Jan Žemlička

PERSONAL DATA

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EDUCATION

University of Zürich *2023 - 2028 (expected)*
Ph.D. in Finance
Chair: Felix Kübler

CERGE-EI, Prague *2021 - 2023*
Ph.D. student in Economics and Econometrics,
All but dissertation
Chair: Marek Kapička

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

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

EXPERIENCE

Visiting Scholar, University of Pennsylvania *8/2022 - 12/2022*
Sponsor: Jesús Fernandéz-Villaverde

Research Assistant to Professor Filip Matějka, CERGE-EI *2020 - 2023*
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 *9/2020 - 10/2020 and 9/2021 - 10/2021*
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

GRANTS AND FELLOWSHIPS

Advanced Neural Networks Architectures for Solving Heterogeneous Agent Models , The Charles University Grant Agency , *Principal Investigator* *2022-2023*
This project aimed to develop specialized neural network architectures for solving dynamic stochastic general equilibrium models with high-dimensional state spaces. The main output of the project is the *Market Clearing Layer* architecture developed in the paper *Intergenerational Consequences of Rare Disasters* coauthored with Marlon Azinović.

WORKING PAPERS

Intergenerational Consequences of Rare Disasters
with Marlon Azinović

We analyze the intergenerational consequences of rare disasters in a calibrated overlapping generations model featuring realistic household portfolios and equilibrium asset prices. Households own houses and trade in bonds and equity. In a disaster, young households suffer from reduced labor income and tightened borrowing constraints. Older households lose a large portion of their savings invested in risky assets. The relative winners are households shortly before retirement, who have a more stable labor income, are not borrowing constrained, and young enough to benefit from large returns of assets purchased during the disaster at depressed prices. In order to solve the model, we advance contemporary deep learning based solution methods along two complementary dimensions. First, we introduce an economics-inspired neural network architecture that, by construction, ensures that market clearing conditions are always satisfied. Second, we illustrate how to solve models with multiple assets by introducing them step-wise into the economy. These two innovations enable us to reduce the number of equilibrium conditions, which are not fulfilled exactly, and to substantially improve the stability of the training algorithm.

Link

Average Inflation Targeting in a Behavioral Heterogeneous Agent New Keynesian Model
with František Mašek

Winner of the Karel Englis Prize for the best paper on the Czech economic policy awarded by the Czech Economic Society within the Young Economist of 2022 Award.

We analyze the optimal window length in average inflation targeting rule within a Behavioral THANK model of Pfäuti and Seyrich (2022). The central bank faces an occasionally binding effective lower bound (ELB) or persistent supply shocks and can also use quantitative easing when we merge Pfäuti and Seyrich (2022) with Sims et al. (2020). We show that the optimal averaging period is infinitely long in the case of a conventional degree of myopia. However, for a higher cognitive discounting finite window length dominates. The optimal length of the averaging period depends on the definition of the average inflation process. Optimal period is substantially lower when the target is defined as an arithmetic moving average while the welfare loss is monotonically decreasing in the history-dependence for an exponential moving average process. We solve the model locally and globally to disentangle the effects of uncertainty about hitting the ELB in the future, which may lead to a downward inflation bias in the case of the global solution. The welfare loss difference given the solution technique is considerably decreasing in the degree of history dependence.

SSRN Link

WORKSHOPS AND CONFERENCES

SED Meeting *scheduled* 6/2024
Universitat Autonoma de Barcelona, Barcelona

EEA-ESEM 8/2023
Universitat Pompeu Fabra, Barcelona

29th SCE Conference 7/2023
Université Côte d'Azur, Nice

Midwest Macroeconomics Meeting 11/2022
SMU, Dallas

AWARDS

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 research 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. 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

SKILLS

Languages
Czech-native proficiency, English-full professional proficiency

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

REFERENCES

Felix Kübler, Ph.D. felix.kubler@df.uzh.ch
Department of Finance, University of Zürich

Doc. Marek Kapička, Ph.D. marek.kapicka@cerge-ei.cz
CERGE-EI

Doc. RNDr. Filip Matějka, Ph.D. filip.matejka@cerge-ei.cz
CERGE-EI

Jesús Fernandéz-Villaverde Ph.D. jesusfv@econ.upenn.edu
University of Pennsylvania