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An Economic Analysis of the Aldo Moro Kidnapping and Assassination

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Abstract

In Rome, on March 16, 1978, the Red Brigades kidnapped Aldo Moro. They kept him a prisoner for fifty-five days, and ultimately killed him. Why did they decide to kill Moro ? It appears that they did not improve their situation by doing so. Our paper answers this question by building mainly on the model of kidnapping by Selten (1977). We develop an integrated game-theoretic model that reliably captures both the problem of kidnapping for some sort of non-monetary ransom and the problem of assassination of prominent political figures. We embed our model within the historical evidence surrounding the Moro case. We show that, in the Moro case, there is a continuum of equilibria implying the death of the hostage.

JEL Classification Numbers: C72, D74, H56, K41.

Key words: Kidnapping, game theory, terrorism.

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1 Introduction

In Rome, on March 16, 1978, the Red Brigades (*Brigate Rosse*, or BR), headed by Mario Moretti, kidnapped Aldo Moro. They kept him a prisoner for fifty-five days. On May 9, 1978, they killed him.

A five-time past prime minister of Italy, Moro was the highest and the most complete representative of the Catholic Political tradition, and one of the most authoritative leaders of the ruling Christian Democrat party (*Democrazia Cristiana*, or DC). A left-wing terrorist group inspired ideologically by Marxist-Leninism, the BR were very active in Italy in the 1970s.

Terrorism is a worldwide problem. Although hostage-taking acts are a small percentage of terrorist incidents, they represent some of the most spectacular events. Italy is not unique among European countries to have suffered from such influential terrorist events. For example, Direct Action (*Action Directe*, or AD), and the Red Army Fraction (*Rote-Armee-Fraktion*, or RAF) posed threats of the same basic type in France, and Germany[1]. However, the experience of Italy in the 1970 is representative of democratic society's conflict with extremist ideologies, and the Moro case is representative of such an experience.

Ever since this particular terrorist act entered public awareness, it was surrounded by mass media. Most of them depicted the BR as irrational extremists. From the economic perspective, such a hypothesis is irrelevant and potentially misleading. Terrorists, as evidenced by most of the existing research, are rational actors who make decisions consistently in pursuit of their own objectives. After the work of Selten (1977), Landes (1978), Sandler *et al.* (1983), and others, this is pretty well accepted (see, e.g. Llussa and Tavares, 2007a).

1.1 Motivation

According to Drake (2006), there are two groups of primary importance among those who have written about the Moro case.

On the one hand, there are the conspiracy theorists who claim that establishment entities, not the BR, were the real perpetrators of the crime against

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[1]The 1977 RAF bloody kidnapping and assassination of German industrialist Hans Martin Schleyer had a bedazzling effect on the BR. The 1978 Moro kidnapping was inspired by the 1977 Schleyer kidnapping.

Moro. The BR functioned mainly as a means to the ends desired by Moro's political enemies. On the other hand, there are the holdouts against conspiracy theories who claim that a historical analysis of the available evidence shows that mistakes cannot be redefined as crimes.

Leonardo Sciascia's *Affaire Moro* (1978)[2] has been the point of departure for the conspiracy literature whose Robert Katz's *Days of Wrath. The Ordeal of Aldo Moro: the Kidnapping, the execution, the Afternath* (1980), and Sergio Flamigni's *Tela del ragno* (1988) are two of the most complete samples available to date.

The central point in Sciascia's analysis is that the inability of the police to find Moro was not attributable to honest human error. In his 1980 book, Katz[3] highlights that the government would have had more of a hand in the murder of Moro than the BR. In his 1988 book, Flamigni emphasizes that the United States government along with its political allies in Italy wanted to eliminate Moro.

In contrast to the conspiracy theory, there are at least three books: Richard Drake's *The Aldo Moro Murder Case* (1995), Vladimiro Satta's *Odissea nel Caso Moro* (2001), and Agostino Giovagnoli's *Il caso Moro: Una tragedia italiana* (2005).

The central point in all these books is that Italy's leaders responded to the Moro crisis in a manner that does not justify condemnation. Even though many questions remain open in the Moro case, no evidence is available to confirm the conspiracy theories. The government, the police, and the secret-service agencies failed to save Moro, but they were not implicated in criminal and treasonous actions depicted by the conspiracy theorists.

In the debate presented above between the supporters of the conspiracy theory and the anti-conspiracy theory camp, the key issue is the government's

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[2]For Sciascia, as well as "for Poe's protagonist Charles Auguste Dupin, it was essential when investigating a crime, to be able to identify with the criminal" (p.35). Thinking that such a sound precept had been totally rejected by the police and the carabinieri, Sciascia tried to palliate as much as possible their failures by accurately studying Moro's letters from captivity. Sciascia himself gives us the most accurate summary of his book: "I have already said that this is a detective story" (p. 98).

[3]Katz contributed to the screenplay for Giuseppe Ferrara's film *Il caso Moro* premiered on 13 November 1986 and starred Gian Maria Volontè as Moro. This documentary-like film of the tragic kidnapping and subsequent execution of Moro was popular in Italy, where it caused a firestorm of controversy among politics.

role in opposing the BR. The controversy does not hinge on the direct responsibility of the BR. There is a consensus that the BR kidnapped Moro, kept him a prisoner for fifty-five days, and ultimately killed him.

In contrast to that consensus view, little or no attention has been paid to the rationale behind the fatal issue of the Moro bloody kidnapping and sequestration. The Moro case is striking because this is a case of kidnapping with murder of a prominent political figure. Why did the BR decide to carry out their threat to kill Moro, whereas it appears, *a posteriori*, that they did not improve their situation by doing so ?

The literature on the economics of terrorism is vast. Llussa and Taveres (2007b, 2007c) portray, in broad brush strokes, the scope and depth of this branch of economic research. In the light of these papers, it seems that kidnapping with murder is an issue that deserves attention but has received little in the past.

1.2 Related literature

To tentatively answer the question asked above, there are two kinds of economic models of terrorism that imply either kidnapping without murder or killing without kidnapping.

As regards killing without kidnapping of prominent political figures, recent economic contributions of interest are Frey (2007a, 2007b), Iqbal and Zorn (2006), Jones and Olken (2007), and Zusman and Zusman (2006).

Frey (2007a) uses the rational choice approach following the economics of crime to gain insights into the occurrence of political assassinations by distinguishing between the demand for killing politicians, and the countermeasures adopted by the possible victims. As regards the demand side of the problem, he highlights that a person may have an incentive to kill a politician to create chaos and to attract the attention of the media. As regards the supply side of the problem, he shows that there are different countermeasures against political assassinations: personal countermeasures, such as bodyguards, and material countermeasures, such as bullet-proof cars. Building on his analysis, Frey suggests that an extension of democracy and a strengthening of civil society significantly reduce the incentive to assassinate politicians. In a companion paper, Frey (2007b) argues that politicians are overprotected.

Through an analysis of all assassinations of heads of State between 1952 and 1997, Iqbal and Zorn (2006) investigate the extent to which the assassina-

tion of a head of State affects political stability. They examine the political consequences of assassination by assessing the levels of political unrest, instability, and civil war in States that experience the assassination of their head of State. They highlight the existence of an interactive relationship among assassination, leadership succession, and political turmoil. They find that assassinations' effects on political instability are greatest in systems in which the process of leadership succession is informal and unregulated.

Using a data-driven approach, Jones and Olken (2007) assess the impact of assassination. They focus on the assassination of national leaders and examine its effects on two important outcomes: institutional change and war. Their results show substantial effects of assassinations, informing theories of conflict and institutional change. They find the following: assassinations affect conflict, but only in limited contexts; assassinations of autocrats produce substantial changes in the country's institutions, while assassinations of democrats do not.

Zussman and Zussman (2006) evaluate the effectiveness of Israel's policy of assassinating members of Palestinian terrorist organizations by examining Israeli stock market reactions to these assassinations and attempted assassinations. They show that the reaction of investor perception to assassination attempts depends on the seniority and the role of the target. The market does not react to low ranked terrorists but the assassination of a senior political leader is seen as counter productive, whereas the assassination of a senior military leader is seen as productive.

As regards kidnapping without murder, the papers written by Selten (1977), Sandler *et al.* (1983), Atkinson *et al.* (1987), Lapan and Sandler (1988), and Enders and Sandler (1995) provide a comprehensive statement of the problem by focusing on terrorist incidents involving the taking of hostages for the purpose of gaining concessions such as prisoners' release[4].

Selten (1977) develops a simple game-theoretic model to gain some insight into the strategic problems faced by a kidnapper and by the hostage's family. Through the analysis of his model, he shows that it is never rational for the kidnapper to kill the hostage.

Sandler *et al.* (1983) present some "rational actor" models depicting the negotiation process between terrorists and government negotiators for those

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[4]In Lapan and Sandler (1988) however the failure of negotiation can be consistent with killing the hostage. Nevertheless, the authors assume that, once a negotiation takes place, it is always successful. This is contrast with what happened with Moro's kidnapping.

incidents where hostages are seized and demands are issued.

Atkinson *et al.* (1987) analyze terrorist negotiations in a bargaining framework and then test econometrically several bargaining theory hypothesis that involve bargaining costs, the duration of the incident, and bluffing, *i.e.*, exaggerated demands or threats that are not carried out. They provide evidence lending support to the view that bluffing works against the bluffer's final payoff.

Lapan and Sandler (1988) ascertain under what circumstances a government would want to precommit itself to a no-negotiation strategy. They show that the folk wisdom regarding the no-negotiation strategy - one should never bargain with terrorists since such negotiations encourage more hostage-taking by making it a profitable activity - does not withstand theoretical scrutiny. Their results are the backbone of the section on kidnapping in the survey written by Enders and Sandler (1995).

In light of these models, the fact that Moro was kidnapped and killed remains a riddle shrouded in controversy.

1.3 Objective

According to common wisdom, terrorists are irrational extremists with little intelligence. On the other hand, all currently available economic models imply either kidnapping without murder or killing without kidnapping. By contrast, evidence shows the following: the BR and the Andreotti government were rational and intelligent players who knew each other to be such; the BR kidnapped and killed Moro.

Among economic methods, game theory is particularly well-suited to provide new insights into the Moro case. First, game theory captures the strategic interactions among various agents as they act based on how they believe that their counterpart will act or react. Second, game theory may be tested and illuminated by history. There are many studies in economic history that either utilize game theory as their main analytical framework or examine the empirical relevance of game-theoretical insights (see, *e.g.*, Greif, 2002). History contains unique and, at times, detailed information regarding behaviour in strategic situations. History illuminates game theory and tests it. History supplies "factual grist for the game theorist's mill" (Mc Closkey, 1976, p.450). At last, by employing game theory, social scientists can draw broad, applicable principles of political order from specific historical examples (see,

e.g., Bates *et al.*, 1998). Their analytic narratives are brute sequences of events analyzed through extensive form games.

We cannot hope to end all the controversy about the Moro case, and to convert this disputed case into a consent judgment, but we shall try to clarify it as much as game-theoretic modelling will allow.

The objective of this paper is twofold. First, by building on all the models presented above, in particular on the model by Selten (1977), we develop an integrated game theoretic model that reliably captures *both* the problem of kidnapping for some sort of non-monetary ransom, and the problem of assassinations of prominent political figures. Second, we embed our game-theoretic analysis of kidnapping with murder within the traditional confines of narrative history by using the historical evidence surrounding the Moro case.

1.4   Structure

The rest of the paper is organized as follows. In section 2, we present the core elements of a simple two-person game of kidnapping. In section 3, we study the Nash subgame perfect equilibria of the game. In section 4, we discuss the interest and the limits of our model with regard to the literature on kidnapping and on the Moro case. Section 5 concludes.

2   The model

This section presents the core elements of a simple two-person game of kidnapping. The two players are a group of terrorists (henceforth denoted by T) and a State (denoted by S). In fact, there will be a third player, mother nature, but who will be a passive one.

We assume that the group of terrorists have kidnapped a politician and demand a ransom to the State. We shall use the game to model the negotiation process between the terrorists and the State in a simple way.

The game has nine nodes which are displayed in figure 1.

At the first node, $T1$ the terrorists demand a ransom equal to D ($D \in \mathbb{R}_+$). Then, at the next node $S1$, the State makes an offer C. At node $T2$, the terrorists may either accept (A) the offer, in which case node $N1$ is reached, or refuse (R) - then node $N2$ is reached (the hostage is then killed). At nodes

$N1$ and $N2$ nature plays. With probability q the terrorists are caught (and with probability $1 - q$ they escape the police).

Let us now comment the payoffs of the players. At each terminal node, the first expression corresponds to the terrorists' payoff, while the second corresponds to the State's one.

When the terminal node with the payoffs $(-x, 0)$ is reached, the terrorists have accepted the offer C of the State, but they have been arrested (so, the State's loss is nil since it is assumed that the offer C is caught too).

The next terminal node, whose payoffs are $(C, -C)$ corresponds to the case where the offer C has been accepted, the hostage is freed, but the terrorists have escaped the police.

When the terminal node with payoffs $(-z, -w)$ is reached, the offer of the State has been refused, and the hostage has been killed. This yields a loss equal to w for the State. However, the terrorists are captured and their loss is z.

The last terminal node is the most interesting one. This is where the difference shows up between our model and that of Selten (1977). At this node, the offer of the State has been refused and the hostage is killed (the State bears a loss equal to w). The terrorists have escaped and we model their gain as: $g + \theta(1 - C/D)$ where $\theta > 0$. This gain has two components.

The first component is term g which describes the gain or the cost of killing the hostage. This term can be positive if the terrorists expect that killing the hostage will enhance the chance of a revolution. This is the first difference with the assumptions used by Selten.

In the Moro case, g was actually positive. The stated goal of the BR was the destruction of the Imperialist State of the Multinationals (*Stato Imperialista delle Multinazionali*, or SIM), *i.e.*, the revolutionary overthrow of capitalism and the creation of a Marxist-Leninist dictatorship of the proletariat. By killing Moro, they hoped to ignate the whole revolutionary left, and plunge the political establishment into a crisis that would lead to its collapse.

At the last node, the offer of the State has been refused and the hostage is killed (the State bears a loss equal to w).The terrorists have escaped and we model their gains as: $g + \theta(1 - C/D)$ where $\theta > 0$. We assume that this gain is an increasing function of the difference between the ransom demanded by the terrorists (D) and the offer (C) made by the State. This can be

understood as follows: the higher the difference between the ransom and the offer of the State, the lower the psychological costs of killing the hostage. Our formulation is inspired from that of Selten, but we do not retain his probabilistic interpretation of the killing of the hostage. This is the second difference with his assumptions.

In the Moro case, the difference between the non- monetary ransom demanded by the BR and the offer made by the Andreotti government was the highest possible. In the eighth communiqué, delivered on 24 April, the BR stipulated the conditions for Moro's release. They offered to exchange Moro for thirteen individuals whom they named. It was a selection of BR, proto-BR and neo-BR prisoners. On 28 April, Andreotti refused even to consider the offer of a prisoner exchange. He irrevocably rejected the demand of the BR.

From a formal viewpoint, our model allows the terrorists to rationally choose to kill a hostage (whereas this is impossible in Selten's model: the death of a hostage is always accidental). We suppose that the terrorists have nothing to loose if the offer is too different from the ransom demanded.

Assumption 1 *We assume that the parameters x, z, w, θ, g are positive and that $0 < q < 1$. Moreover:*

1) $z > x$.

2) $g + \theta - \frac{q}{1-q}(z - x) > 0$.

The first assumption means that the costs for the terrorists of being caught are higher when they have killed the hostage than otherwise. In the Moro case, such an assumption is plausible because Moro's murderers have been caught, tried, and heavily sentenced.

The second assumption is a technical one. As will be seen, it ensures that the offer made by the State is increasing with respect to the ransom demanded by the terrorists.

Finally, we shall assume that whenever the terrorists are indifferent to killing the hostage or not doing so, they never kill him.

In the next section, we shall study the Nash subgame perfect equilibria of the game. The terrorist chooses D in $\mathbb{R}_+$ and so does the State for the choice of C.

3   Study of the game

Let us consider the last move, where the kidnapper has to choose to accept or to refuse the amount C of ransom proposed by the government.

If the terrorists accept its offer, their expected gain is:

$$-qx + (1-q)C \tag{1}$$

where q is the probability of being caught (in this case the terrorists loose x).

If the terrorists refuse the offer, their gain writes:

$$-qz + (1-q)[g + \theta(1 - \frac{C}{D})] \tag{2}$$

Recall that in this case, the gain of the terrorists comprises of a kind of resentment term, *i.e.* $1 - (C/D)$ which depends on the ratio of the offer to the ransom demanded initially (the lower C with respect to D, the higher the resentment).

Comparing the expected gains of the terrorists in the two alternatives, one gets:

Lemma 1 *The terrorists accept the proposal and free the hostage iff*

$$C \geq \frac{D}{\theta + D}[g + \theta - \frac{q}{1-q}(z - x)] \equiv C(D) \tag{3}$$

The right-hand side of the equation defines the smallest offer that the terrorists are ready to accept. Under assumption 1-(2), $C(D)$ increases with the demand D.

We now turn to the State move. From the preceding Lemma, we know that if $C \geq C(D)$, the hostage is saved. The expected gain of the State is then: $-(1-q)C$. This gain is clearly maximized if $C = C(D)$. If $C < C(D)$, the State's gain writes $-w$. We have:

Lemma 2 *The State decides to make the proposal $C(D)$ iff:*

$$C(D) \leq \frac{w}{1-q} \tag{4}$$

We define $\overline{D}$ as the highest value of the ransom that can be asked for the terrorists, *i.e.*, the value which satisfies the next two conditions:

$$C(\overline{D}) \leq \frac{w}{1-q} \qquad (5)$$

and

$$C(D) \leq \frac{w}{1-q} \Rightarrow D \leq \overline{D} \qquad (6)$$

We shall distinguish between two cases.

Case 1. $\frac{w}{1-q} < g + \theta - \frac{q}{1-q}(z - x)$.

In this case, it is easy to see that there exists a unique finite value $\overline{D}$ which satisfies $C(\overline{D}) = w/(1-q)$ (see figure 2).

Let us now consider the choice of the ransom by the terrorists who have made a kidnapping. If $D > \overline{D}$, then $C = 0$ and the hostage will be killed. The terrorists' gain writes:

$$(1-q)[g + \theta(1 - \frac{C}{D}) \mid_{C=0}] - qz = (1-q)[g + \theta] - qz \qquad (7)$$

If, on the other hand, the terrorists choose $D \leq \overline{D}$, then the State makes the offer $C(D)$. So, they demand $\overline{D}$ and their expected gain is now:

$$(1-q)C(\overline{D}) - qx \qquad (8)$$

Comparing the gains, one sees that the terrorists choose $D > \overline{D}$ iff:

$$(1-q)[g + \theta] - qz > (1-q)C(\overline{D}) - qx \qquad (9)$$

But, since $C(\overline{D})) = w/(1-q)$, this condition is equivalent to:

$$\frac{w}{1-q} < g + \theta - \frac{q}{1-q}(z - x) \qquad (10)$$

a condition which is always satisfied by assumption in this case (see figure 2).

Case 2: $\frac{w}{1-q} \geq g + \theta - \frac{q}{1-q}(z - x)$

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In this case, there is no finite value of D such that $C(D) = w/(1-q)$. The State *always* chooses to pay $C(D)$ if the terrorists demand D^5.

Then the terrorists demand $D = +\infty$ and obtain $-qx + (1-q)(g + \theta - \frac{q}{1-q}(z-x))$ if they do not kill the hostage. If the terrorists refuse the offer, their expected gain is $-qz + (1-q)(g+\theta)$ (as $C(+\infty)/\infty = 0$). It is easy to see that they always accept the offer since the State gives the terrorists the minimal amount needed to be indifferent to killing the terrorists or not doing so.

The next Proposition summarizes the preceding discussion (and the two Lemmata).

Proposition *Assume first that $\frac{w}{1-q} < g + \theta - \frac{q}{1-q}(z-x)$. Then at a Nash subgame perfect equilibrium, a ransom $D > \overline{D}$ is demanded by the terrorists and it is refused by the government (thus the hostage is killed). If $\frac{w}{1-q} \geq g + \theta - \frac{q}{1-q}(z-x)$, then at the unique Nash subgame perfect equilibrium the terrorists demand a ransom $\overline{D} = +\infty$. Then, the goverments makes a finite offer $g + \theta - \frac{q}{1-q}(z-x)$ which is accepted by the terrorists and the hostage is freed.*

Notice that when the first case holds true, there is a continuum of equilibria which are indexed to the value of D. This is because any demands higher than $\overline{D}$ can only be responded with $C(\overline{D})$.

Some comments are in order.

First the higher the value of the life of the politician, the more the State is likely to pay for freeing him. Interestingly, this value does not need to be infinite to get the result. This is because what matters is not only what the State is ready to pay for freeing the hostage, but also, and most importantly, what the terrorists need for changing their minds (that is, not killing the hostage). As long as the payoff resulting from the killing for the terrorists is finite, there is a minimum amount of resource that can induce them to free their hostage.

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[5]Indeed, if the State refuses to pay the ransom, his gains is $-w$ whereas if he pays $C(D)$, he gets $-(1-q)C(D)$. Since we always have: $C(D) \leq w/(1-q)$, the conclusion follows.

This intuition stems from the observation of the terms $g + \theta$ in the inequality $\frac{w}{1-q} \geq g + \theta - \frac{q}{1-q}(z - x)$. Theses terms reflect the gain for the terrorist from killing the hostage.

In the Moro case, what the Andreotti government was ready to pay for freeing Moro was not very high, and what the BR needed for changing their minds was very high. To support the former conjecture, what is important is that Andreotti's guiding principle throughout the ordeal actually was that he did not have the right to release any terrorists from prison to save the life of Moro because if the law enforcement officials had seen him liberate the assassin of their colleagues in exchange for Moro's life, there would have been a risk of creating both a political crisis and a situation of great danger in the prisons. Andreotti's fear was multilateral, not of the right or the left, but of both. Thus, Andreotti, with the support of Communist leader Enrico Berlinguer, led the party of firmness (*linea della fermezza*). They took the hard-line position of refusing to negotiate with the BR for Moro's life. They withstood the attacks of Bettino Craxi's Socialists, the Moro family, and the various movements of the Italian ultra left who developed a positive attitude toward negotiation (*linea della trattativa*). Andreotti and Berlinguer didn't abdicate. To support the later conjecture, what is important to emphasize is that, during March, April, and May 1978, the BR believed that a Marxist-Leninist revolution might be at hand in Italy. They sensed the possibility of a breakthrough to revolution. Moro was a pawn for them. They wanted to create chaos. They thought that killing Moro "would be their Winter Palace of 1917" (Drake, 2006, p. 121).

Second, we notice that a huge demand (here $+\infty$!) does not mean that a negotiation will not succeed in freeing the hostage. In the Moro case, the demand made by the BR was huge: the BR offered to exchange Moro's life for the freedom of thirteen individuals. However, according to the testimony of Moretti, a bloodless outcome was possible: the life of Moro could have been "saved until the last moment" (Drake, 1995, p. 119). The argument that Moro's cause had been hopeless from the moment when the ultimatum had been posted and the thirteen names chosen is thus refuted by the testimony of the man who kidnapped and killed Moro and by the implications of our model.

Third, of course, the higher $(z - x)$ - which is the difference between the costs of being seized after killing the hostage or freeing him - the more likely the second case will occur (the hostage will be safe). This effect is re-inforced by

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a high value of q (the probability of catching the terrorists).

In the Moro case, $(z - x)$ was low. The BR wanted to attract the attention of the media. With celebrity comes legitimacy. During the trials, the media gave the assassins of Moro a treatment usually reserved for movie stars. As regards the value of q, the following is noteworthy (*cf.* Satta, 2003). From 1969 to 1990, 654 kidnappings occurred in Italy. The police succeeded in rescuing only eighty six of these victims. Of the twelve BR kidnap victims, only two were freed as a result of successful police work. The performance of the police in the Moro kidnapping conformed to the general pattern of such crimes.

The geometric interpretation of the Proposition is shown in figure 2. The gray region displays all the couples (D, C) which lead to the execution of the hostage. The region in white above displays the couple (D, C) which leads to the freeing of the hostage. The intersection of the vertical lign which originates from $D = \overline{D}$ with the graph of $C(.)$ indicates the maximum value of the offer made by the State that can be extracted by the terrorists (this case is the first one considered in the Proposition).

The figure also displays the case where $g + \theta - \frac{q}{1-q}(z - x) > w/(1 - q)$. From the graph of $C(.)$ one sees that the terrorists can always demand a high ransom, but there is an upper bound on the offer that his made by the State (which results in the freeing of the hostage).

4   Discussion of the model with regard to the Moro case

The model presented and studied above both extends the work by Selten (1977) and is embedded within the historical evidence surrounding the Moro case. It implies that kidnapping with murder may be an equilibrium outcome. To highlight the interest of our model, and to assess its limitations, it is thus necessary to confront it with, on one hand, Selten's model and, on the other, the description of the sequence of events that took place in Italy during the terrible days of March, April, and May 1978.

As regards the confrontation between theory and evidence, some points are important to note.

Although not every question about the *via Fani* operation (kidnapping of Moro) and the *via Montalcini* operation (sequestration and killing of Moro) finds a definite answer in the story written below (*cf.* Appendix), the following is proved true. On March 16, 1978, within three minutes, the BR killed Moro's five bodyguards, and grabbed Moro. From March 16 to May 9, 1978, the BR assumed full responsibility for Moro's sequestration. Bargaining took place between the BR and the Andreotti government. It ended in a disagreement. The government refused to exchange thirteen prisoners for Moro. The BR didn't take back what they had said. On May 9, 1978, the BR killed Moro.

The sequence of events described above shows that our model is built on a solid ground.

First, at the beginning, the BR had no desire to eliminate Moro. If this were so, they could simply have killed him rather than going to the trouble of kidnapping him. The BR began the Moro operation with an unnecessary act of bloodshed, for everyone knew that Moro habitually took long walks, sometimes only in the company of only one of his bodyguards (Drake, 1995, p. 70). The BR deliberately chose to just kidnap Moro, because they wanted to put him on trial to obtain a confession from him regarding the nefarious activities of the DC as the Italian subsidiary in the SIM. It is legitimate to assume at once, as we did in section 2, that the group of terrorists have kidnapped a politician.

Second, about a month later, there was an alternating-offer bargaining game between the BR and the Andreotti government. The bargaining process ended in a disagreement. The game displayed in Figure 1 is the same as that which occurred in Italy during the spring 1978.

Third, at the end, the BR killed Moro. The payoffs that appear at the bottom of the tree displayed in Figure 1 are clearly compatible with such an issue.

As regards the confrontation between Selten's model and our model, there is a good point for us.

In Selten's model, the death of a hostage is *always* accidental. Selten assumes that terrorists do not like the idea of killing human beings, and they cannot improve their situation by doing so. Thus it is never rational for them to carry out their threat to kill the hostage.

However, according to Selten, the threat made by the terrorists to kill the hostage is credible for the following reason: the terrorists will perceive an offer

C too different from the ransom demand D as an aggressive act and a strong frustration to which they will react violently by the execution of the hostage. In a footnote, Selten highlights that this latter assumption "conforms to the well-known frustration-aggression hypothesis" that was formulated by Dollard *et al.* (1939).

Building implicitly on such developments, Selten makes the following remark (at the end of the footnote quoted above): "For our purpose it is not important whether aggression is a necessary consequence of frustration or not".

Taking as a starting point the thus amended version of the frustration aggression hypothesis, Selten assumes that, with a positive probability, a too low offer C can anger the terrorists to the point they will react violently by the execution of the hostage in spite of the fact that this is against their long run interests. More precisely, Selten assumes that the probability with which the terrorists will kill the hostage can be described by a linear function of C/D.

Paying tribute to this idea expressed by Selten, we deal with the consequences of a gap between C and D by including the ratio C/D in the definition of the payoff of the terrorists when they refused the offer C of the State and killed the hostage.

Our game-theoretic analysis has an advantage over Selten's model. It derives the conclusion from the same principle - the rationality assumption - that underlies all the other game-theoretic models, rather than positing special features of the specific environment in which the terrorists play. In Selten's model, the execution of the hostage occurs as the result of non rational emotional pressures that impact upon the behaviour exhibited by the terrorists. In our model, every player is a rational utility-maximizing player.

5   Conclusion

This paper was devoted to an economic analysis of the Moro kidnapping and murder.

By building on the simple game model of kidnapping by Selten (1977), we have first developed an integrated game-theoretic model that reliably captures both the problem of kidnapping for some sort of non-monetary ransom, and the problem of assassinations of prominent political figures.

Second, by using the crucial information furnished by Drake (1995) as regards Moro's kidnapping and murder, we have embedded our model within the historical evidence surrounding this case.

The advantages of our model are twofold.

First, in contrast to common wisdom that terrorists are irrational extremists, our applied model is based on the hypothesis that terrorists are rational actors who make decisions consistently in pursuit of their own objectives.

Second, in contrast to Selten's model, in which the death of a hostage is always accidental, our extended model allows the terrorists to rationally choose to kill a hostage.

We have studied Nash perfect equilibria of our game. We have shown that, in the Moro case, there is a continuum of equilibria implying the death of the hostage. We believe that our model nicely captures the action of the Andreotti government and that of the BR.

Our paper may be of interest beyond a better understanding of Moro's kidnapping and murder.

First, to find solutions to the vast and intricate problems of terrorism facing the democratic world today, it may be useful to understand, through a historical case study with modern parallels, some of the factors involved in the interactions between terrorists and a targeted government. By focusing on the process from which the Moro affair arose, our extended model sheds a new light on the nature of terrorism.

Second, it's important that what economists do know about the causes and consequences of terrorism be listened to and heard. We hope that our paper has achieved such an objective.

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Appendix
Some Background on the Moro case

Building on the crucial information furnished by Drake (1995), it is possible to answer rigorously the Quintilianus seven questions - Quis, quid, ubi, quibus auxiliis, cur, quomodo, quando ? (Who, what, where, by what means, why, how, when ?) -pertaining to the Aldo Moro bloody kidnapping (prelevamento) and horrifying murder case.

On the morning of March 16, 1978, shortly after 9:00 a.m., the BR, headed by Moretti, kidnapped in *via Fani*, a street in Rome, the Honorable (*onorevole*) Moro, who was on his way to Parliament where the ratification debate on the first Christian Democratic Government to have the support of the Italian Communist Party (*Partito Comunista Italiano*, or PCI) was due to begin. Moro and his escort of five men rode in two cars. In the official dark blue Fiat 130, there were three men. Moro was in the back seat. His bodyguard, Oreste Leonardi, and his driver, Domenico Ricci, sat in front. Three security guards followed closely behind in a white Alfa Romeo: Raffaele Iozzino, Giulio Rivera, and Francesco Zizzi. Neither car was bullet-proof. According to Giulio Andreotti, Moro had never asked him for a bullet-proof car. Had Moro wanted such a car he could have had Andreotti's.

As the two cars approached the corner of *via Fani* and *via Stresa*, the following happened. One car, the blue Fiat 126 driven by Moretti, blocked the path of the Fiat 130 of Moro. Another car, the white Fiat 128 in which there were Aliesso Casimirri and Alvaro Loiacono, approached the Moro escort vehicle from behind to close the trap. Casimirri and Loiacono were the only two Red Brigadists (*Brigatisti Rossi*) at *via Fani* who were not members of the Rome Column. Rita Algranati was on watch. Bruno Seghetti drove the escape vehicle. Barbara Balzerani, known as the *pasionaria* of Red Brigadism, helped to prevent traffic from coming through the fatal intersection. The place was clear. A flower vendor, normally stationed on the corner of *via Fani* and *via Stresa*, had had the tires of his truck slashed by the terrorists the night before. As a result, he was away from the scene. The killers were Franco Bonisoli, Raffaele Fiore, Prospero Gallinari, and Valerio Morucci. Fiore and Morucci killed Leonardi and Ricci. Bonisoli and Galinari killed Iozzino, Rivera, and Zizzi. Zizzi died later at the hospital. After the shooting had commenced, the driver of the escort vehicle lost control and slammed into the Fiat 130 of Moro, which in its turn collided with Moretti's

car. The killers were dressed in Alitalia airline pilot uniforms, and they worn
bullet proof vests underneath. Some machine guns and pistols misfired. The
BR's decisive advantage was the element of complete surprise. The security
officers "did not notice anything because until a second before the shooting
there was nothing to notice" (Moretti *et al.*, 1994, p 127). Fiore, Galli-
nari, and Moretti lifted Moro out of his car and pushed him into the escape
car. Morucci took two of the five Moro's briefcases out of the bullet-riddled
Fiat 130. The terrorists and their victim vanished immediately. Later that
day, before nightfall, the new Government, presided over by Andreotti, the
first Christian Democratic Government to have the support of the PCI was
approved in both the Chamber of Deputies and the Senate by a majority
including the Communists. Applications to join the BR rose sharply.

Morucci's testimony and the book-length version of the Mosca-Rossanda in-
terview of Moretti (Moretti *et al.*, 1994) furnish the backbone of the *via
Fany* story written above. Braghetti's testimony and the 1998 book written
by Braghetti and Tavela (1998) furnish the backbone of the *via Montalcini*
story written below.

Moro was held for fifty-five days in the People's Prison (*Prigione del Popolo*,
or PP). Four people were inside the PP: Anna Laura Braghetti, Prospero
Gallinari, Germano Maccari, and Moretti. Moretti, planner of the *via Fani*
attack, made all the decisions. The police and the secret services failed
to uncover the location where Moro was being held. Moro wrote dozen of
letters encouraging negotiations, some to fellow politicians or adversaries,
some to his friends and family. He wrote even to Pope Paul VI. As regards
the authenticity and the sincerity of these letters, two things are certain.
First, everything Moro knew about his situation came from the BR. The
BR often fed Moro false information about both what they were doing and
what the government was doing and saying. Second, had Moro not shown
that he was willing to cooperate with the BR, no letter from him would
ever been forwarded from the PP. Moretti chose which letters would be sent
and which would be kept in the BR archive. He acted as the BR's cen-
sor by reading the prisoner's outgoing letters and suggesting where changes
might be made. Moro's letters were sent through Morucci and Adriana
Faranda. The BR delivered nine communiqués to the Press (accessible at
http : *//www.terrorisme.net/p/printer*26.*shtml*). In addition, there was
the "counterfeit" seventh communiqué. It was delivered on 18 April. It an-
nounced that Moro's execution by suicide had been carried out. In the first

communiqué, delivered on 18 March, the BR assumed full responsibility for Moro's abduction and for his escort's murder, and they declared their intention of putting Moro on trial before the People's Court of Justice (*Tribunale del Popolo*). In fact, Moretti was the sole interrogator of Moro. In the fifth communiqué, delivered on 10 April, the BR made their first mention of negotiations by denying that any secret negotiations were taking place. In the sixth communiqué, delivered on 15 April, the BR announced that Moro had been found guilty and thus had been condemned to death. In the seventh communiqué, delivered on 20 April, the BR explicitly mentioned negotiation: they were ready to exchange Moro for "Communists prisoners". This was an ultimatum. The dead line was 22nd at 3 p.m.. In the eighth communiqué, delivered on 24 April, the BR stipulated the conditions for Moro's release. They offered to exchange Moro for thirteen individuals whom they named: Sante Notarnicola, Mario Rossi, Giuseppe Battaglia, Augusto Viel, Domenico Delli Veneri, Pasquale Abatangelo, Giorgio Panizzari, Maurizio Ferrari, Alberto Franceschini, Renato Curcio, Roberto Ognibene, Paola Besuschio, and Cristoforo Piancone. The government refused to exchange thirteen prisoners for Moro. In the ninth communiqué, delivered on 5 May, the BR announced the executing of the sentence of death against Moro.

On May 9, Moro was murdered. Moro's body was found later that day in the trunk of a parked red Renault 4, left with apparent symbolism *via Caetani*, a site midway between the DC (*Piazza del Gesu*) and the PCI (*via delle Botteghe Oscure*) headquarters. It is recorded in the autopsy report on Moro that he had been struck by eleven bullets. Two weapons were used. No trace of drugs or poisons was found in his system. Moretti admitted that he alone had fired the eleven bullets that killed Moro. He killed Moro in the vain desire of igniting a Communist revolution.

The quest for justice in the Moro case resulted in a completely satisfying triumph against his murderers. Moro's murderers were caught, tried, and convicted. The Italian courts gave the captured terrorists incentives to provide evidence, by introducing a sliding scale of liability for three separate classes of defendants. The irreducible ones (*irriducibili*) were heavily condemned by the courts. By contrast, leniency prevailed both for the defendants who repented of their past terrorist actions and cooperated completely with the authorities to help investigations (*pentiti* or *collaboratori di giustizia*), and, in a least measure, for the defendants who dissociated themselves from the terrorism and took responsibility for their actions without divulging infor-
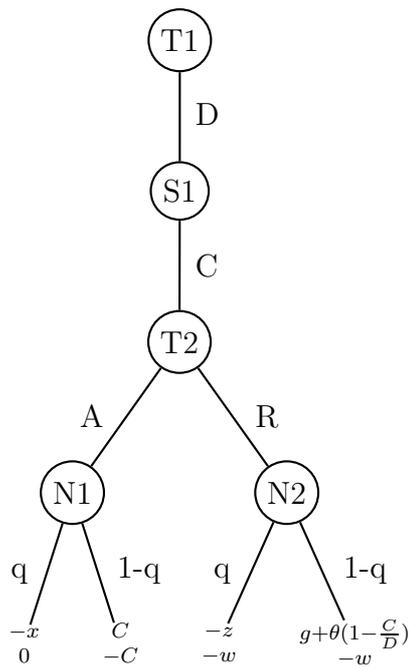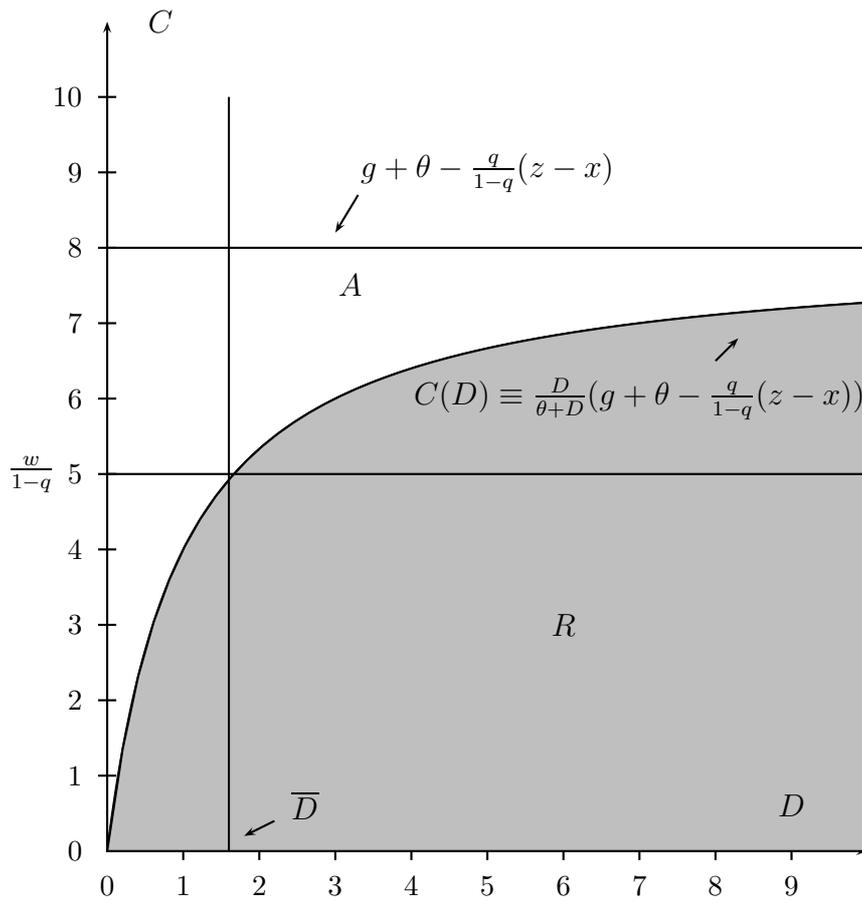
mation about their former confederates (*dissociati*).

Figure 1: The Kidnapping game

Figure 2: The geometry of the game