Simulating Extortees: Group Structures and Reasoning Modes

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***Abstract*—Extortion is a unique crime in that it involves a long-term interaction between the victim and the perpetrator. It is also an interesting crime in that it seems to afflict whole communities, cities or even countries. Extortion is often modelled as an interdependent choice between extorter and extortee using a game theoretic framework. Although a game theoretic model takes into account the first uniqueness of a long-term relationship but leaves out the social influence factors that can make extortion endemic within a social group or society. In this paper we present an agent-based model which looks at the decision making of extortees from a social perspective, transforming the traditional extortion game into a collective problem.**

I. Background

The kind of extortion in this paper is the kind executed by organised crime groups such as the Italian Mafia: the request of protection money from entrepreneurs, usually small businesses like restaurants and shops. Extorters usually ask for a relatively small amount of money on a monthly basis, promising to protect the entrepreneur against criminals. There are other kinds of extortion such as kidnapping and blackmail, which we are not concerned with here as the dynamics are rather different. Much of the literature on extortion rackets uses game theory to operationalise extorter and entrepreneur decision-making [1]; [2]. What is usually operationalised is a game matrix between an extortee, who can decide to pay or not and an extorter, who can decide to punish or not. Although modelling this interaction as an interdependent choice makes intuitive sense, the interaction with the extorter is not the only interaction extortees participate in: As usually extorters have several extortees, there is also in interaction between extortees, albeit an indirect one. The structure of this interaction is as follows: for each individual extortee it is more beneficial to pay the money requested by the extorter than to be punished. However, if none of the extortees paid, extorters might soon leave them alone as it would not be profitable to keep on punishing. This interaction is also an interdependent choice of the form of a common good's problem.

This paper discusses a model of extortion racket systems that focuses on the decision space of extortees. Using the framework of team reasoning [3]; [4]; [5] the simulation model explores the consequences of a traditional individual utility maximisation and a utility maximising decision from a group perspective.

II. Model

There are two kinds of agents: *Extorters* and *entrepreneurs*. Extorters approach an entrepreneur with an extortion request. Entrepreneurs decide whether to pay or refuse payment, depending on the monetary utility of paying or not. The decision procedure is:

$$\text{If } p \times a \times d < m \text{ refuse, pay otherwise,} \tag{1}$$

where p is the perceived punishment probability, a an entrepreneur's attitude to risk, d the possible damage caused by punishment and m the amount of money requested by the extorter. p and a are rational numbers between 0 and 1. The attitude-to-risk (a) is normally distributed over the entrepreneurs at initialisation of the model and static. p is set to 1 when an entrepreneur observes a punishment in its neighbourhood and step-by-step reduces by 0.01 each step no punishment is observed. d is set at 1M monetary units. On the right hand side of the inequality m is the amount of money requested by the extorter. Entrepreneurs decide intermittently whether they want to continue paying the extorter or start resisting.

Extorters punish non-payment but punishment costs so they they can only punish if their wealth is greater than the cost of punishment. We implement three punishment regimes leading to different levels of punishment.

1) Whenever an entrepreneur resists there is a punishment from the extorter. (High level of punsihment.)
2) An extorter punishes resistance unless they observed a punishment in their neighbourhood in the last round. (Medium level of punishment and feedback of neighbourhood structure.)
3) An extorter only punishes if the number of entrepreneurs who resist its extortion demands is greater than the number of acquiescent entrepreneurs. (Medium level of punishment and feedback between resistance and punishment.)

Money is injected into the system exogenously at the entrepreneurs' payday in which each gets a mean income of 300 (normally distributed). The pizzo m is set at 50; extorters are also paid on payday.

This model is seen as a basic implementation of an interdependent choice game tree in which entrepreneurs

decide to pay or not depending on the monetary utility of either action. Extorters punish or not depending on the punishment regime. The main parameters we vary are the punishment regime and the neighbourhood radius, i.e., the level and the deterrence reach of punishment. This model implements individual utility maximisation and running the simulation shows that individualist utility maximisation is able to recreate a stylised fact of extortion rackets: high levels of compliance with low levels of punishment. Only if the reach of deterrence is rather low, does resistance become more prevalent but a low reach of deterrence, equivalent with a lack of information, is very unrealistic as people talk and the media reports attacks on entrepreneurs.

To operationalise team reasoning we implement the following decision function:

$$\text{If } p \times a \times d < G \times m \text{ refuse, pay otherwise.} \quad (2)$$

The left hand side of this inequality is the same as in (1). On the right hand side is the sum of pizzo paments m the group would pay if they all paid. If it is better for the group not to pay, collectively minded agents resist the extorter.

The above decision mechanism is implemented on two social structures, one being a networked structure, i.e., the relevant group is constructed by taking all agents within a certain radius (cf. [6]), the other a set of transitive groups achieved by partitioning the grid into a number of fields.

We implement societies with different levels of collectively minded agents. For these societies we looked again at punishment regimes and neighbourhood radii but also at the influence of group size and the mix of individualistic and collectively minded agents in the society. First results show that groups have to be sufficiently large to make a difference to the resistance outcome. The effect of group size is slightly dampened if groups are transitive but not significantly different. This result is a result on the rather stripped down operationalisation of 'team reasoning' we employ. But literature on trust and groups shows that groups in which people think collectively and keep cooperating need to be rather small [7].

III. Conclusions

It seems rather intuitive that to get rid of extortion, people have to stop paying extorters. We have preliminary results that show that the goal of increased resistance might be obtained by making people consider the group payoff (team reasoning) rather than just reason about their own utility in particular in the case of far reaching deterrence. The results, however, also show that the size of the group has to be rather large for to make a significant difference to levels of resistance. One of the starting points for this simulation was the rise of the *Addio Pizzo* movement, first in Sicily but spreading to all areas affected by the Mafia.[1] *Addio Pizzo* has managed to raise levels of resistance in the population of entrepreneurs. We thought that the explanation might be that entrepreneurs feel part of a group changing their decision mechanism to a collective one. An interpretation of our results is that only institutionalised groups can make a difference in this setting as trust will be engendered through the social norms governing the group. *Addio Pizzo* would thus make a difference as they bring the group size an entrepreneur feels part of up to a relevant level (cf. [8] for a study on the interaction of trust, norms and group size).

Future work is to look at the dynamics of resistance more closely, e.g. to investigate the effect of clustering of collectivist agents (i.e. "bleeding the extorter dry"), having more sophisticated implementations of team reasoning and to analyse the networked and transitive group constructions in more detail.

[1]For more detail on the *Addio Pizzo* movement see http://www.addiopizzo.org/english.asp.

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