

Sjoukje Osinga ◦ Gert Jan Hofstede ◦ Tim Verwaart
Editors

Emergent Results of Artificial Economics

B 377230



Springer

Contents

Part I Humans in the System

Multi-Agent Stochastic Simulation for the Electricity Spot Market Price . . .	3
Matylda Jabłońska and Tuomo Kauranne	
1 Introduction	3
2 Theoretical Framework	4
2.1 Electricity Spot Market Price	4
2.2 Animal Spirits in Financial Markets	5
2.3 Capasso-Morale-Type Population Dynamics	6
3 Multi-Agent Simulations for Electricity Spot Market	7
3.1 Data	7
3.2 Mean-Reverting Jump Diffusion Ensemble Simulation	8
3.3 Ensemble Simulation with Burgers'-Type Interaction	10
4 Conclusions	12
References	13
Referral Hiring and Labor Markets: a Computational Study	15
Samuel Thiriot, Zach Lewkovicz, Philippe Caillou and Jean-Daniel Kant	
1 Introduction	16
2 Model and Experimental Settings	18
2.1 Labor Market Model	18
2.2 Social Network Generation	19
2.3 Experimental Settings	20
3 Results	21
3.1 Efficiency of Link Types	21
3.2 Perfect Interactions, Weak Sensitivity to Networks' Structure	22
3.3 Networks with Probabilistic Interactions	23
4 Discussion	24
References	25

An Agent-Based Information Management Approach to Smoothen the Pork Cycle in China		27
Sjoukje A. Osinga, Mark R. Kramer, Gert Jan Hofstede and Adrie J.M. Beulens		
1	Introduction	28
1.1	Information Management Objective	28
2	Background Literature	29
2.1	Pork Cycle in China	29
2.2	Interventions from Government	30
2.3	Information Management Based Approach	30
3	Research Questions	31
4	Model	31
4.1	Information Management Approach	32
4.2	Research Models	32
4.3	Decision to Restock	33
4.4	Simulation Process	33
4.5	Fourier Transformation	34
5	Results	34
6	Conclusion and Discussion	36
	References	37

Part II Financial Markets

Do Capital Requirements Affect Long-Run Output Trends?		41
Andrea Teglio, Marco Raberto and Silvano Cincotti		
1	The Eurace Credit Market Model	43
1.1	Credit Demand	43
1.2	Credit Supply	44
1.3	Matching Demand and Supply of Credit	45
2	The Computational Experiment	46
3	Conclusions	50
	References	51
Modeling the Textbook Fractional Reserve Banking System.		53
Jacky Mallett		
1	Introduction	53
2	Textbook Description	56
3	A Simple Model of the Banking System	57
4	Results	58
4.1	Textbook Description	59
4.2	Regional Banking Model	60
4.3	Evolution of the Money Multiplier	61
5	Conclusion	62
	References	63

Learning to Trade in an Unbalanced Market	65
Florian Hauser and Marco LiCalzi	
1 Introduction	65
2 The Model	66
3 Convergence to the Competitive Outcome	67
4 The Evolution of Strategic Behavior	70
4.1 Simultaneous Order Clearing	70
4.2 Asynchronous Order Clearing	72
5 Allocative Efficiency	73
References	76

Part III Organization design

Effectivity of Multi Criteria Decision-Making in Organisations: Results of an Agent-Based Simulation	79
Stephan Leitner and Friederike Wall	
1 Introduction, Research Question and Research Method	79
2 Simulation Model	80
2.1 Model of Organisations and Options for Organisational Design	81
2.2 The Representation of the Performance Landscapes	83
2.3 Methods of Multi Criteria Decision Making	84
3 Results	85
3.1 Equal Weighting	86
3.2 Schism Approaches	87
3.3 Evaluation Across Multi Criteria Decision Making Methods	87
4 Conclusion	88
References	89

The Problem of Emergency Department Overcrowding: Agent-Based Simulation and Test by Questionnaire	91
Roger A. McCain, Richard Hamilton and Frank Linnehan	
1 The Problem of Medical Emergency Department Overcrowding ..	91
2 Small-Scale Game-Theoretic Models	93
3 Agent-Based Computer Simulation	95
4 Survey Method and Results	99
5 Concluding Summary	101
References	102

An Agent-based Model of Food Safety Practices Adoption	103
Tim Verwaart and Natalia I. Valeeva	
1 Introduction	103
2 The Agent Model	106
3 Implementation and Results	109
4 Conclusion	112

References	113
------------------	-----

Part IV Macroeconomics

Why Should the Economy be Competitive?	117
---	-----

Hugues Bersini and Nicolas van Zeebroeck

1 Introduction	118
2 The Model	120
3 Results	122
4 Conclusions	127
References	128

Economic Growth by Waste Generation: the Dynamics of a Vicious

Circle	129
---------------------	-----

Benoît Desmarchelier, Faridah Djellal and Faïz Gallouj

1 Background Literature and Issue	129
2 The Model	130
2.1 A Simple Model of Economic Growth Pulled by Durables	131
2.2 Beyond the Limits: the Throw Away Society	132
3 Heterogeneous Agents and the Waste Stream of Durables	135
4 Conclusion	137
References	137

Using Agentization for Exploring Firm and Labor Dynamics	139
---	-----

Omar A. Guerrero and Robert L. Axtell

1 Agentization as a Methodological Tool	140
2 Agentization Example	141
2.1 Micro-Foundations	141
2.2 Crude Agentization	142
2.3 Equilibrium Impossibility	142
2.4 Labor Mobility and Time	145
2.5 Heterogeneity and Local Interaction	145
3 Limits Exploration	147
4 Summary and Conclusions	149
References	149

Part V Market dynamics

Firm Entry Diversity, Resource Space Heterogeneity and Market

Structure	153
------------------------	-----

César García-Díaz and Arjen van Witteloostuijn

1 Background	153
2 The Model	154
3 Results	158
4 Conclusions	162
References	163

Time-Dependent Trading Strategies in a Continuous Double Auction	165
Shira Fano and Paolo Pellizzari	
1	Introduction 165
2	The Model 167
2.1	Evolution Strategies 168
3	Computational Results 171
4	Quality of the Equilibrium and Robustness Test 173
5	Conclusion 176
	References 176
An ACE Wholesale Electricity Market Framework with Bilateral Trading	177
Davide Provenzano	
1	Introduction 177
2	Market Composition 179
3	The Match-Making of Agents in the Bilateral Market of Energy . . 180
3.1	The Bilateral Transaction Mechanism 181
4	The DA Market 182
4.1	The Supply Side 183
4.2	The Demand Side 184
5	Simulation Settings 185
6	Results 187
7	Conclusions 188
	References 188
Part VI Games	
Dynamics of Cooperation in Spatial Prisoner's Dilemma of Memory-Based Players	191
Chenna Reddy Cotla	
1	Introduction 191
2	Model 192
3	Simulation Results 195
4	Discussion 198
5	Conclusion 199
	References 199
Indian Food Supply Chains: a Game and Model to Study Economic Behavior	201
S.A. Meijer, J. Raghothama, R. King and B. Palavalli	
1	Introduction 201
2	Indian Mango Supply Chain 202
3	A New Design: Mango Mandi Gaming Simulation 204
3.1	Description of the Roles / Agents in the MMGS 204
3.2	Game Design 205
4	Validation 210

5 Conclusions and Discussion 211
References 212