

ECON/AREC 741 Graduate Environmental Economics

Do unto those downstream as you would have those upstream do unto you.

– Wendell Berry

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Office Hours: TBD (or by appointment)

Course Description: This is a second-year graduate course in environmental economics, intended for PhD students. We will develop a range of theoretical and empirical tools and consider their application to the regulation of environmental problems. Topics will include the origins of market failure, assorted topics in regulation theory, dynamic modeling of stock pollution problems, causal inference, and a variety of topics that arise when studying global environmental problems such as climate change.

Expectations and Requirements: Because this is a second-year graduate course, my main objectives—beyond a simple survey of topics—are to get you to critically read as many papers in the peer-reviewed environmental economics literature as possible, and to give you opportunities to explore potential avenues for your own research.

To encourage you to do this, each student will be required to lead two classroom discussions on a paper from the syllabus. This will be worth 30 percent of your grade. In addition, you will be required to write two referee reports on papers from the syllabus. The referee reports will be worth 20 percent of your grade. You will also be required to submit a final paper worth 40 percent of your grade. The final paper will explore a research direction of interest to you, and part of your grade will include the submission of an interim paper 1 month before the end of the semester. The final 10 percent of your grade will be assigned on the basis of your contributions to in-class discussions.

Plagiarism and cheating are strictly forbidden.

In-class presentations:

Your goal is to summarize the research question, methods and findings of a paper from the syllabus. You will then setup a classroom discussion about the paper. You may draw on a discussion or presentation of related papers from the literature if appropriate. The discussion should take up most of the class period. I will post a grading rubric for these presentations in Canvas.

Referee Reports: Supporting the peer review process by writing referee reports is an important responsibility of academic economists. It is also a good opportunity to hone your critical reading skills, and to develop your understanding of what a good research paper looks like.

The report should be about three (single-spaced) pages. The first page or so should summarize what the paper does. Your goal is not to simply restate what the authors claim to have done in the abstract or introduction. Rather, provide your professional opinion, having read the entire paper, regarding what you think the authors *actually* accomplish. If this is different from what the authors claim to have done, it is important that you indicate this in your report.

The remaining portion of the report should critically examine the paper. In doing so, keep an eye on the following questions. (1) *Does the paper make an important contribution to the literature?* At this point you may not be very familiar with the relevant literature, but you should at least provide some idea of how important the contribution is likely to be. (2) *Are there any major flaws in the manuscript?* This could include a flaw in method: perhaps a mathematical error if it is a theoretical paper, or an incorrect use of a particular econometric tool if the paper is applied. It could also arise due to flaws in the logical development of the paper, or due to inaccurate statements regarding what the author claims to have accomplished. Finally, *Are there any minor flaws in the writeup?* This could include grammatical mistakes or areas where the writeup is unclear. For more information about writing a referee report, see the resources on Canvas.

Final Paper: Choose a topic by reviewing recent discussions of interest in environmental economics. I recommend looking at The Resources for the Future website (www.rff.org) and The Harvard Belfer Center for Science and International Affairs (www.belfercenter.ksg.harvard.edu). You may also look at recent issues of the following journals: Review of Environmental Economics and Policy, Journal of the Association of Environmental and Resource Economics (JAERE), Journal of Environmental Economics and Management (JEEM), Ecological Economics, Resource and Environmental Economics, Land Economics, and Energy Economics.

Once you have found a general topic of interest, you need to narrow down to a specific research question. In presenting your question, use the following template. (1) *Situation*: What background information does one need to understand in order to have a clear idea where your research question is coming from? This includes information about prior work or prior efforts to address the question that a knowledgeable reader would already be familiar with. (2) *Complication*: What is the wrinkle? This is your entry into the literature. It prompts the problem that you will try to solve. (3) *Key question(s)*: This is the question or questions that your proposed research would attempt to solve. (4) *Answer*: This is your current working hypothesis about what a possible answer to the indicated question might look like.

In addition to setting up the research question using the template above, you also need to conduct a literature review. The review should cover at least eight to ten relevant papers. Building on your understanding of these papers, you need to provide a careful discussion that explains to the reader what has been done before in the relevant peer reviewed literature related to your question of interest.

Next, you need to take a first step into researching your topic. If the problem is empirical, you need to collect the data and run your initial regressions. If it is theoretical, then you need to setup a preliminary model and work towards some initial analytical results.

Finally, you need to talk about what you have accomplished and where you need to go next.

Readings

Required textbook

“Perman”: *Natural Resource and Environmental Economics, 4th Edition*, by Roger Perman, Yue Ma, Michael Common, David Maddison, and James McGilvray (Pearson Education Limited 2011)

Other textbooks

“B&O”: *The Theory of Environmental Policy*, by William Baumol and Wallace Oates (Cambridge University Press 1988)

“Laffont”: *Fundamentals of Public Economics*, Jean-Jacques Laffont (MIT Press 1988)

§1: Efficiency and Market Failure

- Perman Chapter 4
- Laffont Chapter 1
- P.A. Samuelson. The pure theory of public expenditure. *The review of economics and statistics*, 36(4):387–389, 1954

§2: Pollution Control Targets

- Perman Chapter 5
- B&O Chapter 4
- N.Z. Muller, R. Mendelsohn, and W. Nordhaus. Environmental accounting for pollution in the united states economy. *The American Economic Review*, 101(5):1649–1675, 2011

§3: Pollution Control Instruments

- Perman Chapter 6
- Karp Chapter 2
- J.B. Bushnell and C. Wolfram. Enforcement of vintage differentiated regulations: The case of new source review. *Journal of Environmental Economics and Management*, 2012

§4: Pollution Policy with Imperfect Information

- Perman Chapter 7
- B&O Chapter 5
- M.L. Weitzman. Prices vs. quantities. *The Review of Economic Studies*, pages 477–491, 1974
- R.N. Stavins. Correlated uncertainty and policy instrument choice. *Journal of Environmental Economics and Management*, 30(2):218–232, 1996
- M. Hoel and L. Karp. Taxes versus quotas for a stock pollutant. *Resource and Energy Economics*, 24(4):367–384, 2002

§5: Valuation

- Perman Chapter 12
- Catherine L Kling, Daniel J Phaneuf, and Jinhua Zhao. From exxon to bp: Has some number become better than no number? *The Journal of Economic Perspectives*, pages 3–26, 2012
- Jason F Shogren, Seung Y Shin, Dermot J Hayes, and James B Kliebenstein. Resolving differences in willingness to pay and willingness to accept. *The American Economic Review*, pages 255–270, 1994

- Richard T Carson. Contingent valuation: a practical alternative when prices aren't available. *The Journal of Economic Perspectives*, 26(4):27–42, 2012
- Jerry Hausman. Contingent valuation: from dubious to hopeless. *The Journal of Economic Perspectives*, pages 43–56, 2012

§6: Stock Pollutants

- Perman Chapter 16
- Heal “Valuing the future,” chapter 4
- Olli Tahvonen. Fossil fuels, stock externalities, and backstop technology. *Canadian journal of Economics*, pages 855–874, 1997

§7: Optimal Carbon Taxes

- Frederick van der Ploeg. Untapped fossil fuel and the green paradox: a classroom calibration of the optimal carbon tax. *Environmental Economics and Policy Studies*, 17(2):185–210, 2015
- Mikhail Golosov, John Hassler, Per Krusell, and Aleh Tsyvinski. Optimal taxes on fossil fuel in general equilibrium. *Econometrica*, 82(1):41–88, 2014
- W.D. Nordhaus. A review of the stern review on the economics of climate change. *Journal of Economic Literature*, pages 686–702, 2007

§8: Discounting

- Perman Chapter 11
- William D Nordhaus. Discounting in economics and climate change; an editorial comment. *Climatic Change*, 37(2):315–328, 1997
- Gollier Book “Pricing the Planets Future”
- M.L. Weitzman. Why the far-distant future should be discounted at its lowest possible rate. *Journal of environmental economics and management*, 36(3):201–208, 1998
- M.L. Weitzman. Gamma discounting. *American economic review*, pages 260–271, 2001
- R.G. Newell and W.A. Pizer. Discounting the distant future: how much do uncertain rates increase valuations? *Journal of Environmental Economics and Management*, 46(1):52–71, 2003

§9: Fossil Fuel Extraction

- Joseph E Stiglitz. Monopoly and the rate of extraction of exhaustible resources. *The American Economic Review*, 66(4):655–661, 1976
- Soren T Anderson, Ryan Kellogg, and Stephen W Salant. Hotelling under pressure. *Journal of Political Economy*, 126(3):984–1026, 2018

- Daron Acemoglu, Philippe Aghion, and David Hemous. Climate change, directed innovation, and energy transition: Should we escape from coal through gas. Technical report, mimeo, 2014
- Thomas Eichner and Rüdiger Pethig. Carbon leakage, the green paradox, and perfect future markets*. *International Economic Review*, 52(3):767–805, 2011

§10: Supply-Side Environmental Policy

- Michael Hoel and Snorre Kverndokk. Depletion of fossil fuels and the impacts of global warming. *Resource and energy economics*, 18(2):115–136, 1996
- Bård Harstad. Buy coal! a case for supply-side environmental policy. *Journal of Political Economy*, 120(1):77–115, 2012

§11: International Environmental Agreements

- Perman Chapter 9
- William Nordhaus. Climate clubs: Overcoming free-riding in international climate policy. *American Economic Review*, 105(4):1339–70, 2015
- S. Barrett. Self-enforcing international environmental agreements. *Oxford Economic Papers*, 46:878–894, 1994

§12: Identification and Quasi-Experiments

- J. Angrist and J.S. Pischke. The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *Journal of Economic Perspectives*, 2010
- Michael Greenstone and Ted Gayer. Quasi-experimental and experimental approaches to environmental economics. *Journal of Environmental Economics and Management*, 57(1):21–44, 2009
- Wolfram Schlenker and W Reed Walker. Airports, air pollution, and contemporaneous health. *The Review of Economic Studies*, 83(2):768–809, 2016
- Maximilian Auffhammer and Ryan Kellogg. Clearing the air? the effects of gasoline content regulation on air quality. *American Economic Review*, 101(6):2687–2722, 2011
- Sammy Zahran, Terrence Iverson, Shawn P McElmurry, and Stephan Weiler. The effect of leaded aviation gasoline on blood lead in children. *Journal of the Association of Environmental and Resource Economists*, 4(2):575–610, 2017