Computational Economics and Finance 2020

Final Project Instructions

October 12, 2020

Please follow these instructions for handing in your projects:

1. In the final projects, you are asked to write a short paper that contains a proper numerical analysis of an economic model and its associated computational solution methods. Start with an introduction, briefly describe the model, the methods applied and carry out your computational analyses on the basis of your own code.
2. The ideal length of such a paper is 5 - 7 pages without appendices. You are allowed to include your central tables and figures in you main text, but please make sure that your main text body does not to exceed 10 pages.
3. You are allowed to submit your results until November 30, 2020.
4. You are expected to submit your own work and to cite your references.
5. Submit your work via Email to me (maximilian.werner@business.uzh.ch). The Email should contain:
   - A single PDF-file with your name on page 1.
   - The source code in a separate zip archive. The code should be well documented, readable, and written in MATLAB.
6. Send your results from your official UZH Email account and put 'Final projects CEF 2020' into the subject line.

Projects: The models and methods are referring to their textbook representation in Heer and Maussner (2009, HM hereafter)[1].

- **Group 1 (Anguera Sempere, Annoni, Bauer, Bogdanova, and Cordier)**: Take a the stochastic growth model with non-negative investment from HM (chapter 4,3,1). Solve the model via value function iteration and describe the economic as well as the computational aspects of the kink.

- **Group 2 (Domingues, Donkov, Golob, Gong, and Ho)**: Take a stochastic, infinite time horizon model of your choice from HM (chapter 4). Compare the value function iteration in its basic version to its extension with linear interpolation.

- **Group 3 (Jhala, Jiang, Jin, Kemelov, and Kong)**: Take a stochastic, infinite time horizon model of your choice from HM (e.g., chapter 4). Solve the model by a method of your choice from HM. Discuss the impulse responses to transitory shocks in total factor productivity (tfp). That is, simulate a one period shock to the tfp-level and track how consumption, capital, and factor prices co-move with contractive and/or expansive shocks.

- **Group 4 (Lin, Liu, Ni, Riccucci, and Schwarz)**: Take a deterministic, infinite time horizon model of your choice from HM (chapter 6). Solve via at least 2 different projection approaches. Simulate simulate several time pathes from some point in the state space to the steady state. Describe the equilibrium dynamics along this path and compute the Euler Equation residuals along this simulation path.

- **Group 5 (Sejdaj, Shen, Sieni Saliba, Vasileva, and Wang)**: Take the stochastic growth model with non-negative investment from HM (chapter 5,3,1). Solve the model via parameterized expectations and describe your computations and results.

- **Group 6 (Xu, Xu, Yang, Zhou, and Zhu)**: Take a stochastic, infinite time horizon model of your choice from HM (e.g., chapter 4). Implement the value function iteration with a multigrid scheme (see Chow and Tsitsiklis (1991)).[2]. Present the idea of multigrid algorithms, review their applications in economics, and document your computational experiments.

[1] Heer, B. and Maussner 2009, *'Dynamic General Equilirium Modeling'*, Springer-Verlag Berlin Heidelberg 2nd printing

[2] Chow, C.-S. and J. M. Tsitsiklis 1991, *'An Optimal One-Way Multigrid Algorithm for Discrete-Time Stochastic Control'*, IEEE Transactions on Automatic Control, 36, 898-914