

Bounded Rationality and Learning in Market Competition

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. D.C. van den Boom

ten overstaan van een door het college voor promoties
ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel
op vrijdag 13 februari 2015, te 14:00 uur

door

Dávid Kopányi

geboren te Gyula, Hongarije

Contents

1	Introduction	1
2	Learning Cycles under Competing Learning Rules	11
2.1	Introduction	11
2.2	Related literature	14
2.3	The market structure	17
2.4	Learning methods	19
2.4.1	Least squares learning	19
2.4.2	Gradient learning	28
2.5	Heterogeneous oligopoly with fixed learning rules	33
2.5.1	Steady states and stability	33
2.5.2	Simulation results	37
2.6	Endogenous switching between learning mechanisms	40
2.6.1	The switching mechanism	40
2.6.2	Learning cycles	42
2.7	Concluding remarks	46
	Appendix 2.A Proofs of Propositions	49
3	Coexistence of Stable Equilibria under Least Squares Learning	55
3.1	Introduction	55
3.2	The circular road model	58

3.2.1	Homogeneous consumers	58
3.2.2	Heterogeneous consumers	61
3.3	Market dynamics under learning	64
3.3.1	Least squares learning	65
3.3.2	Equilibria under least squares learning	68
3.3.3	Stability of equilibria	73
3.4	Simulation results	77
3.4.1	Simulations with all observations	78
3.4.2	Simulations with the last τ observations	81
3.5	Discussion	86
	Appendix 3.A Proofs and derivations	91
4	Price-Quantity Competition under Strategic Uncertainty	109
4.1	Introduction	109
4.2	Related literature	112
4.3	Price-quantity competition	114
4.4	A model with strategic uncertainty and risk aversion	116
4.5	Symmetric pure-strategy equilibrium	118
4.6	Comparative statics	122
4.6.1	The effect of prices and production levels on the objective function . .	123
4.6.2	The effect of risk aversion	125
4.6.3	The effect of price uncertainty	126
4.6.4	The effect of output uncertainty	129
4.6.5	Welfare analysis	130
4.7	Discussion and concluding remarks	133
	Appendix 4.A The first-order conditions for the symmetric pure-strategy equilibrium	136
	Appendix 4.B The marginal effect of prices and production levels in equilibrium . .	144
	Appendix 4.C Expected welfare in the standard model	149

5 Endogenous Information Disclosure in Experimental Oligopolies	151
5.1 Introduction	151
5.2 Market and information structures	155
5.3 Experimental design and procedures	157
5.4 Hypotheses	160
5.5 Results	164
5.5.1 Output decisions	164
5.5.2 Consequences of information sharing on output decisions	167
5.5.3 Coordination	170
5.5.4 Factors influencing behavior	173
5.6 Conclusion	178
Appendix 5.A Instructions for Treatment I-NF	181
6 Summary	187
Bibliography	191
Samenvatting (Summary in Dutch)	201