in the last period, because he will not

receive anything from making any demand different from x_1. Accordingly, x_1 is not well determined. But this is not only a last-period problem. More generally, if x is endogenous, it is possible to support many equilibria through S's beliefs about T's investment decision as a function of T's demands.

In Konrad and Skaperdas (1997) we discuss this issue and assume that x is chosen before the terrorist group makes the investment choice, so that the terrorist group's demands cannot be considered as a signal of the gang's actual demands. In this case we found that, from an ex-ante point of view, the terrorist group prefers to choose the highest possible demand that still leads to an equilibrium of the above type.

3.4 Infinite time horizon

Introducing a discount rate, the above analysis can be extended to the case with an infinite number of periods, with the investment in a terrorist network, extortion demands, terrorist attack etc. in each period. The difference from the former set-up in this extension is the idea that the terrorist group could invest at a later period if it has not invested earlier, particularly if this became observable because no terrorist attack followed non-compliance.

The game structure becomes as illustrated in figure 1. In period 0 in STAGE 1 the gang decides whether to invest and spend e on creating a network or organization, or to invest zero. The investment probability in period 0 will be denoted q_0. As in the finite horizon case, this investment establishes a punishment mechanism by which the terrorist carries out acts of punishment at zero further cost if (and only if) the state did not comply. Next, in STAGE 2, the terrorist group asks for a political favor. This favor is valued at x by the terrorist group and its size is exogenous, and the state's cost of granting this favor in the respective period is $C(x)$. Next, in STAGE 3, the government decides whether to comply or to refuse to comply. Let p_0 denote the probability with which the government decides to refuse to comply in period 0. In STAGE 4, if the government refuses to comply, the terrorist network will carry out a terrorist attack if, and only if, it is able to carry out such an attack, i.e., if it has invested in building up an organization. It simplifies the exposition (and possibly eliminates a few additional equilibria) to assume that the terrorist attack is triggered by a refusal to comply, instead of making this a matter of choice. The damage that is inflicted to the state if the act of punishment occurs is again denoted D. Accordingly, if this happens, the gang's investment becomes revealed and the government will comply in all future periods. If T has not invested in period 0, this also becomes observable at this stage. No damage is inflicted on S in this period. From here, the game starts from the beginning again in the sense that T can

decide again about whether to invest in a terrorist organization or not at the begining of period 1.

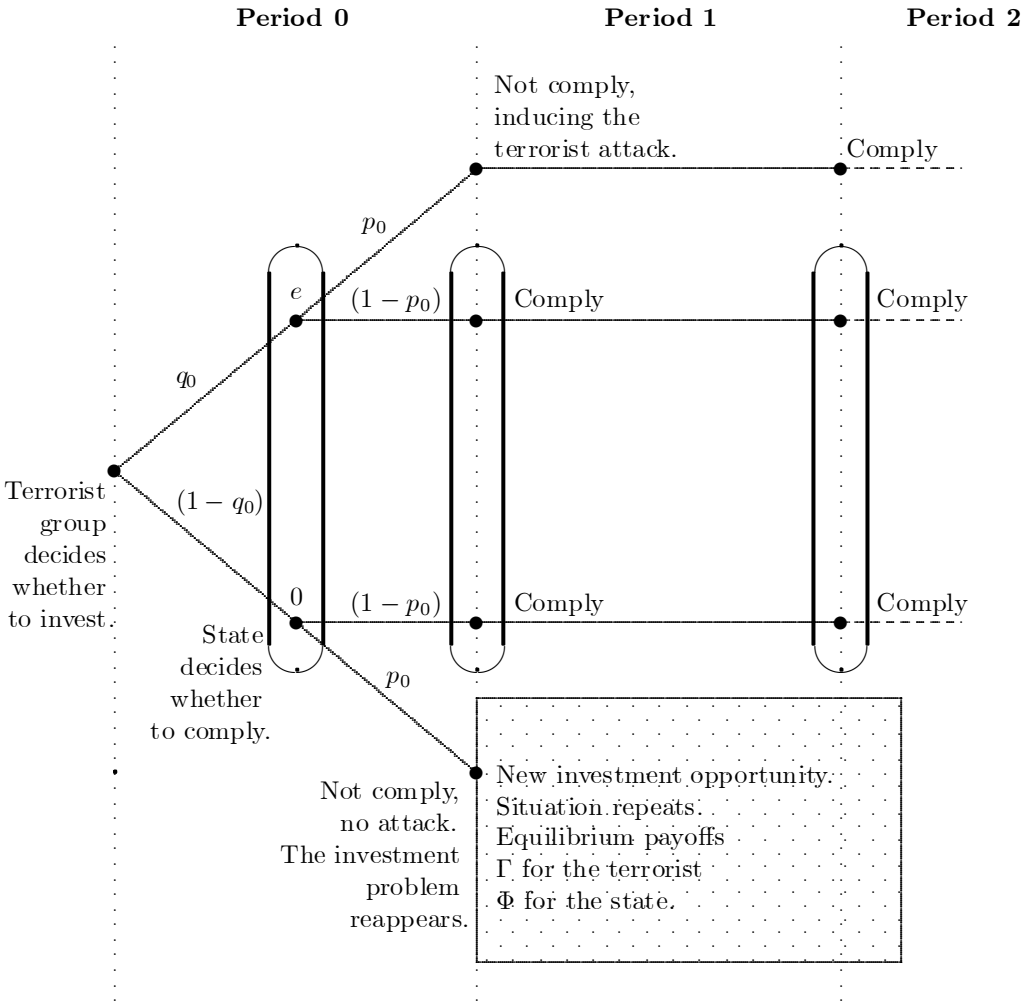

Figure 1: The infinitely repeated game

Consider next what happens if the state decides to comply in period 0. In this case no attack occurs. Further, it may be reasonable to assume that compliance is an irreversible decision, or to select a particular equilibrium path for the continuation games in which the government complied in a period t and assume that the state will comply for all future periods.

Solving for the equilibria of this game, denote Γ the equilibrium payoff of the terrorist group, and Φ the equilibrium payoff of the state, and let $\frac{1}{1+r}$ be the discount factor both for the terrorist group and for the state. Then, in

order to be indifferent between investing and not investing, it must hold in period 0 that

$$-e + (1 - p_0)\frac{x}{r} + p_0\frac{1}{1+r}\frac{x}{r} = \Gamma = (1 - p_0)\frac{x}{r} + p_0\frac{1}{1+r}\Gamma. \tag{3}$$

The left-hand side of (3) is the terrorist group's payoff from investing. It has to bear the investment cost e, and, with probability $(1 - p_0)$, it receives an annuity of size x which has a present value equal to x/r, whereas, with probability p_0, the state refuses to comply in period 0, and this triggers the terrorist attack and reveals to the state that the terrorist group has invested. Accordingly, the state will comply for all future periods from period 1 onwards. The right-hand side of (3) is the present value from not investing in period 0. In this case there is also a probability $(1-p_0)$ by which the state complies, leading to a flow of benefits with a present value equal to x/r. With the remaining probability p_0, the state does not comply. No attack occurs. It becomes observable that it has not invested in the organization that is required to carry out the terrorist threat. At this point, the situation is similar to the one in period 0 and the terrorist group may reconsider whether or not to invest, and it should be able to generate the same equilibrium payoff from the extortion game starting one period later.

The conditions (3) yield an equilibrium value of p_0 (and similarly for all periods in which the government gets a first chance to refuse to comply with the terrorist group's demands) equal to

$$p_0 = \frac{1}{2x}\left(-e + \sqrt{(e^2 + 4xe)}\right)(1 + r) \tag{4}$$

The terrorists' advantage of having invested in a given period in which the government decides not to comply with the terrorist group's demands becomes smaller in this set-up than if the investment choice is a unique opportunity as in the previous set-up. Instead of establishing the reputation of being able to carry out a terrorist attack, the terrorist group can simply start establishing this reputation one period later by investing a period later.

The state is indifferent to whether to comply or to refuse compliance if T's probability for having invested fulfills the following condition:

$$\frac{C}{r} = \frac{1}{1+r}\frac{C}{r} + q_0 D$$

This makes use of the consideration that, in the period after non-compliance, whatever the outcome is the government will again be in a situation of indifference between compliance and non-compliance, and assumes that the

government will simply comply in this later period. The condition simplifies to

$$q_0 = \frac{1}{(1+r)}\frac{C}{D}. \tag{5}$$

Accordingly, the fact that the terrorist group has a repeated chance for investment does not change the equilibrium probability for investing in a given period, as this reduces to $q = C/D$ for $r = 0$. I summarize this result as

Proposition 4 *If investment is unobservable and the terrorist group has a new investment opportunity in each period, the perfect equilibrium with infinite time horizon and discount rate* $\frac{1}{1+r}$ *is given by (5) and (4) if the investment cost* $e > 0$ *is sufficiently small.*

In the long run, the probability that the terrorist group has made an investment in period t increases, and, converges towards 1 if t approaches infinity. Accordingly, if terrorists get a repeated opportunity to invest in establishing a network, eventually they will do this and eventually they will be successful with their agenda and make the government comply. This last result should not be taken too seriously because it is not robust and is caused by the assumption that T's investment lasts for ever and that a terrorist group never prefers to exit.

4 Retaliation

In the contexts considered above, non-compliance with the terrorist network's demands may, but need not, trigger a terrorist attack. The attack occurs if the terrorist network has the capability for carrying out the attack. If the terrorist group successfully attacks, this changes the prior beliefs regarding the terrorist group's investment choice. If the attack is successful, the state will fully comply with the terrorists' demands. This result explains why the government may dislike successful attacks (apart from the damage they cause) and why the terrorist group enjoys and celebrates successful attacks: they establish the terrorists' reputation.

However, this result rests on a strong assumption. The ability to carry out attacks does not depreciate. The state may try to destroy a terrorist group's network and its ability to carry out successful attacks. Indeed, an empirically relevant aspect of terrorism is that the state intensifies its antiterrorist effort when a terrorist attack has taken place and tries to retaliate. In the framework considered here, this retaliation could be seen as an attempt to destroy the terrorists' network and its ability to carry out future attacks, for

instance, because the terrorist group could increase its demands given that it has successfully established its ability to carry out attacks. After retaliation and destruction, it is then up to the terrorist group to consider whether to invest from the beginning, or to abstain from investment.

The ability to destroy the network, together with an ex ante commitment to destroy the terrorists' group's investment each time a successful attack has been launched, destroys the value of the information being revealed about the ability to attack successfully. The benefit of having invested compared to not having invested is that the state which refused to comply will comply if the terrorist gang has successfully proven its power, and may continue to refuse to comply if the terrorist group did not successfully attack. This benefit accrues not in the period in which refusal and attack took place, but in later periods and is based on the change in the state's perceptions about the terrorist group's choices. If the state manages to commit to destroying the investment once the investment has been revealed, the future benefit of investment can never materialize. This then implies that no investment ever takes place.

Note that this argument is independent of whether the terrorist group has the ability to reinvest in each period or not: it will not invest in the last period. It will also not invest in the second last period: an investment in this period could generate benefits only in the last period, and only if the government refused to comply and the gang attacked successfully, thus proving its abilities. But the destruction of the investment, particularly in this state, will eliminate this benefit. This argument continues up to the first period.

Also, for this argument to apply, it is not necessary to assume that the probability of success in retaliating and destroying the terrorist network, or the probability by which retaliation occurs, must be equal to 1. It is sufficient to assume that these probabilities are sufficiently high to induce the state to not comply next period. The following proposition summarizes this result.

Proposition 5 *If the state has a technology that can destroy the terrorist organization and can commit to use this technology as a reaction to an attack with sufficiently high probability, with endogenous unobserved investment by the terrorist this leads to an equilibrium without terrorism.*

5 Making the extortion game unprofitable

Consider the welfare implications of terrorism and possible policy options. First, in the extortion equilibrium above, the government is typically indiffer-

ent between compliance and non-compliance, or even strictly prefers compliance. Hence, it cannot gain from fighting terrorism. This is an unfortunate outcome and suggests that the only way out is to break this equilibrium. The analysis suggests several variables that can be influenced in order to achieve this goal.

First, the government can change the cost of compliance. A sufficient increase in compliance cost will make the mixed strategy equilibirum disappear. The structure of governance in a state may influence the compliance cost. If the head of state is known to have compliance cost that exceeds his or her cost of suffering a terrorist attack, this should lead to an extortion free equilibrium. Similarly, if the state's decision maker does not bear the cost of the terrorist attack, but suffers from the compliance cost, this will also lead to an extortion free outcome. Such structures are difficult to generate, however, particularly within given democratic institutions. Moreover, for this policy to work, it is essential that the extortion equilibrium fully disappears. As long as the mixed strategy equilibrium persists, the utility loss on the side of the state is independent of the particular equilibrium probabilities for investment and compliance.

Second, the mixed strategy equilibrium disappears if the cost of investing in a network become sufficiently high. There are two principal ways of changing these costs. One is to make attack more difficult, spend more resources on surveillance, tighten security control etc. To make such a policy sufficiently effective would mean a drastic change of our world, and imply a major sacrifice. The other means is to increase the terrorist's opportunity cost of investment. This may be the more viable way to go, even though it has its disadvantages and limits, too.

Third, as pointed out in section 4, commitment to sufficiently strong retaliation eliminates the terrorist group's incentives for investment. This conclusion, however, has to be considered with some caution. Retaliation may have side effects that are not considered in this simple extortion framework. For instance, retaliation may change (and actually lower) the terrorist group's future cost of investing in an organization if it makes it easier to recruit new members etc. So, while commitment to retaliate turns out to be a useful tool in the pure extortion framework, implementation should not occur without carefully considering these side effects. Some of these effects are discussed in the next section.

6 Important neglected aspects

The analysis here abstracts from many aspects that are important, and possibly crucial, in describing terrorism, and some of these aspects should be mentioned here more explicitly.

First, the terrorist organization operates within a larger and heterogenous society. Feelings of subgroups of this society towards the terrorist group matter.[6] The feelings of the population in Arab countries towards the terrorist organization and the states that were attacked, and which now intervene in the Arab region are an important factor and this aspect is absent in the considerations here. Also, attack and retaliation may cause new terrorist groups to emerge or change existing groups or the balance of power between them.

Second, I considered the state as a perfect agent on behalf of a homogenous population that does not include the terrorists. The state is neither a perfect agent, nor is the population homogenous, particularly in many regions where terrorist groups are active. Tensions between the government and some of the population in a country are important for the functioning of the terrorist threat. This is most obvious in situations in which a large share of the population sympathizes with the terrorist group, which may be the case more frequently in dictatorial states. Another aspect of this is the trend of giving up civil liberty rights under the terrorist threat. While it is not perfectly clear what the policy failure is, the loosening of privacy laws and the willingness to give up important human rights, even when these changes do not have an impact on the terrorist organizations and their operations, is puzzling.[7] It seems to be easy for governments to convince their citizens that

[6] I am not engaging in a study of whether, and under what circumstances, terrorism is considered a legitimate tool of politics, or how this depends on social or political factors and the correlation between own value judgements and terrorists' goals. There seems to be evidence that acts of terrorism are considered more or less legitimate, depending on the perceived goals, and the avaliability of alternative means to achieve these goals. To mention an example, in the recent Harris poll (see, http://www.contrast.org/mirrors/ehj/html/harris_poll.html) 89 percent of the respondents answered that killing people is sometimes justified when asked the question "During World War II, a group of German officers set up a bomb to kill Hitler and nearly did so. Do you think that there are sometimes situations like this where it is morally justified to kill people if you have no other way to fight against a really bad government or leader?" 57 percent of respondents considered people fighting to overthrow undemocratic governments as freedom fighers rather than terrorists, and 58 percent of respondents answered that bombs can be justified when asked the question "Some terrorists or freedom fighters groups are fighting against governments that do not give their people the right to decide their own future by free democratic elections. Do you think that the use of bombs and guns against these governments can ever be justified?"

[7] Frey (1999) has also expressed concerns about the large willingness to sacrifice human

more surveillance and less privacy is an appropriate response to a terrorist attack.[8] Maybe a better understanding is needed of why privacy laws can improve welfare in a world in which the government is not a perfect agent on behalf of the citizens.[9]

Third, I do not consider the internal structure and organization of terrorist groups. As in the case of the mafia, this is an underresearched area, but for obvious reasons. On the other hand, to understand the emergence and formation of such groups and the astounding stability of the groups is important. Such organizational questions should be high on the research agenda.[10]

Fourth, I abstract from the fact that the government of the state that is the victim of the terrorist threat is a complex organization. Indeed, the organizational structure matters for whether a state can be extorted by a terrorist threat, or not. Returning to the Ismaili case study, Lewis (1967) reports evidence that the Ismaili successfully extorted from the Christian King of Jerusalem. However, they were less successful with the Hospitallers and the Templars, which were organizations of knights who were, to some extent, subordinates of the King of Jerusalem.[11] Not only did the Hospitallers and Templars refuse to pay tribute to the Ismaili, but the Ismaili were actually extorted from by the Templars. This difference is often attributed to the different types of government structure. According to Lewis (1967, p.121),

> This tribute was paid, explains Joinville, because these two orders feared nothing from the Assassins, since, if one master was killed, he would at once be replaced by another as good and

rights under the threat of terrorism. For the recent development in the US see Rathbone and Rowley (2002, p.17).

[8] There are examples for this in many countries. The U.S. is about to, or has taken already, measures as a reaction to September 11, 2001. In Germany, the terrorist group "Rote Armee Fraktion" caused a tightening of security laws, police and prosecution rights, and a reduction in privacy rights. Several other laws have been enacted recently that follow a similar pattern.

[9] A step in this direction is made in Konrad (2001) where I show that government failure of a welfarist government may be reduced by an information asymmetry between the government and private individuals.

[10] It is unclear whether the internal coherence and the functioning of the chain of command inside such organisations can be explained on purely economic grounds. The Ismaili may have carefully instilled the actual assassins with certain preferences and beliefs about the post mortem state. It is most likely that there are also sanctions that make it costly for a group member to defect. As has been discussed in the context of the Mafia (Polo 1995), the understanding of the internal structure and incentive mechanisms of such organizations is important for understanding, and possibly for undermining, these organizations.

[11] The precise relationship is more complicated. Their main superior was the Pope, and the degree of autonomy was considerable. See, e.g., Selwood (1999) for some details.

> the Assassin chief did not wish to waste his men where nothing could be gained.

Whether or not this can really explain the difference, is unclear. One may think that the considerations of the head of the Templars or of the Hospitallers and their willingness to pay to avoid a credible threat of being assassinated are not much different from those of a king, and it is unclear why their lower transaction cost of finding a successor should help. A different, and perhaps more convincing reason for the difference may result from the larger discretion the king has to allocate his wealth, compared to that of the head of the Hospitallers or Templars. The case reveals that organizational design matters for whether an organization is immune to extortionary threats or not, and this opens up an important question for future research.

Fifth, I make only a small step in putting terrorism into a wider perspective here. To invest and build up a terrorist organization must be seen as a matter of choice. On the individual scale, the trade-off between legal and illegal activities has been considered in the literature on crime and punishment, and an application of this in the context of hijackers is Landes (1978). However, the question of whether it is worthwhile to make the investment to form a complex organization has several more dimensions. Attitudes of groups in society matter, and attitudes towards, for instance, politically motivated assassination are most likely to depend on the political, economic and social situation, on the amount of oppression from others, and on the alternative options that certain groups in the society can exercise. When collectives are involved, expectations about co-players' attitudes and the likelihood of contagion also matter.

7 Conclusions

In this paper I used an early terrorist group to show that there is no clear cut distinction between extortion and terrorism. The group was a state and a non-state organization during different periods of its existence and used terrorism as an instrument to pursue political, religious and monetary goals. I used this structural similarity to draw some conclusions from the theory of extortion for a theory of terrorism, concentrating on a fundamental information problem. This information problem can explain why terrorism is a multi-period problem, why violence occurs, why terrorists prefer publicity, and how retaliation can, but need not, affect the equilibrium outcome in a beneficial way. I also discuss briefly the various determinants that cause a distinction between equilibria without terrorism and equilibria with terrorism,

and which determinants can more easily be influenced by political action. It should be emphasized, however, that the analysis of extortion abstracts from many aspects that are important, and possibly crucial, in describing terrorism, some of which may had to different policy conclusions.

8 References

Abadie, Alberto, and Javier Gardeazabal, 2001, The economic costs of conflict: a case-control study for the Basque country, NBER working paper no. W8478.

Enders, Walter, and Todd Sandler, 2000, Is transnational terrorism becoming more threatening? Journal of Conflict Resolution, 44(4), 307-332.

Enders, Walter, and Todd Sandler, 1996, Terrorism and foreign direct investment in Spain and Greece, Kyklos, 49(3), 331-352.

Enders, Walter, Todd Sandler and Gerald F. Parise, 1992, An econometric analysis of the impact of terrorism on tourism, 45(4), 531-554.

Enders, Walter, and Todd Sandler, 1995, Terrorism: theory and applications, in: Keith Hartley and Todd Sandler (eds.), Handbook of Defense Economics, vol. 1, Elsevier, Amsterdam, 213-249.

Frey, Bruno S., 1999, Economics as a science of human behavior: Towards a new social science paradigm, 2nd edition, Boston, Dordrecht and London: Kluwer Academic Publishers.

Henderson, Harry, 2001, Global terrorism, the complete reference guide, Checkmark Book, New York.

Konrad, Kai A., 2001, Privacy and time-consistent optimal labor income taxation, Journal of Public Economics, 79, 503-19.

Konrad, Kai A. and Stergios Skaperdas, 1997, Credible threats in extortion, Journal of Economic Behavior and Organization, 33, 23-39.

Konrad, Kai A. and Stergios Skaperdas, 1998a, Extortion, Economica, 65, 461-477.

Konrad, Kai A. and Stergios Skaperdas, 1998b, Backing up words with deeds, information and punishment in organized crime.

Kreps, David M. and R.Wilson, 1982, Reputation and imperfect information, Journal of Economic Theory, 27, 253-279.

Landes, W.M., 1978, An econmic study of U.S. aircraft hijackings, 1961-1976, Journal of Law and Economics 21, 1-31.

Lapan, Harvey E. and Todd Sandler, 1988, To bargain or not to bargain: that is the question, American Economic Review, Papers and Proceedings, 78(2), 16-21.

Lapan, Harvey E. and Todd Sandler, 1993, Terrorism and signalling, European Journal of Political Economy, 9, 383-397.

Lee, Dwight R., 1988, Free riding and paid riding in the fight against terrorism, American Economic Review, Papers and Proceedings, 78(2), 22-26.

Lewis, Bernard, 1967, The Assassins, A Radical Sect in Islam, Weidenfeld and Nicolson, London.

Nelson, Paul S. and John L. Scott, 1992, Terrorism and the media: an empirical analysis, Defence Economics, 3(4), 329-339.

O'Brien, Sean P., 1996, Foreign policy crises and the resort to terrorism, Journal of Conflict Resolution, 40(2), 320-335.

Polo, Michele, 1995, Internal cohesion and competition among criminal organizations, in: Gianluca Fiorentini and Sam Peltzman (eds.), The Economics of Organised Crime, Cambridge University Press, Cambridge.

Rapoport, David C., 1984, Fear and trembling, terrorism in three religious traditions, American Political Science Review, 78, 658-677.

Rathbone, Anne, and Charles K. Rowley, 2002, Terrorism, Public Choice 111, 9-18.

Sandler, Todd, and Walter Enders, 2002, An economic perspective on transnational terrorism, mimeo.

Schelling, Thomas C., 1984, Choice and Consequence, Harvard University Press, Cambridge.

Scott, John L., 1989, Deterring terrorism through reputation building, in: James E. Payne and Anandi P. Sahu (eds.), Defense Spending and Economic Growth, Westview Press, Boulder and Oxford, 257-268.

Scott, John L., 1991, Reputation building in hostage taking incidents, Defence Economics, 2, 209-218.

Selwood, Dominic, 1999, Knights of the Cloister, Templars and Hospitallers in Central-Southern Occitania, The Boydell Press, Woodbridge.

Slone, Michelle, 2000, Responses to media coverage of terrorism, Journal of Conflict Resolution, 44(4), 508-522.