Abstract

This thesis investigates the performance of simulation-based estimation methods in financial econometrics, specifically focusing on their application to agent-based models. Traditional estimation techniques often fail due to the intractability of analytical solutions in agent-based models, necessitating the use of innovative simulation-based approaches. The study compares two frequentist methods, Simulated Method of Moments (SMM) and Nonparametric Simulated Maximum Likelihood (NPSML), with their Bayesian counterparts, Approximate Bayesian Computation (ABC) and Bayesian Estimation (BE), respectively. On simple benchmark models, such as the AR(2) model and the ARMA(1,1)-GARCH(1,1) model, the simulation-based methods match the performance of traditional techniques. The well-known agent-based model from Franke and Westerhoff (2012) is the main model of interest. The results do not indicate a clear overall winner, as the performance varies parameter by parameter. However, Bayesian methods generally outperform their frequentist counterparts. ABC and SMM provide less biased estimates than the likelihood methods, NPSML and BE. On the other hand, the estimates from NPSML and BE are more stable across different simulation runs. Additionally, this study contributes to the understanding of the behavior of an extended NPSML approach designed to handle latent variables.