

Frontiers in Environmental & Natural Resource Economics 1
AAE 760
Spring 2017

Instructor:

Dominic Parker
Department of Agricultural and Applied Economics
Taylor Hall, Room 413
dparker5@wisc.edu

Class Meetings:

Tuesday and Thursday, 1:00 – 2:15 p.m., Taylor Hall B30

Office Hours:

Wednesday 2 to 3 pm, or by appointment.

Class Website:

We will use Learn@UW. Check regularly for announcements, readings, assignments, etc.

Course Description:

This course examines the operation of markets for natural resources, including fish, wildlife, water, minerals, land and fossil fuels. Special emphasis will be given to the role that resource governance and regulation plays in affecting resource use. The course is slightly multi-disciplinary because a basic understanding of natural science processes and property law are necessary for economic analysis. For this reason, the readings present simple biological models for studying fisheries, wildlife, and forests and incorporate geological and hydrologic concepts in examining minerals and water. The readings also describe ownership rights to resources, which often are not clearly defined. In these cases the interests of some potential resource users will not be reflected in market outcomes and the scramble or “race” to acquire un-owned resources is often wasteful. Because the use of some natural resources is ultimately linked to the release of waste into the environment, there are also considerations of environmental degradation that result from incomplete ownership. We will encounter these themes throughout the course.

The readings and lectures will introduce the tools of resource economics, which differ from standard microeconomics because of the stronger emphasis on dynamic optimization. Important concepts include *open access*, *commons*, *anticommons*, *steady state*, *maximum sustained yield*, and *discounting*. Important tools include analytical models of optimal control and numerical simulation.

Even though the reading list is comprehensive, it naturally omits some important articles, volumes, or reports. As you note these omissions, please let me know. Some of the material on the list is required reading while other articles are supplemental. This does not imply that the latter is less critical, but only that we have just one semester and a LOT to cover.

Textbooks

Conrad, Jon M. 2010. *Resource Economics*, Cambridge University Press.

Conrad, Jon M. and Colin W. Clark. 1987. *Natural Resource Economics: Notes and Problems*, Cambridge University Press.

The Conrad and Clark book focuses on modelling methods, and spends relatively little time with institutional details or discussion of resource industries and policy issues. These topics will be treated in readings from journals and other books. The Conrad *Resource Economics* book is similar to Conrad and Clark, but a bit less technical in terms of modeling. It allocates more of the book to discussing resource industries and policies and a fair amount of attention is given to simulation exercises.

Grading and Course Structure:

Reading and participation	40 %
Occasional problem sets	30 %
Research paper	30 %
Total	100 %

Reading and Participation

Each student will periodically present and discuss a journal article in class. The presentations should span 15 minutes and address the following items. 1) What research question(s) is addressed and why is this question important? 2) What is the main theoretical approach (if not purely an empirical paper) and what are the important assumptions? 3) If the paper is empirical, what is the data set and empirical estimation strategy? 4) What are the key results? 5) What did you like best about the paper? 6) What was confusing or not convincing? 7) What follow up research questions does the article motivate?

Students who are not assigned to present a particular paper are still expected to read it thoroughly and to join in the class discussions. To provide you with incentives to read the papers, I will sometimes ask all students to bring brief, written responses to discussion questions that I will send out before class. In these cases, I will distribute the discussion questions via email a day or two before our class meeting.

The 'reading and participation' component of your grade will be based on the quality of your in-class presentations, written responses to discussion questions, and general contributions in class.

Occasional Problem Sets:

I will lecture from textbooks and related materials during some weeks and will occasionally assign problem sets based on the lecture material. The problem sets may require you to solve analytical models or perform numerical simulations. The problem set portion of your grade will be determined by the quality (and timeliness) of your answer sets.

Research Paper:

Each student will develop (or advance) an original research paper that is due on May 8. I'll require you to provide a 1-2 page document early in the semester that summarizes your research plan. I'll also require a 1-2 page progress report later in the semester. Ideally, student papers will build on themes discussed in the class.

TENTATIVE SCHEDULE (Subject to Change)

Week	Topic
Jan. 17 Jan. 19	Syllabus, course organization Tragedy of the commons
Jan. 24 Jan. 26	Are all commons tragedies? Excluding users from the commons
Jan. 31 Feb. 2	Tragedy of the anti-commons: theory Tragedy of the anti-commons: application
Feb. 7 Feb. 9	Scope of regulation & federalism: theory Scope of regulation & federalism: applications
Feb. 14, 16	Overview of fishery economics
Feb. 21 Feb. 23	Regulated open access ITQs
Feb. 28 Mar. 2	ITQs - continued Cooperation
Mar. 7 Mar. 9	Overview of forest economics Deforestation determinants
Mar. 14 Mar. 16	Payments for ecosystem services & deforestation Conservation easements
Mar. 28 Mar. 30	U.S. Endangered species protection Trade of wildlife products
Apr. 4 Apr. 6	Intro to non-renewable resource econ Optimal time to drill
Apr. 11 Apr. 13	Fossil fuel externalities
Apr. 18 Apr. 20	Local resource curse abroad Local resource curse in U.S.
Apr. 25, 27	Resource certification
May 2, 4	Student Research Projects

AAE 760 READING LIST
Spring 2017

Natural Resource Scarcity

Brander, James A. and M. Scott Taylor. 1998. The Simple Economics of Easter Island: A Ricardo-Malthus Model of Renewable Resource Use. *American Economic Review* 88(1): 119-138.

Krautkraemer, Jeffrey A. 2005. Economics of Natural Resource Scarcity: The State of the Debate. *RFF Discussion Paper 05-14*

Krutilla, John V. 1967. Conservation Reconsidered. *American Economic Review* 57(4): 777-786.

Nordhaus, W.D. 1974. Resources as a Constraint on Economic Growth. *American Economic Review* 64(2): 22-26.

Tierney, John. 1990. Betting on the Planet. *New York Times Magazine*

Tragedy of the Commons and Anti-Commons

Baland, Jean-Marie and Jean-Philippe Platteau. 1996. Halting the Degradation of Natural Resources: Is there a Role for Rural Communities? *Food and Agriculture Organization of the United Nations*.

Banzhaf, H. Spencer, Timothy Fitzgerald, and Kurt Schnier. 2013. Nonregulatory Approaches to the Environment: Coasean and Pigouvian Perspectives. *Review of Environmental Economics and Policy* 7(2): 238 – 258.

Buchanan, James and Yong Soon. 2000. Symmetric Tragedies: Commons and Anticommons. *Journal of Law and Economics* 43(1): 1-13.

Copeland, Brian R. and M. Scott Taylor. 2009. Trade, Tragedy, and the Commons. *American Economic Review* 99(3): 725-49.

Demsetz, Harold. 1967. Toward a Theory of Property Rights. *American Economic Review* 67(2): 347-360.

Dietz, Thomas, Elinor Ostrom and Paul Stern. 2003. The Struggle to Govern the Commons. *Science* 302 (5652): 1907-12.

Fehr, Ernst, and Andreas Leibbrandt, 2010. A Field Study on Cooperativeness and Impatience in the Tragedy of the Commons". Unpublished manuscript: Department of Economics, University of Chicago.

Fennell, Lee Anne. 2011. Commons, Anticommons, Semicommons. In *Research Handbook on the Economics of Property Law*, eds. Kenneth Ayotte and Henry E. Smith.

- Hardin, Garrett. 1968. The Tragedy of the Commons. *Science* 162: 1243-8.
- Heller, Michael A. 1998. The Tragedy of the Anticommons: Property in the Transition from Marx to Markets. *Harvard Law Review* 111: 621-688.
- Hill, Peter J. 2014. Are All Commons Tragedies? The Case of Bison in the 19th Century. *The Independent Review* 18(4): 1-18.
- Kaffine, Daniel T. 2009. Quality and the Commons: The Surf Gangs of California. *Journal of Law and Economics* 52: 727- 743.
- Leibbrandt, Andreas, Uri Gneezy and John List, 2011. Ode to the sea; The socio-ecological Underpinnings of social norms. Unpublished manuscript: University of Chicago.
- Libecap, Gary D. 2014. Addressing Global Environmental Externalities: Transaction Costs Considerations. *Journal of Economic Literature* 52(2): 424-479.
- Leonard, Bryan and Dominic P. Parker. 2016. Creating Anticommons: Historical Land Privatization and Modern Natural Resource Use. Working Paper.
- McCarthy, N., E. Sadoulet, and A. de Janvry. 2001. Appropriation under Costly Cooperation. *Journal of Environmental Economics and Management* 42: 297-309.
- Ostrom, Elinor. 2008. Tragedy of the Commons. In *The New Palgrave Dictionary of Economics*, 2nd ed., ed. Steven Durlauf and Lawrence Blume. New York: Palgrave Macmillan.
- Smith, Henry E. 2002. Exclusion versus Governance: Two Strategies for Delineating Property Rights. *Journal of Legal Studies* 31: S453-S487.
- Taylor, Scott M. 2011. Buffalo Hunt: International Trade and the Virtual Extinction of the North American Bison. *American Economic Review* 101: 3162-3195.

Wildlife and Biodiversity

- Ando, Amy W. 1999. Waiting to be Protected under the Endangered Species Act: The Political Economy of Regulatory Delay. *Journal of Law and Economics* 42(1): 29-60.
- Brown, Gardner M. and Jason F. Shogren. 1998. Economics of the Endangered Species Act. *Journal of Economic Perspectives* 12(3): 3-20.
- Bulte, Erwin H., Richard D. Horan, and Jason F. Shogren. 2003. Elephants: Comment. *American Economic Review* 93(4): 1437-1445.
- Farah, Naima and John R. Boyce. 2015. Elephants and Mammoths: Can Ice Ivory Save Blood Ivory? Working Paper.
- Ferraro, P.J., C. McIntosh, and M. Ospina. 2007. The Effectiveness of the U.S. Endangered

Species Act: An Econometric Analysis Using Matching Methods. *Journal of Environmental Economics and Management* 54: 245-261.

Fischer, Carolyn, Edwin Muchapondwa, and Thomas Sterner. 2005. Bioeconomic Model of Community Incentives for Wildlife Management Before and After CAMPFIRE. *RFF Discussion Paper 05-06*.

Fischer, Carolyn. 2010. Does Trade Help or Hinder the Conservation of Natural Resources? *Review of Environmental Economics and Policy* 4:1, 103-121.

Sas-Rolfes, Michael 't and Timothy Fitzgerald. 2013. Can a Legal Horn Trade Save Rhinos? Working Paper.

Kremer, Michael and Charles Morcom. 2000. Elephants. *American Economic Review* 90(1): 212-234.

Kremer, Michael and Charles Morcom. 2003. Elephants: Reply. *American Economic Review* 93(4): 1446-1448.

Langpap, Christian and Joe Kerkvliet. 2010. Allocating Conservation Resources under the Endangered Species Act. *American Journal of Agricultural Economics* 92(1): 110-124.

List, John A., Michael Margolis and Daniel E. Good. 2006. Is the Endangered Species Act Endangering Species? NBER Working Paper 12777.

Lueck, Dean and Jeffrey A. Michael. 2003. Preemptive Habitat Destruction under the Endangered Species Act. *Journal of Law and Economics* 46(1): 27-60.

Lueck, Dean. 1989. The Economic Nature of Wildlife Law. *Journal of Legal Studies* 18 (2): 291 - 324.

Lueck, Dean. 2002. The Extermination and Conservation of the American Bison. *Journal of Legal Studies* (June): S609-S650.

Taylor, Scott M. 2011. Buffalo Hunt: International Trade and the Virtual Extinction of the North American Bison. *American Economic Review* 101: 3162-3195.

Weitzman, Martin L. 1998. Noah's Ark Problem. *Econometrica* 66(6): 1279-1298.

Fisheries

Costello, Christopher, Steven D. Gains and John Lynham. 2008. Can Catch Shares Prevent Fisheries Collapse? *Science* 321(19): 1678-1681.

Costello, Christopher S. and Corbett Grainger. 2015. Property Rights, Regulatory Capture, and Exploitation of Natural Resources. NBER Working Paper No. 20859.

- Grainger, Corbett A. and Christopher Costello. 2014. Capitalizing Property Rights Insecurity in Natural Resource Assets. *Journal of Environmental Economics and Management* 67(2): 224-240.
- Deacon, Robert T., Dominic P. Parker, and Christopher Costello. 2013. Reforming Fisheries: Lessons from a Self-Selected Cooperative. *Journal of Law and Economics* 56(1): 83-125.
- Deacon, Robert T. and Dominic P. Parker. 2009. Encumbering Harvest Rights to Protect Marine Environments: A Model of Marine Conservation Easements. *Australian Journal of Agricultural and Resource Economics* 53: 37-58.
- Deacon, Robert T., David Finnoff and John Tschirhart. 2011. Restricted Capacity and Rent Dissipation in a Regulated Open Access Fishery. *Resource and Energy Economics* 33:366-380.
- Deacon, Robert T. and Dominic P. Parker. 2009. Encumbering Harvest Rights to Protect Marine Environments: A Model of Marine Conservation Easements. *Australian Journal of Agricultural and Resource Economics* 53: 37-58.
- Evans, Keith S. and Quinn Weninger. 2014. Information Sharing and Cooperative Search in Fisheries. *Environmental and Resource Economics* 58: 353-372.
- Gordon, H. Scott, 1954. The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy* 62(2): 124-142.
- Grafton, R. Quentin, Dale Squires and Kevin J. Fox. 2000. Private Property and Economic Efficiency: A Study of a Common-Pool Resource. *Journal of Law and Economics* 43(2): 679-714.
- Grafton, R. 1996. Individual Transferable Quotas: Theory and Practice. *Reviews in Fish Biology and Fisheries* 6: 5-20.
- Grainger, Corbett and Dominic P. Parker. 2013. The Political Economy of Fishery Reform. *Annual Review of Resource Economics* 5: 369-386.
- Homans, F. R. and James E. Wilen. 1997. A Model of Regulated Open Access Resource Use. *Journal of Environmental Economics and Management* 32: 1-21.
- Newell, Richard G., Kerry L. Papps, and James N. Sanchirico. 2007. Asset Pricing in Created Markets. *American Journal of Agricultural Economics* 89(2): 259-272.
- Newell, Richard G., Kerry L. Papps, and James N. Sanchirico. 2005. Fishing Quota Markets. *Journal of Environmental Economics and Management* 89(2): 259-272.
- Scott, Anthony. 1955. The Fishery: The Objectives of Sole Ownership. *Journal of Political Economy* 63(2): 116-124.
- Squires, Dale and Niels Vestergaard. 2013. Technical Change and the Commons. *Review of*

Economics and Statistics 95(5): 1769-1787.

Smith, Martin D. 2012. The New Fisheries Economics: Incentives Across Many Margins. *Annual Review of Resources Economics* 379-402.

Smith, Martin D., and James E. Wilen. 2003. Economic Impacts of Marine Reserves: Importance of Spatial Behavior. *Journal of Environmental Economics and Management* 46(2): 183-206.

McWhinnie, Stephanie F. 2009. The Tragedy of the Commons in International Fisheries: An Empirical Examination. *Journal of Environmental Economics and Management* 57: 321-333.

Forest Resources

Alesina, Alberto; Cateroma Gennaioli; and Stefania Lovo. 2017. Public Goods and Ethnic Diversity: Evidence from Deforestation in Indonesia. NBER Working Paper 20504.

Alix-Garcia, Craig McIntosh, Katharine R. E. Sims and Jarrod R. Welch. 2013. The Ecological Impact of Poverty Alleviation: Evidence from Mexico's Oportunidades Program. *Review of Economics and Statistics* 95(2): 417-435.

Alix-Garcia, Jennifer M., Katharine R.E. Sims and Patricia Yanez-Pagans. 2015 Only One Tree from Each Seed? Environmental Effectiveness and Poverty Alleviation in Programs of Payments for Ecosystem Services. *American Economic Journal: Economic Policy* 7(4): 1-40.

Alix-Garcia, Jennifer and Hendrik Wolff. 2014. Payments for Ecosystem Services from Forests. *Annual Review of Resource Economics*

Alston, Lee J., Krister Andersson and Steven M. Smith. 2013. Payment for Environmental Services: Hypotheses and Evidence. *Annual Review of Resource Economics*: 139-159.

Amacher, Gregory S., Markku Ollikainen, and Erkki Koskela. 2009. *Economics of Forest Resources*. MIT Press. Cambridge MA.

Arriagada, Rodrigo A., Paul J. Ferraro, Erin O. Sills, Subhrendu K. Pattanayak, and Silvia Cordero-Sancho. 2012. Do Payments for Environmental Services Affect Forest Cover? A Farm-Level Evaluation from Costa Rica. *Land Economics* 88(2): 382-399.

Bohn, Henning and Robert T. Deacon. 2000. Ownership Risk, Investment, and the Use of Natural Resources. *American Economic Review* 90(3): 526-549.

Bulte, E. H., R. Damania and R. Lopez. 2007. On the Gains of Committing to Inefficiency: Corruption, Deforestation and Low Land Productivity in Latin America. *Journal of Environmental Economics and Management*

Foster, Andrew D., and Mark R. Rosenzweig. 2003. Economic Growth and the Rise of Forests. *Quarterly Journal of Economics* 118(2): 601-37.

Jayachandran, Seema. 2013. Liquidity Constraints and Deforestation: The Limitations of Payments for Ecosystem Services. *American Economic Review P&P* 103(3): 309-313.

Plantinga, Andrew and Klaas van't Veld. 2005. Carbon Sequestration or Abatement? The Effect of Rising Carbon Prices on the Optimal Portfolio of Greenhouse-Gas Mitigation Strategies. *Journal of Environmental Economics and Management* 50: 59-81.

Sohnngen, Brent and Robert Mendelsohn. 1998. Valuing the Impact of Large-Scale Ecological Change in a Market: The Effect of Climate Change on U.S. Timber. *American Economic Review* 88(4): 686-710.

Non-Renewable Resources – Minerals and Oil

Black, Geoffrey and Jeffrey T. LaFrance. 1998. Is Hotelling's Rule Relevant to Domestic Oil Production? *Journal of Environmental Economics and Management* 36: 149-169.

Bohn, Henning and Robert T. Deacon. 2000. Ownership Risk, Investment, and the Use of Natural Resources. *American Economic Review* 90(3): 526-549.

Boyce, John R. 2012. Prediction and Inference in the Hubbert-Deffeyes Peak Oil Model. *The Energy Journal*. 34(2): 91-141.

Fattouh, Bassam and Lavan Mahadeva. 2013. OPEC: What Difference Has it Made? *Annual Review of Resource Economics* 5: 427-443.

Griffin, James M. and Weiwen Xiong. 1997. The Incentive to Cheat: An Empirical Analysis of OPEC. *Journal of Law and Economics* (October): 289-316.

Harsted, Bard. 2012. Buy Coal! A Case for Supply-Side Environmental Policy. *Journal of Political Economy* 120(1): 77-115.

Kellog, Ryan. 2014. The Effect of Uncertainty on Investment: Evidence from Texas Oil Drilling. *American Economic Review* 104(6): 1698-1734.

Libecap, Gary D. and Steven N. Wiggins. 1984. Contractual Responses to the Common Pool: Prorationing of Crude Oil Production. *American Economic Review* 74(1): 87-98.

Muehlenbachs, Lucija, Elisheba Spiller and Christopher Timmins. 2015. The Housing Market Impacts of Shale Gas Development. *American Economic Review* 105(12): 3633-59.

Stroebel, Johannes and Arthur van Benthem. 2013. Resource Extraction Contracts under Threat of Expropriation: Theory and Evidence. *Review of Economics and Statistics* 95(5): 1622-1639.

Victor, David G. 2013. National Oil Companies and the Future of the Oil Industry. *Annual Review of Resource Economics* 5: 445-462

Wiggins, Steven and Gary D. Libecap. 1985. Oil Field Unitization: Contractual Failure in the Presence of Imperfect Information. *American Economic Review* 75: 368-85.

The Natural Resource Curse

Allcott, Hunt and Daniel Keniston. 2014. Dutch Disease or Agglomeration? The Local Economic Effects of Natural Resource Booms in Modern America. Working Paper.

Aragón, F.M. and Rud, J.P. 2013. Natural Resources and Local Communities: Evidence from a Peruvian Gold Mine. *American Economic Journal: Economic Policy* 5(2): 1-25.

Boyce, John R. and J.C. Herbert Emory. 2011. Is a Negative Correlation between Resource Abundance and Growth Sufficient Evidence that there is a 'Resource Curse.' *Resource Policy* 36: 1-13.

Brollo, Fernanda, Tommaso Nannicini, Roberto Perotti, and Guido Tebellini. 2013. *The Political Resource Curse*. *American Economic Review* 103(5): 1759-1796.

Caselli, F. and Michaels, G. (2013). "Do Oil Windfalls Improve Living Standards? Evidence from Brazil", *American Economic Journal: Applied Economics* (5)1: 208-238.

Collier, P. and Goderis, B. 2008. Commodity Prices, Growth, and the Natural Resource Curse: Reconciling a Conundrum. Munich Personal RePEc Archive, MPRA Working Paper No. 17315.

Deacon, Robert. T. 2011. The Political Economy of the Natural Resource Curse: A Survey of Theory and Evidence, *Foundations and Trends in Microeconomics*, vol. 7(2): pp. 111-208.

Mehlum, H., Moene, K., and Torvik. R. 2006. Institutions and the Resource Curse *The Economic Journal* 116(508): 1-20.

Michaels, Guy. 2011. The Long Term Consequences of Resource-Based Specialization. *The Economic Journal* 121(551): 31-57.

Sachs, J.D., and Warner, A.M. (1995). "Natural Resource Abundance and Economic Growth", National Bureau of Economic Research, NBER Working Paper No. 5398.

van der Ploeg, F. 2011. Natural Resources: Curse or Blessing? *Journal of Economic Literature* 49(2): 366-420.

Land and Water Use

- Alston, Lee J., Gary D. Libecap, and Bernardo Mueller. 2000. Land Reform Policies, The Sources of Violent Conflict and Implications for Deforestation in the Brazilian Frontier. *Journal of Environmental Economics and Management*
- Brewer, Jedidiah, Robert Glennon, Alan Ker and Gary D. Libecap. 2007. Water Markets in the West: Prices, Trading, and Contractual Forms. NBER Working Paper 13002.
- Burchi-eld, Marcy, Henry G. Overman, Diego Puga, and Matthew A. Turner. 2006. Cause of Sprawl: A Portrait from Space. *Quarterly Journal of Economics* (May): 587–633 - See more at:
- Hornbeck, Richard. 2012. The Enduring Impact of the American Dust Bowl: Short and Long-Run Adjustments to Environmental Catastrophe. *American Economic Review* 102(4): 1477-1507.
- Hornbeck, Richard and Pinar Keskin. Forthcoming. The Historically Evolving Impact of the Ogallala Aquifer: Agricultural Adaptation to Groundwater and Drought. *American Economic Journal: Applied Economics*.
- Kremer, Michael, Jessica Leino, Edward Miguel, and Alix Peterson Zwane. 2011 “Spring Cleaning: Rural Water Impacts, Valuation, and Property Rights Institutions.” *Quarterly Journal of Economics* 126 (1): 145–205
- Kanazawa, Mark. 2003. Origins of Common Law Restrictions on Water Transfers: Groundwater in Nineteenth-Century California. *Journal of Legal Studies* 32(1): 153-80. - See more at: <http://perc.org/articles/trade-or-not-trade#sthash.recUMnaJ.dpuf>
- Libecap, Gary D. 2008. Chinatown Revisited: Owens Valley and Los Angeles-Bargaining Costs and Fairness Perception of the First Major Water Rights Exchange. *Journal of Law, Economics, and Organization* 24(2): 1-28
- Libecap, Gary D. and Dean Lueck. 2011. The Demarcation of Land and the Role of Coordinating Property institutions. *Journal of Political Economy* 119(3): 426-427.
- Parker, Dominic P. and Walter N. Thurman. 2016. Tax Incentives and the Price of Conservation. Working Paper.
- Pfeiffer, Lisa and C.-Y. Cynthia Lin. 2012. Groundwater Pumping and Spatial Externalities in Agriculture. *Journal of Environmental Economics and Management* 64(1): 16-30.
- Provencher, Bill and Oscar Burt. 1993. The Externalities Associated with the Common Property Exploitation of Groundwater. *Journal of Environmental Economics and Management* 24(2): 139-158.

Schlenker, Wolfram, W. Michael Hanemann, and Anthony C. Fisher. 2006. The Impact of Global Warming on U.S. Agriculture: An Econometric Analysis of Optimal Growing Conditions. *Review of Economics and Statistics* 88(1): 113 – 125.

Turner, Matthew A., Andrew Haughwout, and Wilbert van der Klaauw. Forthcoming. Land Use Regulation and Welfare. *Econometrica*

Scope of Regulation and Federalism

Banzhaf, Spencer H. and B. Andrew Chupp. 2012. Fiscal Federalism and Interjurisdictional Externalities: New Results and an Application to US Air Pollution. *Journal of Public Economics* 96: 449-464.

Burgess, Robin; Matthew Hansen; Benjamin A. Olken; Peter Potapov; and Stefanie Sieber. 2012. The Political Economy of Deforestation in the Tropics. *Quarterly Journal of Economics* 127: 1707-1754.

Lipscomb, Molly and Ahmed Mushfiq Mobarak. 2017. Decentralization and Pollution Spillovers: Evidence from the Re-drawing of County Borders in Brazil. *Review of Economic Studies* 84: 464-502.

Tullock, Gordon. 1969. Problems of Scale. *Public Choice* 6: 19-29.

Oates, Wallace E. 2001. A Reconsideration of Environmental Federalism. *Resources for the Future Discussion Paper 01-54*.