Interaction between criminals, cops and storeowners

Behavioral Economics and Complexity

Student Salvatore Romano

Abstract

This model want to simulate a world in which there are mafia, camorra, police and storeowners that interact each other; the aim is to carry out some analysis based on different situation that can be easily created by the user in the *interface* section by adjusting the sliders. The software used is Netlogo[1], a programming language for agent-based modelling problems. The original model can be visited via `http://ccl.northwestern.edu/netlogo/models/community/The%20Mafia%20Model%20-%20Interaction%20between%20police,%20mafia%20and%20storewoners`.

Model structure and interaction

The structure is made up of 4 agents:

- **Mafia**: criminal organization that wants to make profit and gain power
- **Camorra**: criminal organization that wants to make profit and gain power
- **Cops**: police that can "help" the criminals or try to fight them
- **Storeowners**: people that own *"activities"*

Regarding the interaction, mafia and camorra act by asking pizzo to storeowners, like a sort of *"protection"*. Note that only the storeowners can get profit by walking in the patch that, if the profit is available it will be green, otherwise red. Of course the storeowner can decide to pay the pizzo or not, and this decision is affected by some variables like *police-power,storeowners-thrust-in-govs-ability-to-fight-mafia* and *ProbRefuse-myself*. By paying the pizzo, a storeowner will get advantages, so new patches will grow around him that want to indicate the benefits of operating with mafia or camorra; if a storeowner decide to not pay, he loses a share of his money. In the model, like in the real world, the camorra will get less money from pizzo, this why the mafia has a great business related to this activity rather than camorra. When a cop finds an individual from mafia or camorra, the individual must pay a bribe for not being arrested. This bribe

is conditioned of the global variables *storeowners-thrust-in-govs-ability-to-fight-mafia* and *police-power*, which means that the joint effort between storeowners and cops can reduce the power of mafia and camorra. It may happen that the cops help mafia and camorra with controlling the market. If a storeowner has sufficient money and he trusts the cops, it can "reproduces", which according to economic theory means that as long as there is profit in the market, new storeowners will arise, but another condition is that the mafia/camorra power in that area must be lower than that combination. These new storeowners are "born" with the possibility of paying pizzo to mafia/camorra or not, conditioned by the endogenous variable *ProbRefuse-myself*, which depends on the wealth of the cops in the local area.

Output overview

In the following is explained the *interface* section that can be observed in the Netlogo model. The user has the possibility to choose several slider that will affect the model's result, and also to set the initial number of agents in the world. By clicking the button setup, the chosen one is applied and will be executed by the command go. It's possible to see the evolution of the following plots:

- **Storeowners population**: this plot allows to see and understand the reproduction of storeowners based on the multiply-storeowners function.
- **Money flow**: in this graph are plotted the information about money owned by the different agents; it's important to consider that this graph can be affected by several variables, for instance it can be noticed a decreasing line regarding the money of mafia and camorra if we set an high value of *police power*, and vice versa.
- **Money of mafia and camorra**: this plot represents the sum of the money of the two criminal organizations in the model.
- **Government's cost to fight criminals**: in order to know how much the government spend in fighting the criminal organizations, this plot allow to see the movement of the related cost's line. In particular, it can be observed that the line decrease when the criminals die, so when the money of the criminal are smaller than 0.
- **Lorenz curve**: this particular graph can be used to analyse the distribution of the wealth for the storeowners. Graphically speaking, the farther the curve moves from the baseline, represented by the red straight diagonal line, the higher the level of inequality in the distribution.

As part of the *interface* section, there are also some monitors that try to clarify and display the value of the related graph.

References

[1] Wilensky, U. (1999). NetLogo. http://ccl.northwestern.edu/netlogo/ Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.