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Summer semester 2020

Master's seminar

Economic Models of Climate Change

- Summary:

  Climate change is arguably the biggest challenge faced by the world in the current century. There is a broad consensus that global emissions from burning fossil fuels must be reduced substantially, immediately, and permanently. To achieve this goal, a large number of countries which differ considerably in terms of their state of economic development, reliance on fossil fuels, exposure to climate damage, etc. must coordinate on a common strategy when, where, and how to reduce their emissions. As a consequence, understanding the economic incentives for different regions to adopt a particular climate policy is crucial for any climate agreement to be successful.
  The seminar discusses the problem of climate change from a macroeconomic perspective and studies models from the recent literature suitable to evaluate and compare alternative climate policies. Conceptually, the discussed models augment dynamic general equilibrium frameworks with a climate model which permits to incorporate the full interactions between economic and climate variables and describe their evolution over time in a single consistent framework. Models of this type are called Integrated Assessment (IA) Models. We will discuss different IA-Models and use them to analyze alternative climate policies, their welfare properties, and their impact on economic and climate variables both theoretically and with the help of numerical simulations.

- Course Meeting Times:

  Kick-off meeting: April 24th (tentative)

  Seminar presentations: as announced in the kick-off meeting.

- Important notes:

  - Successful participation in Advanced Macroeconomics I is required for participation.
  - The seminar is limited to 12 participants.
  - To sign up for the seminar, send the registration form available on our homepage via email to markus.epp@vwl.uni-freiburg.de until **April 10th**.
  - We will assign the seminar topics and announce the allocation during the kick-off.
  - While we will do our best to assign topics based on your preferences, we cannot guarantee that everybody will get their favorite topics.

- Requirements:

  - Participants must deliver a presentation on their respective topic and write a short summary on each topic (approx. 3-4 pages).
  - Active participation of all participants in class discussions is expected.

- Topics:

  1. **Environmental Macroeconomics and the Problem of Climate Change**
     Literature:
     - ∗ Hassler & Krusell (2016) *Environmental Macroeconomics*, Ch. 24 in Handbook of Macroeconomics, 1st Edition, published by Taylor, J. & Uhlig, H., Elsevier (North Holland Publishing Co.), Amsterdam.
  2. **(Rolling the) DICE: An IA-Model**
     - ∗ Nordhaus & Boyer (2000) *Warming the World: Economic Models of Global Warming*, MIT Press, MA.
     - – Nordhaus (1993), *Optimal Greenhouse-Gas Reductions and Tax Policy in the DICE-Model*, American Economic Review, 83, p.313-317.
  3. **Optimal Climate Policy in a Model of the Global Economy**
     Literature:
     - ∗ Golosov et al. (2014) *Optimal Tax on Fossil Fuel in General Equilibrium*, Econometrica, 82(1), 41-88).
     - – Rezai & van der Ploeg (2015) *Robustness of a Simple Rule for the Social Cost of Carbon* , Economics Letters, 132, 48-55).
  4. **Optimal Climate Policies in Models with Multiple Regions**
     Literature:
     - ∗ Hassler & Krusell (2012) *Economics and Climate Change in A Multi-Region World*, Journal of the European Economic Association, 10(5), 974-1000.
     - – Hillebrand & Hillebrand (2019) *Optimal climate policies in a dynamic multi-country equilibrium model*, Journal of Economic Theory 179 (2019): 200-239.

- **Note**: Articles marked with an asterisk (∗) are required readings for all participants.
- For a survey, see Hillebrand, M. (2019): *Macroeconomic Models of Climate Change*, Lecture slides, Goethe University Frankfurt. (provided via ILIAS)
- Further details will be announced during the kick-off meeting.