Prof. Dr. Marten Hillebrand **Summer semester 2022**
Moritz May, Zhiyuan Qiu
Anastasia Golubeva, Philipp Moog

Master's course

Advanced Macroeconomics 2

Syllabus

- Summary:

The course studies macroeconomic models at an advanced level using state-of the art dynamic general equilibrium theory. The focus is on models of economic growth describing the long run evolution of economies. The course is organized in two parts.
Part I discusses the general economic forces generating the empirically observed increase in key macroeconomic variables over time and the determinants of per-capita income which is generally used as a (crude) measure of well-being in a country. We will also explore whether fiscal policy can and should influence the growth process in an attempt to foster production and income. Models to be discussed include the Solow growth model, models with overlapping generations (OLG), and the neoclassical growth model. Finally, we will study the role of natural resources for the production process and whether scarcity of these resources limits output and growth in the long run. A particular application studies the problem of climate change from an economic perspective and derives an optimal climate policy.
Common to all models explored in Part I is that growth of labor productivity being the driver of growth is taken as exogenous. This assumption is relaxed in Part II which focuses on the Romer model of endogenous growth aiming to explain productivity growth and how policy can affect this process. Time permitting, we will also explore technological change directed towards specific production factors or technologies and the implications for environmental problems.
All theoretical results will be illustrated and quantified by numerical simulation scripts written in PYTHON which will be made available to all participants.

- Contents:

  Part I: Exogenous Growth Models

  1. The Solow Model
  2. The Overlapping Generations (OLG) Growth Model
  3. Fiscal Policy in the OLG Model
  4. The Neoclassical Growth (NCG) Model
  5. Labor Supply and Fiscal Policy in the NCG Model
  6. Energy and Natural Resources*
  7. A Macroeconomic Model of Climate Change*

  Part II: Models of Endogenous Growth

  8. The Romer Model
  9. Directed Technical Change*
  10. Directed Technical Change and the Environment*

  * = 'time permitting'

- Literature:

  Acemoglu (2009): *Modern Economic Growth*, Princeton University Press

  Miao (2014): *Economic Dynamics in Discrete Time*, MIT press.

  Additional references will be given in class.

- Target audience:

  Students enrolled in the M.Sc. programs "Economics" and "VWL".

- Prerequisites:

  Course participants are expected to have a sound understanding of intermediate macroeconomics and microeconomics paired with a solid background in basic mathematics (linear algebra, calculus, constrained optimization, etc.) and statistics (probability theory, random variables, etc.). Since the course will have a strongly quantitative focus, we also expect a genuine interest in economic theory and mathematical model building. Having completed any of the courses "*Advanced Macroeconomics I*" and/or "*Advanced Mathematics in Economics and Finance*" from the winter semester is favorable but not required.

- Credit points: 6 ECTS

- Course schedule:

  One regular lecture class per week

  An additional lecture or tutorial class alternating every other week.

  Lecture classes take place on

  - **Wednesdays, 10-12 in lecture hall Pauluskirche** (every week)
  - **Thursdays, 10-12 in lecture hall HS1015** (every other week)

  The first lecture class is on **Wednesday, April 27, 10-12.**

  Lecture classes are complemented by

  - **regular tutorial classes** (offered in English and Chinese)
  - **supplementary tutorials** (not relevant for the exam).

  Regular tutorials are taught by Moritz May (in English) and Zhiyuan Qiu (in Chinese). Supplementary tutorials are taught by Anastasia Golubeva and Philipp Moog

  Meeting times and venues will be announced in the first lecture class.

- Orgainization:

  The entire course takes place on-site with in-person attendance. There will neither be live-streaming nor pre-recorded videos (screencasts).

  Only exception are the supplementary tutorials some of which may be held online.

  The course material (slides, problem sets) will be provided electronically on the ILIAS platform (`ilias.uni-freiburg.de`).

  Students can directly sign up for the course and no password is required.

  The course material will be released gradually every week prior to the lecture classes on Wednesdays and Thursdays.

  Participants enrolled in the course will be notified about all updates.

  The same procedure applies for the tutorial classes.

  We will also set up the ILIAS course to include a **discussion forum** permitting all participants to engage in discussions and ask questions.

- Examination:

  Two-hour (90 minutes) written final exam at the end of the semester.

  The tentative examination date is **Monday, August 15, 12-14**.

  A retake will be offered at the end of the following semester.