

Behavioral and Complexity Macroeconomics

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Introduction

- Macroeconomic theory: What have we learned?
- Focus on Behavioral Macroeconomics
 - Influence of behavioral economics on macro
 - Recent interest: 2000s and after the financial crisis
 - Relation to „irrational exuberance“
- Overview over behavioral macroeconomics
- Discussion of problems
 - Representative agent framework
- Distinction between levels is important
 - Macro level vs. micro level
- Behavioral macroeconomics should be combined with complexity macroeconomics.

Two ways of macroeconomic theorizing

- Aggregate level
 - Old-style Keynesian macro
 - Post Keynesian macro
 - System dynamics
 - Accounting identities, technological constraints
 - Stock-flow consistent models
- Models with microfoundations
 - In principle a good idea, but not always needed
 - Not per se superior to purely aggregate models
 - Models with perfectly rational representative agents are a very bad idea.
 - Models with representative agents trivialize the aggregation process.
- If you use macroeconomic models with microfoundations, do it right!

History of Behavioral Macroeconomics

- J.M. Keynes had many behavioral insights, but he was an armchair theorist.
 - Insights about consumption
 - Animal spirits
- George Katona combined macroeconomics with psychology.
 - Already in the 1940s
 - Father of consumer sentiment
- George Akerlof's Nobel lecture in 2001 „Behavioral macroeconomics and macroeconomic behavior“
 - Six unexplained phenomena in New Classical Macroeconomics
 - Rediscovery of psychology in macroeconomics
- Boston Fed conference „Implications of behavioral economics for economic policy“ in 2007

Current approaches

- Ad-hoc behavioral approaches, e.g.
 - Habit formation
 - Rule-of-thumb consumers
 - Mainly to get a better fit to the data
- Partial behavioral models, e.g.
 - Fairness and wage and price setting (Shefrin & Thaler 1988)
 - Consumption and discounting (Laibson 1997)
- Experiments, e.g.
 - Expectations (Hommes 2011, Luhan & Roos 2013)
 - Sunspots (Duffy & Fisher 2005)
 - Consumption (Carbone & Duffy 2014, Luhan et al. 2014)
- Attempts to marry standard (New Keynesian) models with behavioral approaches, e.g.
 - De Grauwe (2012): fundamentalist and extrapolative forecasting
 - Danthine and Kurmann (2010): Gift-exchange in labor market

Problems

- Many papers focus only on some issues and do not describe the macroeconomic system.
- Some papers introduce some behavioral features into otherwise standard macro models.
 - Some optimization, some use of heuristics
 - Some agents form rational expectations, others do not
 - Models not internally consistent
- Wilderness of bounded rationality
 - Many ways of not being rational
 - Hardly convincing to choose just one particular behavior for the representative agent
- Different types of agents
 - Degree of forward-orientation, propensity to plan
 - Very hard to incorporate many types into mathematical models
- Behavior may change and depend on external circumstances
 - Difficult do in standard equilibrium models

What is needed?

- Incorporating behavioral features into neoclassical representative agent models is the wrong approach.
- We need
 - A new theoretical framework
 - New modeling tools
- Both are available:
 - Complexity economics
 - Agent-based modeling

Complexity Economics

- Adequate framework for macroeconomics
- Economy seen as a Complex Adaptive System (CAS)
 - Composed of „large number of agents that interact and adapt of lean“
 - Decentralized decision-making
- Self-organization and emergence
 - Regularities at the macro level are result of interactions of individual decisions
 - Macro patterns typically different from micro patterns
- Nonlinear dynamics
- Uncertainty

Complexity and Behavioral Macroeconomics

- Complexity economics and behavioral economics are ideal complements for the study of macroeconomics.
- Substantive rationality impossible in a complex environment
 - Agents are confronted with fundamental uncertainty.
 - Procedural rationality
 - Heuristics and animal spirits
 - Learning
- Behavioral economics tells us how to model the agents.
- Complexity economics tells us how to analyze the different levels.
 - Micro, meso, macro

Agent-based Macroeconomics

- Complexity and behavioral macroeconomics is hard to do with mathematical models.
- Agent-based models are a more natural tool
- Algorithmic approach is closer to behavioral problem solving.
- Agent-based models have huge flexibility and many degrees of freedom.
 - Boon and bane
- Often criticised for arbitrary assumptions
 - Behavioral economics can help to justify assumptions about agents
- Approaches, e.g.
 - EURACE and EURACE@UniBi (Dawid et al. 2012)
 - Keynes-Schumpeter model (Dosi et al. 2013)
 - Financial accelerator model (Delli Gatti et al. 2010)
 - ABM-Stock-Flow consistent model (Caiani et al. 2016)

Implications

- Many challenges
 - Models richer and more difficult than conventional DSGE models
 - Conceptual problem: right degree of granularity
 - Validation
- No simple statements
 - Causality often difficult
 - No clear-cut predictions
 - No simple policy solutions
- These are inherent features of complexity.
- Complexity and behavioral macroeconomics requires a more sophisticated view.
- Assumptions do matter!
 - Behavior of agents must be well justified by empirical evidence.

The way forward

- Behavioral and complexity macroeconomics is still in its infancy.
- Much research needed.
- Host of insights from behavioral economics
 - What is relevant for macroeconomics?
 - Are there robust and parsimonious behavioral models?
- What is the right balance between behavioral details at the micro level and transparency of the macro level dynamics?
- How do we validate these models reliably?
- What kind of answers can we get from this approach?

What have we learned?

1. Macroeconomic models with perfectly rational representative agents are flawed.
 - Individual agents are boundedly rational
2. Models with boundedly rational representative agents are also flawed.
 - Agents are heterogenous
 - Behavior may change and is dependent on context
 - Agents interact
 - Aggregate behavior will be different from individual behavior
3. Macroeconomic models with microfoundations must take into account bounded rationality, heterogeneity and interaction.
 - Complex dynamics and emergent outcomes will result.
 - Behavioral and Complexity Macroeconomics