

Dissertation Abstract: Game Theory Applied to Rent Seeking

The dissertation consists of three chapters. The first chapter “Potential pitfalls in an international regulation game with two regulators in a free-trade agreement bloc” is an analysis of an international fishery. These issues are analyzed in the context of strategic interactions between states sharing a single fishery (the best example being British Columbia and Alaska) where behavior of one state can influence behavior of the other. I create a model that allows evaluating welfare impact of the different regulation types (total allowable catch and individual quotas) and identifying situations in which implementation of a system that is generally believed to be superior leads to actual decrease in market performance. It turns out that under some plausible circumstances (inelastic demand and short fishing season) introduction of supposedly better system will lead to a welfare loss. It also turns out that if regulator is worried mostly about consumer surplus, the adoption of more efficient system may never happen. Also, in these cases international coordination may be needed to introduce individual quotas.

The second chapter of the dissertation is “Colonel Blotto with Imperfect Targeting”. It is a theoretical analysis of variation on a popular game-theoretical model that can be applied to military conflicts, advertising wars, competition between education providers, or elections. The paper provides insights into what can happen if agents are competing in two theaters (e.g. markets) but cannot perfectly target their efforts (e.g. advertisement is seen not only by the target group but also by other groups). Many important properties of equilibria in such games are established, among others when players distribute resources towards the same theater and when towards different ones or that more resources does not necessarily guarantee better outcome.

The final chapter of the dissertation contains an analysis of penny auctions – auctions in which bidders pay for bids placed, and the winner is the last person to place the bid. These auctions have drawn a lot of attention recently in the economic literature, probably due to their controversial gambling nature. Some game theoretical models have been already built and solved. My model improves on the previous research by incorporating possibilities of ties – which are likely to occur frequently in reality due to communication delay over Internet. Moreover, huge data sets of bids were obtained which allows comparing model predictions to actual behavior of auction participant. This research project allows better understanding of the behavior of auction participants; makes an attempt to explain why they engage in such behavior and helps evaluate this type of auction in general.

All three chapters have three elements in common: game theory, rent seeking, and numerical simulations. In each chapter I develop economic theories. The theories which are too complicated to be dealt with using calculus are implemented in form of computer programs (written mostly in C++ and a variety of software packages aimed at helping numerical simulations).