

Report on Bachelor/Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	Mgr. Stanislav Kovalčín
Advisor:	PhDr. Petr Švarc
Title of the thesis:	Duopoly modelling with agent-based computational economics

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

The bachelor thesis presents an agent-based computational model of boundedly rational learning agents playing classical and extended duopoly game. In both settings the learning of agents is modeled using Q-learning (the form of reinforcement learning). In the first part author uses Q-learning to explain collusive behavior in standard quantity setting duopoly game. This part is a partial replication of the results of paper by Waltman and Kaymak (2008) published in Journal of Economic Dynamics and Control. Stanislav Kovalčín replicated the results for two players version and tests the robustness of the results on changes in the main parameters of the model. As his experiments show the collusive outcome can be reached by Q-learning agents in most cases.

The second part uses Q-learning as a learning model for agents playing extended two period quantity setting game originally introduced in Hamilton and Slutsky (1988) published in Games and Economic Behavior. The main motivation for introducing the Q-learning agents to the extended game was to explain the difference between the results of the analytical Hamilton and Slutsky model and experiments with humans playing the game. While the analytical results predicted the emergence of endogenous leader in the game the simultaneous plays were more often observed in experiments. Using Q-learning agents author showed that if agents learn rather than deduce the optimal strategy the simultaneous moves prevail.

Personally, I consider the thesis quite interesting and with no doubt contributes to the modern economic research. The author uses a methodology that lies on the intersection of game theory, evolutionary economics and computational science and that allowed him to address important questions that lies beyond the reach of the neoclassical paradigm. **As a result I suggest to evaluate the thesis EXCELLENT (1) and in the case of successful defense to consider it for the Dean Award for an extraordinarily good bachelor thesis.**

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SUMMARY OF POINTS AWARDED (for details, see below):

CATEGORY	POINTS
Literature (max. 20 points)	20
Methods (max. 30 points)	25
Contribution (max. 30 points)	30
Manuscript Form (max. 20 points)	15
TOTAL POINTS (max. 100 points)	90
GRADE (1 – 2 – 3 – 4)	1

NAME OF THE REFEREE: PhDr. Petr Švarc

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