

Department of Economics
Environmental Studies Program
University of Colorado at Boulder

Jonathan Hughes
jonathan.e.hughes@colorado.edu
Office: Economics 102

ECON 8545
ENVIRONMENTAL ECONOMICS II
Fall 2018
MW 9:00-10:15, ECON 5

Overview:

This course is an applied course in environmental economics with an emphasis on energy markets and energy consuming technologies. The focus is on empirical studies of environmental regulation, measurement of damages from pollution, producer and consumer behavior. The goal is to provide students interested in these topics, the tools necessary to begin conducting their own research.

Office Hours and Contact Information:

Professor: Jonathan Hughes
Office location: Economics 102
Office hours: Mondays and Wednesdays from 10:30am to 12:00pm (or by appointment)
Phone: (303) 735-0220
Email: jonathan.e.hughes@colorado.edu
Class web site: <https://canvas.colorado.edu/>

Background Texts:

There is no required textbook for this course. Course readings can generally be downloaded from JSTOR, NBER, etc. or for other working papers, from the web sites listed in the course schedule. Please *contact me* if you have difficulty downloading the required readings. In addition to these readings, graduate texts in environmental economics, industrial organization and applied microeconometrics will provide useful background to the topics covered in the course. Excellent examples include:

Kennedy, "A Guide to Econometrics."
Angrist and Pischke, "Mostly Harmless Econometrics."
Cameron and Trivedi, "Microeconometrics: Methods and Applications."
Baumol and Oates, "The Theory of Environmental Policy."
Freeman, "The Measurement of Environmental and Resource Values."
Tirole, "The Theory of Industrial Organization."

Course Requirements and Grading:

| | |
|-----------------------------|-----|
| Reading/class participation | 15% |
| Referee reports | 15% |
| Midterm exam | 20% |
| Final exam | 20% |
| Research paper/proposal | 30% |

Reading/Class Participation:

Please come to class each day ready to discuss the assigned reading. **Please prepare a ½ page summary** of each paper that discusses: the main research question; data used in the analysis; the empirical approach, structural versus reduced form, identification of the parameter(s) of interest, etcetera; and any major assumptions or limitations of the study. I will randomly select several of these summaries during the semester to evaluate as part of your class participation grade.

Referee Reports:

Each student is required to submit two original referee reports on unpublished empirical papers in environmental economics. I will select each paper from the NBER EEE or similar working paper series. The report should not exceed 4 pages. Each report should (briefly) summarize the main contribution of the paper, strengths and weaknesses and areas for improvement. Your goal is to critically evaluate the manuscript and provide feedback the author(s) could use to improve their work. Due dates are: **October 8, 2018** and **November 12, 2018**.

Examinations:

There will be an in class mid-term exam on **October 29, 2018** and a final exam on **Wednesday December 19, 2018** from 1:30 – 4:00 pm. If you have a conflict with the mid-term exam date, please see me during the first week of class to discuss alternate arrangements.

Research Paper/Proposal:

You have begun to transition from consumers of economics to producers of economics. An important part of this process is developing original research questions. Each student will complete a research paper or well-developed research proposal due on the last day of class, **December 12, 2018**. A one-page description of the project that identifies the data you will use and potential research questions should be turned in on **September 24, 2018**. The project should deal with an important empirical question in environmental economics. I am not necessarily looking for a finished paper. However, a successful project must: 1.) Pose an interesting and original research question. 2.) Identify and obtain data suitable for answering this question and 3.) Outline an empirical strategy that can plausibly answer the question of interest.

Late Assignments and Missed Examinations:

Reading summaries and other assignments are due before the start of class on the date due. No late assignments will be accepted except in the case of documented medical or family emergency. No make-up exams will be given. If you foresee a conflict, contact me as soon as possible in order to make alternate arrangements for you to complete the requirements of this course.

Campus Policies: I will adhere to all campus policies with respect to disabilities, religious observances, appropriate behavior, discrimination and harassment, and academic conduct. See <https://www.colorado.edu/academicaaffairs/policies-customs-guidelines/required-syllabus-statements>

Schedule of topics:

* Denote required readings for which you are to turn in an executive summary

I. Introduction

* Angrist and Jorn-Steffen Pischke, “The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics.” *Journal of Economic Perspectives*, Spring 2010

Angrist and Krueger, “Empirical Strategies in Labor Economics”

* Nevo and Whinston, “Taking the Dogma Out of Econometrics: Structural Modeling and Credible Inference,” *Journal of Economic Perspectives*, Spring 2010

Reiss and Wolak, “Structural Econometric Modeling: Rationales and Examples from IO”

* List, “Why Economists Should Conduct Field Experiments and 14 Tips for Pulling One Off,” *Journal of Economic Perspectives*, Summer 2011

Muralidharan and Niehaus, “Experimentation at Scale,” *Journal of Economic Perspectives*, Fall 2017

II. Environmental Regulation and Effects

A. Transportation

* Auffhammer and Kellogg, “Clearing the Air? The Effects of Gasoline Content Regulation on Air Quality.” *American Economic Review* 101, October 2011.

Brown, Hastings, Mansur and Villas Boas (2008), “Reformulating competition? Gasoline content regulation and wholesale gasoline prices.” *Journal of Environmental Economics and Management*, 55: 1-19.

* Davis (2008). “The Effect of Driving Restrictions on Air Quality in Mexico City.” *Journal of Political Economy* 116(1): 38-81.

Hausman, Catherine, and David S. Rapson. "Regression discontinuity in time: Considerations for empirical applications." *Annual Review of Resource Economics*, (2017).

* Busse and Keohane (2007), “Market Effects of Environmental Regulation: Coal, Railroads, and the 1990 Clean Air Act.” *RAND Journal of Economics* 38(4): 1159-1179

Brown, Hastings, Mansur and Villas-Boas (2008), “Reformulating Competition? Gasoline Content Regulation and Wholesale Gasoline Prices.” *Journal of Environmental Economics and Management* 55: 1-19.

Hughes, “The Higher Price of Cleaner Fuels: Market Power in the Rail Transport of Fuel Ethanol.” *Journal of Environmental Economics and Management* 62(1), 2011.

* Roberts and Schlenker, “Identifying Supply and Demand Elasticities for Agricultural Commodities: Implications for the U.S. Ethanol Mandate.” *American Economic Review* 103(6): 2265-95.

B. Electricity and Manufacturing

* Greenstone (2002), “The Impacts of Environmental Regulations on Industrial Activity: Evidence from the 1970 and 1977 Clean Air Act Amendments and the Census of Manufactures.” *Journal of Political Economy* 110: 1175-1219.

Bushnell, Chong and Mansur, “Profiting from Regulation: Evidence from the European Carbon Market” *American Economic Journal: Economic Policy* 5(4) November 2013, Pages 78-106.

* Fowlie (2010), “Emissions Trading, Electricity Restructuring, and Investment in Pollution Abatement.” *American Economic Review*, June 2010, 837-869.

* Fowlie and Perloff, “Distributing Pollution Rights in Cap-and-Trade Programs: Are Outcomes Independent of Allocation?” *Review of Economics and Statistics*, December 2013, Vol. 95, No. 5, Pages 1640-1652.

* Fowlie, Holland and Mansur, “What Do Emissions Markets Deliver and to Whom? Evidence from Southern California's NOx Trading Program.” *American Economic Review*, 102(2): 965-93.

* Ryan, “The Costs of Environmental Regulation in a Concentrated Industry” *Econometrica* Volume 80, Issue 3, pages 1019–1061, May 2012

Hortascu and Syverson (2007), “Cementing Relationships: Vertical Integration, Foreclosure, Productivity, and Price” *Journal of Political Economy*, 115: 250-301.

III. Consumers

A. Transportation

* Busse, Knittel and Zettelmeyer, “Are Consumers Myopic? Evidence from New and Used Car Purchases” *The American Economic Review*, 103(1), February 2013.

Berry, Levinsohn and Pakes (1995). “Automobile Prices in Market Equilibrium.” *Econometrica* 63: 841-890.

Allcott and Wozny, “Gasoline Prices, Fuel Economy, and the Energy Paradox.” *The Review of Economics and Statistics*, December 2014, Vol. 96, No. 5, Pages 779-795.

Klier and Linn (2010), “The Price of Gasoline and New Vehicle Fuel Economy: Evidence from Monthly Sales Data.” *American Economic Journal: Economic Policy* 2(3).

* Knittel, Christopher, and Ryan Sandler. "The Welfare Impact of Second Best Uniform-Pigouvian Taxation: Evidence from Transportation," forthcoming, *American Economic Journal: Economic Policy*.

* Jacobsen, "Evaluating U.S. Fuel Economy Standards In a Model with Producer and Household Heterogeneity." *American Economic Journal: Economic Policy*, Vol. 5, No. 2, 2013.
Bento, Goulder, Jacobsen and von Haefen (2009) "Distributional and Efficiency Impacts of Increased U.S. Gasoline Taxes," *American Economic Review*, Vol. 99, No. 3, 2009.

Goulder, Jacobsen and van Benthem, "Unintended Consequences from Nested State & Federal Regulations: The Case of the Pavley Greenhouse-Gas-per-Mile Limits" *Journal of Environmental Economics and Management* Volume 63, Issue 2, March 2012, Pages 187–207

Li, Timmins and von Haefen (2009), "How Do Gasoline Prices Affect Fleet Fuel Economy." *American Economic Journal: Economic Policy* 1(2): 113-137

B. Electricity and Energy Efficiency

* Rapson, David. "Durable goods and long-run electricity demand: Evidence from air conditioner purchase behavior." *Journal of Environmental Economics and Management* 68, no. 1 (2014): 141-160.

Burr, "Subsidies, Tariffs and Investments in the Solar Power Market,"
<http://spot.colorado.edu/~chbu2511/research.html>

* Burlig, Fiona, Christopher Knittel, David Rapson, Mar Reguant, and Catherine Wolfram. *Machine learning from schools about energy efficiency*. No. w23908. National Bureau of Economic Research, 2017.

Davis, "Evaluating the Slow Adoption of Energy Efficient Investments: Are Renters Less Likely to Have Energy Efficient Appliances?"
<http://www.nber.org/papers/w16114>

* Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram. "Do energy efficiency investments deliver? Evidence from the weatherization assistance program." *The Quarterly Journal of Economics* 133, no. 3 (2018): 1597-1644.

Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram. "Are the non-monetary costs of energy efficiency investments large? Understanding low take-up of a free energy efficiency program." *American Economic Review* 105, no. 5 (2015): 201-04.

* Bushnell and Mansur (2005), "Consumption Under Noisy Price Signals: A Study Of Electricity Retail Rate Deregulation In San Diego." *Journal of Industrial Economics*, 53(4): 493-513.

Ito, Koichiro. "Do consumers respond to marginal or average price? Evidence from nonlinear electricity pricing." *American Economic Review* 104, no. 2 (2014): 537-63.

* Holland and Mansur (2008), "Is Real-Time Pricing Green? The Environmental Impacts Of Electricity Demand Variance." *Review of Economics and Statistics* 90(3): 550-561.

Cullen, Joseph. "Measuring the environmental benefits of wind-generated electricity." *American Economic Journal: Economic Policy* 5, no. 4 (2013): 107-33.

Holland, Stephen P., Erin T. Mansur, Nicholas Z. Muller, and Andrew J. Yates. "Are there environmental benefits from driving electric vehicles? The importance of local factors." *American Economic Review* 106, no. 12 (2016): 3700-3729.

Fell, Harrison, and Daniel T. Kaffine. "The fall of coal: Joint impacts of fuel prices and renewables on generation and emissions." *American Economic Journal: Economic Policy* 10, no. 2 (2018): 90-116.

*Allcott, "Rethinking Real-Time Electricity Pricing."
Resource and Energy Economics, Volume 33, Issue 4, November 2011, Pages 820–842

Jessoe, Katrina, and David Rapson. "Knowledge is (less) power: Experimental evidence from residential energy use." *American Economic Review* 104, no. 4 (2014): 1417-38.

Wolak, "Residential Customer Response to Real-Time Pricing: The Anaheim Critical-Peak Pricing Experiment." ftp://zia.stanford.edu/pub/papers/anaheim_cpp.pdf

* Grant and Kotchen (2009), "Does Daylight Saving Time Save Energy? Evidence From A Natural Experiment In Indiana." *Review of Economics and Statistics* November 2011, Vol. 93, No. 4, Pages 1172-1185

Kellogg and Wolff (2008), "Daylight time and energy: Evidence from an Australian experiment." *Journal of Environmental Economics and Management* 56: 207-220.

C. Voluntary Measures/Information

* Cutter and Neidell (2009), "Voluntary information programs and environmental regulation: Evidence from 'Spare the Air'." *Journal of Environmental Economics and Management*, 53(3): 253-256.

Reiss and White (2008), "What changes energy consumption? Prices and public pressures." *RAND Journal of Economics* 39(3): 636-663.

Zivin and Neidell (2009), "Days of haze: Environmental information disclosure and intertemporal avoidance behavior." *Journal of Environmental Economics and Management* Volume 58, Issue 2, September 2009, Pages 119–128

IV. Estimating Damages

A. Air Pollution

* Chay and Greenstone (2005). "Does Air Quality Matter? Evidence from the Housing Market." *Journal of Political Economy*, 113(2): 376-424.

* Davis (2010). "The Effect of Power Plants on Local Housing Values and Rents." *Review of Economics and Statistics*, November 2011, Vol. 93, No. 4, Pages 1391-1402

* Currie and Neidell (2005), "Air Pollution and Infant Health: What Can We Learn From California's Recent Experience?" *Quarterly Journal of Economics*, 120(3): 1003-1030.

Knittel, Christopher R., Douglas L. Miller, and Nicholas J. Sanders. "Caution, drivers! Children present: Traffic, pollution, and infant health." *Review of Economics and Statistics* 98, no. 2 (2016): 350-366.

Currie and Walker. "Traffic Congestion and Infant Health: Evidence from E-Z Pass" *American Economic Journal: Applied Economics*, 3(1): 65-90.

B. Climate Change

* Deschenes and Greenstone (2007), "The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather." *American Economic Review* Vol. 97, No. 1 (Mar., 2007), pp. 354-385

* Fisher, Hanemann, Roberts and Schlenker. "The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather: Comment" 2012. *American Economic Review*, 102(7): 3749-3760

* Albouy, Graf, Kellogg and Wolff, "Aversion to Extreme Temperatures, Climate Change, and Quality of Life." <http://www-personal.umich.edu/~kellogg/NBERw18925.pdf>

Deschênes, Olivier and Michael Greenstone (2008), "Climate Change, Mortality and Adaptation: Evidence from Annual Fluctuations in Weather in the U.S." *American Economic Journal: Applied Economics*, 3(4): 152-85.

Zivin, Joshua Graff and Matthew Neidell (2010), "Temperature and the Allocation of Time: Implications for Climate Change." *Journal of Labor Economics* Vol. 32, No. 1 (January 2014), pp. 1-26

V. Discussion of final projects