AEB 7483, Seminar in Environmental Economics, Spring 2026

Instructor: Dr. Youngho (Young) Kim

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Lecture (in-person); 3 credits:
Tuesday 1:55-2:45 pm; Mechanical & Aerospace Engineering Building B 0230 (MAEB 0230)
Thursday 1:55-3:50 pm; Mechanical & Aerospace Engineering Building B 0230 (MAEB 0230)

Office Hours: Friday 2:30 - 4:30 pm or by appointment at MCCB 1121

1. Course Description

Application of economic methods to problems of environmental and regional development; input-output models, cost-benefit analysis, economic valuation, and development planning.

This PhD-level course covers theoretical and empirical components of modern environmental economics. Economic theories applicable to address environmental problems as well as quantitative tools to derive intuition, test hypothesis, and evaluate environmental policy.

The first half of the class offers theoretical insights and empirical tests of those insights. Topics include optimal environmental policy and instrument choice. Second half of the class focuses on the applications of empirical methods to environmental problems. Topics could range from the following depending on students' interest: non-market valuation; climate change; air pollution; water pollution; water scarcity; environment and development; cost-benefit analysis; and environmental justice.

2. Course Learning Objectives

After successful completion of the course, you should be able to:

A. Appreciate the breadth and depth of modern environmental economics theory and empirical applications.
B. Articulate key insights from the existing literature and identify gaps for future research.
C. Apply theoretical and empirical insights to formulate original research questions in environmental economics or an adjacent field.
D. Present and critique research ideas with a scholarly standard.

3. Course Prerequisites

This course is an advanced PhD level field course. Students are expected to have finished PhD microeconomics and econometrics sequence courses (ECO 3101 or AEB 6106 or ECO 7115 or equivalent). Please reach out to me if you have questions about your preparation for this course.

4. Textbook

A. Required
   a. A Course in Environmental Economics: Theory, Policy, and Practice, by Daniel J. Phaneuf and Till Requate, Cambridge University Press (2017)

B. Optional
   a. A Primer on Non-market Valuation (2nd Edition), by Patricia A. Champ, Kevin J. Boyle, and Thomas C. Brown, Springer (2017)
   b. Pricing the Priceless: A History of Environmental Economics, by Spencer Banzhaf, Cambridge University Press (2023)

C. Readings
   a. Readings associated with each topic are listed below.

5. Important Dates

- Jan 13: First day of classes
- Jan 22: Paper presentation signup due
- Mar 3: Referee report presentation (in class)
- Mar 5: Referee report due
- Mar 17, 19: Spring break; no class
- Mar 31: Research proposal due
- Apr 16, 21: Final project presentation (in class)
- Apr 27: Final paper due

6. Course Timetable

Note: the course timetable may evolve as the course goes along.

Week	Tuesday	Thursday	Deadline
[1] 13-Jan	Introduction / Phaneuf and Requate Ch 1	Phaneuf and Requate Ch 2,3	
[2] 20-Jan	Phaneuf and Requate Ch 4	Phaneuf and Requate Ch 5,6	
[3] 27-Jan	Phaneuf and Requate Ch 7	Phaneuf and Requate Ch 8,9	
[4] 3-Feb	Phaneuf and Requate Ch 10	Phaneuf and Requate Ch 11,12	
[5] 10-Feb	Phaneuf and Requate Ch 13	Phaneuf and Requate Ch 14 Stated vs. Revealed Preference	
[6] 17-Feb	Hedonics	Student Presentation	

Week	Tuesday	Thursday	Deadline
[7] 24-Feb	Air pollution	Student Presentation	
[8] 3-Mar	Climate Impact on Agriculture	Referee Report Presentation	Referee Report due
[9] 10-Mar	Climate Impact: Labor, health, adaptation	Student Presentation	
[10] 17-Mar	No class - Spring Break	No class - Spring Break	
[11] 24-Mar	Enviro-development Economics	Student Presentation	
[12] 31-Mar	Integrated Assessment	Student Presentation	Research Proposal due
[13] 7-Apr	Water Pollution	Student Presentation	
[14] 14-Apr	Cost-benefit analysis	Final Project Presentation 1	
[15] 21-Apr	Final Project Presentation 2	No class - End of Semester	Research Paper due

7. Grading Structure and Scale

You will be evaluated with a total of 100 points, which consist of the following:

A. Class Participation (10%)
B. Paper Presentation (30%)
C. Referee Report and Presentation (20% = 10% written report + 10% presentation)
D. Research Proposal (10%)
E. Research Paper (30% = 20% written paper + 10% presentation)

Points will be translated into grades according to the following table. For information on current UF policies for assigning grade points, see: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies

Grade	Points	Grade Points
A	>93	4.00
A-	90-92.9	3.67
B+	86-89.9	3.33

Grade	Points	Grade Points
B	83-85.9	3.00
B-	80-82.9	2.67
C+	76-79.9	2.33
C	73-75.9	2.00
C-	70-72.9	1.67
D+	66-69.9	1.33
D	>63-65.9	1.00
D-	60-62.9	0.67
E	<60	0.00

7.1 Class participation

You are expected read the assigned readings before each module and actively participate in classroom discourses. Additionally, you are required to ask at least one constructive question during each paper/referee report/research project presentation session.

7.2 Paper presentation

You will be leading discussions on a series of the papers listed in the course outline. You should prepare a 20-minute presentation as if you are the author of the paper.

7.3 Referee report and presentation

You are requested to write a referee report and present your report to the editor with your assessment on the paper for publication in an academic journal.

You referee a working paper that has not been published yet. You choose a paper that falls into at least one of the following categories (which also serves as a list for you to select papers to review). A paper that does not falling into any of the following categories will need explicit approval from the instructor. If you have trouble selecting a paper, I am happy to pick one for you.

A. A paper that was presented at one of the NBER-hosted conferences (e.g., Summer Institute, Program Meetings, or thematic meetings)
B. A *job market paper* by a current or recent (within the past 2 years) job market candidate
C. A paper that has been presented at one the following conferences: ASSA; AERE; AAEA; Camp Resources Workshop; Heartland Environmental and Resource Economics Workshop; the Occasional Workshop in Environmental and Resource Economics; the Online Summer Workshop in Environment, Energy, and Transportation(OSWEET); the

Social Cost of Water Pollution Workshop; or the Southeastern Workshop on Energy & Environmental Economics & Policy (SWEEEP)

Your report and presentation should in general follow the following structure:

A. Summary: a one-page/2-3 slide recap of the paper (slightly longer than typical ones because the audience has not listened to the paper yet)
B. Discussion: as many bullet points/slides as needed that are some combination of
C. Framing within the literature
D. Summary of the paper's strengths
E. Weaknesses and constructive suggestions for improvement (which usually is the bulk of the report)

Your referee report will be evaluated on its thoughtfulness, clarity, and constructiveness. You should write your report as if you are writing to the editor. You should also present your report to the editor (aka, the instructor and the rest of the class) in a 15-minute presentation.

Here is some reference materials for writing a good referee report:

- Preparing a Referee Report: Guidelines and Perspectives
- Guidelines to Write a Referee Report by Andrea Passalacqua
- Suggestions on how to write a referee report by Ekaterina Zhuravskaya
- Guidelines for Referee Reports

7.4 Paper Presentation

As a seminar course, you will be asked to present papers that are related to the topic of the week. Each student will need to present three papers during the semester.

A. You will sign up for papers to present on the second week of the semester, and present on your assigned dates.
B. You should select one paper from the list of papers that have not been selected to other students. If you want to present a relevant paper that is not on the list for a particular topic, please consult with me first.
C. You will have 25 minutes to present the paper: the first 15 minutes should mimic a conference/workshop presentation, followed by your own evaluation of the paper (5 minutes) and Q&A (5 minutes)
D. You should present the paper as if you were the actual author of the paper, which means you need to try your best to sell the paper in front of a skeptical audience.
E. A typical economics presentation usually includes the following components:
    a. Motivation (Institutional setting, relevant literature, research question, contribution, and optionally a preview of the results)
    b. Theoretical framework (hypothesis to be tested)
    c. Data

    d. Empirical framework
    e. Results
    f. Discussion and conclusion

F. Audience members should each prepare for at least one question to ask the presenter at the end of the presentation. I recommend reading (the abstract/introduction of) the paper before the presentation to help you formulate questions.

7.5 Research Proposal

You will write a research proposal that serves as a sketch of your final research paper. Unless otherwise permitted by the instructor, your research proposal should follow the introduction formula based on Steps 1 and 2 of Jesse Shapiro's applied micro paper guideline. Specifically, your proposal should largely mimic the Shapiro structure:

A. Paragraphs 1-2: Motivation. After reading these paragraphs, a reader in any field of economics should believe that if you answer your research question your paper will make an important contribution.
B. Paragraphs 3-4: Contribution. These paragraphs explain why your research question is important to economists and general public. Lay out the two main ways your paper contributes to the literature. Each paragraph should center around one contribution and should explain precisely how your paper differs from the most closely related recent work.
C. Paragraph 5: This Paper. This paragraph states in a nutshell what the paper accomplishes and how.
D. Paragraphs 6-7: Theoretical framework. Summarize the key formal assumptions you will maintain in your analysis.
E. Paragraphs 8-9: Data. Explain where you obtain your data and how you measure the concepts that are central to your study.
F. Paragraphs 10-11: Empirical framework. Explain how you take your model to the data and how you overcome the challenges you raised in paragraphs 3-4.
G. Paragraphs 12-13: Findings. Describe the key findings. Make sure they connect clearly to the motivation in paragraphs 1-2.
H. Paragraphs 14: Conclusion. Key takeaway messages with limitations and caveats.

You do not need to have all the components fleshed out at this stage. However, you should have clear expectations as to what will be needed in the next months to complete the paper.

Reference: Four steps to an applied micro paper by Jesse Shapiro

7.6 Research Paper

You will write a full-length independent research paper due at the end of the semester. I expect a first draft of one of your dissertation chapters with original theoretical and empirical analyses.

If this is new work that has not been prepared for another class, a paper with preliminary results should suffice. Alternatively, you can choose to advance/revise a paper that you have already made progress of in another class. If so, you must submit an existing version of the paper at the beginning of the semester and make substantive progress on the paper during the semester.

You are highly encouraged to consult your supervisor(s)/advisor(s) for potential research topics.

7.7 Submission, formatting, and deadlines

All written work should be submitted electronically in pdf format via e-Learning. All written work should be submitted by 11:59 pm on the due date. Late submission will be penalized by 10% per day unless explicit approval is granted by the instructor.

8. Preliminary Course Outline

Week 1: Introduction

Topic: Overview of the field of environmental economics

Readings:

- Phaneuf and Requate Ch. 1, 2, 3
- McCarthy, G. (2019). The role of environmental economics in US environmental policy. Review of Environmental Economics and Policy.

Week 2: First-best Environmental Policy: Instrument Equivalence

Topic: Externality; Pigovian tax; Coase theorem; Cap-and-trade

Readings:

- Phaneuf and Requate Ch. 4, 5, 6
- Goulder, L. H. (2013). Markets for pollution allowances: what are the (new) lessons?. Journal of economic perspectives, 27(1), 87-102.
- Fowlie, M., & Perloff, J. M. (2013). Distributing pollution rights in cap-and-trade programs: are outcomes independent of allocation?. Review of Economics and Statistics, 95(5), 1640-1652.
- Schmalensee, R., & Stavins, R. N. (2013). The SO2 allowance trading system: The ironic history of a grand policy experiment. Journal of Economic Perspectives, 27(1), 103-122.
- Schmalensee, R., & Stavins, R. N. (2017). Lessons learned from three decades of experience with cap and trade. Review of Environmental Economics and Policy.

Week 3: First-best Environmental Policy: Instrument Divergence

Topic: Prices versus quantities; Instrument divergence; Uncertainty and risk

Readings:

- Phaneuf and Requate Ch. 7, 8, 9
- Weitzman, M.L. (1974). Prices vs. quantities. The Review of Economic Studies, 41(4), 477-491.
- Carlton, D. W., & Loury, G. C. (1980). The limitations of Pigouvian taxes as a long-run remedy for externalities. The Quarterly Journal of Economics, 95(3), 559-566.
- Weitzman, M. L. (2011). Fat-tailed uncertainty in the economics of catastrophic climate change. Review of Environmental Economics and Policy.
- Goulder, L. H. (2020). Timing is everything: how economists can better address the urgency of stronger climate policy. Review of Environmental Economics and Policy.

Presentation papers:

- Kroetz, K., Sanchirico, J. N., & Lew, D. K. (2015). Efficiency costs of social objectives in tradable permit programs. Journal of the Association of Environmental and Resource Economists, 2(3), 339-366.
- Meng, K. C. (2017). Using a free permit rule to forecast the marginal abatement cost of proposed climate policy. American Economic Review, 107(3), 748-784.
- Li, S. (2018). Better lucky than rich? Welfare analysis of automobile licence allocations in Beijing and Shanghai. The Review of Economic Studies, 85(4), 2389-2428.
- Fowlie, M., & Muller, N. (2019). Market-based emissions regulation when damages vary across sources: What are the gains from differentiation?. Journal of the Association of Environmental and Resource Economists, 6(3), 593-632.
- Giglio, S., Maggiori, M., Rao, K., Stroebel, J., & Weber, A. (2021). Climate change and long-run discount rates: Evidence from real estate. The Review of Financial Studies, 34(8), 3527-3571.
- Hernandez-Cortes, D., & Meng, K. C. (2023). Do environmental markets cause environmental injustice? Evidence from California's carbon market. Journal of Public Economics, 217, 104786.
- Toyama Y. (2023). Dynamic Incentives and Permit Market Equilibrium in Cap-and-Trade Regulation. American Economic Journal: Microeconomics (forthcoming)
- Zaklan, A. (2023). Coase and cap-and-trade: Evidence on the independence property from the European carbon market. American Economic Journal: Economic Policy, 15(2), 526-558.
- Shapiro, J. S., & Walker, R. (2023). Is Air Pollution Regulation Too Stringent? Evidence from US Offset Markets. Working Paper.
- Hong, H., Wang, N., & Yang, J. (2023). Mitigating disaster risks in the age of climate change. Econometrica, 91(5), 1763-1802.
- Colmer, J., Martin, R., Muûls, M., & Wagner, U. J. (2023). Does pricing carbon mitigate climate change? Firm-level evidence from the European Union emissions trading scheme. Review of Economic Studies (forthcoming)

Week 4: Externality with Output Markets

Topic: Regulating the environment when output markets are present

Readings:

- Phaneuf and Requate Ch. 10, 11, 12
- Goulder, L. H., & Parry, I. W. (2008). Instrument choice in environmental policy. Review of environmental economics and policy
- Presentation papers:
- Li, S., Linn, J., & Muehlegger, E. (2014). Gasoline taxes and consumer behavior. American Economic Journal: Economic Policy, 6(4), 302-342.
- Fowlie, M., Reguant, M., & Ryan, S. P. (2016). Market-based emissions regulation and industry dynamics. Journal of Political Economy, 124(1), 249-302.
- Bushnell, J., & Humber, J. (2017). Rethinking trade exposure: The incidence of environmental charges in the nitrogenous fertilizer industry. Journal of the Association of Environmental and Resource Economists, 4(3), 857-894.
- Ayres, A. B., Meng, K. C., & Plantinga, A. J. (2021). Do environmental markets improve on open access? Evidence from California groundwater rights. Journal of Political Economy, 129(10), 2817-2860.
- Cao, J., Ho, M. S., Ma, R., & Teng, F. (2021). When carbon emission trading meets a regulated industry: Evidence from the electricity sector of China. Journal of Public Economics, 200, 104470.
- Browne, O. R., & Ji, X. J. (2023). The economic value of clarifying property rights: Evidence from water in Idaho's Snake River Basin. Journal of Environmental Economics and Management, 119, 102799.
- Aronoff, D., & Rafey, W. (2023). Conservation priorities and environmental offsets: Markets for Florida wetlands (No. w31495). National Bureau of Economic Research.

Week 5: Non-market valuation: an overview

Topic: Applied welfare analysis; Stated vs. revealed preference

Readings:

- Phaneuf and Raquete Ch. 13, 14
- Kling, C. L., Phaneuf, D. J., & Zhao, J. (2012). From Exxon to BP: Has some number become better than no number?. Journal of Economic Perspectives, 26(4), 3-26.
- Hausman, J. (2012). Contingent valuation: from dubious to hopeless. Journal of economic perspectives, 26(4), 43-56.
- Johnston, R. J., Boyle, K. J., Adamowicz, W., Bennett, J., Brouwer, R., Cameron, T. A., ... & Vossler, C. A. (2017). Contemporary guidance for stated preference studies. Journal of the Association of Environmental and Resource Economists, 4(2), 319-405.

- Hanley, N., & Czajkowski, M. (2019). The role of stated preference valuation methods in understanding choices and informing policy. Review of Environmental Economics and Policy.
- Mendelsohn, R. (2019). An examination of recent revealed preference valuation methods and results. Review of Environmental Economics and Policy.
- Alberini, A. (2019). Revealed versus stated preferences: what have we learned about valuation and behavior?. Review of Environmental Economics and Policy.
- Lupi, F., Phaneuf, D. J., & von Haefen, R. H. (2020). Best practices for implementing recreation demand models. Review of Environmental Economics and Policy.
- Stantcheva, S. (2023). How to run surveys: A guide to creating your own identifying variation and revealing the invisible. Annual Review of Economics, 15, 205-234.

Week 6: Hedonic model

Topic: The hedonic model, its identification, and equilibrium sorting models

Readings:

- Taylor, L. O. (2017). Hedonics. In A primer on nonmarket valuation, Chapter 7, 235-292.
- Kuminoff, N. V., Smith, V. K., & Timmins, C. (2013). The new economics of equilibrium sorting and policy evaluation using housing markets. Journal of economic literature, 51(4), 1007-1062.
- Kuminoff, N. V., & Pope, J. C. (2014). Do "capitalization effects" for public goods reveal the public's willingness to pay?. International Economic Review, 55(4), 1227-1250.
- Bishop, K. C., Kuminoff, N. V., Banzhaf, H. S., Boyle, K. J., von Gravenitz, K., Pope, J. C., ... & Timmins, C. D. (2020). Best practices for using hedonic property value models to measure willingness to pay for environmental quality. Review of Environmental Economics and Policy.
- Banzhaf, H. S. (2021). Difference-in-differences hedonics. Journal of Political Economy, 129(8), 2385-2414.

Presentations:

- Black, S. E. (1999). Do better schools matter? Parental valuation of elementary education. The quarterly journal of economics, 114(2), 577-599.
- Bayer, P., Ferreira, F., & McMillan, R. (2007). A unified framework for measuring preferences for schools and neighborhoods. Journal of political economy, 115(4), 588-638.

- Greenstone, M., & Gallagher, J. (2008). Does hazardous waste matter? Evidence from the housing market and the superfund program. The Quarterly Journal of Economics, 123(3), 951-1003.
- Bayer, P., Keohane, N., & Timmins, C. (2009). Migration and hedonic valuation: The case of air quality. Journal of Environmental Economics and Management, 58(1), 1-14.
- Currie, J., Davis, L., Greenstone, M., & Walker, R. (2015). Environmental health risks and housing values: evidence from 1,600 toxic plant openings and closings. American Economic Review, 105(2), 678-709.
- Muehlenbachs, L., Spiller, E., & Timmins, C. (2015). The housing market impacts of shale gas development. American Economic Review, 105(12), 3633-3659.
- Bayer, P., McMillan, R., Murphy, A., & Timmins, C. (2016). A dynamic model of demand for houses and neighborhoods. Econometrica, 84(3), 893-942.
- Haninger, K., Ma, L., & Timmins, C. (2017). The value of brownfield remediation. Journal of the Association of Environmental and Resource Economists, 4(1), 197-241.
- Tanaka, S., & Zabel, J. (2018). Valuing nuclear energy risk: Evidence from the impact of the Fukushima crisis on US house prices. Journal of Environmental Economics and Management, 88, 411-426.
- Bakkensen, L. A., & Barrage, L. (2022). Going underwater? Flood risk belief heterogeneity and coastal home price dynamics. The Review of Financial Studies, 35(8), 3666-3709.
- Zivin, J. G., Liao, Y., & Panassie, Y. (2023). How hurricanes sweep up housing markets: Evidence from florida. Journal of Environmental Economics and Management, 118, 102770.
- Cassidy, A., Meeks, R. C., & Moore, M. R. (2023). Cleaning up the Great Lakes: Housing market impacts of removing legacy pollutants. Journal of Public Economics, 226, 104979.
- Christensen, P., Keiser, D. A., & Lade, G. E. (2023). Economic effects of environmental crises: Evidence from Flint, Michigan. American Economic Journal: Economic Policy, 15(1), 196-232.
- Mamun, S., Castillo-Castillo, A., Swedberg, K., Zhang, J., Boyle, K. J., Cardoso, D., ... & Polasky, S. (2023). Valuing water quality in the United States using a national dataset on property values. Proceedings of the National Academy of Sciences, 120(15), e2210417120.

Week 7: Air Pollution

Topic: Air pollution; Health impacts; Defensive actions and avoidance behavior;

Readings:

- Graff Zivin, J., & Neidell, M. (2013). Environment, health, and human capital. Journal of Economic Literature, 51(3), 689-730.
- Chen, Y., Ebenstein, A., Greenstone, M., & Li, H. (2013). Evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River policy. Proceedings of the National Academy of Sciences, 110(32), 12936-12941.
- Ebenstein, A., Lavy, V., & Roth, S. (2016). The long-run economic consequences of high-stakes examinations: Evidence from transitory variation in pollution. American Economic Journal: Applied Economics, 8(4), 36-65.
- Arceo, E., Hanna, R., & Oliva, P. (2016). Does the effect of pollution on infant mortality differ between developing and developed countries? Evidence from Mexico City. The Economic Journal, 126(591), 257-280.
- Deryugina, T., Heutel, G., Miller, N. H., Molitor, D., & Reif, J. (2019). The mortality and medical costs of air pollution: Evidence from changes in wind direction. American Economic Review, 109(12), 4178-4219.
- Currie, J., & Walker, R. (2019). What do economists have to say about the Clean Air Act 50 years after the establishment of the Environmental Protection Agency?. Journal of Economic Perspectives, 33(4), 3-26.
- Schmalensee, R., & Stavins, R. N. (2019). Policy evolution under the clean air act. Journal of Economic Perspectives, 33(4), 27-50.
- Ito, K., & Zhang, S. (2020). Willingness to pay for clean air: Evidence from air purifier markets in China. Journal of Political Economy, 128(5), 1627-1672.
- Greenstone, M., He, G., Li, S., & Zou, E. Y. (2021). China's war on pollution: Evidence from the first 5 years. Review of Environmental Economics and Policy, 15(2), 281-299.
- Presentations:
- Currie, J., & Walker, R. (2011). Traffic congestion and infant health: Evidence from E-ZPass. American Economic Journal: Applied Economics, 3(1), 65-90.
- Chang, T., Graff Zivin, J., Gross, T., & Neidell, M. (2016). Particulate pollution and the productivity of pear packers. American Economic Journal: Economic Policy, 8(3), 141-169.
- Isen, A., Rossin-Slater, M., & Walker, W. R. (2017). Every breath you take—every dollar you'll make: The long-term consequences of the clean air act of 1970. Journal of Political Economy, 125(3), 848-902.
- Deschenes, O., Greenstone, M., & Shapiro, J. S. (2017). Defensive investments and the demand for air quality: Evidence from the NOx budget program. American Economic Review, 107(10), 2958-2989.
- Hollingsworth, A., & Rudik, I. (2021). The effect of leaded gasoline on elderly mortality: Evidence from regulatory exemptions. American Economic Journal: Economic Policy, 13(3), 345-373.

- Zou, E. Y. (2021). Unwatched pollution: The effect of intermittent monitoring on air quality. American Economic Review, 111(7), 2101-2126.
- Fu, S., Viard, V. B., & Zhang, P. (2021). Air pollution and manufacturing firm productivity: Nationwide estimates for China. The Economic Journal, 131(640), 3241-3273.
- Schlenker, W., & Walker, W. R. (2016). Airports, air pollution, and contemporaneous health. The Review of Economic Studies, 83(2), 768-809.
- Chang, T. Y., Graff Zivin, J., Gross, T., & Neidell, M. (2019). The effect of pollution on worker productivity: evidence from call center workers in China. American Economic Journal: Applied Economics, 11(1), 151-172.
- Heissel, J. A., Persico, C., & Simon, D. (2022). Does pollution drive achievement? The effect of traffic pollution on academic performance. Journal of Human Resources, 57(3), 747-776.
- Bishop, K. C., Ketcham, J. D., & Kuminoff, N. V. (2023). Hazed and confused: the effect of air pollution on dementia. Review of Economic Studies, 90(5), 2188-2214.
- Huang, J., Xing, J., & Zou, E. Y. (2023). (Re) scheduling pollution exposure: The case of surgery schedules. Journal of Public Economics, 219, 104825.

Week 8: Climate and Agriculture

Topic: Climate impact on agriculture; Technological change; Irrigation

Readings:

- Mendelsohn, R., Nordhaus, W. D., & Shaw, D. (1994). The impact of global warming on agriculture: a Ricardian analysis. The American economic review, 753-771.
- Schlenker, W., Michael Hanemann, W., & Fisher, A. C. (2005). Will US agriculture really benefit from global warming? Accounting for irrigation in the hedonic approach. American Economic Review, 95(1), 395-406.
- Deschênes, O., & Greenstone, M. (2007). The economic impacts of climate change: evidence from agricultural output and random fluctuations in weather. American economic review, 97(1), 354-385.
- Schlenker, W., & Roberts, M. J. (2009). Nonlinear temperature effects indicate severe damages to US crop yields under climate change. Proceedings of the National Academy of sciences, 106(37), 15594-15598.
- Schlenker, W., & Lobell, D. B. (2010). Robust negative impacts of climate change on African agriculture. Environmental Research Letters, 5(1), 014010.
- Burke, M., & Emerick, K. (2016). Adaptation to climate change: Evidence from US agriculture. American Economic Journal: Economic Policy, 8(3), 106-140.

- Mendelsohn, R. O., & Massetti, E. (2017). The use of cross-sectional analysis to measure climate impacts on agriculture: theory and evidence. Review of Environmental Economics and Policy.
- Blanc, E., & Schlenker, W. (2017). The use of panel models in assessments of climate impacts on agriculture. Review of Environmental Economics and Policy.

Presentations:

- Hornbeck, R., & Keskin, P. (2014). The historically evolving impact of the ogallala aquifer: Agricultural adaptation to groundwater and drought. American Economic Journal: Applied Economics, 6(1), 190-219.
- Hornbeck, R., & Keskin, P. (2015). Does agriculture generate local economic spillovers? Short-run and long-run evidence from the Ogallala Aquifer. American Economic Journal: Economic Policy, 7(2), 192-213.
- Kala, N. (2017). Learning, adaptation, and climate uncertainty: Evidence from Indian agriculture. MIT Center for energy and environmental policy research working paper.
- Hendricks, N. P. (2018). Potential benefits from innovations to reduce heat and water stress in agriculture. Journal of the Association of Environmental and Resource Economists, 5(3), 545-576.
- Cui, X. (2020). Climate change and adaptation in agriculture: Evidence from US cropping patterns. Journal of Environmental Economics and Management, 101, 102306.
- Aragón, F. M., Oteiza, F., & Rud, J. P. (2021). Climate change and agriculture: Subsistence farmers' response to extreme heat. American Economic Journal: Economic Policy, 13(1), 1-35.
- Mérel, P., & Gammans, M. (2021). Climate Econometrics: Can the Panel Approach Account for Long-Run Adaptation?. American Journal of Agricultural Economics, 103(4), 1207-1238.
- Schlenker, W., & Taylor, C. A. (2021). Market expectations of a warming climate. Journal of Financial Economics, 142(2), 627-640.
- Cui, X., & Zhong, Z. (2023). Climate change, cropland adjustments, and food security: Evidence from China. Journal of Development Economics, 103245.
- Moscona, J., & Sastry, K. A. (2023). Does directed innovation mitigate climate damage? evidence from us agriculture. The Quarterly Journal of Economics, 138(2), 637-701.
- Dasgupta, A., & Ramirez, E. R. (2023). Explaining Rural Conservatism: Political Consequences of Technological Change in the Great Plains. American Political Science Review (forthcoming)
- Matranga, A. (2024). The ant and the grasshopper: Seasonality and the invention of agriculture. The Quarterly Journal of Economics, qjae012.

Week 9: Climate Impact: Labor, health, and adaptation

Topic: Social consequences of climate change; Adaptation

Readings:

- Deschênes, O., & Greenstone, M. (2011). Climate change, mortality, and adaptation: Evidence from annual fluctuations in weather in the US. American Economic Journal: Applied Economics, 3(4), 152-185.
- Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. Science, 341(6151), 1235367.
- Dell, M., Jones, B. F., & Olken, B. A. (2014). What do we learn from the weather? The new climate-economy literature. Journal of Economic literature, 52(3), 740-798.
- Heal, G., & Park, J. (2016). Reflections—temperature stress and the direct impact of climate change: a review of an emerging literature. Review of Environmental Economics and Policy.
- Auffhammer, M. (2018). Quantifying economic damages from climate change. Journal of Economic Perspectives, 32(4), 33-52.

Presentations:

- Sekhri, S., & Storeygard, A. (2014). The impact of climate variability on crimes against women: Dowry deaths in India. Journal of Development Economics, 111: 212-223.
- Barreca, A., Clay, K., Deschenes, O., Greenstone, M., & Shapiro, J. S. (2016). Adapting to climate change: The remarkable decline in the US temperature-mortality relationship over the twentieth century. Journal of Political Economy, 124(1), 105-159.
- Zhang, P., Deschenes, O., Meng, K., & Zhang, J. (2018). Temperature effects on productivity and factor reallocation: Evidence from a half million Chinese manufacturing plants. Journal of Environmental Economics and Management, 88, 1-17.
- Deryugina, T., Kawano, L., & Levitt, S. (2018). The economic impact of Hurricane Katrina on its victims: Evidence from individual tax returns. American Economic Journal: Applied Economics, 10(2), 202-233.
- Adhvaryu, A., Kala, N., & Nyshadham, A. (2020). The light and the heat: Productivity co-benefits of energy-saving technology. Review of Economics and Statistics, 102(4), 779-792.
- Engle, R. F., Giglio, S., Kelly, B., Lee, H., & Stroebel, J. (2020). Hedging climate change news. The Review of Financial Studies, 33(3), 1184-1216.
- Park, R. J., Goodman, J., Hurwitz, M., & Smith, J. (2020). Heat and learning. American Economic Journal: Economic Policy, 12(2), 306-339.
- Heutel, G., Miller, N. H., & Molitor, D. (2021). Adaptation and the mortality effects of temperature across US climate regions. Review of Economics and Statistics, 103(4), 740-753.

- Jarvis, S., Deschenes, O., & Jha, A. (2022). The private and external costs of Germany's nuclear phase-out. Journal of the European Economic Association, 20(3), 1311-1346.
- Liu, M., Shamdasani, Y., & Taraz, V. (2023). Climate change and labor reallocation: Evidence from six decades of the Indian Census. American Economic Journal: Economic Policy, 15(2), 395-423.
- Colmer, J., & Doleac, J. L. (2022). Access to Guns in the Heat of the Moment: More Restrictive Gun Laws Mitigate the Effect of Temperature on Violence. the Review of Economics and Statistics (forthcoming)
- Hsiao, A. (2023). Sea Level Rise and Urban Adaptation in Jakarta.
- Obolensky, M., Tabellini, M., & Taylor, C. (2024). Homeward Bound: How Migrants Seek Out Familiar Climates.

Week 10: Spring break

Week 11: Envirodevonomics

Topic: Environmental economics in the developing world

Readings:

- Greenstone, M., & Jack, B. K. (2015). Envirodevonomics: A research agenda for an emerging field. Journal of Economic Literature, 53(1), 5-42.
- Jayachandran, S. (2022). How economic development influences the environment. Annual Review of Economics, 14, 229-252.
- Hanna, R., & Oliva, P. (2016). Implications of climate change for children in developing countries. The Future of Children, 115-132.
- Burgess, R., Greenstone, M., Ryan, N., & Sudarshan, A. (2020). The consequences of treating electricity as a right. Journal of Economic Perspectives, 34(1), 145-169.

Presentations:

- Maccini, S., & Yang, D. (2009). Under the weather: Health, schooling, and economic consequences of early-life rainfall. American Economic Review, 99(3), 1006-1026.
- Lipscomb, M., Mobarak, A. M., & Barham, T. (2013). Development effects of electrification: Evidence from the topographic placement of hydropower plants in Brazil. American Economic Journal: Applied Economics, 5(2), 200-231.
- Brainerd, E., & Menon, N. (2014). Seasonal effects of water quality: The hidden costs of the Green Revolution to infant and child health in India. Journal of Development Economics, 107, 49-64.
- Greenstone, M., & Hanna, R. (2014). Environmental regulations, air and water pollution, and infant mortality in India. American Economic Review, 104(10), 3038-3072.
- Adukia, A. (2017). Sanitation and education. American Economic Journal: Applied Economics, 9(2), 23-59.

- Duflo, E., Greenstone, M., Pande, R., & Ryan, N. (2018). The value of regulatory discretion: Estimates from environmental inspections in India. Econometrica, 86(6), 2123-2160.
- Benshaul-Tolonen, A. (2019). Local industrial shocks and infant mortality. The Economic Journal, 129(620), 1561-1592.
- Yan, Y. (2019). Unintended land use effects of afforestation in China's Grain for Green Program. American Journal of Agricultural Economics, 101(4), 1047-1067.
- Corno, L., Hildebrandt, N., & Voena, A. (2020). Age of marriage, weather shocks, and the direction of marriage payments. Econometrica, 88(3), 879-915.
- Sekhri, S., & Hossain, M. A. (2023). Water in scarcity, women in peril. Journal of the Association of Environmental and Resource Economists, 10(6), 1475-1513.
- Frank, E., & Sudarshan, A. (2023). The Social Costs of Keystone Species Collapse: Evidence From The Decline of Vultures in India. University of Chicago, Becker Friedman Institute for Economics Working Paper, (2022-165).
- Garg, T., Jagnani, M., & Pullabhotla, H. K. (2023). Rural roads, farm labor exits, and crop fires. American Economic Journal: Economic Policy.
- Patel, D. (2023). Floods. https://dev-patel.com/content/Floods.pdf
- McGuirk, E. F., & Nunn, N. (2023). Transhumant pastoralism, climate change, and conflict in africa. Review of Economic Studies (forthcoming).
- Feir, D. L., Gillezeau, R., & Jones, M. E. (2023). The Slaughter of the Bison and Reversal of Fortunes on the Great Plains. Review of Economic Studies, rdad060.
- Frank, E., Wang, S., Wang, X., Wang, Q., & Y. You. (2024). Campaigning for Extinction: Eradication of Sparrows and the Great Famine in China

Week 12: Integrated Assessment

Readings/presentations:

- Keeler, B. L., Gourevitch, J. D., Polasky, S., Isbell, F., Tessum, C. W., Hill, J. D., & Marshall, J. D. (2016). The social costs of nitrogen. Science advances, 2(10).
- Kling, C. L., Arritt, R. W., Calhoun, G., & Keiser, D. A. (2017). Integrated assessment models of the food, energy, and water nexus: A review and an outline of research needs. Annual Review of Resource Economics, 9, 143-163.
- Antle, J. M., & Stöckle, C. O. (2017). Climate impacts on agriculture: insights from agronomic-economic analysis. Review of Environmental Economics and Policy.
- Rennert, K., Errickson, F., Prest, B. C., Rennels, L., Newell, R. G., Pizer, W., ... & Anthoff, D. (2022). Comprehensive evidence implies a higher social cost of CO2. Nature, 610(7933), 687-692.
- Carleton, T., Jina, A., Delgado, M., Greenstone, M., Houser, T., Hsiang, S., ... & Zhang, A. T. (2022). Valuing the global mortality consequences of climate change accounting

for adaptation costs and benefits. The Quarterly Journal of Economics, 137(4), 2037-2105.

- Weng, W., Cobourn, K. M., Kemanian, A. R., Boyle, K. J., Shi, Y., Stachelek, J., & White, C. (2023). Quantifying Co-Benefits of Water Quality Policies: An Integrated Assessment Model of Nitrogen Management. American Journal of Agricultural Economics (forthcoming).
- Zuidema, S., Liu, J., Chepeliev, M. G., Johnson, D. R., Baldos, U. L. C., Frolking, S., ... & Hertel, T. W. (2023). US climate policy yields water quality cobenefits in the Mississippi Basin and Gulf of Mexico. Proceedings of the National Academy of Sciences, 120(43), e2302087120.

Week 13: Water Pollution

Topic: Water pollution; Health impacts; Point and non-point source pollution

Readings:

- Fisher-Vanden, K., & Olmstead, S. (2013). Moving pollution trading from air to water: potential, problems, and prognosis. Journal of Economic Perspectives, 27(1), 147-172.
- Rabotyagov, S. S., Kling, C. L., Gassman, P. W., Rabalais, N. N., & Turner, R. E. (2014). The economics of dead zones: Causes, impacts, policy challenges, and a model of the Gulf of Mexico hypoxic zone. Review of Environmental Economics and Policy.
- Keiser, D. A., & Shapiro, J. S. (2019). Consequences of the Clean Water Act and the demand for water quality. The Quarterly Journal of Economics, 134(1), 349-396.
- Keiser, D. A., Kling, C. L., & Shapiro, J. S. (2019). The low but uncertain measured benefits of US water quality policy. Proceedings of the National Academy of Sciences, 116(12), 5262-5269.
- Keiser, D. A., & Shapiro, J. S. (2019). US water pollution regulation over the past half century: burning waters to crystal springs?. Journal of Economic Perspectives, 33(4), 51-75.
- Keiser, D. A., Olmstead, S. M., Boyle, K. J., Flatt, V. B., Keeler, B. L., Phaneuf, D. J., ... & Shimshack, J. P. (2022). The Evolution of the "Waters of the United States" and the Role of Economics. Review of Environmental Economics and Policy, 16(1), 146-152.

Presentations:

- Olmstead, S. M., Muehlenbachs, L. A., Shih, J. S., Chu, Z., & Krupnick, A. J. (2013). Shale gas development impacts on surface water quality in Pennsylvania. Proceedings of the National Academy of Sciences, 110(13), 4962-4967.
- He, G., Wang, S., & Zhang, B. (2020). Watering down environmental regulation in China. The Quarterly Journal of Economics, 135(4), 2135-2185.
- Aggeborn, L., & Öhman, M. (2021). The effects of fluoride in drinking water. Journal of Political Economy, 129(2), 465-491.

- Paudel, J., & Crago, C. L. (2021). Environmental externalities from agriculture: evidence from water quality in the united states. American Journal of Agricultural Economics, 103(1), 185-210.
- Hadachek, J. (2022). The cost of nitrate pollution in drinking water.
- Marcus, M. (2022). Testing the water: Drinking water quality, public notification, and child outcomes. Review of Economics and Statistics, 104(6), 1289-1303.
- Dave, D. M., & Yang, M. (2022). Lead in drinking water and birth outcomes: A tale of two water treatment plants. Journal of Health Economics, 84, 102644.
- Hill, E. L., & Ma, L. (2022). Drinking water, fracking, and infant health. Journal of Health Economics, 82, 102595.
- Keiser, D. A., Mazumder, B., Molitor, D., & Shapiro, J. S. (2023). Water Works: Causes and Consequences of Safe Drinking Water in America.
- Liu, P., Wang, Y., & Zhang, W. (2023). The influence of the Environmental Quality Incentives Program on local water quality. American Journal of Agricultural Economics, 105(1), 27-51.
- Dias, M., Rocha, R., & Soares, R. R. (2023). Down the River: Glyphosate Use in Agriculture and Birth Outcomes of Surrounding Populations. Review of Economic Studies (forthcoming).

Week 14: Benefit-cost Analysis and Distributional Impacts

Topics: Benefit-cost analysis; Environmental Justice

Readings:

- Banzhaf, H. S., Ma, L., & Timmins, C. (2019). Environmental justice: Establishing causal relationships. Annual Review of Resource Economics, 11, 377-398.
- Banzhaf, S., Ma, L., & Timmins, C. (2019). Environmental justice: The economics of race, place, and pollution. Journal of Economic Perspectives, 33(1), 185-208.
- OMB (2023). Guidance for assessing changes in environmental and ecosystem services in benefit-cost analysis. https://www.whitehouse.gov/wp-content/uploads/2023/08/DraftESGuidance.pdf
- Hay and Xie (2023). Circular A-4: A Comparison between the 2023 Draft and the 2003 Circular. https://regulatorystudies.columbian.gwu.edu/circular-4-comparison-between-2023-draft-and-2003-circular

Presentations:

- Wolverton, A. (2009). Effects of socio-economic and input-related factors on polluting plants' location decisions. The BE Journal of Economic Analysis & Policy, 9(1).
- Currie, J., Greenstone, M., & Moretti, E. (2011). Superfund cleanups and infant health. American Economic Review, 101(3), 435-441.

- Banzhaf, H. S., & Walsh, R. P. (2013). Segregation and Tiebout sorting: The link between place-based investments and neighborhood tipping. Journal of Urban Economics, 74, 83-98.
- Bakkensen, L. A., & Ma, L. (2020). Sorting over flood risk and implications for policy reform. Journal of Environmental Economics and Management, 104, 102362.
- Persico, C., Figlio, D., & Roth, J. (2020). The developmental consequences of superfund sites. Journal of Labor Economics, 38(4), 1055-1097.
- Currie, J., Voorheis, J., & Walker, R. (2023). What caused racial disparities in particulate exposure to fall? New evidence from the Clean Air Act and satellite-based measures of air quality. American Economic Review, 113(1), 71-97.
- Marion J., & West, J. (2023). Socioeconomic Disparities in Privatized Pollution Remediation: Evidence from Toxic Chemical Spills. American Economic Journal: Applied Economics (Forthcoming).
- Christensen, P., & Timmins, C. (2023). The damages and distortions from discrimination in the rental housing market. The Quarterly Journal of Economics, 138(4), 2505-2557.

Optional topic: Environmental Policy in the Real World

Topic: Command-and-control; Standard; Monitoring and enforcement; Strategic behavior

Readings:

- Gray, W. B., & Shimshack, J. P. (2011). The effectiveness of environmental monitoring and enforcement: A review of the empirical evidence. Review of Environmental Economics and Policy.
- Lipscomb, M., & Mobarak, A. M. (2016). Decentralization and pollution spillovers: evidence from the re-drawing of county borders in Brazil. The Review of Economic Studies, 84(1), 464-502.
- Shapiro, J. S., & Walker, R. (2018). Why is pollution from US manufacturing declining? The roles of environmental regulation, productivity, and trade. American Economic Review, 108(12), 3814-3854.
- Presentations:
- Hanna, R. (2010). US environmental regulation and FDI: evidence from a panel of US-based multinational firms. American Economic Journal: Applied Economics, 2(3), 158-189.
- Duflo, E., Greenstone, M., Pande, R., & Ryan, N. (2013). Truth-telling by third-party auditors and the response of polluting firms: Experimental evidence from India. The Quarterly Journal of Economics, 128(4), 1499-1545.
- Evans, M. F., Gilpatric, S. M., & Shimshack, J. P. (2018). Enforcement spillovers: Lessons from strategic interactions in regulation and product markets. The Journal of Law and Economics, 61(4), 739-769.

- Greenstone, Michael, Guojun He, Ruixue Jia, and Tong Liu. 2022. "Can Technology Solve the Principal-Agent Problem? Evidence from China's War on Air Pollution." American Economic Review: Insights, 4(1): 54-70.
- Blundell, W., Gowrisankaran, G., & Langer, A. (2020). Escalation of scrutiny: The gains from dynamic enforcement of environmental regulations. American Economic Review, 110(8), 2558-2585.
- Greenstone, M., & Nath, I. (2022). Do renewable portfolio standards deliver cost-effective carbon abatement?. University of Chicago, Becker Friedman Institute for Economics Working Paper, (2019-62).
- Agarwal, S., Han, Y., Qin, Y., & Zhu, H. (2023). Disguised pollution: Industrial activities in the dark. Journal of Public Economics, 223, 104904.

8. Academic Policies and Resources

Academic policies for this course are consistent with university policies. See https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links.

9. Campus Health and Wellness Resources

Visit https://one.uf.edu/whole-gator/topics for resources that are designed to help you thrive physically, mentally, and emotionally at UF.

Please contact UMatterWeCare for additional and immediate support.

10. Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

11. Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights.

12. Technical Support

UF Computing Help Desk & Ticket Number: All technical issues require a UF Helpdesk Ticket Number. The UF Helpdesk is available 24 hours a day, 7 days a week. https://helpdesk.ufl.edu/ | 352-392-4357