

<b>Ph.D class</b>	<b><u>Environmental Economics and Climate Change</u></b>
When	1-3PM, January 23 <sup>rd</sup> – 30 <sup>th</sup> , 2019
Where	MIT E51-372
Credit	3 units, pass/fail grade
Professor	<a href="mailto:bardh@econ.uio.no">Bård Harstad (bardh@econ.uio.no)</a>
Syllabus date	January 29, 2019
Link	<a href="https://www.sv.uio.no/econ/personer/vit/bardh/dokumenter/mit19.pdf">https://www.sv.uio.no/econ/personer/vit/bardh/dokumenter/mit19.pdf</a>

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This Ph.D minicourse introduces the basic insight of traditional environmental economics before we discuss modern tools for analyzing climate change and international agreements. We will apply game theory to analyze frameworks that can be used to study jurisdictions' strategic choices of emissions over time, their investments in environmentally friendly technology, coalition formation, negotiations, agreements, and compliance. Assumptions will be based on real-world environmental and climate policy, and we will arrive at results that are relevant for domestic policies as well as international treaties.

There will be 10h lectures and to get credit (3 units), you should write a 5-paged "referee report" (including a proposal for how to develop the paper further) before February 20<sup>th</sup>. You will be able to select among eight different papers (TBA).

- Session 1** Welfare theorems, externalities, and Pigou taxes (Read: 7, 16, [slides](#))
- Session 2** Coase theorem, tradable permits, and policy instruments (Read: 14, 17, [slides](#))
- Session 3** Emissions and technology in dynamic games (Read: [Lecture Note 1](#), [slides2](#))  
Background reading: 8, 9, 12.
- Session 4** Agreements and institutional design (Read: [Lecture Note 2](#), [slides4](#))  
Background reading: 4, 5, 11.
- Session 5** Free riding vs. participation (Read: [Lecture Note 3](#), [slides5](#))  
Background reading: 1, 2, 13, and 15.
- Session 6** The winner of the vote is deforestation&conservation! ([Lecture Note 6](#), [slides6](#))  
Background: [BurgessEtAl12](#), [Harstad16](#).
- a) Political economy of instruments and treaties
  - b) Oil, resource extraction, and supply-side environmental policy
  - c) Deforestation in the tropics and conservation**
  - d) Discounting and the value of the future

## **Readings:**

See above link to slides and [Lecture Note 1](#), [Lecture Note 2](#), [Lecture Note 3](#), and [Lecture Note 6](#).

## **Relevant Articles:**

- 1) Barrett, Scott (2005): "The Theory of International Environmental Agreements," Ch. 28 in Mäler, K.-G. and Vincent, J.R., *Handbook of Environmental Economics 3*: 1457-1516, Elsevier.
- 2) Battaglini, Marco and Harstad, Bård (2016): "Participation and Duration of Environmental Agreements," *Journal of Political Economy* 124(1): 160-204.
- 3) Battaglini, Marco and Harstad, Bård (2019): "The Political Economy of Weak Treaties," forthcoming, *Journal of Political Economy*.
- 4) Beccherle, Julien and Tirole, Jean (2011): "Regional Initiatives and the Cost of Delaying Binding Climate Change Agreements," *Journal of Public Economics* 95 (10-11): 1339-48.
- 5) Buchholz, Wolfgang and Konrad, Kai (1994): "Global Environmental Problems and the Strategic Choice of Technology," *Journal of Economics* 60 (3): 299-321.
- 6) Calvo, Emilio and Rubio, Santiago (2013): "Dynamic Models of International Environmental Agreements: A Differential Game Approach," *International Review of Environmental and Resource Economics* 6(4): 289339.
- 7) Coase, R. H. (1960): "The problem of social cost," *The Journal of Law & Economics* 5(4): 837-77.
- 8) Dutta, Prajit K. and Radner, Roy (2004): "Self-enforcing climate-change treaties," *PNAS* 101, 4746-51.
- 9) Dutta, Prajit K. and Radner, Roy (2009): "A Strategic Analysis of Global Warming: Theory and Some Numbers," *Journal of Economic Behavior & Organization* 71 (2): 187-209.
- 10) Harstad, Bård (2012): "Climate Contracts: A Game of Emissions, Investments, Negotiations, and Renegotiations," *Review of Economic Studies* 79(4): 1527-57.
- 11) Harstad, Bård (2016): "The Dynamics of Climate Agreements," *Journal of the European Economic Association* 14(3): 719-52.
- 12) Harstad, Bård, Lancia, Francesco and Russo, Alessia (2019): "Compliance Technology and Self-Enforcing Agreements," *Journal of the European Economic Association* 17(1):1-30.
- 13) Hoel, M. (1994): "Efficient Climate Policy in the Presence of Free Riders." *J. Environmental Econ. and Management* 27 (3): 259-74.
- 14) Montgomery, W. (1972): "Markets in licenses and efficient pollution control programs," *Journal of Economic Theory*, 5(3): 395-418.
- 15) Nordhaus, W. D. (2015): "Climate Clubs: Overcoming Free-riding in International Climate Policy," *American Economic Review* 105(4): 1339-70.
- 16) Sandmo, A. (1975): "Optimal Taxation in the Presence of Externalities," *The Swedish Journal of Economics*, 77(1): 86-98.
- 17) Weitzman, M. L. (1974): "Prices vs. quantities," *The Review of Economic Studies*, 41(4): 477-491.
- 18) Weitzman, M. L. (1998): "Why the Far-Distant Future Should Be Discounted at Its Lowest Possible Rate," *Journal of Environmental Economics and Management*, 36(3): 201-208.

## **Relevant Books:**

Barrett, Scott (2003): *Environment & Statecraft: The Strategy of Environmental Treaty-Making*, Oxford University Press.

Phaneuf, Daniel J. and Till Requate (2016): *A Course in Environmental Economics: Theory, Policy, and Practice*, Cambridge University Press.