

The Macroeconomics of Climate Change

Syllabus for December 2015 Oslo course

The purpose of the course is to provide a comprehensive analysis package for studying questions relating to climate change, with a particular emphasis on policy evaluation. The macroeconomic perspective means that the course will be model-based and have a quantitative orientation: we will build toward a complete global model of the two-way feedbacks between the climate and the economy (an Integrated Assessment Model, IAM). The course is self-contained and will thus not require any prior knowledge in the field. It will, however, aim to get to the research frontier on several of the topics covered.

The readings are listed below at the end of the document. They comprise a required part, mainly material written by John Hassler, Per Krusell, and Tony Smith in various combinations, and a reference reading list that will only be used more sparingly during the course.

The examination involves a choice between four different options:

1. a take-home exam
2. writing a short paper, or ambitious draft of a paper
3. a computational task (such as formulating and solving an IAM)
4. reading, presenting, and writing a short review of a recent paper in the literature.

Different students can choose different options. The grading is on a pass/fail basis.

Course building blocks (some to be covered very quickly):

The IAM will consist of a number of components, listed as 1–6 below. Some of these components are standard and are expected to be well known; these will not require more than a minimum of class time. Some, however, are new (like 1, 4, and 6) and will require some more class time. The bulk of the time will, however, be spent on part 7.

1. The natural science part: greenhouse effects, energy budgets, the carbon cycle, and climate modeling.
2. Externalities in public economics: Pigou, taxes vs. other instruments, second-best.
3. Growth theory and empirics: a comprehensive, empirically oriented, model of long-run growth and optimal saving, including comments on the world income distribution.
4. Natural resource economics: Hotelling, Dasgupta-Heal.

5. Endogenous technical change: green technology developments.
6. Measuring damages: how it is done (bottom-up vs. reduced form, damage functions).
7. A complete model: putting everything together into an IAM; a sequence of models of increasing complexity (e.g., going from a static to a dynamic model and going from a one- to a many-region model).
8. Quantitative policy analysis: taxes vs. quotas, green subsidies, the Green Paradox.

Reading list: required (own papers/chapters)

1. 2015. “Climate Policy” (joint with John Hassler and Jonas Nycander), forthcoming in *Economic Policy*.
2. 2015. “Environmental Macroeconomics” (joint with John Hassler and Tony Smith), forthcoming chapter in the *Handbook of Macroeconomics*.
3. 2014. “Optimal Taxes on Fossil Fuel in General Equilibrium” (joint with Michael Golosov, John Hassler, and Aleh Tsyvinski), *Econometrica* 82:1, 41-88.
4. 2014. “Energy-Saving Technical Change” (joint with John Hassler and Conny Olovsson).
5. 2014. “A Global Economy-Climate Model with High Regional Resolution” (joint with Anthony Smith).
6. 2012. “Economics and Climate Change: Integrated Assessment in a Multi-Region World” (joint with John Hassler), *Journal of European Economic Association* 10:5, 974-1000.
7. 2010. “Oil Monopoly and the Climate” (joint with John Hassler and Conny Olovsson), *American Economic Review Papers and Proceedings* 100:2, 460–464.

Reading list: supplementary material

... to be added