JAN ŽEMLIČKA

CONTACT INFORMATION

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RESEARCH INTERESTS

Macroeconomics, Public Finance, Computational Methods

EDUCATION

CERGE-EI, Prague *2019 - present*
Ph.D. in Economics and Econometrics
Dissertation topic: Optimal Policies in Heterogeneous Agent Economies with Aggregate Risk

CERGE-EI, Prague *2019 - 2021*
MA in Economic Research
Thesis: Macro-Epidemic Modelling: A Deep Learning Approach
Macro courses:

- Core macro sequence (Macro I/II/III)
  - Dynamic programming (including numerical implementation)
  - Neoclassical growth
  - Incomplete market models (including numerical implementation)
  - New Keynesian models
- Public Finance (syllabus)
  - Ramsey problems
  - Mirrlees problems
- Macro Topics II
  - Bayesian estimation of dynamic stochastic equilibrium economies
  - Additional numerical methods (including formal introduction to perturbation and projection methods and key approaches to optimization and numerical differentiation/integration)

Other courses: Core Ph.D. sequences in Micro and Econometrics, Time Series, Computer Solutions of Continuum Physics Problems (visiting lectures coveringMPI parallelism in Python)

Prague University of Economics and Business *2016 - 2019*
BA in Economics
Thesis: Does Risk Matter For Monetary Policy? An Evidence from Small Open Economy Model
Field courses: Economics (I had optionally/off-curriculum taken MA/Ph.D. level courses in Macroeconomics), Empirical Methods, Banking & Financial Markets

EXPERIENCE

Research Assistant to Professor Filip Matějka, CERGE-EI *2020-present*
Research assistant work on Filip Matějka's ERC grants Behavioral and Policy Implications of Rational Inattention (INATTENTION) and Economics of Inattention (ATTENTION).

Teaching Assistant to Professor Marek Kapička, CERGE-EI *September/October 2020 and September/October 2021*
Teaching assistant for the first-part of the core Ph.D. macro sequence. Covered topics included

- Fixed-point theory and its connection with dynamic programming
- Economic applications of dynamic programming (e.g. growth model)
- Numerical dynamic programming and basic numerical methods (optimization and functional approximation) in Julia

Assistant Analyst, Česká Spořitelna, a.s. *2017-2019*
Part-time in the Department of Economic and Strategic Analysis. My main tasks consisted of economic and financial data acquisition and writing regular internal client reports about domestic and global economic developments in both Czech and English language

VOLUNTEER EXPERIENCE

Organiser/Instructor, Simulace Plzeň z.s. *2015 - 2018*
After three years of being a participant of the Model of United Nations organized by Simulace Plzeň as a high school student, I had the honor to be also an organiser for three further years. My task (apart of compulsory fundraising effort) was the preparation and execution of economics-oriented part of program including "Econ101" kind of lectures and workshops.

SKILLS

Programming Languages and Frameworks
Julia, Python (JAX/TensorFlow), basics of R, rudimentary C++ and Java

AWARDS AND SCHOLARSHIPS

The Karel Engliš Prize for the Best Policy Paper , The Czech Economic Society *2021*
My master thesis *Macro-Epidemic Modelling: A Deep Learning Approach* applied recently developed deep learning approximation methods to the issue of solving macro-epidemic models featuring aggregate uncertainty. Beyond solving the model equilibrium for some fixed government policy, my thesis shows how deep learning methods could be used to simultaneously solve the model for a large number of different government policy rules to facilitate optimal policy computations. Link

RSJ Second-Year Research Fellowship - 2nd prize , CERGE-EI *2021*
My dissertation proposal *Optimal Policies in Heterogeneous Agent Economies with Aggregate Risk* propose a novel approach for computing optimal policy systems in rich heterogeneous agent economies with aggregate risk. Compared to the existing literature which focuses on linear policy system, my method aims to allow for nonlinear and time-varying policy instruments (e.g. progressive taxes). Link

Dean's Prize for the Best Undergraduate Thesis , Faculty of Economics and Public Administration, Prague University of Economics and Business *2019*
My thesis *Does Risk Matter For Monetary Policy? An Evidence from Small Open Economy Model* focused on the issue of how approximating method used to solve New Keynesian models could influence policy advise provided by those models. Link

2nd prize in the 38th round of national high school competition "Students' Professional Activities" in Economic , The Ministry of Education, Youth and Sports *2016*
The paper *"Problems and Possible Reform of the Economic and Monetary Union* focused on the issue of asymmetric bank credit flows within the euro area generated by a single interest rate policy applied to heterogeneous economies. Available in Czech Language

Statement

Dear Sir or Madam,

I apply to the NBER Student Workshop on Heterogeneous-Agent Macroeconomics because I believe it will help me to pursue my research agenda which is intimately connected to the topic of your workshop. An opportunity to learn from and to be able to consult my research with the leading scholars of the field would be invaluable for me.

The topic of my dissertation research is dynamic public finance in heterogeneous agent economies and computational methods of solving thereof. I focus on two research questions. Firstly, I am interested in developing a method for computing optimal policy systems in heterogeneous agent economies which would simultaneously allow for nonlinear policies (e.g. progressive taxes) and their reaction on aggregate shocks. I believe that such a framework could deliver some crucial insights about trade-offs faced by real-world governments since indeed, they face aggregate shocks, use nonlinear policies and adjust their policy instruments in reaction to aggregate shocks.

Second, given my background as a citizen of a small non-eurozone economy, I am naturally drawn towards open economy issues. Specifically, I am interested in analyzing exchange rate and portfolio management problems faced by monetary policy authorities such as the Czech National Bank. Solving for welfare-maximizing central bank/government policy requires taking into account the cross-sectional heterogeneity among both households and firms. For that reason, I am especially interested in learning how to construct open-economy HANK models, such as the one recently developed by Auclert, Rognlie, Souchier, and Straub. Besides purely econ reasons, I am also eager to learn more solution methods in Python. Last year, after years of being an all-in Julia evangelist, I ported my deep learning based project to JAX/Python & I don't regret that. Performance gains that I achieved in that project make me really curious about the potential of Python frameworks also for non deep learning based algorithms.

Thank you for considering my application.

Sincerely,
Jan Žemlička