EVOLUTIONARY AGENT-BASED POLICY ANALYSIS IN DYNAMIC ENVIRONMENTS

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prof.dr. A.E. Eiben

To Harald & Tjadine

And crawling on the planet's face
Some insects called the human race
Lost in time, and lost in space
And meaning.

—Richard O'Brian

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PREFACE

Little did I know what I was embarking on when I fired off that email to Guszti Eiben, professor of story-writing, suggesting to use evolutionary artificial societies to study economic processes. Not only did he want to do exactly that, but his colleague Jeroen van den Bergh, professor of scientific debate, had already secured funding for a PhD position and, surprise, was willing to take me as a student, despite my ignorance of economic theory. Soon I was running agent-based simulations right and left, leaving far behind what was considered the state of the art in general equilibrium theory. My hard disk was filling with gigabytes of exciting data. Only that they made no sense. The artificial agents were dying. Or their technology went through the roof. Or their welfare exploded. We used different parameters. Different methods. Different ideas. To no avail.

If mainstream economists frown upon evolutionary agent-based simulations, here I am, shaking their hand and hugging their shoulder: they have every reason to do so. These beasts are unruly, unpredictable, incomprehensible, nasty, and mean. Only a madman can believe in them. Or visionaries like Guszti and Jeroen. I myself threw in the towel not only once but twice! Then I had the good fortune to meet Sorin Solomon, professor of good hope, and David Bree, professor of the high seas, who together pulled me back on the firm grounds of wonder and astonishment. You can't really control what you get out of a complex system by what you are putting in. Thats why its called complex. There is some break of causality.

Still, there is no denying it: real economic phenomena emerge from the complex interaction of opinionated and irresolute human beings like me, while the super-hero of rational choice theory really belongs to the comic book. The little headway I could make in taming this raging madness, nothing but charts of shallow waters around an abysmal depth of mystery, is contained within this thesis. I hope that it will be useful to you, reader, if only by warning you of obstacles that lie ahead.

This thesis would not be complete without a word on interdisciplinary research. By this we mean a holistic and systematic research plan that requires scientific advances in unrelated disciplines. I think Sorin has formulated it well: this is where things really get interesting; but unless one enjoys the luxury of a four year PhD contract, it can hardly be done. By and large, research gets funded if it can be published in high ranking journals. Differences in culture, language, style, methods, and expectations make it extremely difficult to write articles that will be accepted by high ranking journals of more than one discipline. From the point of view of academic career building, this cancels the added value of interdisciplinary research. If this is your choice, be prepared for painful misunderstandings, and make sure you can afford to fail.

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The life of a PhD student is a unique mixture of independent scientific investigation, professional creativity, and irresponsible leisure, particularly when you share a flat, or live door to door, with like minded people. I was lucky to share this experience with Stefano Bocconi, Jeroen Groenenboom, Sara Mautino and Davide Moratti, Peter Hofgesang and Maya Joosz, Simona Montagnana and Paolo Zeppini, Marcin Zukowski, Krzysztof Pietrzak, Christian Shaffner and Sonja Peters.

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