

Report on Bachelor / Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University

Student:	Bc. Ondřej Karlíček
Advisor:	PhDr. Jiří Kukačka, Ph.D.
Title of the thesis:	Simulation-based estimation methods in financial econometrics: Analysis of performance and comparison

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

Short summary

The presented thesis compares various simulation-based estimation methods commonly used in the agent-based modeling literature. Specifically, it explores the effectiveness of simulation-based estimation methods and their application to agent-based models, where traditional techniques struggle due to the complexity of analytical solutions. The study compares two frequentist methods - Simulated Method of Moments (SMM) and Non-parametric Simulated Maximum Likelihood (NPSML) - with two Bayesian methods - Approximate Bayesian Computation (ABC) and Bayesian Estimation (BE). The results indicate that ABC and SMM produced less biased estimates, while NPSML and BE showed greater stability across simulations. The study also extends knowledge on the behavior of NPSML in handling latent variables.

Contribution

The thesis definitely contributes to the financial agent-based modeling literature. While the focus on the ABM subfield of the literature may seem narrow, it is becoming more and more important with increasing computational power. The thesis brings an interesting comparison of the currently widely used techniques and also extends these methods.

Methods

The thesis consists of well-established methods from the agent-based literature. I think the author has done a good job of describing the methods in sufficient detail - sometimes the description is very detailed, but this is not a problem as the text reads very well. Overall, the methods seem to be applied correctly, and I have no problems trusting the results.

Literature

The submitted thesis contains a well-written literature review. All the papers mentioned in the thesis are highly relevant to the topic and were published in respected economic journals. The author shows an excellent knowledge of the literature, works with it properly, and explains all the concepts used throughout the thesis nicely.

Manuscript form

The submitted thesis is nicely written, uses proper language, and reads well.

Overall evaluation and suggested questions for the discussion during the defense

Overall, the presented thesis is very nice, well structured and reads well. I believe that with some minor revisions, it could easily be submitted to a decent economics journal.

I have no additional questions that need to be answered during the defense.

In my view, the thesis fulfills the requirements for a bachelor thesis at IES, Faculty of Social Sciences, Charles University, I recommend it for the defense and suggest a grade A. The results of the Turnitin analysis do not indicate significant text similarity with other available sources.

SUMMARY OF POINTS AWARDED (for details, see below):

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CATEGORY	POINTS
<i>Contribution (max. 30 points)</i>	29
<i>Methods (max. 30 points)</i>	30
<i>Literature (max. 20 points)</i>	20
<i>Manuscript Form (max. 20 points)</i>	20
TOTAL POINTS (max. 100 points)	99
GRADE (A – B – C – D – E – F)	A

NAME OF THE REFEREE: František Čech

DATE OF EVALUATION: 9.9.2024

Referee Signature

EXPLANATION OF CATEGORIES AND SCALE:

CONTRIBUTION: *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

METHODS: *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

LITERATURE REVIEW: *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

MANUSCRIPT FORM: *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

Overall grading:

TOTAL	GRADE
91 – 100	A
81 - 90	B
71 - 80	C
61 – 70	D
51 – 60	E
0 – 50	F