

# AAE 760 : Environment & Resource Economics

University of Wisconsin - Madison

Spring 2025

Location: Taylor Hall B30 Tues/Thurs 2:30-3:45pm

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**Office Hours** By appointment

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## Course Description.

This course has two broad aims: (i) to expose students to a range of topics related to foundational as well as current research in environmental economics and (ii) to prepare PhD students to conduct original research in environmental economics. We will spend the first week reviewing foundations of applied empirical research. The rest of the class will be organized around major themes in environmental economics, including public goods and property rights; pollution and health, pollution and sorting, natural disasters, transportation, and new methods. We will dissect research papers that use a wide range of research designs, identification strategies, and estimation techniques. By actively engaging in this process, each of you will hopefully start putting the pieces together as applied microeconomic researchers – by understanding (i) what makes a successful research question, and (ii) what passes muster for credible empirics at the time of this course. This is a companion course to AAE 762. Relative to that class, this course will be more focused on topics that tend to overlap across environmental and urban economics fields, including transportation, sorting, and health.

## Course Objectives.

- Understand methods, topics and contributions of major works in environmental economics
- Develop proficiency with theoretical, computational, and empirical tools that will be valuable for future self-directed research;
- Gain experience in reading, presenting, and discussing modern research in environmental economics

## Prerequisites.

- ECON 709 (Economic Statistics & Econometrics I) and ECON 711(Economic Theory – Microeconomics Sequence) OR permission from the instructor.

## Class Format

Most of our class time will be spent discussing papers. All students should arrive prepared to contribute to a thorough and in-depth discussion of the assigned readings. On occasion, I will lecture on big picture topics or technical material, and sometimes we will have more free flowing conversations about general research opportunities.

## Grading Criteria.

1. Referee Report: 15%. Each student is required to do an original referee report on an unpublished empirical paper in environmental economics that I will assign. The reports should *not* exceed 4 pages (1.5 spaced). 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. An example report and a suggested template are posted to Canvas (note, do not feel compelled to complete every piece of the template in your report. It is meant as a guide, not as necessary criteria for a useful report). **Due Feb 27<sup>th</sup>**
2. In-Class Presentations: 20%. Each of you will conduct one in-class presentation either individually or as a group (depending on the final class size). You will be expected to present the paper as the instructor, providing the basis for a critical discussion amongst the class. The point of this exercise is to give students an opportunity to perform an in-depth study of an interesting paper, and to provide practice with presenting technical material. The papers will be chosen by the individual/group from the supplementary reading list beneath each major theme. I will assign each student to their presentation group in the first week of class
3. Replication Assignment 20%: See attached rubric.
4. Class Attendance & Participation: 10%. Please come to class each day ready to discuss the assigned reading, ask questions about them and answer questions about them. I realize that some weeks you will have more time and focus than others, but please do your best. If we have an issue with students not showing up prepared, I reserve the right to require that you submit a written summary of each assigned paper prior to class. (If implemented, these written summaries will be brief, will be posted to Canvas by 8am of the day of class, and will become part of your participation grade). Note that papers on the syllabus that are not required reading (e.g., do not have a \*) are meant to be supplementary.
5. Summaries of ECON and/or AAE Seminars (5%): Seminars are an excellent opportunity for you to (i) engage with cutting edge research in AAE-related fields; (ii) learn how to structure and prepare an economics talk; and (iii) apply the microeconomics toolkit on the fly. I strongly encourage you to attend as many seminars as you can throughout your time in the graduate program. As part of this class, you are required to attend **at least 2** AAE and/or ECON seminars this semester. Within 24 hours of these seminars, you will be required to write and submit 1 healthy paragraph describing the following aspects of the paper presented:
  1. Its main research question(s)
  2. Its theoretical/empirical approach
  3. Its main conclusions
  4. Its strengths/weaknesses

AAE department seminars occur weekly on Fridays (12-1:15pm). [Schedule](#).  
ECON seminars occur throughout the week, but the seminars most likely relevant to this class include the Public seminars (Tuesdays at 3:45pm in Room 7142 Social Sciences, [Schedule](#)) and the Industrial Organization seminar (Wednesdays at 3:45pm in Room 7142 Social Sciences, [Schedule](#)). You must attend both seminars BEFORE the last day of class, May 1

6. Final Exam: 15%: There will be a take-home final exam that will cover the cumulative content of the course. The final will be posted on the last day of class and will be due May 6<sup>th</sup>.

## **Canvas.**

Class announcements, readings, and assignments will be posted on the course website on Canvas. All important announcements will be posted there.

## **Late Assignments and Missed Examinations:**

No late assignments will be accepted except in the case of documented medical or family emergency. The final exam will be take-home. Students are responsible for making sure, at the beginning of the term, that they can submit assignments and take the final exam. Registering for a course means that you certify that you will be available for the exam. 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.

## **Classroom etiquette.**

I value your presence in my class, and I want your classmates to feel the same way. I am requesting that you NOT eat/drink during class because it can be distracting. Please silence your cell phones and other electronic devices during class. If you need to respond to a text message or make a phone call, please leave the classroom before doing so.

## **Accommodations for Students with Disabilities.**

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy ([UW-855](#)) require the university to provide reasonable accommodations to students with disabilities to access and participate in its academic programs and educational services. Faculty and students share responsibility in the accommodation process. Students are expected to inform faculty of their need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations. Faculty will work either directly with the student or in coordination with the McBurney Center to provide reasonable instructional and course-related accommodations.

Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: [McBurney Disability Resource Center](#))

## **Academic Integrity.**

I do not tolerate academic misconduct. I will not hesitate to assign failing grades to students who do not fully comply with the University's academic misconduct policy (<http://www.students.wisc.edu/doso/academic-integrity/>.) If you find yourself contemplating cheating, plagiarism, or other forms of academic misconduct, please come see me first. Help is available if you are struggling. I want everyone in the class to try their best and to do their own work. Please be advised that I reserve the right to utilize anti-plagiarism resources when grading assignments.

**Mental and Emotional Health.** In the best of times, graduate school can be an incredibly stressful experience. University Health Services provides a number of useful resources for mental health (<https://www.uhs.wisc.edu/mental-health/>), and my door is always open should you need it. If a situation arises where you find yourself emotionally or physically unable to keep pace with our schedule, please do not hesitate to contact me and we can discuss how to best address the situation.

**Child/Dependent Care and the Classroom:** Arranging dependent care is a complicated process (I deeply sympathize). Should you find yourself suddenly without coverage during class time and still wanting to attend, please feel free to bring children or other dependents to lecture. Similarly, parents with infants in need of regular feedings are welcome to bring them to class. I ask only that you sit somewhere with easy

access to an exit such that, if a situation requires a hasty retreat, you can do so with minimum disruption. Out of consideration for your classmates, please do not bring in any dependents that are unwell.

All other Syllabus Statements apply! <https://guide.wisc.edu/courses/#SyllabusStatements>

### Course Schedule (subject to change)

| Date      | Module                         | Papers covered in class*       | Due                                  |
|-----------|--------------------------------|--------------------------------|--------------------------------------|
| T Jan 21  | Intro & Applied Micro Methods  |                                |                                      |
| R Jan 23  | Applied Micro Methods          | Angrist, J. D., & Pischke      |                                      |
| T Jan 28  | Public Goods & Property Rights | Stavins (2011)                 |                                      |
| R Jan 20  | Public Goods & Property Rights | Hornbeck (2010)                |                                      |
| T Feb 4   | Public Goods & Property Rights | Fier et al. (2024)             |                                      |
| R Feb 6   | Hedonics & Sorting             | Chay & Greenstone (2005)       |                                      |
| T Feb 11  | Hedonics & Sorting             | Christensen et al (2023)       |                                      |
| R Feb 13  | Hedonics & Sorting             | Heblich et al (2021)           |                                      |
| T Feb 18  | Environment & Health           | Currie & Niedell (2005)        |                                      |
| R Feb 20  | Environment & Health           | Clay, Lewis & Severnini (2024) |                                      |
| T Feb 25  | Environment & Health           | Hansen-Lewis & Marcus (2025)   |                                      |
| R Feb 27  | Environment & Health           | STUDENT LECTURE 1              | <i>Due: Referee Report</i>           |
| T Mar 4   | Catchup/Methods                |                                |                                      |
| R Mar 6   | No Class                       |                                |                                      |
| T Mar 11  | Transportation                 | Davis (2008)                   |                                      |
| R Mar 13  | Transportation                 | Anderson (2014)                |                                      |
| T Mar 18  | Transportation                 | Balboni (2025)                 | <i>Due: Choose replication paper</i> |
| R Mar 20  | Transportation                 | STUDENT LECTURE 2              |                                      |
| Mar 23-25 | SPRING BREAK                   |                                |                                      |
| T Apr 1   | Natural Disasters              | Deryugina (2017)               |                                      |
| R Apr 3   | Natural Disasters              | Hornbeck & Keniston (2017)     |                                      |
| T Apr 8   | Natural Disasters              | Kocornick et al. (2020)        |                                      |
| R Apr 10  | Natural Disasters              | STUDENT LECTURE 3              |                                      |
| T Apr 15  | Catchup/Replications           |                                |                                      |
| R Apr 17  | New Methods                    | Ito & Zhang (2020)             | <i>Due: Replications</i>             |

|          |             |                      |                                   |
|----------|-------------|----------------------|-----------------------------------|
| T Apr 22 | New Methods | Barwick et al (2024) |                                   |
| R Apr 24 | New Methods | STUDENT LECTURE 4    |                                   |
| T Apr 29 | New Methods | Toledo (2016)        |                                   |
| R May 1  | Catch Up    |                      | <i>Deadline to see 2 seminars</i> |

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## Replication Assignment

This project asks you to write an essay that reviews, replicates, and extends an empirical paper (approved by the instructor by mid-March at the latest) in one of the topics we cover in class. You must choose an empirical paper that has available data. It does not have to be on the reading list (in fact it would be preferable to choose something not on the reading list - choose something of interest to you!). At the risk of stating the obvious, you MAY NOT choose a paper on which you were a research assistant. Try to choose a paper for which the data source is pretty complete, i.e., it includes not only the processed data to produce the tables in the paper and code to go with them, but also clear documentation.

After the replication of the paper, it is highly desirable (although not necessary to receive full credit in certain circumstances) to make at least one sensible extension to the paper.

**Due March 18<sup>th</sup>:** Deadline to select your paper and to meet with me to approve your selection. Please come to the meeting having also located the data necessary for replication, and the replication code, if available.

**Due April 17<sup>th</sup>:** Final Essay and replication code (posted to Canvas)

### Details

Your essay should have three components, outlined below. Try to keep each section under 2 pages of writing, 1.5 spaced not including figures or tables (so in total your essay will be no more than 6 pages, excluding figures and tables and references).

#### *A. Overview*

- What question does the study ask, and why is this of economic interest? What are the most important findings in the paper?
- Describe an ideal research design for the question at hand. Is the work causal or descriptive? If the former, which assumptions support a causal interpretation of the results presented in your chosen paper? Are the econometric techniques used in the study likely to yield estimates with a causal interpretation? Are the results convincing?

#### *B. Replication*

- Identify the main findings and use the authors' data to replicate the published/working paper findings if possible. Note that you need only to replicate the main results of the paper, not all the tables.
- Summarize and compare your replication results to the original results, with original and replication results reported side-by-side in a single table. Highlight any differences. Explain why you think your results differ from the original (if they do).
- Post the code attached with your report to Canvas. This should include the construction from the raw data sets to the data set ready for analysis to the extent you have these data available.

#### *C. Extension\** (\*Required for papers that have replication code available).

Extend the work either by either:

- (a) estimating alternative specifications that may illuminate issues and questions raised by the paper (e.g., specification checks; subsamples of special interest; distributional effect)
- (b) OR: if available, start from the very raw data to produce different variables that the authors may have chosen to include (or a different way to compute some of their main outcomes)

## Resources

The product of this exercise is a short essay. Start polishing your writing skills now rather than the summer before you go on the job market. Learn to tell stories with numbers by imitating the good work of others. And as is increasingly required in economics as well, please submit a documented code to go with your results. Most top journals and top field journals have their data available for replication, at least within the last 2-3 years. The papers in the journals of the *American Economic Association* (AEA) have their data available for replication as of 2015 onward. That could be a good place to look for papers to replicate!

Please note most of your learning in this exercise will happen in the journey, not necessarily with the end result. Therefore, my evaluation of your replication will be heavily influenced by whether I can observe a good-faith effort from you, rather than your success in replicating the precise results of a paper.

## READING LIST:

### Applied Micro Basics:

\* Angrist, J. D., & Pischke, J. S. (2010). The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *Journal of economic perspectives*, 24(2), 3-30.

- Nevo, A., & Whinston, M. D. (2010). Taking the dogma out of econometrics: Structural modeling and credible inference. *Journal of Economic Perspectives*, 24(2), 69-82.
- See supplemental list from Louis Prenoas (on Canvas) for a longer list of methodological references

### Public Goods & Property Rights

\* Stavins, R. N. (2011). The problem of the commons: Still unsettled after 100 years. *American Economic Review*, 101(1), 81-108

\* Hornbeck, 2010. "Barbed Wire: Property Rights and Agricultural Development" *Quarterly Journal of Economics* 125(2), pp. 767-810.

\* Feir, Gillezaue, Jones "The Slaughter of the Bison and Reversal of Fortunes on the Great Plains" *ReStud 2024*

- Hardin, 1968. "The Tragedy of the Commons" *Science* 162(3859).
- Coase, Ronald H, "The Problem of Social Cost" *Journal of Law and Economics* (III) (1960)
- Ostrom, Elinor, "Coping with Tragedies of the Commons" *Annual Review of Political Science* 2 (1999), 493-535
- Ayers, Andrew B., Kyle C. Meng and Andrew J. Plantinga, "Do Environmental Markets Improve on Open Access? Evidence from California Groundwater Rights" *JPE*, 129(10) 2021
- Samuelson, 1954. "The Pure Theory of Public Expenditure" *Review of Economic Studies*, 26(4), November. Use Coate's notes on this in class

### The Environment & Sorting

\* Chay, Kenneth and Michael Greenstone (2005). "Does Air Quality Matter? Evidence from the Housing Market." *Journal of Political Economy*, 112(2)

\*Christensen, Peter, David A. Keiser, and Gabriel E. Lade. 2023. "Economic Effects of Environmental Crises: Evidence from Flint, Michigan." *American Economic Journal: Economic Policy*, 15 (1): 196–232

\*Heblich, S., Trew, A., & Zylberberg, Y. (2021). East-side story: Historical pollution and persistent neighborhood sorting. *Journal of Political Economy*, 129(5), 1508-1552

- Currie, Janet, Lucas Davis, Michael Greenstone, and Reed Walker. 2015. "Environmental Health Risks and Housing Values: Evidence from 1,600 Toxic Plant Openings and Closings." *American Economic Review*, 105 (2): 678–709.
- Muehlenbachs, Lucija, Elisheba Spiller, and Christopher Timmins. 2015. "The Housing Market Impacts of Shale Gas Development." *American Economic Review*, 105 (12): 3633–59.
- Davis, L. W. (2011). The effect of power plants on local housing values and rents. *Review of Economics and Statistics*, 93(4), 1391-1402

- Yu and Zhang (2023) “The Value of Waterways: Evidence from the Black-and-Smelly Water Program in China” Working Paper
- 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
- Coury, M., Kitagawa, T., Shertzer, A., & Turner, M. A. (2024). The value of piped water and sewers: Evidence from 19th century Chicago. *Review of Economics and Statistics*, 1-47.
- Bakkensen, L. A. and Ma, L. (2020). Sorting over flood risk and implications for policy reform. *Journal of Environmental Economics and Management*, page 102362

## Environment & Health

- \* Currie, J., & Neidell, M. (2005). Air pollution and infant health: what can we learn from California's recent experience?. *The quarterly journal of economics*, 120(3), 1003-1030.
- \* Clay, K., Lewis, J., & Severnini, E. (2024). Canary in a coal mine: infant mortality and tradeoffs associated with mid-20th century air pollution. *Review of Economics and Statistics*, 106(3), 698-711.
- \* Hansen-Lewis, J., & Marcus, M. M. (2025). Uncharted waters: Effects of maritime emission regulation. *American Economic Journal: Economic Policy* (forthcoming)

- Alsan, M., & Goldin, C. (2019). Watersheds in child mortality: The role of effective water and sewerage infrastructure, 1880–1920. *Journal of Political Economy*, 127(2), 586-638
- Currie, Janet, John Voorheis, and Reed Walker. 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.
- Clay, K., Lewis, J., & Severnini, E. (2018). Pollution, infectious disease, and mortality: Evidence from the 1918 Spanish influenza pandemic. *The Journal of Economic History*, 78(4), 1179-1209.
- Galiani, S., Gertler, P., & Schargrodsky, E. (2005). Water for life: The impact of the privatization of water services on child mortality. *Journal of political economy*, 113(1), 83-120.
- Ebenstein, A. (2012). The consequences of industrialization: evidence from water pollution and digestive cancers in China. *Review of Economics and Statistics*, 94(1), 186-201.
- Ariaster B. Chimeli and Rodrigo R. Soares. 2017. "The Use of Violence in Illegal Markets: Evidence from Mahogany Trade in the Brazilian Amazon." *American Economic Journal: Applied Economics* 9 (4): 30–57.

## Transportation

- \* Davis, Lucas (2008). The effect of driving restrictions on air quality in Mexico City. *Journal of Political Economy*, 116(1), 38-81.
- \* Anderson, Michael L. 2014. "Subways, Strikes, and Slowdowns: The Impacts of Public Transit on Traffic Congestion." *American Economic Review*, 104 (9): 2763–96.
- \* Balboni, Clare. 2025. "In Harm's Way? Infrastructure Investments and the Persistence of Coastal Cities." *American Economic Review*, 115 (1): 77–116.
- Li, Shanjun. (2018). Better lucky than rich? Welfare analysis of automobile licence allocations in Beijing and Shanghai. *The Review of Economic Studies*, 85(4), 2389-2428.

- Severen, C., & Van Benthem, A. A. (2022). Formative experiences and the price of gasoline. *American Economic Journal: Applied Economics*, 14(2), 256-284
  - [LPM, Panel FE](#)
- Hanna, R., Kreindler, G., & Olken, B. A. (2017). Citywide effects of high-occupancy vehicle restrictions: Evidence from “three-in-one” in Jakarta. *Science*, 357(6346), 89-93
- Wolff, H. (2014). Value of time: Speeding behavior and gasoline prices. *Journal of Environmental Economics and Management*, 67(1), 71-88.
- Burchfield, M., Overman, H. G., Puga, D., & Turner, M. A. (2006). Causes of sprawl: A portrait from space. *The Quarterly Journal of Economics*, 121(2), 587-633.
- Henderson, J. V., Squires, T., Storeygard, A., & Weil, D. (2018). The global distribution of economic activity: nature, history, and the role of trade. *The Quarterly Journal of Economics*, 133(1), 357-406
- Asher, S., Garg, T., & Novosad, P. (2020). The ecological impact of transportation infrastructure. *The Economic Journal*, 130(629), 1173-1199
- Busse, M. R., & Keohane, N. O. (2007). Market effects of environmental regulation: coal, railroads, and the 1990 Clean Air Act. *The RAND Journal of Economics*, 38(4), 1159-1179.

## Natural Disasters

\* Hornbeck , Richard and Daniel Keniston. 2017. Creative destruction: Barriers to urban growth and the Great Boston Fire of 1872. *American Economic Review*, forthcoming

\* Deryugina, T. (2017). The fiscal cost of hurricanes: Disaster aid versus social insurance. *American Economic Journal: Economic Policy*, 9(3):168–98.

\* Kocornik-Mina, Adriana, Thomas K. J. McDermott, Guy Michaels, and Ferdinand Rauch. 2020. "Flooded Cities." *American Economic Journal: Applied Economics*, 12 (2): 35–66.

- Bakkensen, L. A. and Ma, L. (2020). Sorting over flood risk and implications for policy reform. *Journal of Environmental Economics and Management*, page 102362
- Boustan, L. P., Kahn, M. E., Rhode, P. W., and Yanguas, M. L. (2020). The effect of natural disasters on economic activity in us counties: A century of data. *Journal of Urban Economics*, 118.
- Davis, D. R. and Weinstein, D. E. (2002). Bones, bombs, and break points: the geography of economic activity. *American Economic Review*, 92(5):1269–1289
- Ortega, F., & Taşpınar, S. (2018). Rising sea levels and sinking property values: Hurricane Sandy and New York’s housing market. *Journal of Urban Economics*, 106, 81-100
- Young, R., & Hsiang, S. (2024). Mortality caused by tropical cyclones in the United States. *Nature*, 1-8.

## New Approaches & Topics in Environmental

### i. *Valuation & Welfare:*

\* Ito, Koichiro and Shuang Zhang. “Willingness to Pay for Clean Air: Evidence from Air Purifier Markets in China” *The Journal of Political Economy*. May 2020.

- Gabriel E. Kreindler. 2023. “Peak-Hour Road Congestion Pricing: Experimental Evidence and Equilibrium Implications.” *Econometrica*: forthcoming
- Gianmarco León and Edward Miguel. 2017. “Risky Transportation Choices and the Value of a Statistical Life.” *American Economic Journal: Applied Economics* 9 (1): 202–228.

- [Frank, Eyal. The economic impacts of ecosystem disruptions: Costs from substitution biological pest control. \*Science\*, 385, eadg0344, 2024](#)

ii. *Remote Sensing / "Big" Data / Administrative Data*

\* Barwick, Panle Jia, Shanjun Li, Liguang Lin, and Eric Zou. "From Fog to Smog: The Value of Pollution Information", *American Economic Review*, May 2024

- "Unwatched Pollution: The Effect of Intermittent Monitoring on Air Quality" Eric Zou *American Economic Review*, July 2021
- Grant, Laura and Matthew Kotchen, "Does Daylight Saving Time Save Energy? Evidence from a Natural Experiment in Indiana" *Review of Economics and Statistics*, Nov 2011
- Burgess, Robin, Francisco Costa and Benjamin Olken. 2023. "National Borders and the Conservation of Nature". Working Paper.
- Gertler, Shelef, Wolfram and Fuchs. 2016. "The Demand for Energy-Using Assets among the World's Rising Middle Classes", *American Economic Review*, vol 106(6).

iii. *Experimental Design*

\* Toledo, Chantal. 2016. "Do Environmental Messages Work on the Poor? Experimental Evidence from Brazilian Favelas." *Journal of the Association of Environmental and Resource Economists* 3 (1): 37–83.

- Esther Duflo, Michael Greenstone, Rohini Pande, and Nicholas Ryan. 2013. "Truth-telling by Third-party Auditors and the Response of Polluting Firms: Experimental Evidence from India." *Quarterly Journal of Economics* 128 (4).
- Kenneth Lee, Edward Miguel, and Catherine Wolfram. 2020. "Experimental Evidence on the Economics of Rural Electrification." *Journal of Political Economy* 128 (4): 1523–1565
- Andres Gonzalez-Lira and Ahmed Mushfiq Mobarak. 2024. "Slippery Fish: Enforcing Regulation when Agents Learn and Adapt." Working Paper.