

Euro Area Business Cycle Network Training School

## **Heterogeneous-Agent Macro in the Sequence Space**

by

**Ludwig Straub (Harvard University)**

**University of Mannheim**

**Germany**

15-17 June 2022

**Deadline: 6pm (UK time), Friday 1 April 2022**

### **General description**

We are pleased to announce details of the latest EABCN Training School; a three-day course entitled “Heterogeneous-Agent Macro in the Sequence Space”. Professor Ludwig Straub will teach the course. It is primarily aimed at participants in the Euro Area Business Cycle Network but applications will also be considered from doctoral students, post-doctoral researchers and economists working in central banks and government institutions outside of the network, as well as commercial organisations (fees are applicable for non-network non-academic organisations).

### **Tentative course outline**

The goal of this workshop is to get participants up to speed on solution methods for general equilibrium models with heterogeneity, including computation of steady states, transition dynamics, estimation, and optimal policy. We will focus on the “sequence space” approach to solving these problems.

Our primary application of these tools will be to the literature around heterogeneous agent New Keynesian (HANK) models. We will cover monetary and fiscal policy, in both closed and open economies; estimation of HANK on macro data. Time permitting, we will also apply the tools to the literature on price-setting with menu costs.

The course is divided into three lecture sessions, each followed by a practice session.

#### **Day 1 – Wednesday, June 15, 2022**

Topic: “A canonical HANK model with application to fiscal policy”

Morning lecture session from 09:00 AM - 12:00 NOON (CEST)

Afternoon practice session from 01:30PM - 3:30PM (CEST)

In the morning, we begin with neoclassical heterogeneous-agent models in the tradition of Bewley, Aiyagari, and Huggett. We then introduce nominal wage rigidities and set up a canonical HANK model. We show how the model can be used to study the effects of fiscal policy.

In the afternoon practice session, we implement the “fake-news” algorithm that allows to simulate heterogeneous-agent models quickly in the sequence space.

**Day 2** – Thursday, June 16, 2022

Topic: “Monetary policy with heterogeneous agents”

Morning lecture session from 09:00 AM - 12:00 NOON (CEST)

Afternoon practice session from 01:30PM - 3:30PM (CEST)

In the morning, we go over monetary policy in HANK models. We contrast HANK with other models, including representative agent models, two agent models, and models with tractable heterogeneity such as zero-liquidity models. Time permitting, we also compare open and closed economy HANK models.

In the afternoon, we learn how to set up models with the Sequence-Space-Jacobian toolbox. The toolbox is designed to automate the fake-news algorithm and allows to incorporate building larger macroeconomic models with heterogeneous agents.

**Day 3** – Friday, June 17, 2022

Topic: “Advanced sequence-space methods”

Morning lecture session from 09:00 AM - 12:00 NOON (CEST)

Afternoon practice session from 01:30PM - 3:30PM (CEST)

In the morning, we go over advanced sequence-space methods, including second moments and Bayesian estimation to macro time series data. Time permitting, we discuss how to incorporate deviations from full information rational expectations in sequence-space models.

In the afternoon, we further work with the Sequence-Space-Jacobian toolbox, compute steady states, linear impulse responses and transition dynamics. Time permitting, we also compute second moments and the likelihood.

**Practice sessions**

The practice sessions are hands on and are based entirely on Python code. They are most useful if Python is installed ahead of time, and if there is some basic familiarity with Python. For reference, we will go over some of the code on: <https://github.com/shade-econ/sequence-jacobian>

**Administrative Information:**

The course will take place at the University of Mannheim. Mannheim can be reached with a 30 minute train ride from Frankfurt airport. More information about logistics will be circulated closer to the date.

Participants will be invited to make their own arrangements regarding their accommodation and meals. Further information about hotel options will be available to successful applicants.

We ask that you send a **current** version of your CV. PhD students **must** also specify in which way the school will be useful for their current research (**max** 300 words).

Participants from non-academic institutions where the employer is not a member of the EABCN network are charged a course fee of EUR2000.

## How to Apply:

**Candidates who are CEPR affiliated or already have a CEPR profile should apply by submitting their CV online:**

- 1) Log in on the CEPR portal online at <https://portal.cepr.org/>
- 2) Go to <https://portal.cepr.org/meetings/1488/info>
- 3) If you are a member of the MEF programme area, click on "Change registration details", complete the requested information and click "Submit information".
- 4) If you have a CEPR profile, click on "Step 1: Apply" and complete the requested information and click "Register"

**Candidates who are not CEPR affiliated or do not have a CEPR profile should apply by submitting their CV online:**

- 1) Create an online profile [here](#)
- 2) Log in on the CEPR portal online at <https://portal.cepr.org/>
- 3) Go to <https://portal.cepr.org/meetings/1488/info>
- 4) Click on "Step 1: Apply" and complete the requested information and click "Register"

If you have any difficulty in applying please contact, Lydia Williams, CEPR Events Officer at [lwilliams@cepr.org](mailto:lwilliams@cepr.org) for assistance, with the subject line '1488- EABCN Training School - Ludwig Straub - Mannheim, 2022'

## About the Instructor:

**Ludwig Straub** is an Assistant Professor of Macroeconomics at Harvard University. He is a Faculty Research Fellow at the National Bureau of Economic Research (NBER) and a Research Affiliate at the Center for Economic and Policy Research. His research focuses on the implications of household and firm heterogeneity for fiscal and monetary policy.