

## **Stephen P. Holland**

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### **Positions**

- Associate Professor:** University of North Carolina at Greensboro, Aug. 2009-present.  
**Assistant Professor:** University of North Carolina at Greensboro, Aug. 2003-2009.  
**Research Associate:** National Bureau of Economic Research (Environmental and Energy Economics), April 2010-present.  
**Faculty Research Fellow:** National Bureau of Economic Research (Environmental and Energy Economics), April 2008-2010.  
**Visiting Research Associate:** University of California Energy Institute, Aug. 2001 –Dec. 2003 and Aug. –Dec. 2007.  
Research Topics: CO2 spillover effects, realtime electricity pricing and investment in generation capacity, realtime pricing and pollution, RECLAIM emissions permit market, intertemporal trading of emissions permits, collusion with exhaustible resources.  
**Economist:** Bureau of Economics, Federal Trade Commission, Aug. 1999- Aug. 2002.  
Antitrust and merger analysis: crude oil production, petroleum and natural gas pipelines, electricity generation, futures markets, petrochemicals, and petroleum refining.  
Policy analysis: drafted OECD price transparency submission, analyzed EIA information disclosure reforms.

### **Education**

- Ph.D.**, Economics, University of Michigan, August 1999.  
Dissertation: “Set-up Costs and Capacity Constraints in the Theory of Natural Resource Extraction,” chaired by Stephen Salant and Michael R. Moore.  
Fields: Natural Resources and Environment, IO, Micro Theory, and Public Finance.
- M.S.**, Agricultural Economics, Iowa State University, August 1994.  
Thesis: “Some Economic Policies for Ameliorating the Tragedy of the Commons” chaired by Todd Sandler.
- B.A.**, Mathematics, With distinction, University of Iowa, May 1989.

### **Refereed publications**

- “Taxes and Trading versus Intensity Standards: Second-Best Environmental Policies with Incomplete Regulation (Leakage) or Market Power” *Journal of Environmental Economics and Management* (2012) 63(3):375–387
- “What Do Emissions Markets Deliver and to Whom? Evidence from Southern California’s NOx Trading Program” (with Meredith Fowlie and Erin Mansur) forthcoming in *American Economic Review*.

“When to Pollute, When to Abate? Intertemporal Permit Use in the Los Angeles NOx Market” (with Michael R. Moore) *Land Economics* (2012) 88(2) 275-299.

“Greenhouse Gas Reductions under Low Carbon Fuel Standards?” (with Jonathan E. Hughes and Christopher Knittel) *American Economic Journal: Economic Policy* (2009) 1(1): 106-146.

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

“Modeling Peak Oil,” *Energy Journal* (2008) 29(2): 61-80.

“The Short-Run Effects of Time-Varying Prices in Competitive Electricity Markets,” (with Erin Mansur) *Energy Journal* (2006) 27(4): 127-155.

“Privatization of Water-Resource Development,” *Environmental and Resource Economics* (2006) 34: 291-315.

“On the Efficiency of Competitive Electricity Markets With Time-Invariant Retail Prices,” (with Severin Borenstein) *The RAND Journal of Economics*, 36(3) Autumn 2005 pp. 469-493.

“Set-up Costs and the Existence of Competitive Equilibria when Extraction Capacity Is Limited,” *Journal of Environmental Economics and Management* 46(3) November 2003, p. 539-56 .

“Cadillac Desert Revisited: Property Rights, Public Policy, and Water Resource Depletion,” (with Michael R. Moore) *Journal of Environmental Economics and Management* 46(1) July 2003, p. 131-155.

“Extraction Capacity and the Optimal Order of Extraction,” *Journal of Environmental Economics and Management* 45(3) May 2003, p. 569-588.

### **Papers under submission**

“Some Inconvenient Truths About Climate Change Policy: The Distributional Impacts of Transportation Policies” (with Jonathan E. Hughes, Christopher Knittel, and Nathan C. Parker)

### **Invited publications**

“Comment on ‘Setting the Initial Time-Profile of Climate Policy’” in *The Design and Implementation of U.S. Climate Policy*, Don Fullerton and Catherine Wolfram, editors, University of Chicago Press, forthcoming.

“Spillovers from Climate Policy” ” in *The Design and Implementation of U.S. Climate Policy*, Don Fullerton and Catherine Wolfram, editors, University of Chicago Press, forthcoming.

“Brokering Power,” (with John Neufeld) *IEEE Power & Energy* (Sept./Oct. 2009) 7(5): 36-43.

### **Working papers**

“Some Inconvenient Truths About Climate Change Policy: The Distributional Impacts of Transportation Policies” NBER WP 17386 , September 2011; EI@Haas WP 220, August 2011.

- “The Economics of Peak Oil” UNCG WP 11-13, July 2011.
- “Spillovers from Climate Policy” NBER WP 16158, July 2010.
- “Taxes and Trading versus Intensity Standards: Second-Best Environmental Policies with Incomplete Regulation (Leakage) or Market Power” NBER WP 15262, Aug. 2009; CSEM WP 190, Aug. 2009.
- “What Do Emissions Markets Deliver and to Whom? Evidence from Southern California’s NOx Trading Program” (with Meredith Fowlie and Erin Mansur) CSEM WP 186, June 2009; NBER WP 15082, June 2009.
- “When to Pollute, When to Abate? Intertemporal Permit Use in the Los Angeles NOx Market” (with Michael R. Moore) CSEM WP 178, May 2008; NBER WP 14254, August 2008.
- “Greenhouse Gas Reductions under Low Carbon Fuel Standards?” (with Christopher Knittel and Jonathan E. Hughes) CSEM WP 167 May 2007; NBER WP 13266, July 2007.
- “The Distributional and Environmental Effects of Time-Varying Prices in Competitive Electricity Markets,” (with Erin T. Mansur) CSEM WP 143, May 2005.
- “Is Real-Time Pricing Green?: The Environmental Impacts of Electricity Demand Variance,” (with Erin T. Mansur) CSEM WP 136 August 2004; NBER WP 13508, October 2007.
- “On the Efficiency of Competitive Electricity Markets With Time-Invariant Retail Prices,” (with Severin Borenstein) CSEM WP 116, August 2003; NBER WP 9922, August 2003.
- “Investment Efficiency in Competitive Electricity Markets With and Without Time-Varying Retail Prices,” (with Severin Borenstein), CSEM WP 106, July 2003.
- “Subgame Perfection in Natural Resource Extraction,” (with Chad Hogan) demonstrates the limited potential for collusion in natural resource extraction by showing that the equilibrium value correspondence is single-valued for small stocks but is multiple-valued for larger stocks.
- “Optimal Mixing, Sorting and Grading” shows that a monopoly will not necessarily produce an inefficient output mix under a simple linear mixing technology.

### **Honors, Grants, and Sponsored Research**

- UNC Research Competitiveness Grant: “Economic and Environmental Impacts of the Production and Transportation of Crop Residues as Bioenergy Feedstocks” (with Mark Burkey, PI, Lyubov Kurkalova, and Abolghasem Shahbazi) Spring 2008: \$132,739.
- Beta Gamma Sigma, 2007.
- EPA-NCER STAR grant: “The Market for RECLAIM Trading Credits: A Theoretical and Empirical Investigation of Intertemporal Trading and Cost Effectiveness” (with Michael R. Moore co-PI) Oct. 1, 2004- Sept. 30, 2006: \$119,498
- Federal Trade Commission Outstanding Team Award, 2000.
- RFF Joseph L. Fisher Dissertation Fellowship, 1998-1999.
- Michael J. Moore Dissertation Prize, 1998.
- Rackham Dissertation Fellowship, 1997.
- University of Michigan Regents Fellowship, 1994-1996.

Gamma Sigma Delta, Honor Society for Agriculture, 1993.  
U.S.D.A. National Needs Fellowship, 1993-1994.  
Phi Beta Kappa, 1988.

### **Seminars and Presentations**

“Some Inconvenient Truths About Climate Change Policy” University of Texas, April 6, 2011;  
NBER EEE, April 9, 2011; UNCG Brown Bag, July 6, 2011; Georgia Institute of Technology,  
September 9, 2011; Duke University, January 27, 2012.

“Smart Grid Dynamics: What do we know about dynamic pricing?” University of Texas, April 7,  
2011.

“Carbon Policy for Transportation: Low Carbon Fuel Standards, Land Use, and Incomplete  
Regulation” US EPA National Center for Environmental Economics, November 10, 2010.

“Permit Validity and Compliance Timing in Cap and Trade Programs” UNCG Brown Bag, June 9,  
2010; Camp EI@Haas, June 21, 2010; Southern Economic Association, November 19, 2011;  
POWER at EI@Haas, March 22, 2012.

“Green Acres? Transportation Carbon Policies and Land Use” Bioenergy Camp, Iowa State  
University, May 21, 2010.

“Taxes and Trading versus Intensity Standards: Second-Best Environmental Policies with  
Incomplete Regulation (Leakage) or Market Power” University of California Energy Institute,  
June 24, 2009; Appalachian State University, October 30, 2009.

“What Do Emissions Markets Deliver and to Whom? Evidence from Southern California's NO<sub>x</sub>  
Trading Program,” University of California Energy Institute, POWER conference, March 20,  
2009.

“Economic and Environmental Impacts of the Production and Transportation of Crop Residues as  
Bioenergy Feedstocks in North Carolina,” Southern Economic Association, November 21, 2008.

“Carbon Standards: What is the right choice for the US & Canada? The Academic Perspective,”  
Woodrow Wilson Center Cross-Border Forum on Energy Issues, Chicago, IL, October 2, 2008.

“The Carbon Cost of Cofiring Corn Stover in Coal-Fired Power Plants,” UC Energy Institute, June  
27, 2008.

“Evaluating Emissions Trading Using a Nearest (Polluting) Neighbor Estimator,” UNCG, May 7,  
2008; UC Energy Institute, June 24, 2008; Camp Resources, August 7, 2008.

“Greenhouse Gas Reductions under Low Carbon Fuel Standards?” NBER Environmental and  
Energy Economics Program Meeting, February 8, 2008; University of Central Florida, February  
22, 2008; International Industrial Organization Conference, May 17, 2008.

“When to Pollute, When to Abate? Evidence on Intertemporal Permit Use in the Los Angeles NO<sub>x</sub>  
Market,” UC Energy Institute, September 21, 2007; UC Santa Barbara, October 19, 2007; Yale  
University, November 19, 2008.

- “CO<sub>2</sub> Spillover Effects from the Environmental Regulation of Power Plants,” International Industrial Organization Conference, April 14, 2007; UC Berkeley ARE, November 30, 2007.
- “Nearest Polluting Neighbors Estimates: An Empirical Assessment of the RECLAIM Market,” (with Erin Mansur and Meredith Fowlie) UC Energy Institute, June 30, 2006.
- “Pollutant Spillovers and the Effectiveness of Environmental Regulations on Power Plants” University of North Carolina-Greensboro, June 1, 2006; UC Energy Institute, June 28, 2006; Southern Economic Association November 18, 2006.
- “Modeling Peak Oil,” University of North Carolina-Greensboro, March 17, 2006; University of West Virginia, March 31, 2006; Appalachian State University, April 21, 2006; Southern Economic Association November 19, 2006.
- “The Distributional and Environmental Effects of Time-Varying Prices in Competitive Electricity Markets,” (with Erin Mansur) University of Richmond, February 25, 2005, NC State/RTI, October 18, 2005.
- “The Benefits of Flat Bills,” UC Energy Institute, June 27, 2005.
- “The Political Economy and Environmental Effects of Real-Time Pricing Adoption in Competitive Electricity Markets,” (with Erin Mansur) University of North Carolina-Greensboro, April 2, 2004, and UC Energy Institute, June 28, 2004.
- “Raising Rivals’ Costs in the RECLAIM Permit Market” (with Erin Mansur and Meredith Fowlie) UC Energy Institute, August 29, 2003.
- “Is Real-time Pricing Green?” UCEI Power Conference, Berkeley, CA. (with Erin Mansur), March 14, 2003; International Industrial Organization Conference, Northwestern University, Chicago, IL April 24, 2004.
- “Investment Efficiency in Competitive Electricity Markets With and Without Time-Varying Retail Prices” Econometrics Society Summer Meetings, Northwestern University, Evanston, IL, June 28, 2003; Center for Research in Regulated Industries Western Conference, San Diego, CA, June 26, 2003; International Industrial Organization Conference, Northeastern University, Boston, MA, April 4, 2003; Department of Economics, UC Berkeley, CA, November 26, 2002.
- “The Impact of Time-Varying Prices on Investment in Electricity Markets,” UC Energy Institute, Oct. 4, 2002.
- “Privatization of Water-Resource Development,” UC-Davis ARE, March 7, 2002; UC-Berkeley ARE, March 8, 2002; U. of Michigan, April 12, 2002; AERE/EAERE World Congress June 23, 2002; University of North Carolina-Greensboro, January 24, 2003; St. Joseph’s University, January 28, 2003; Rensselaer Polytechnic Institute, January 29, 2003; Amherst College, January 30, 2003; Clark University, January 31, 2003; California State University-Sacramento, February 6, 2003.
- “Is Collusion Possible in Natural Resource Extraction,” Berkeley-Stanford Conference in Industrial Organization, October 27, 2001.
- “Extraction Capacity and the Optimal Order of Extraction,” UC Energy Institute, Sept. 21, 2001.

“Competition and the EIA Information Disclosure Reforms,” Harvard Electricity Policy Group Plenary Session, June 11, 2001.

“Antitrust Problems and Solutions in the Gas/Electric Convergence,” UC Energy Institute, April 6, 2001.

“*Cadillac Desert* Revisited: Property Rights, Public Policy, and Water Resource Depletion in the American West,” Heartland Environmental Economics Workshop, Sept. 20, 1999, UC-Berkeley Environmental and Resource Economics Seminar, Oct. 17, 2001.

“Subgame Perfection in Natural Resource Extraction: An Example” U. of Michigan Natural Resources Seminar, April 7, 2000; FTC Bureau of Economics, April 27, 2000.

“Saving Existence of a Competitive Equilibrium When Set-up Costs Cannot Be Ignored,” U. of Michigan Natural Resources Seminar, Sept. 25, 1998; U. of California-Riverside, Jan. 25, 1999; U. of Calgary, Jan. 29, 1999; Wake Forest University, Feb. 3, 1999; Resources for the Future, Feb. 5, 1999.

“The Optimal Order of Natural Resource Extraction with Capacity Constraints: Partial vs. General Equilibrium,” U. of Michigan Natural Resources Seminar, March 20, 1998.

“Optimal Transition to a Capacity Constrained Backstop with Fixed Costs,” U. of Michigan Natural Resources Seminar, Sept. 19, 1997.

### **Teaching and professional experience**

University of North Carolina, Greensboro, 2003-present. Courses: Environmental Economics (undergrad, writing intensive), Microeconomics I (MA), Microeconomics II (MA), Mathematical Economics (PhD), Intertemporal Economics (PhD), Advanced Microeconomics II (PhD).

Graduate Student Instructor, University of Michigan, 1995-97. Courses: Introductory Micro, Intermediate Micro, Ph.D. Statistics, Ph.D. Micro, American Economic History (English Composition Board course).

Research Assistant, Office of Tax Policy Research, U. of Michigan, 1995.

Summer Intern, Resources for the Future, RFF, Washington, D.C., 1994.

Research Assistant, Center for Agricultural and Rural Development, CARD, Iowa State University, 1992-93.

Mathematics Teacher, U.S. Peace Corps Botswana, Secondary Ed., 1990-91.

### **Other professional activities**

External Dissertation Examiner: Energy & Environment Ph.D., North Carolina Agricultural and Technical State University (2009 to present)

Memberships: American Economic Association, and Association of Environmental and Resource Economists.

Referee: *American Economic Review*, *Journal of Political Economy*, *Rand Journal of Economics*, *Journal of Environmental Economics and Management*, *American Journal of Agricultural Economics*, *Canadian Journal of Economics*, *Contemporary Economic Policy*, *Energy Economics*, *Energy Journal*, *Energy Policy*, *Environmental and Resource Economics*, *Environment and Development Economics*, *Environmental Health Perspectives*, *Geoforum*, *International Journal of Industrial Organization*, *Journal of Development and Agricultural Economics*, *Journal of Environmental Management*, *Natural Resource Modeling*, *Oxford Economic Papers*, *Resource and Energy Economics*, and *Water Resources Research*.

Reviewer: National Science Foundation, MacArthur Fellows Program, University of California Energy Institute.

Service:

- Environmental Studies Committee (January 2009 to present)
- Phi Beta Kappa Web Master (Spring 2007 to present)
- UNCG Bryan School Program Review Committee (Fall 2011)
- UNCG Bryan Committee on Research (Fall 2010 to Spring 2011)
- Economics Department Seminar Series (Fall 2004 to Spring 2011)
- Phi Beta Kappa Executive Committee (October 2004 to Spring 2007)
- Harriet Elliott Lecture Committee (Fall 2005 to Spring 2007)