

#37 Topic: Parameter Space Characterisation of Macroeconomic Agent-Based Models

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Abstract:

Post the 07/08 financial crash, the main workhorse of macroeconomic policy makers and central banks, DSGE models, has received criticism from a number of camps. Critics often cite the method's inability to capture more complex, non-linear behaviours, and a lack of microeconomic foundations. As a result, a push has been made in the last decade to use agent-based modelling to rectify these concerns. In this talk, I'll discuss a 'hot-topic' within this field of Macro ABMs, namely that of model calibration. Successful Macro ABMs typically consist of anywhere between 10 and (upwards of) 40 parameters, all of which exist in an n-dimensional parameter space. The 'success' of different parameter sets is defined by certain objective functions, which typically seek to minimise the difference between an observed and a model-generated time series (of GDP for example). However, not much has been written about the existence of features such as flat regions, discontinuities and local equilibria within the parameter spaces of these ABMs. Optimisation procedures are typically run over the space, but no quantitative insight has been gained on the existence of these features, and how certain model mechanisms may play a role in generating such features. If such insights on any potential mechanism-parameter space coupling were to be gained, through quantitative metrics for the space, it could be of use to central banks, policy makers and practitioners (who are beginning to work with such ABMs), within their model design, selection and calibration, and in their objective function selection. Finally, if such couplings can be detected, are we able to use such metrics to think more quantitatively and systematically about over-parameterization?