

## **ECON 733a ENV 908a: URBAN AND ENVIRONMENTAL ECONOMICS**

Costas Arkolakis and Mushfiq Mobarak  
Yale University, Fall Semester, 2024

### **Instructors:**

Costas Arkolakis. Office: 28 Hillhouse Ave, Room A306

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Class time: Mon, Wed 09:00 - 10:20.

### **Class location:**

TBD

### **Office hours:**

Arkolakis: Mon 17:30-18:30

Mobarak: By appointment (please email)

### **Description of the course**

A Ph.D. field course covering latest research topics in urban economics and in environmental and energy economics. Topics include the links between urban planning and city productivity and livability, infrastructure investments in electrification and water management, managing externalities, environmental regulation, and the effects of climate change in cities and in rural areas.

Prerequisites: Instructor's consent. If you are not a current Ph.D. student, please email or speak to the instructors to enroll.

### **Readings**

Most of the readings are journal articles and working papers. We will also share slides on Canvas. We will share relevant parts of the manuscript "Modern Spatial Economics" by Allen and Arkolakis. For background reading you can also consult (but not required to)

1. Fujita, Krugman, and Venables. Spatial Economics. MIT Press. 2001.
2. Squires, Graham. Urban and environmental economics: An introduction. Routledge, 2012.

### **Grading**

The primary requirement for this class is a term paper on a topic related to either urban or environmental economics. Since this course is aimed at Ph.D. students, we expect this paper to be the equivalent of a solid "research proposal" of 10-15 pages for original research that can be turned into an academic journal article or a dissertation chapter in the future. A good research proposal will review the literature and identify gaps that such a paper would fill, explain the research or policy motivation for the chosen topic, the importance and relevance of the research question, and present a research strategy to answer that question. A research strategy could consist of data sources, empirical facts, and an "identification strategy" for empirical work, or the outline of a model for theoretical work. 15 pages with standard size font (e.g. Times New Roman 12) and standard spacing (e.g. 32 lines per page) is the absolute maximum for this term paper. There is no minimum length,

but we suspect a complete proposal would be at least 10 pages in length. We encourage you to start developing your research idea early in the semester, and to talk to either professor about it to get feedback. We have scheduled one class session (**Monday, Oct 21**) to have students make very short presentations on their research proposals, so that the professors can provide feedback.

Other than that, we will informally monitor attendance and class participation. And you will be assigned one paper to write a 1-page referee report on, where you will have to summarize a published research paper, and critically analyze its strengths and weaknesses.

Grading: 70% term paper (research proposal), 15% referee report, 15% class participation

### **Academic Integrity**

The following statement, which we endorse, was composed at the Yale Graduate School: "Academic integrity is a core institutional value at Yale. It means, among other things, truth in presentation, diligence and precision in citing works and ideas we have used, and acknowledging our collaborations with others. In view of our commitment to maintaining the highest standards of academic integrity, the Graduate School Code of Conduct specifically prohibits the following forms of behavior: cheating on examinations, problem sets and all other forms of assessment; falsification and/or fabrication of data; plagiarism, that is, the failure in a dissertation, essay or other written exercise to acknowledge ideas, research, or language taken from others; and multiple submission of the same work without obtaining explicit written permission from both instructors before the material is submitted. Students found guilty of violations of academic integrity are subject to one or more of the following penalties: written reprimand, probation, suspension (noted on a student's transcript) or dismissal (noted on a student's transcript)."

### **Course Calendar**

We have provided a tentative list of topics and readings below. Please treat this as a "living document" that will be edited over the course of the semester. Especially the topics and readings in the second half of class (after mid-October) may change during the first half of the semester.

Date	Professor	Topic	Notes
Wed, Aug 28	Arkolakis	introduction: facts on spatial economics and the environment	
Fri, Aug 30	Mobarak	Introduction: Technology Adoption and Behavior Change in Environmental Economics	
Wed, Sept 4	Arkolakis	The basic urban model	
Mon, Sept 9	Mobarak	Methods: Empirical Inference and Design of Randomized Controlled Trials (RCT)	
Wed, Sep 11	Mobarak	Methods: RCT Design Choices and measuring externalities	

Mon, Sep 16	Arkolakis	Modeling Environmental Externalities: CO2, Pollution, Abatement	
Wed, Sept 18	Arkolakis	Basic Migration and Commuting Model	
Mon, Sept 23	Arkolakis	Microeconomic Effects of Climate Change	
Wed, Sept 25	Arkolakis	Macroeconomic Effects of Climate Change	
Mon, Sept 30	Arkolakis	<b><i>Guest Lecture on Fisheries from Elliot Kang</i></b>	
Wed, Oct 2	Arkolakis	A Framework for Natural Resources: Land and Resource Extraction	
Mon, Oct 7	Arkolakis	Natural Resources III: Land, Water, Forests, Biodiversity etc	
Wed, Oct 9		<b><i>Guest Lecture on Remote Sensing by Karen Seto</i></b>	
Mon, Oct 14	Arkolakis	Renewable Growth, Energy Production and Electrification	
Mon, Oct 21	Mobarak and Arkolakis	<b><i>Feedback session on student research</i></b>	<i>Be prepared to make a short presentation of your early stage research idea!</i>
Wed, Oct 23	Arkolakis	Industry Decarbonization	
Mon, Oct 28		<b><i>Guest Lecture on Electrification by Nick Ryan</i></b>	
Wed, Oct 30	Arkolakis	Transportation	
Mon, Nov 4	Mobarak	Methods: The Science of Scaling Interventions	
Wed, Nov 6	Mobarak	Rural - Urban Wage Gaps	
Mon, Nov 11	Mobarak	Research Agenda on Internal Migration	
Wed, Nov 13	Mobarak	Effects of Migration Restrictions in China: Interactions with Pollution, effects on Children	
Mon, Nov 18	Mobarak	Conditional Cash Transfers for Conservation	
Wed, Nov 20	Mobarak	Collective Action, Demand Interlinkages and Spillover Effects	
Mon, Dec 2	Mobarak	Measuring Environmental Externalities	
Wed, Dec 4	Mobarak	Implementing Environmental Regulations	
Mon, Dec 9	Mobarak	Developing a Research Agenda on Climate Change.	

If we have time...	Mobarak	Empirical Research on Deforestation	
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## TENTATIVE TOPICS and LECTURE DATES

1. (8/28 ARKOLAKIS) INTRODUCTION FACTS ON SPATIAL ECONOMICS AND THE ENVIRONMENT
  - Climate Change around the World, Krusell, Smith Jr., 2022. NBER working paper.
  - The Economics of Tropical Deforestation, Balboni, Berman, Burgess, A.Olken, 2022. Working paper.
  - Clean Growth, Arkolakis, Walsh, working paper
  - Global Land Use Changes are Four Times Greater than Previously Estimated, Winkler, Fuchs, Rounsevell, Herold, 2021. Nature Communications.
  - Estimated Carbon Dioxide Emissions from Tropical Deforestation Improved by Carbon-Density Maps, Baccini et al., 2012. Nature Climate Change, 2(3), pp. 182-185.
  - Effects of Tropical Deforestation on Climate and Agriculture, Lawrence, Vandecar, 2014. Nature Climate Change, vol 5, pp 27 - 36.
2. (8/30 MOBARAK) INTRODUCTION: TECHNOLOGY ADOPTION AND BEHAVIOR CHANGE IN ENVIRONMENTAL ECONOMICS
  - A. M. Mobarak and N. Saldanha, "Remove Barriers to Technology Adoption for People in Poverty", *Nature: Human Behavior*, March 28, 2022, <https://www.nature.com/articles/s41562-022-01323-9>, Paper
  - "Sure, we can build a better toilet, but will people use it?" *Wired Science News*, August 17, 2012, <http://www.wired.com/wiredscience/2012/08/gates-foundation-toilets/>
  - "What Cookstoves Tell us about the Limits of Technology," *The Washington Post*, May 8, 2012. [http://www.washingtonpost.com/blogs/wonkblog/post/what-cook-stoves-tell-us-about-the-limits-of-technology/2012/05/08/gIQAApp8YAU\\_blog.html](http://www.washingtonpost.com/blogs/wonkblog/post/what-cook-stoves-tell-us-about-the-limits-of-technology/2012/05/08/gIQAApp8YAU_blog.html)
3. (9/4 ARKOLAKIS) THE BASIC URBAN MODEL
  - Fujita, Krugman, and Venables textbook Chapter 1-3
  - Glaeser, E. L., and J. D. Gottlieb "The economics of place-making policies", Brookings Papers on Economic Activity, 2008
  - Kline, Patrick, and Enrico Moretti. "Local economic development, agglomeration economies, and the big push: 100 years of evidence from the Tennessee Valley Authority." *The Quarterly journal of economics* 129.1 (2014): 275-331.
  - Allen, Treb, and Costas Arkolakis. "Economic Activity across Space." *The Journal of Economic Perspectives* 37.2 (2023): 3-28.
4. (9/9 AND 9/11 MOBARAK) METHODS: EMPIRICAL INFERENCE AND DESIGN OF RANDOMIZED CONTROLLED TRIALS (RCT)
  - E. Duflo, R. Glennerster and M. Kremer (2008). "Using Randomization in Development Economics Research," <http://www.nber.org/papers/t0333.pdf>
  - Blattman, Christopher and Dercon, Stefan, "The Impacts of Industrial and Entrepreneurial Work on Income and Health: Experimental Evidence from Ethiopia" *American Economic Journal: Applied Economics*, 2018 <https://ssrn.com/abstract=2843595>

- Lee, Miguel and Wolfram, “Experimental Evidence on the Demand for and Costs of Rural Electrification,” *Journal of Political Economy* 128(4), <http://www.nber.org/papers/w22292>
- Hunt Allcott, “Site Selection Bias in Program Evaluation,” *Quarterly Journal of Economics*, Vol. 130, No. 3 (August 2015), pages 1117-1165.
- Angus Deaton, “Instruments of Development,” [www.nber.org/papers/w14690](http://www.nber.org/papers/w14690)

Videos about evaluation and randomization:

1. <http://vimeo.com/92748374>
2. <http://vimeo.com/92939095>

5. (9/16 ARKOLAKIS) MODELING ENVIRONMENTAL EXTERNALITIES: CO<sub>2</sub>, POLLUTION

- Nordhaus, W. (2007). To tax or not to tax: The case for a carbon tax. *Review of Environmental Economics and Policy*, 1, 26–44.
- The Economic Geography of Global Warming, Cruz, Rossi-Hansberg, 2022. NBER working paper.
- Krusell, Per, and Anthony A. Smith Jr. Climate change around the world. No. w30338. National Bureau of Economic Research, 2022.
- Bilal, Adrien, and Esteban Rossi-Hansberg. *Anticipating Climate Change Across the United States*. No. w31323. National Bureau of Economic Research, 2023.
- Nath, Ishan B., Valerie A. Ramey, and Peter J. Klenow. How Much Will Global Warming Cool Global Growth?. Working paper, 2023.
- Copeland, B. R., J. S. Shapiro, and M. S. Taylor. "Globalization and the environment, handbook of International Economics, forth, 2021.

6. (9/18 ARKOLAKIS) THE BASIC MIGRATION AND COMMUTING MODEL

- Ahlfeldt, Gabriel M., et al. "The economics of density: Evidence from the Berlin Wall." *Econometrica* 83.6 (2015): 2127-2189.
- Bryan, Gharad, and Melanie Morten. "The aggregate productivity effects of internal migration: Evidence from Indonesia." *Journal of Political Economy* 127.5 (2019): 2229-2268.
- Christoph Albert, Paula Bustos, and Jacopo Ponticelli, 2023, The Effects of Climate Change on Labor and Capital Reallocation, mimeo

7. (9/23, 9/25 ARKOLAKIS) Microeconomic and Macroeconomic Effects of Climate Change

- Nath, Ishan B., Valerie A. Ramey, and Peter J. Klenow. How much will global warming cool global growth?. No. w32761. National Bureau of Economic Research, 2024.
- Bilal, Adrien, and Diego R. Känzig. The Macroeconomic Impact of Climate Change: Global vs. Local Temperature. No. w32450. National Bureau of Economic Research, 2024.
- An optimal transition path for controlling greenhouse gases". *Science* 258.5086, pp. 1315–1319.
- Dell, Melissa, Benjamin F. Jones, and Benjamin A. Olken (2012). "Temperature shocks and economic growth: Evidence from the last half century". *American Economic Journal: Macroeconomics* 4.3, pp. 66–95.
- Dell, Melissa, Benjamin F. Jones, and Benjamin A. Olken (2014). "What Do We Learn from the Weather? The New Climate–Economy Literature". *Journal of Economic Literature* 52.3, pp. 740–798.
- Burke, Marshall, Solomon M. Hsiang, and Edward Miguel (2015). "Global non-linear effect of temperature on economic production". *Nature* 527.7577, pp. 235–239

8. (9/30 ARKOLAKIS) A FRAMEWORK FOR LAND USE and RESOURCE EXTRACTION
  - Costinot, Arnaud, Dave Donaldson, and Cory Smith. "Evolving comparative advantage and the impact of climate change in agricultural markets: Evidence from 1.7 million fields around the world." *Journal of Political Economy* 124.1 (2016): 205-248.
  - Farokhi, Farid, Elliot Kang, Heitor Pellegrina, and Sebastian Sotelo "Deforestation: A Global and Dynamic Perspective", 2023, mimeo
  - Clare Balboni, Robin Burgess, and Benjamin A. Olken, "The Origins and Control of Forest Fires in the Tropics", 2023, mimeo
  - Grosset, Florian, Anna Papp, and Charles Taylor. "Rain Follows the Forest: Land Use Policy, Climate Change, and Adaptation." *Climate Change, and Adaptation* (January 26, 2023) (2023).
  - Useful publicly available data <https://ghsl.jrc.ec.europa.eu/> (granular population, structures, building heights, urbanization etc), <https://dataforgood.facebook.com/dfg/tools> (infrastructures, population, connectivity, social connections, wealth, public insights).
  
9. (10/2, 10/7 ARKOLAKIS) ENVIRONMENTAL RESOURCES. WATER, BIODIVERSITY, FOREST, WASTE MANAGEMENT etc. REMOTE SENSING DATA
  - Nath, Ishan, Tamma, "Agriculture, Trade, and the Spatial Efficiency of Global Water Use", 2023, mimeo
  - Kim, Jihee, et al. "The Economic Costs of Trade Sanctions: Evidence from North Korea." Available at SSRN 4032573 (2022).
  - Donghyun Ahn, Jeasurk Yang, Sungwon Han, Sungwon Park, Susang Lee, Jihee Kim, Sangyoon Park, Hyunjoo Yang, and Meeyoung Cha, "Measuring economic development in North Korea: Human-machine collaboration using satellite imagery", *Nature Communications* forthcoming
  - Arkolakis, Costas, Jose-Antonio Espin-Sanchez, Anton Yang, and Conor Walsh, "Deep Waters", 2023, mimeo
  - Fenichel, E.P., Abbott, J.K., Yun, S.D., 2018. The nature of natural capital and ecosystem income, in: Smith, V.K., Dasgupta, P., Pattanayak, S. (Eds.), *Handbook of Environmental Economics North Holland*, pp. 85-142.
  - Barbier, E.B., 2013. Wealth accounting, ecological capital and ecosystem services. *Environ. Devel. Econ.* 18, 133-161.
  - Dasgupta, P., 2014. Measuring the wealth of nations. *Annu Rev of Res Econ* 6, 17-31.
  - Eli P. Fenichel and Joshua K. Abbott, *Journal of the Association of Environmental and Resource Economists* 2014 1:1/2, 1-27
  - Arrow, K., Dasgupta, P., Goulder, L., Daily, G., Ehrlich, P., Heal, G., Levin, S., Maler, K.-G., Schneider, S., Starrett, D., Walker, B., 2004. Are we consuming too much? *J Econ Perspect* 18, 147-172.
  - Nordhaus, W.D., Tobin, J., 1973. Is Growth Obsolete, *Economic Research: Retrospect and Prospect*. National Bureau of Economic Research, pp. 1-80.
  - Espin-Sanchez and Donna, 2018, "Complements and Substitutes in Sequential Auctions: The Case of Water Auctions," *The RAND Journal of Economics*, 2018, Vol. 49, No. 1, pp 87-127.
  - Espin-Sanchez and Donna, 2023, "The Illiquidity of Water Markets: Efficient Institutions for Water Allocation in Southeastern Spain," working paper
  - Espin-Sanchez and Truffa, 2023, "Playing Checkers in Chinatown," working paper
  - Rafey, 2023, "Droughts, Deluges, and (River) Diversions: Valuing Market-Based Water Reallocation," *American Economic Review*, 2023, Vol. 113, No. 2, pp. 430-471.
  - Kong, 2023, "Liquid Markets: An Empirical Analysis of a Water Exchange," working paper.

10. (10/9, GUEST LECTURE) GUEST LECTURE BY PROFESSOR KAREN SETO, YALE SCHOOL OF ENVIRONMENT
11. (10/14 ARKOLAKIS) RENEWABLE GROWTH, ELECTRIFICATION, CLEAN INNOVATION
  - Arkolakis, Costas, and Conor Walsh. "Clean Growth." (2022).
  - Van Reenen et al.
  - Ryan, Nicholas. Energy productivity and energy demand: Experimental evidence from Indian manufacturing plants. No. w24619. National Bureau of Economic Research, 2018.
  - Garcia-Lembergman, Ramondo, Rodriguez-Clare, and Shapiro. "The Carbon Footprint of Multinational Production"
  - Xiang, Wei "Clean Growth and Environmental Policies in the Global Economy", 2023
12. (10/9, GUEST LECTURE) GUEST LECTURE BY PROFESSOR KAREN SETO, YALE SCHOOL OF ENVIRONMENT
  - Remote Sensing: Using and interpreting satellite images for economics research
13. (10/21, MOBARAK AND ARKOLAKIS) FEEDBACK SESSION FOR STUDENT PAPERS
14. (10/23 ARKOLAKIS) INDUSTRY DECARBONIZATION
  - TBD
15. (10/28 GUEST LECTURE) GUEST LECTURE BY PROFESSOR NICHOLAS RYAN
  - Energy Markets in Developing Countries
16. (10/30 ARKOLAKIS) TRANSPORTATION
  - Allen, Treb, and Costas Arkolakis. "Trade and the Topography of the Spatial Economy." The Quarterly Journal of Economics 129.3 (2014): 1085-1140.
  - Allen, Treb, and Costas Arkolakis. "The welfare effects of transportation infrastructure improvements." The Review of Economic Studies 89.6 (2022): 2911-2957.
  - Fajgelbaum, Pablo D., and Edouard Schaal. "Optimal transport networks in spatial equilibrium." Econometrica 88.4 (2020): 1411-1452.
  - Tsivanidis, Nick. Evaluating the impact of urban transit infrastructure: Evidence from bogota's transmilenio. UC Berkeley (mimeo), 2020
  - Barwick, Panle Jia, et al. Efficiency and equity impacts of urban transportation policies with equilibrium sorting. No. w29012. National Bureau of Economic Research, 2021.
  - Wong, Woang Foong and Simon Fuchs, "Multimodal Transport Networks", 2022, mimeo.
  - Brancaccio, Giulia, Myrto Kalouptsidi, and Theodore Papageorgiou. "Geography, transportation, and endogenous trade costs." Econometrica 88.2 (2020): 657-691.
  - Conwell, Lucas, Subways or Minibuses? Privatized Provision of Public Transit, 2022, mimeo
  - Gillingham, Kenneth, et al. "Equilibrium trade in automobiles." Journal of Political Economy 130.10 (2022): 2534-2593.
17. (11/4 MOBARAK) Methods: The Science of Scaling Interventions
  1. A. M. Mobarak and M. Rosenzweig. "Risk, Insurance and Wages in General Equilibrium" [Paper](#)
  2. C. A. Davis and A. M. Mobarak, "The Challenge of Scaling Effective Interventions: A Path Forward for Research and Policy," *World Development*, v 127, March 2020 [Paper](#)

3. A. M. Mobarak, "Assessing social aid: the scale-up process needs evidence, too" *Nature*, vol. 609, pp. 892-894 (September 29, 2022), <https://www.nature.com/articles/d41586-022-03039-2>

18. (11/6 MOBARAK) Rural-Urban Wage Gaps

- Gollin, D., Lagakos, D., & Waugh, M. E. (2013). The agricultural productivity gap. *Quarterly Journal of Economics*, 129(2), 939-993.
- Hicks, J. H., Kleemans, M., Li, N. Y., & Miguel, E. (2017). *Reevaluating Agricultural Productivity Gaps with Longitudinal Microdata* (No. w23253). National Bureau of Economic Research.
- Lagakos, S. Marshall, A. M. Mobarak, C. Vernot and M. Waugh, "Migration Costs and Observational Returns to Rural-Urban Migration in the Developing World," *Journal of Monetary Economics*, [Paper](#)
- Alwyn Young. "[Inequality, the Urban-Rural Gap, and Migration.](#)" *Quarterly Journal of Economics* 128 (November 2013): 1727-1785. [Appendix](#)

19. (11/11 MOBARAK) Internal Migration

- G. Bryan, S. Chowdhury and A. M. Mobarak, "Under-Investment in a Profitable Technology: The Case of Seasonal Migration in Bangladesh," *Econometrica*, 82(5): 1671-1748, September 2014 [Paper](#) [\[Supplement\]](#), [Data Repository/Replication Code](#)
- C. Meghir, A. M. Mobarak, C. Mommaerts, M. Morten, "Migration and Informal Insurance," *Review of Economic Studies*, [Paper](#)
- D. Lagakos, A.M. Mobarak, M.E. Waugh, "The Welfare Effects of Encouraging Rural-Urban Migration," *Econometrica* 2022 [Paper](#) [Data and Code](#)

20. (11/13 MOBARAK) Effects of Migration Restrictions in China: Pollution and Child Development

- G. Khanna, W. Liang, A. M. Mobarak, R. Song, "The Productivity Consequences of Pollution-Induced Migration in China," *American Economic Journal: Applied Economics*, [Paper](#) | [Policy Brief](#)
- X. Gao, W. Liang, A. M. Mobarak, R. Song, "Daughters Left Behind: How Trade Liberalization Harms Girls in China when Government Restricts Migration," [Paper](#)

21. (11/18 MOBARAK) Conditional Cash Transfers for Conservation

- S. Jayachandran, J. De Laat, E. Lambin, C. Stanton, R. Audy, and N. Thomas, [Cash for Carbon: A Randomized Trial of Payments for Ecosystem Services to Reduce Deforestation](#) *Science*, July 2017, vol 357(6348), pp. 267-273. [\[Supplementary material\]](#)
- S. Baird, C. McIntosh and B. Ozler, "Cash or Condition? Evidence from a Cash Transfer Experiment," *Quarterly Journal of Economics* 2011.
- Alatas, V., Banerjee, A., Hanna, R., Olken, B. A., Purnamasari, R., & Wai-Poi, M. (2013). Ordeal mechanisms in targeting: Theory and evidence from a field experiment in Indonesia, *Journal of Political Economy*, 124 (2) <https://www.nber.org/papers/w19127>
- G. Bryan, S. Chowdhury, A.M. Mobarak, M. Morten, J. Smits, "Encouragement and distortionary effects of conditional cash transfers," *Journal of Public Economics* [Paper](#)



22. (11/20 MOBARAK). Collective Action, Demand Interlinkages and Spillover Effects
- Crépon, B., Duflo, E., Gurgand, M., Rathelot, R., & Zamora, P. (2013). Do labor market policies have displacement effects? Evidence from a clustered randomized experiment. *The Quarterly Journal of Economics*, 128(2), 531-580.
  - Kremer and Miguel, "Worms," *Econometrica*, 2004, 72 (1), 159-217  
[http://elsa.berkeley.edu/~emiguel/pdfs/miguel\\_worms.pdf](http://elsa.berkeley.edu/~emiguel/pdfs/miguel_worms.pdf)
  - R. Guiteras, J. Levinsohn, A. M. Mobarak. "Demand Estimation with Strategic Complementarities: Sanitation in Bangladesh" [Paper](#)
  - M. Bakhtiar, R. Guiteras, J. Levinsohn, A.M. Mobarak, "Social and Financial Incentives for Overcoming a Collective Action Problem," *Journal of Development Economics*, Volume 162, May 2023, <https://doi.org/10.1016/j.jdeveco.2023.103072> | [Paper](#)
23. (12/2 MOBARAK). Measuring Environmental Externalities
- M. Lipscomb and A. M. Mobarak, "Decentralization and Pollution Spillovers: Evidence from the Re-drawing of County Borders in Brazil," *Review of Economic Studies*, 84 (1): 464-502, January 2017 [Paper](#) [Online Appendix](#)
  - Dipoppa and Gulzar, "Administrative Incentives Impact Crop-Residue Burning and Health in South Asia", [https://www.dropbox.com/s/tk1l05y6ozecvc9/Dipoppa\\_Gulzar.pdf?raw=1](https://www.dropbox.com/s/tk1l05y6ozecvc9/Dipoppa_Gulzar.pdf?raw=1)
  - He, Guojun, Shaoda Wang, and Bing Zhang. "[Watering Down Environmental Regulation in China](#)," *Quarterly Journal of Economics*, 2020, 135(4): 2315-2385.
  - Ryan and Sudarshan, "Rationing the Commons" *Journal of Political Economy* (2022), 130 (1): 210-257. <https://www.nber.org/papers/w27473.pdf>
24. (12/4 MOBARAK) Implementing Environmental Regulations
- A. G. Lira and A. M. Mobarak, "Slippery Fish: Enforcing Regulation when Agents Learn and Adapt," *Journal of the European Economic Association*, [Paper](#) | [Policy Brief](#) | [Audio Summary](#)
25. (12/9 MOBARAK). Developing a Research Agenda on Climate Change
- The Climate Impact Lab, <https://impactlab.org/>
  - Desmet and Rossi-Hansberg, "[On the Spatial Economic Impact of Global Warming](#)," *Journal of Urban Economics*, 2015, 88,16-37. Coverage in The [Economist](#). Related [Vox](#) column.
  - Conte, Desmet, Nagy, Rossi-Hansberg "[Local Sectoral Specialization in a Warming World](#)," *Journal of Economic Geography*, 2021, 21, 493-530. Related VoxEU [column](#). Further [coverage in](#) Vox. CEPR e-book on [combating climate change](#).
26. (if we have time..MOBARAK) Deforestation
- Clare Balboni, Aaron Berman, Robin Burgess, Ben Olken. "The Economics of Tropical Deforestation". *Annual Review of Economics*
  - Balboni, Burgess, Olken "The Origins and Control of Forest Fires in the Tropics," May 2023, *Review of Economic Studies*.
  - J. Assunção, M. Lipscomb, A. M. Mobarak, D. Sberman, "Agricultural Productivity and Deforestation: Evidence from Brazil" [Paper](#)
  - Burgess, Hansen, Olken, Potapov, Sieber) "The Political Economy of Deforestation in the Tropics" *Quarterly Journal of Economics*, vol 127, issue 4, November 2012, pp. 1707-1754.

