

Reading Group on
Dynamic Stochastic General
Equilibrium Modeling
&
Agent-Based Modeling

Chair for Economic Theory and Computational Economics
Bielefeld University

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Preface

The topic of this reading group is Dynamic Stochastic General Equilibrium Modeling (DSGE) and Agent-Based Modeling (ABM). Our focus will be on understanding the main differences between these two modeling strategies, the underlying assumption and methodology, and possibly also their history. We will also consider the computational algorithms that are used in each modeling method.

We will consider the most important contributions from the literature; the theoretical models and their implementations; and the analysis of these models. For DSGE models, these are often analysed using the Dynare platform. For ABMs, the models are analysed using a variety of platforms (e.g., FLAME, Matlab, LSD, Netlogo, Swarm).

The participants of the reading group will present relevant papers from the literature and we will deepen our understanding of the issues mentioned above by extensive discussions.

From the description of a Research Workshop held in 2011 at the Österreichische Nationalbank, on *Analyzing the Macroeconomy: DSGE versus Agent based Modelling*:

‘Dynamic Stochastic General Equilibrium Models have become one of the main workhorses for macroeconomic analysis. Their impact has been particularly strong within the central banking community, where policy analysis, policy simulation as well as forecasting is based on this class of models. More recently these models have received a fair amount of criticism both from inside as well as from outside the academic community. In this debate agent based models were frequently discussed as potential competitors in modelling the macro economy. Like DSGE models, agent based models describe economic behaviour at the individual level. In contrast to DSGE models, in agent based models the aggregate implications of individual behaviour are analyzed using the simulation capacity of modern computing technology. This allows for the analysis of a wide range of behaviour, the description of fairly complex institutions as well as the study of system dynamics both out of and in equilibrium. Are these competing modelling strategies alternatives or complements? Are there important aspects of macroeconomics that are better understood by one model class rather than by the other? What are strengths and weaknesses of both approaches? In this workshop we want to simultaneously present and comparatively discuss both modelling strategies. We want to assess their relative merits and their potential in enhancing our understanding of how the macro economy works.’

Organization

Room: W8-107

Time: 10:15 – 11:45 h

Dates: Thursday, bi-weekly

Planning Session: 29.10.2015

Presentations/Discussions: 6 sessions

Time schedule:

12.11.2015	26.11.2015	10.12.2015
07.01.2016	21.01.2016	04.02.2016

Session overview

The papers marked for further reading provide more background information on a topic.

Preliminary reading for everyone

- Summer (2011): Comparisons of macro modelling between DSGE vs ABM.

Session 1: Computational Modelling for Economic Policy

Presentation 1:

- Tovar (2008): Good critical discussion of DSGE models, its benefits and flaws.
- *Further reading:* Dotsey (2013): DSGE Models and their use for policy.

Presentation 2:

- Fagiolo and Roventini (2012): Non-technical critical discussion of DSGE methods.
- *Further reading:* Leijonhufvud (2011): On the perils of doing Macroeconomics with DSGE models.

Session 2: Introduction to DSGE and ABM macroeconomic models

Presentation 3:

- Romer (2011): Introduction to DSGE macroeconomic modelling.
- *Further reading:* Sbordone et al. (2010): Policy analysis using DSGE Models.

Presentation 4:

- Dawid and Harting (2012): Agent-based macroeconomic modelling and the Management Science Approach.
- *Further reading:* Dawid and Neugart (2011): Using ABMs for policy analysis.

Session 3: DSGE Estimation Techniques

Presentation 5:

- Griffoli (2013) (Dynare User Guide, Ch. 6-8): Estimation of DSGE models: the technical details.

Presentation 6:

- Ruge-Murcia (2007): Overview of Monte Carlo estimation methods for DSGE models: ML, SMM, GMM.

Session 4: DSGE Estimation Applications

Presentation 7:

- Smets and Wouters (2003): Empirical estimation of the standard DSGE model.

Presentation 8:

- Wouters and Smets (2005) or Smets and Wouters (2007): Empirical estimation of the standard DSGE model using Bayesian techniques.

Session 5: ABM Estimation Methodology

Presentation 9:

- Werker and Brenner (2004): Methods of Inference: deduction, induction, abduction.
- *Further reading*: Brenner and Werker (2006): Steps to build and analyze simulation models.

Presentation 10:

- Fagiolo et al. (2007): Good discussion of the methodological and technical issues; rwDGP and mDGP.

Session 6: ABM Estimation Techniques

Presentation 11:

- Grazzini and Richiardi (2014): Estimation of ABMs using Markov Chain Monte Carlo methods (MCMC).

Presentation 12:

- Barde (2015): Estimation of ABMs using a Markov Information Criterion (MIC).

Presentation 13:

- Lamperti (2015): Estimation of ABMs using a theoretic information criterion.

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