Borui Niklas Zhu
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Cambridge, MA 02138
United States

March 20, 2023

Dear Adrian, Bence, Matthew, and Ludwig:

Enclosed is my application to the NBER Workshop on Heterogeneous-Agent Macroeconomics 2023.

A **reference** is kindly provided by:
Ludwig Straub
ludwigstraub@g.harvard.edu

My contact details are as follows:
Email: boruizhu@g.harvard.edu
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Attached are:

- My CV
- A brief statement

Thank you.

Yours Faithfully,



Borui N. Zhu

BORUI NIKLAS ZHU

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Mailing Address: Department of Economics, Harvard University, Littauer Center
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Education

PhD Economics 2022 – present
Harvard University *Cambridge MA, USA*

- First-year student, relevant coursework: Macroeconomics (3 of 4 modules), Macroeconomics 1st year at LSE (audit), Time Series Analysis, Behavioural Economics (1 of 2 modules)

MSc Econometrics and Mathematical Economics (EME) 2020 – 2021
London School of Economics *London, United Kingdom*

- Graduated with Distinction
- Courses: Advanced Macroeconomics, Advanced Microeconomics, Econometric Analysis, Contracts and Organisations

BSc Economics, minor in Mathematics 2016 – 2020
University of Mannheim *Mannheim, Germany*

- Graduated with Distinction ("mit Auszeichnung")
- Bachelor Thesis: "Inequality and Votes for Extremists: an Analysis of Wuerttemberg in the Inter-War Period". Empirical work using viticultural terrain features as IV
- Exchange Year 2018-2019 at the National University of Singapore (NUS), modules in Statistics, Economics, and Computer Science

Work Experience

Pre-Doctoral Research Assistant Aug 2021 – Aug 2022
London School of Economics, Centre for Macroeconomics *London, United Kingdom*

- Prof. Benjamin Moll and Prof. Ricardo Reis
- Data work in R and STATA, literature reviews, writing proofs, checking maths in paper drafts; for projects on taxation, inflation, and government debt limits
- Coding in MATLAB for numerical solution and visualisation of general equilibria

Research Assistant May 2020 – Nov 2020
University of Mannheim *Mannheim, Germany*

- Prof. Antonio Ciccone
- Econometric analysis for projects on population dynamics, historical factors of growth and agglomeration externalities
- Coding using R, STATA, Python; QGIS

Intern, Political Department Feb 2019 – Mar 2020
Embassy of Germany to the United States *Washington, D.C., USA*

- Informed foreign ministry officials on positions of key actors in US politics, by monitoring think tank events and congressional hearings on topics of interest to the German government

Intern, Banking Supervision: Risk Analysis June 2019 – Sep 2020
German Central Bank *Frankfurt, Germany*

- Used econometric techniques such as matching and quantile regression to evaluate effects of the G-SIB framework on systemically relevant banks: risk behaviour, balance sheet composition
- Coding using STATA and R, data from SNL, Bloomberg etc.

Research Assistant (part-time) Apr 2018 – Dec 2018
University of Mannheim *Mannheim, Germany*

- Prof. Hans-Peter Grüner
- Programming in R to numerically solve for Perfect Bayesian Equilibria and subsequent welfare analysis of a game theoretical model from Grüner, Tröger (2019)

Projects

Corresponding Author: R-Package "DistributionFitR" Sep 2019 – Present

- Given univariate data, crawls over chosen or all parametric distributions available on CRAN, identifies parameters and extracts parameter space, and returns best MLE-fits, see: GitHub repository
- Official release: 04/03/2020 on CRAN

Teaching Experience

Teaching Assistant 2017 – 2020
University of Mannheim *Mannheim, Germany*

- Teaching Assistant, Principles of Economics, Fall 2017
- Revision Lecture, Microeconomics A, Summer 2018, 2019, 2020

Extracurricular Activities

Volunteer Summer 2020
NHS Vaccination Programme *London, United Kingdom*

- Provided steward support at the Covid-19 Mass Vaccination Centre in the Science Museum, South Kensington
- Check-ins, answering questions about vaccine eligibility, interpreting for Russian and Chinese speaking patients

Founding Member Sep 2017 – Aug 2020
Students' Association for Statistics and Data Science "STADS" *Mannheim, Germany*

- Head of Training: initiated a series of expert seminars on topics in computational statistics
- Organised an introductory Python course with over 200 participants, created a dedicated course website linked with the university CAS-login

Voluntary Service Mar 2016 – Aug 2016
Kulturweit *Kiev, Ukraine*

- Volunteering programme offered by the German UNESCO commision jointly with the MFA
- Assisted in teaching German at a Ukrainian state school

Skills

Programming: **R**, **STATA** (Proficient), **MATLAB**, **Python**, C++ (Intermediate)
Languages: **German** (Native), **English** (Proficient), **Chinese** (Fluent), **Russian** (Beginner)

Awards and Honours

German Academic Scholarship Foundation, 2019 - 2021
DAAD Promos Scholarship for Studies Abroad, 2018
Deutschlandstipendium Scholarship, 2016 - 2019

Brief Research Statement

Borui Niklas Zhu

In macroeconomics, the first topic I am particularly interested in is studying household saving choices and asset distributions. The rise in the top share of wealth has been prominently established, and work such as Hubmer, Krusell, and Smith (2020) highlight that it is crucial to understand why households differ across the wealth distribution in what kind of assets they hold. As of now, there is no canonical benchmark theory on this. In fact, there still is no consensus on a related question: Why do the richest households keep accumulating so much? Based on previous work that focuses on income risk or bequest motives, I also want to have a closer look at the nature of consumption itself. One particular approach I would like to try out is that of taking seriously nonhomothetic CES-preferences, as for example Comin, Lashkari, and Mestieri (2021) did for structural transformation; and another approach involves durable consumption goods. Any quantitative model will require knowledge in computational solution methods, and given that more and more people who are working in this field are adopting the representation using SSJs and DAGs, I hope to make use of the workshop to acquaint myself with both the intuition behind the modelling approach as well as developing template code for solving HA-models this way.

A second topic I have grown to be more interested in recently is the formation of production networks and the interactions thereof with macroeconomic outcomes. I am still exploring these issues at the level of contract theory, but so far there are indications that embedding any such ideas into a macroeconomic framework will require HA-tools as well. In particular, I expect that it may become even more complicated than in the household question outlined earlier, due to many more state variables to keep track of. Having a modular and tractable approach would be helpful, and given what people told me about the SSJ-approach, I hope that this would enable me to focus on the economic mechanism I am interested in, rather than to worry about implemention concerns in the computational parts.

References

Comin, D., D. Lashkari, and M. Mestieri (2021): "Structural Change With Long-Run Income and Price Effects," *Econometrica*, 89, 311–374.

Hubmer, J., P. Krusell, and A. A. J. Smith (2020): *Sources of US Wealth Inequality: Past, Present, and Future*, University of Chicago Press, 391–455.