Simulating the Economic Impacts of Mafia

The aim is to understand if and how organized crimes, in specific Mafia-type organizations, impact the economy. We usually assume that Mafia only influences negatively the economy, but there are some works, such as van Dijk (2007), showing that sometimes these organizations boost some aspects of the economy giving the impression that they are beneficial to the society. Hence, this model aims to serve as a tool (1) to evaluate different social scenarios and individual reactions to extortion to check these conclusion about the different impacts Mafia has on economy, and (2) to identify measurements/metrics that helps us to check the possible benefits and damages caused by Mafia.

Preliminary results of a simplified economy model show that depending on the metrics analyzed, one would conclude that a certain kind of Mafia-type organization is beneficial to economy. For instance, our preliminary results show that a certain strategy of the organized crime (i.e., extort little, punish less, and provide some benefit in return to the protection payment) increases the overall production and selling of products, which is a sign of a good economy. However, analyzing the overall wealth of Entrepreneurs, a significant reduction was detected.

Analytical approach and data used

We may use different survey data to define the input parameter values of the simulation model about level of crime, strength of the State, and entrepreneurial behaviors. For instance, use surveys from World Economic Forum ("The global competitiveness report") and other European Social Survey to inform the level of activity of organized crime (or at least a perception of this type of groups) and the level of Police enforcement against them.

We have tested a similar approach during the GLODERS project. We used data from the European Social Survey to inform some of the parameters of the model regarding selfishness and sociability (see Section 7 of Nardin et al., 2016). However, we have not tested this approach with this derivative model we are implementing to research a different impact of Mafia on society.

Teaching approach

Tutorial 1: Simulation Modeling with UML and BPMN (2 hours, Gerd Wagner)
This tutorial presents a general approach how to use UML class diagrams and BPMN process diagrams at all three levels of model-based simulation engineering: for making conceptual domain models, for making platform-independent simulation design models, and for making platform-specific, executable simulation models. In our Object-Event Modeling (OEM) approach, object and event types are modeled as stereotyped classes, random variables are modeled as stereotyped operations constrained to comply with a specific probability distribution, while event rules/routines are modeled both as BPMN process diagrams and in pseudo-code. We will discuss how to extend the basic OEM approach by adding the modeling concepts of activities and agents with perceptions, actions and beliefs.

<u>Tutorial 2:</u> Implementing Simulation Models with OESjs (2 hours, Luis Gustavo Nardin and Gerd Wagner)

As opposed to traditional simulation technologies, web-based simulations, typically implemented with JavaScript, can be executed in any web browser, not just on desktop computers, but also on mobile devices like tablets and smartphones. This allows sharing simulations by means of simple web links and makes them easily accessible to anyone anywhere. OESjs is a JavaScript simulation framework that implements the Object-Event Simulation (OES) paradigm. It supports both next-event time progression, as used in discrete event simulation, and fixed-increment time progression, as used in NetLogo-based social science simulations as well as in continuous state change simulations. As opposed to NetLogo, OESjs supports the development of web-based simulations. We show how to implement different versions of the Schelling Segregation Model with OESjs.

References

Nardin, L. G. et al. (2016) Simulating protection rackets: A case study of the Sicilian mafia. Autonomous Agents and Multi-Agent Systems, 30(6):1117–1147

van Dijk, J. (2007) Mafia markers: Assessing organized crime and its impacts upon societies. Trends in Organized Crime 10:39-56. DOI: 10.1007/s12117-007-9013-x

World Economic Forum (2004) The global competitiveness report 2003–2004. Oxford University Press, New York