

# Contents

## Part I Networks

<b>1 Comparing Traffic Discrimination Policies in an Agent-Based Next-Generation Network Market .....</b>	<b>3</b>
Simon Diedrich and Fernando Beltrán	
1.1 Introduction .....	3
1.2 Network neutrality and traffic discrimination .....	4
1.3 An agent-based simulation model of traffic management in all-IP networks .....	6
1.3.1 Consumer behaviour .....	8
1.3.2 Provider strategies .....	10
1.4 Simulation and experimental design .....	11
1.5 Results .....	12
1.6 Conclusion .....	13
References .....	14
<b>2 Transformation Networks: A study of how technological complexity impacts economic performance .....</b>	<b>15</b>
Christopher D. Hollander, Ivan Garibay, Thomas O'Neal	
2.1 Introduction .....	15
2.2 Resource-Based Agents and Transformation Networks .....	17
2.3 Experimental Setup .....	18
2.4 Results and Discussion .....	19
2.4.1 Results .....	19
2.4.2 Discussion .....	23
2.5 Conclusion .....	24
References .....	25
<b>3 Contagion and Bank Runs in a Multi-Agent Financial System ..</b>	<b>27</b>
Davide Provenzano	
3.1 Introduction .....	27

<b>3.2</b>	The model .....	29
3.2.1	The financial network .....	29
3.2.2	The banking system .....	30
3.2.3	Depositors' behavior .....	31
3.2.4	Liquidity transfers and bank's bankruptcy .....	31
3.2.5	Withdrawals and contagion spread .....	32
<b>3.3</b>	Network structures .....	33
3.3.1	Complete interbank market .....	33
3.3.2	Incomplete interbank markets .....	33
<b>3.4</b>	Simulations .....	33
3.4.1	Simulation settings .....	35
3.4.2	Results .....	36
<b>3.5</b>	Conclusions .....	38
	References .....	38
<b>4</b>	<b>Innovation niche stability with a short-term policy intervention</b> .....	39
	Antonio Lopolito, Piergiuseppe Morone and Richard Taylor	
4.1	Introduction .....	39
4.2	Sketching the theoretical background .....	40
4.3	The model specification .....	41
4.3.1	The expectation mechanism .....	42
4.3.2	The power mechanism .....	43
4.3.3	The knowledge mechanism .....	44
4.3.4	Agents of change: modelling policy action .....	44
4.4	Preliminary findings .....	45
4.5	Conclusions .....	49
	References .....	50

## Part II Macroeconomics

<b>5</b>	<b>Dynamics of probabilistic labor markets: statistical physics perspective</b> .....	53
	He Chen and Jun-ichi Inoue	
5.1	Introduction .....	53
5.2	Model systems .....	54
5.3	Non-linear map for the aggregation probability .....	57
5.4	Ranking frozen line .....	58
5.5	Global mismatch measurement .....	59
5.6	Aggregation probability at 'high temperature' .....	60
5.6.1	The high temperature expansion .....	60
5.6.2	Analytic solution for unemployment rate .....	62
5.7	Summary .....	64
	References .....	64

<b>6 Integrating the housing market into an agent-based economic model .....</b>	65
Einar Jón Erlingsson, Marco Raberto, Hlynur Stefánsson, and Jón Thór Sturluson	
6.1 Introduction .....	65
6.2 The artificial economy .....	68
6.2.1 Consumption and the wealth effect .....	68
6.3 The housing market .....	69
6.3.1 Supply and demand formation .....	69
6.3.2 Housing market matching .....	70
6.3.3 Financing of housing .....	70
6.4 Analysis of results .....	71
6.5 Concluding remarks .....	73
References .....	75

### Part III Finance

<b>7 Inequality and Financial Markets - A Simulation Approach in a Heterogeneous Agent Model .....</b>	79
Thomas Fischer	
7.1 Introduction .....	79
7.2 The Model .....	80
7.3 Simulation Results .....	84
7.3.1 A Theoretical Primer for the Static Version .....	84
7.3.2 The Role of the Behavioral Consumption Function .....	85
7.3.3 The Effect of Income Inequality on Macroeconomic and Financial Stability .....	87
7.4 Outlook .....	89
References .....	90
<b>8 Risk Aversion Impact on Investment Strategy Performance: A Multi Agent-Based Analysis .....</b>	91
Olivier Brandouy, Philippe Mathieu, and Iryna Veryzhenko	
8.1 Introduction .....	91
8.2 The advantages of the proposed heterogeneous multi-agent model ..	92
8.3 Simulations design and results .....	94
8.3.1 Ecological Competition Analysis of Strategy Performance ..	98
8.4 Conclusion .....	101
References .....	101
<b>9 The shark game: equilibrium with bounded rationality .....</b>	103
Lucian Daniel Stanciu-Viziteu	
9.1 Introduction .....	103
9.2 The model .....	105
9.3 Results .....	107
9.4 Conclusions .....	110

References .....	110
<b>Part IV Industrial organization</b>	
<b>10 A stylized model for the continuous double auction .....</b>	115
Tijana Radivojević, Jonatha Anselmi and Enrico Scalas	
10.1 Introduction .....	115
10.2 An Elementary Model for the Continuous Double Auction .....	116
10.2.1 Description of the model .....	116
10.2.2 An exact result .....	118
10.3 Monte Carlo Simulations .....	119
10.4 Summary .....	122
References .....	123
10.5 Appendix .....	123
<b>11 Sense making and information in an agent-based model of cooperation .....</b>	127
Caterina Cruciani, Anna Moretti and Paolo Pellizzari	
11.1 Introduction .....	127
11.2 The model .....	130
11.3 Results .....	132
11.3.1 Heterogeneity in contributions .....	133
11.3.2 Increasing information .....	134
11.3.3 Sense making .....	135
11.4 Conclusions .....	137
References .....	138
<b>12 Comparing system-marginal-price versus pay-as-bid auctions in a realistic electricity market scenario .....</b>	141
Eric Guerci and Mohammad Ali Rastegar	
12.1 Introduction .....	141
12.2 ACE Model .....	143
12.2.1 Market model .....	143
12.2.2 Grid model .....	144
12.2.3 Agent model .....	145
12.2.4 Learning model .....	147
12.3 Results .....	148
12.4 Conclusions .....	151
References .....	152
<b>13 Heterogeneous Learning in Bertrand Competition with Differentiated Goods .....</b>	155
Dávid Kopányi	
13.1 Introduction .....	155
13.2 Market Structure .....	156
13.3 Learning Methods .....	157

13.3.1	OLS Learning . . . . .	157
13.3.2	Gradient Learning . . . . .	158
13.4	Heterogeneous Learning . . . . .	159
13.5	Competition Between Learning Rules . . . . .	161
13.6	Conclusion . . . . .	164
	References . . . . .	164

## Part V Management

<b>14</b>	<b>Talent management in triadic organizational architectures . . . . .</b>	169
	Marco LiCalzi and Lucia Milone	
14.1	Introduction . . . . .	169
14.2	The model . . . . .	170
14.3	Comparison of organizational architectures . . . . .	171
14.4	Results for the exemplar . . . . .	173
14.4.1	The exemplar . . . . .	173
14.4.2	Ranking architectures . . . . .	174
14.4.3	Placement within architectures . . . . .	176
14.5	Validation and robustness . . . . .	178
	References . . . . .	181
<b>15</b>	<b>Multi-dimensional information diffusion and balancing market supply: an agent-based approach . . . . .</b>	183
	Sjoukje A. Osinga, Mark R. Kramer, Gert Jan Hofstede and Adrie J.M. Beulens	
15.1	Introduction and background literature . . . . .	183
15.2	Problem definition . . . . .	185
15.3	Model . . . . .	185
15.3.1	Agent-based properties . . . . .	187
15.4	Simulations . . . . .	188
15.5	Results . . . . .	189
15.6	Conclusion and discussion . . . . .	192
	References . . . . .	193
<b>16</b>	<b>Rural landscapes in turbulent times: a spatially explicit agent-based model for assessing the impact of agricultural policies</b>	195
	Marleen Schouten, Nico Polman, Eugène Westerhof, and Tom Kuhlman	
16.1	Introduction . . . . .	195
16.2	Spatially Explicit Rural Agent-based model (SERA) . . . . .	197
16.2.1	Purpose . . . . .	197
16.2.2	State variables and scales . . . . .	197
16.2.3	Process overview and scheduling . . . . .	198
16.2.4	Design concepts . . . . .	200
16.2.5	Initialization and input data . . . . .	201
16.2.6	Submodels . . . . .	201
16.3	Implementation and selected simulation results . . . . .	203

16.3.1	Comparing two auction mechanisms . . . . .	203
16.3.2	Experimenting with buyer and seller surplus . . . . .	205
16.4	Conclusion . . . . .	205
	References . . . . .	206
<b>17</b>	<b>Interactions among biases in costing systems: A simulation approach . . . . .</b>	<b>209</b>
	Stephan Leitner	
17.1	Introduction and Research Question . . . . .	209
17.2	Simulation Model . . . . .	210
17.2.1	Model of the costing system . . . . .	210
17.2.2	Investigated types of biases . . . . .	214
17.3	Results . . . . .	215
17.3.1	Simulation experiments and data analysis . . . . .	215
17.3.2	Interactions among biases and impact on information quality	216
17.3.3	Sensitivity of results to costing system parameterization . . . . .	217
17.4	Discussion and conclusion . . . . .	219
	References . . . . .	220
<b>Part VI Methodological issues</b>		
<b>18</b>	<b>Initial Predictions in Learning-to-Forecast Experiment . . . . .</b>	<b>223</b>
	Cees Diks and Tomasz Makarewicz	
18.1	Introduction . . . . .	223
18.2	Testing methodology . . . . .	226
18.3	LtF initial expectations . . . . .	229
18.4	Conclusions . . . . .	234
	References . . . . .	234
<b>19</b>	<b>Small sample bias in MSM estimation of agent-based models . . . . .</b>	<b>237</b>
	Jakob Grazzini, Matteo Richiardi and Lisa Sella	
19.1	Introduction . . . . .	237
19.2	The Bass model . . . . .	239
19.3	The AB version . . . . .	240
19.4	Estimation . . . . .	240
19.5	Small sample bias . . . . .	243
19.6	Conclusions . . . . .	243
	References . . . . .	245