EAS 501.022: Climate Economics and Policy

Winter 2018 Course Syllabus
(Version: January 20th, 2018)

Logistics

Lecture: TR 1:00-2:30 p.m. (Dana 1028)
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Graduate Student Instructor: Benjamin Rego (benrego@umich.edu)
Website: https://umich.instructure.com/courses/194586
Office Hours: Thursdays 3:00-5:00pm, Dana 3006 (Prof. Stolper)
Wednesdays 11:00-1:00pm, Dana 4325 (Ben)

About this course

Climate change has been called the ultimate economic problem, and possibly the greatest challenge humanity as a whole has ever faced. In this course, we will learn what is known – and what is not known – about the economics of climate change and climate policy. The course will open with a review of the economics rationale for government intervention in markets affecting the environment. We will then discuss climate cost-benefit analysis and the all-important, yet controversial, "social cost of carbon". After laying this foundation for economic analysis of the climate, we will set our sights on policy solutions, giving attention to both international and domestic efforts, and to both carbon pricing and prescriptive regulation. From there, we will zero in on a few specific areas with large potential to affect climate outcomes: electric power, energy efficiency, and transportation. Finally, we will discuss the future of energy and its implications for climate change mitigation.

Prerequisite: EAS 570. Environmental Economics: Principles, Methods, and Tools

Class format and teaching goals

I have designed this course with several teaching goals in mind. I want you, the students, to:

- Become knowledge experts in the area of climate economics and policy
- Develop a versatile economic intuition, for use in any environmental professional setting

- Become more comfortable with quantitative thinking and analysis
- Improve your ability to communicate, translate, and wield rhetoric in the highly divisive scientific debate about how to respond to the changing climate

I think the best way to achieve these goals is to engage you, the students, as much as possible, and in as many ways as possible. I will devote some part of most class meetings to lecture, but I will also emphasize discussion, both during lecturing and in dedicated periods of class time. I will strive to make students feel comfortable speaking up, raising questions in all class meetings. And I will vary course assignments to give you practice in a variety of tasks to which you may be exposed in your future careers.

Assignments

Readings

For most classes, you will be assigned readings from some combination of textbook, academic journals, blogs, and popular media.

The textbook is Nathaniel O. Keohane and Sheila M. Olmstead, Markets and the Environment, 2nd Edition (2016). It is available in digital form from the University of Michigan library system, at <https://mirlyn.lib.umich.edu/Record/015159266>.

For review of key concepts in microeconomics, Jeffrey M. Perloff's Microeconomics, 6th Edition (2012) is a good resource. It can be freely downloaded from <https://ugess3.files.wordpress.com/2016/01/microeconomics-perloff-jeffrey.pdf>.

Some of the assigned readings come from the blog run by the Energy Institute at Haas, based at the University of California Berkeley, Haas School of Business. There is an excellent group of environmental and energy economists at Berkeley, and I encourage you to peruse the blog (https://energyathaas.wordpress.com/) beyond the assigned readings.

Participation

In-class participation is a significant part of your final grade. This should not intimidate you; the course will be more fun and more valuable if we all share our perspectives, our questions, our ideas.

Policy analysis

The goal of this assignment is to get comfortable with the basics of climate-related economic analysis: externalities, efficiency, equity. You will recommend an optimal level of a tax to internalize environmental externalities, calculate the resulting impacts on consumption, emissions, and total welfare, and discuss several other important aspects of the policy choice and your methods.

Op-ed

Writing is an extremely important professional skill that is often under-emphasized in quantitative disciplines like economics. With this assignment, you will practice your communication skills by writing an op-ed to your local newspaper. The short format and broad audience of an op-ed will challenge your ability to be clear, compelling, and convincing.

Presentation

Each of you will make a group presentation at some point during the semester. Each presentation will cover a different topic and will be slotted into the most relevant class meeting. You will prepare to present for ten minutes (with slides) and field questions for another five. The point is to give you training in synthesizing research and experience into a concise, clear, and compelling summary. Public speaking is absolutely vital, whatever the job, whatever the field, so your presentation is good practice. Plus, we'll all get to grapple with some important dilemmas and open questions in climate policy.

Cost-benefit analysis

As an analyst for a large electric utility, you will be tasked with reporting on the costs and benefits of an energy efficiency program. You will be provided with household-level data on consumption, demographics, and assignment to the program. With these data, you will estimate the program's average effect and advise on future adjustment/expansion to the program. The point of this exercise is to gain familiarity with conducting and utilizing impact evaluation to achieve environmental (or any other) targets.

Final exam

The exam will be held on the last day of the course. It will test your ability to explain the important economics principles underlying the climate problem, using short verbal answers and/or graphical analysis. You will not be asked to recall specific policy impacts, solve lengthy math problems, or write rhetorically.

Grading

The distribution of course grades will resemble that of other SEAS courses. The weight of each assignment is as follows:

- Class participation: 20%
- Policy analysis: 10%
- Op-ed: 10%
- In-class presentation: 10%
- Cost-benefit analysis: 20%
- Final exam: 30%

Late (unexcused) assignments will be penalized 10 percentage-points per day (calendar date). Please notify me as soon as possible of any excused absences.

Other course policies

Laptops and phones: Neither laptops nor phones are allowed in class. They would inevitably draw your attention away from class lecture and discussion.

Correspondence: We (Ben and I) will try to get back to your emails within 24 hours. Please note EAS 501 in your subject line. If you plan on asking multiple involved questions, please come to office hours or schedule a meeting.

Homework submission: Problem sets and written assignments are due at the beginning of class, unless otherwise stipulated. You may submit your work via the homework section of the Canvas course website, or via hard copy in my mailbox (on the door of Dana 3006).

Grade grievances: You must submit requests for a re-grade within one week of receiving the original grade. You must also attach the original graded item and provide a clear written explanation of what you would like to be re-evaluated and why. Your adjusted grade may be higher or lower than the original.

Work ethic: Do not plagiarize. If you paraphrase or copy work that is not your own, you must reference that work. The risk of plagiarizing is not worth the reward. More generally, cheating and academic dishonesty in any form will not be tolerated. Any student found to have cheated or behaved unethically or dishonestly will be given a zero on the assignment or exam involved and referred to the appropriate disciplinary committees at U of M.

Course calendar

Date	Day	#	Unit	Assignment Due
1/4	Th	1	Introduction: Why Study Climate Economics?	
1/9	T	2	Externalities and the Impacts of Climate Change	
1/11	Th	3	The Social Cost of Carbon	
1/16	T	4	Efficiency vs. Equity	Policy analysis due
1/18	Th	5	International Climate Negotiation	
1/23	T	6	Market-based Policy	
1/25	Th	7	Prescriptive Regulation	
1/30	T	8	International Trade	Op-ed due
2/1	Th	9	Electric Power	
2/6	T	10	Energy Efficiency	
2/8	Th	11	Transportation	
2/13	T	12	Wrap-up: The Future	Cost-benefit analysis due
2/15	Th	13	Final Exam Review	
2/20	T	14	Final Exam	

Detailed course schedule

Class #1 – January 4th. Introduction: Why Study Climate Economics?

Class #2 – January 9th. Externalities and the Impacts of Climate Change

Readings

1. KO: Chapter 5, pp. 80-94.
2. Heal, Geoffrey and Jisung Park (2016). "Temperature Stress and the Direct Impact of Climate Change: A Review of an Emerging Literature." *Review of Environmental Economics and Policy* 10(2): 347-362.

Class #3 – January 11th. The Social Cost of Carbon

Readings

1. Greenstone, Michael, Elizabeth Kopits, and Ann Wolverton (2013). "Developing a Social Cost of Carbon for US Regulatory Analysis: A Methodology and Interpretation." *Review of Environmental Economics and Policy* 7(1): 23-46.
2. Bordoff, Jason. "Trump vs. Obama on the Social Cost of Carbon — And Why It Matters." *Wall Street Journal*, November 15th, 2017. <https://blogs.wsj.com/experts/2017/11/15/trump-vs-obama-on-the-social-cost-of-carbon-and-why-it-matters/>.

Class #4 – January 16th. Efficiency vs. Equity

Readings

1. Fullerton, Don (2011). "Six Distributional Effects of Environmental Policy." *Risk Analysis* 3(6): 923-929.
2. Guerin, Emily. "Environmental groups say California's climate program has not helped them." *National Public Radio*, February 24th, 2017. <http://www.npr.org/2017/02/24/515379885/environmental-groups-say-californias-climate-program-has-not-helped-them>.
3. Stolper, Samuel. "Who Bears the Burden of Energy Taxes?" *Sense and Sustainability*. May 4th, 2015. <http://www.senseandsustainability.net/2015/05/04/who-bears-the-burden-of-energy-taxes-the-distributional-impacts-of-environmental-policies/>.

Class #5 – January 18th. International Climate Negotiation

Readings

1. KO: Chapter 5, pp. 94-97.
2. Center for Climate and Energy Solutions (2015). "Outcomes of the U.N. Climate Change Conference in Paris."
3. Cramton, Peter, Axel Ockenfels, and Jean Tirole (2017). "Translating the Collective Climate Goal Into a Common Climate Commitment." *Review of Environmental Economics and Policy* 11(1): 165-171.

Assignments

1. Policy analysis due

Class #6 – January 23rd. Market-Based Policy

Readings

1. KO: Chapter 8, pp. 139-162.
2. Harvey, Fiona. "China Aims to Drastically Cut Greenhouse Gas Emissions Through Trading Scheme." *The Guardian*, December 19th, 2017. <https://www.theguardian.com/environment/2017/dec/19/china-aims-to-drastically-cut-greenhouse-gas-emissions-through-trading-scheme>.

Class #7 – January 25th. Prescriptive Regulation

Readings

1. KO: Chapter 9, pp. 168-197.
2. Fowlie, Meredith, Lawrence Goulder, Matthew Kotchen, Severin Borenstein, James Bushnell, Lucas Davis, Michael Greenstone, Charles Kolstad, Christopher Knittel, Robert Stavins, Michael Wara, Frank Wolak, and Catherine Wolfram (2014). "An Economic Perspective on the EPA's Clean Power Plan." *Science* 346(6211): 815-816.

Class #8 – January 30th. International Trade

Readings

1. Fowlie, Meredith. "Will Coal Exports Abroad Offset Hard-Won Carbon Reductions at Home?" *Energy Institute at Haas* blog, July 28th, 2014. <https://energyathaas.wordpress.com/2014/07/28/will-coal-exports-abroad-offset-hard-won-carbon-reductions-at-home/>.
2. Union of Concerned Scientists (2011). "Fact Sheet: Drivers of Deforestation."

Assignments

1. Op-ed due

Class #9 – February 1st. Electric Power

Readings

1. Fowlie, Meredith. "The Decline of Coal: Break the Fall or Soften the Blow? *Energy Institute at Haas* blog, December 11th, 2017. <https://energyathaas.wordpress.com/2017/12/11/the-decline-of-coal-break-the-fall-or-soften-the-blow/>.
2. Laidler, John. "Should Massachusetts commit itself to 100 percent renewable energy?" *The Boston Globe*, March 17th, 2017. <https://www.bostonglobe.com/metro/regionals/south/2017/03/17/should-massachusetts-commit-itself-percent-renewable-energy/fp0PmIhFzbRf6A3VMhiuEP/story.html>.

Class #10 – February 6th. Energy Efficiency

Readings

1. Cavanagh, Ralph. "How We Learned Not to Guzzle." *The New York Times*, September 12th, 2013. <http://www.nytimes.com/2013/09/13/opinion/how-we-learned-not-to-guzzle.html>.
2. Allcott, Hunt and Michael Greenstone (2012). "Is There an Energy Efficiency Gap?" *Journal of Economic Perspectives* 26(1): 3-28.
3. Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram (2015). "Costs of Residential Energy Efficiency are Twice their Benefits: Implications for Policy." E2e Policy Brief.

Class #11 – February 8th. Transportation

Readings

1. Allcott, Hunt and Christopher Knittel (2017). **Sections I-IV** in "Are Consumers Poorly-Informed about Fuel Economy? Evidence from Two Experiments." National Bureau of Economic Research Working Paper 23076.
2. Kahn, Matthew. "Some Uber Environmental Economics." *Environmental and Urban Economics*, January 15th, 2016. <http://greeneconomics.blogspot.com/2016/01/some-uber-environmental-economics.html>

Class #12 – February 13th. Wrap-up: The Future

Readings

1. Auffhammer, Maximilian. "The Economics of an Electrified Autonomous Future." *Energy Institute at Haas* Blog, August 21st, 2016. <https://energyathaas.wordpress.com/2017/08/21/the-economics-of-an-electrified-autonomous-future/>.
2. Aufhammer, Maximilian. "Giving Up on Carbon Markets in Favor of a Giant Vacuum in the Sky?" *Energy Institute at Haas* Blog, May 23rd, 2016. <https://energyathaas.wordpress.com/2016/05/23/giving-up-on-carbon-markets-in-favor-of-a-giant-vacuum-in-the-sky/>.
3. D'Aprile, Paolo, John Newman, and Dickon Pinner. "The New Economics of Energy Storage." McKinsey, August 2016. <https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-new-economics-of-energy-storage>.

Assignments

1. Cost-benefit analysis due

Class #13 – February 15th. Final exam review.

Class #14 – February 20th. FINAL EXAM.