

## Douglas H. Wrenn

### Curriculum Vitae

Department of Agricultural Economics, Sociology, and Education  
 The Pennsylvania State University  
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### EDUCATION

#### **The Ohio State University**, Columbus, Ohio, USA

Ph.D., Agricultural, Environmental, and Development Economics 12/2012  
 Dissertation Title: "Three Essays on Residential Land Development"  
 Advisor: Elena G. Irwin

M.A., Economics 08/2008

#### **Eastern Mennonite University**, Harrisonburg, Virginia, USA

B.S., Economics and Business Administration (Cum Laude) 04/2002

### PROFESSIONAL APPOINTMENTS

#### **The Pennsylvania State University**, Department of Agricultural Economics, Sociology, and Education

Assistant Professor, Environmental and Resource Economics 08/2013-Present

#### **The Ohio State University**, Department of Agricultural, Environmental, and Development Economics

Postdoctoral Researcher (Advisor: Elena G. Irwin) 01/2013-07/2013  
 Graduate Research Assistant 08/2007-12/2012

#### **Mennonite Central Committee**, Ukraine/Formal Soviet Union

Coordinator of Economic Development and Rural Lending 02/2003-04/2006

### PUBLICATIONS

#### **Journal Articles**

1. **Wrenn, Douglas H.**, H. Allen Klaiber, and David A. Newburn. 2016. "Confronting Price Endogeneity in a Duration Model of Residential Subdivision Development." (Forthcoming: *Journal of Applied Econometrics*.)
2. Zhang, Wendong, Douglas H. Wrenn, and Elena G. Irwin. 2016. "Spatial Heterogeneity, Accessibility, and Zoning: An Empirical Examination of Leapfrog Development." (Forthcoming: *Journal of Economic Geography*.)

3. Zaveri, Esha, Danielle Grogan, Karen Fisher-Vanden, Steve Frolking, Richard Lammers, **Douglas H. Wrenn**, Alexander Prusevich, and Robert Nicholas. 2016. "Invisible water, Visible Impact: Groundwater Use and Indian Agriculture under Climate Change." *Environmental Research Letters*. 11(1):1-14.
4. **Wrenn, Douglas H.**, H. Allen Klaiber, and Edward C. Jaenicke. 2016. "Unconventional Shale Gas Development, Risk Perceptions, and Averting Behavior: Evidence from Bottled Water Purchases." *Journal of the Association of Environmental and Natural Resource Economists*. 3: 779-817. (Lead article)
5. **Wrenn, Douglas H.** and Elena G. Irwin. 2015. "Time is Money: An Empirical Examination of the Effects of Regulatory Delay on Residential Subdivision Development." *Regional Science and Urban Economics*. 51: 25-36.
6. **Wrenn, Douglas H.**, Timothy W. Kelsey, and Edward C. Jaenicke. 2015. "Resident versus Non-Resident Employment Impacts Associated with Marcellus Shale Development." *Agricultural and Resource Economics Review*. 44/2 (August 2015) 1-19. (Winner, Best Article Award, 2016)
7. **Wrenn, Douglas H.** and Abdoul G. Sam. 2014. "Geographically and Temporally Weighted Likelihood Regression: Exploring the Spatiotemporal Determinants of Land Use Change." *Regional Science and Urban Economics*. 44: 60-74.
8. **Wrenn, Douglas H.** and Elena G. Irwin. 2012. "How Do Land Use Policies Influence Fragmentation? An Econometric Model of Land Development with Spatial Simulation" *Environmental Economics*. 3(4): 82-96.

#### Book Chapters

1. Irwin, Elena G. and **Douglas H. Wrenn**. "An Assessment of Empirical Methods for Modeling Land Use." In: J.M. Duke and J. Wu (ed.), the Oxford Handbook of Land Economics. Oxford Univ. Press, 2014.

#### Under Review/Submitted

1. Towe, Charles, H. Allen Klaiber, and **Douglas H. Wrenn**. 2016. "Not My Problem: Growth Spillovers From Uncoordinated Land Use Policy." (Revise and Resubmit: *Land Use Policy*)
2. Hoy, Kyle and **Douglas H. Wrenn**. 2017. "Unconventional Energy, Taxation, and Interstate Welfare: An Analysis of Pennsylvania's Severance Tax Policy." (*Energy Economics*)
3. **Wrenn, Douglas H.** and H. Allen Klaiber. 2017. "Price Based Land Use Policy and Development Density: Impacts on Urban Land Use Patterns." (*Review of Economic Studies*)

#### Manuscripts/Working

1. Zaveri, Esha, **Douglas H. Wrenn**, and Karen Fisher-Vanden. 2017. "The Impact of Water Access on Short-Term Migration in India." (Manuscript)
2. Van Hook, Jennifer, Justine Blandford, Yosef Bodovsky, Guangqing Chi, Annelise Hagedorn, Edward C. Jaenicke, and **Douglas H. Wrenn**. 2016. "Accessibility Measures of Community Food Environments and the Healthiness of Home Food Purchases." (Manuscript)
3. Fetter, T. Robert, Andrew L. Steck, Christopher D. Timmins, and **Douglas H. Wrenn**. 2017. "Learning by Viewing? Social Learning, Regulatory Disclosure, and Firm Productivity in Shale Gas." (Manuscript)

4. Zhang, Bo and **Douglas H. Wrenn**. 2017. "House Prices and Marriage" (Manuscript)
5. Zaveri, Esha, **Douglas H. Wrenn**, and Karen Fisher-Vanden. 2016. "Water in the Balance: The Impact of Water Infrastructure on Agricultural Adaptation to Rainfall Shocks in India."
6. **Wrenn, Douglas H.**, H. Allen Klaiber, and David A. Newburn. 2016. "Price-Based Policies for Residential Development Patterns and Impacts to Water Quality in the Chesapeake Bay."
7. **Wrenn, Douglas H.**, H. Allen Klaiber, and Edward C. Jaenicke. 2016. "Averting Behavior and Beverage Purchases in Shale-Gas Counties: A Structural Approach."

## **TEACHING**

### **The Ohio State University**

Short Course: Using R for Econometric Analysis	Spring, 2011
Development Economics (AED Economics/International Studies 535)	Spring, 2010

### **The Pennsylvania State University**

Applied Welfare Analysis (AEREC 597A)	Spring, 2014-2015
Introductory Environmental and Resource Economics (CED 201)	Spring, 2014-2017
Applied Microeconometrics II (AEREC 597A)	Spring, 2016-2017
Guest Lecture: AEREC 590	Fall 2013-2016

## **INVITED SEMINARS**

1. Department of Business and Economics, Eastern Mennonite University, TBD. Fall, 2017.
2. Department of Applied Economics, Oregon State University, TBD. May 19<sup>th</sup>, 2017.
3. Department of Agricultural and Applied Economics, Virginia Tech, "Price-Based Land Use Policies with Heterogeneous Development Outcomes: Impacts on Urban Land Use Patterns." December 2<sup>nd</sup>, 2016.
4. Department of Economics, Binghamton University, "Confronting Price Endogeneity in a Competing Risks Model of Residential Subdivision Development." September 30<sup>th</sup>, 2016.
5. Center for Urban Environmental Research and Education (CUERE), University of Maryland Baltimore County, Seminar Series, "Local Interactions versus Regulatory Delay: Evaluating Competing Explanations for Residential Land Development." November 22, 2013.

## **CONFERENCES**

### **Local/Regional**

1. Wrenn, Douglas H., Timothy W. Kelsey, and Edward C. Jaenicke. 2016. "Resident versus Non-Resident Employment Impacts Associated with Marcellus Shale Development." Energy Days Poster Presentation, Pennsylvania State University, May 19<sup>th</sup>, 2016.

2. Jaenicke, Edward C., Douglas H. Wrenn, and H. Allen Klaiber. "Unconventional Shale Gas Development, Risk Perceptions, and Averting Behavior: Evidence from Bottled Water Purchases." Water Conference, Pennsylvania State University Water Conference, April 22<sup>nd</sup>, 2015.

### **Domestic**

1. Wrenn, Douglas H., H. Allen Klaiber, and Edward Jaenicke. "Unconventional Shale Gas Development, Risk Perceptions, and Averting Behavior." Selected paper presented at the Annual Meetings of the Applied and Agricultural Economic Association, Boston, Massachusetts, July 31<sup>st</sup>-August 2<sup>nd</sup>, 2016.
2. Wrenn, Douglas and H. Allen Klaiber. "Meeting Water Quality Standards by Altering Land Use Patterns: An Analysis of Price vs. Quantity Based Policy Instruments." Selected paper for 5<sup>th</sup> Annual Summer Meetings of the Association of Environmental and Resource Economists, Breckenridge, Colorado, June 9-11, 2016.
3. Wrenn, Douglas H., H. Allen Klaiber, and David A. Newburn. "Confronting Endogeneity in a Duration Model of Residential Subdivision Development." Selected paper presented at the Annual Meetings of the Applied and Agricultural Economic Association, San Francisco, California, July 26-28, 2015.
4. Wrenn, Douglas H., H. Allen Klaiber, and Edward Jaenicke. "Unconventional Shale Gas Development, Risk Perceptions, and Averting Behavior: Evidence from Bottled Water Purchases." Selected paper for the 4<sup>th</sup> Annual Summer Meetings of the Association of Environmental and Resource Economists, San Diego, California, June 3-5, 2015.
5. Wrenn, Douglas H., H. Allen Klaiber, and David A. Newburn. "Confronting Endogeneity in a Duration Model of Residential Subdivision Development." Selected paper presented at the 61<sup>st</sup> Annual North American Meetings of the Regional Science Association International, Washington, D.C., November 12-14, 2014.
6. Wrenn, Douglas H. Western Regional Science Association Annual Meeting, Santa Barbara, California, February 24-27, 2013.
7. Wrenn, Douglas H. and Elena G. Irwin. "Integrating Economics Into Land Use Change Models to Simulate Policy Scenarios and Assess Sustainability." Selected presentation for the 4<sup>th</sup> International EcoSummitt, Columbus, Ohio, September 30-October 5, 2012.
8. Wrenn, Douglas H., Abdoul G. Sam, and Elena G. Irwin. "Searching for the Urban Fringe: Exploring the Spatiotemporal Determinants of Land Use Using a Conditionally-Parametric Duration Model." Selected paper presented at the Annual Meetings of the Applied and Agricultural Economic Association, Seattle, Washington, August 12-14, 2012.
9. Wrenn, Douglas H., Abdoul G. Sam, and Elena G. Irwin. "Searching for the Urban Fringe: Exploring the Spatiotemporal Determinants of Land Use Using a Conditionally-Parametric Duration Model." Selected paper for the 2<sup>nd</sup> Annual Summer Meetings of the Association of Environmental and Resource Economists, Asheville, North Carolina, June 3-5, 2012.
10. Wrenn, Douglas H., Abdoul G. Sam, and Elena G. Irwin. "Not All Policies are Equal: A Nonparametric Examination of the Heterogeneous Effects of Land Use Policy." Selected paper presented at the 58<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Miami, Florida, November 9-12, 2011.

11. Wrenn, Douglas H. "Time Is Money: An Empirical Examination of the Dynamic Effects of Regulatory Uncertainty on Residential Subdivision Development." Selected paper presented at the Heartland Environmental & Resource Economics Workshop, Urbana-Champaign, Illinois, October 22-23, 2011.
12. Wrenn, Douglas H. "Time Is Money: An Empirical Examination of the Dynamic Effects of Regulatory Uncertainty on Residential Subdivision Development." Selected paper presented at the Baltimore Ecosystem Study 2011 Annual Meeting, Baltimore, Maryland, October 19-20, 2011.
13. Wrenn, Douglas H., Abdoul G. Sam, and Elena G. Irwin. "Heterogeneous Effects of Regulation: A Nonparametric Model of Residential Land Development." Selected paper presented at Camp Resources, XVIII, Wrightsville Beach, North Carolina, August 7-9, 2011.
14. Towe, Charles, H.Allen Klaiber, Douglas H. Wrenn, David A. Newburn, and Elena G. Irwin. "Exploiting Spatial and Temporal Variations in Residential Subdivision Development to Identify Urban Growth Spillovers." Selected paper presented at the Annual Meeting of the Applied and Agricultural Economic Association, Pittsburgh, Pennsylvania, July 24-26, 2011.
15. Wrenn, Douglas H. and Elena G. Irwin. "Rationally Indecisive: A Competing Risks Model of Exurban Land Development in the Presence of Multiple Options." Selected paper presented at the 57th Annual North American Meetings of the Regional Science Association International, Denver, Colorado, November 10-13, 2010.
16. Wrenn, Douglas H. and Elena G. Irwin. "Rationally Indecisive: A Competing Risks Model of Exurban Land Development in the Presence of Multiple Options." Selected paper presented at the Annual Meeting of the Applied and Agricultural Economic Association, Denver, Colorado, July 25-27, 2010.
17. Wrenn, Douglas and Elena G. Irwin. "Does Development Size Matter: An Empirical Examination of the Pattern and Timing of Large Versus Small Subdivision Development in an Urban-Fringe County." Selected paper presented at the Southern Regional Science Association Meetings, Washington, DC, March 25-27, 2010.
18. Chen, Yong, Douglas H. Wrenn, Ciriya Jayaprakash, and E.G. Irwin. "Measuring and Simulating the Spatiotemporal Land Use Pattern in the Exurbs of the Baltimore Metro Region." Selected paper presented at the 56th Annual North American Meetings of the Regional Science Association International, San Francisco, CA, November 18-20, 2009.

### **International**

1. Wrenn, Douglas H., Elena G. Irwin, and David A. Newburn. "The Structural Effects of Zoning in Residential Land Markets." Selected paper for the 3rd Annual Summer Meetings of the Association of Environmental and Resources Economists, Banff, Alberta, Canada, June 6-8, 2013.
2. Wrenn, Douglas H. and Elena G. Irwin. "Time Is Money: An Empirical Examination of the Dynamic Effects of Regulatory Uncertainty on Residential Subdivision Development." Selected paper for the Urban Economics Association sessions at the 59th Annual North American Meetings of the Regional Science Association International, Ottawa, Canada, November 7-10, 2012.
3. Jayaprakash, Ciriya, Elena G. Irwin, Yong Chen, Jill Clark, Ron McChesney, Chang Wang, and Douglas H. Wrenn. "Quantifying and Explaining Spatio-Temporal Patterns of Fragmentation in the Baltimore Metro Region." Selected paper presented at the "Complexity and Regional Science" session at the 49th European Congress of Regional Science Association, Lodz, Poland, August 25-29, 2009.

## HONORS AND AWARDS

1. Winner, Best Article Award, Agricultural and Resource Economics Review, Northeastern Agricultural and Resource Economics Association, (2016).
2. Winner, 27th Charles M. Tiebout Prize in Regional Science, Western Regional Science Association, (2013).
3. Winner, North American Regional Science Council (NARSC) Graduate Student-Led Paper Competition, (2012).

## EXTENSION AND OUTREACH

### **Publications**

1. NARSC Newsletter. June, 2014. Marcellus Employment.
2. “Developing Spatially Disaggregate Models of Land Change for Policy Simulation.” Elena G. Irwin and **Douglas H. Wrenn**. *UGEC Viewpoints*, No. 8. November, (2012). Published by the Urbanization and Global Environmental Change Project, International Human Dimensions Programme.

## GRANTS

### **Approved/Funded**

1. “A Multi-Model, Multi-Scale Research Program in Stressors, Responses, and Coupled Dynamics and the Energy-Water-Land Nexus and for Concentrated, Interdependent Infrastructures.” Penn State University-Stanford University-Department of Energy. Program PI: John Weyant and Karen Fisher-Vanden. Role: Co-PI. PSU Amount: \$8,925,155. Dates: 8/1/2016-7/30/2021.
2. “How Does an Exogenous Change in Retail Market Structure and Other Food Environment Characteristics Affect the Healthfulness of Consumer Food Purchases?” USDA Economic Research Service. PI: Edward C. Jaenicke. Role: Co-PI. Total Amount: \$60,000. Dates: 09/01/2016-08/31/2018.
3. Horace T. Woodward Faculty Development Fund in Agricultural Science (Travel Grant). Pennsylvania State University. Amount: \$1,775. Dates: 07/2016-06/2017.
4. “Modeling Residential Land and Housing Supply and Integration of Structural Urban Demand and Supply Models.” Cooperative Agreement, U.S. Forest Service USDA Northern Research Station and the Baltimore Ecosystem Study (BES) Long-Term Ecological Research Program. PI: Douglas H. Wrenn. Amount: \$25,000. Dates: 07/01/2015-01/31/2017.
5. “A Household-Level Longitudinal Investigation into the Food Environment’s Impact on Food and Behavior and Health.” SEED Grant Proposal, Pennsylvania State University. Program PI: Jennifer Van Hook. Role: Co-PI. Amount: \$20,000. Dates: 06/1/2015-10/31/2016.
6. Horace T. Woodward Faculty Development Fund in Agricultural Science (Travel Grant). Pennsylvania State University. Amount: \$1,400. Dates: 07/2014-06/2015.

### **Declined**

1. "Optimal Land and Water Resource Management: Analyzing the Impact of Urban-Rural Land Use on Ecosystem Services in the Lake Erie Watershed." USDA Agriculture and Food Research Initiative. PI: H. Allen Klaiber. Role: Co-PI. Total Amount: \$497,026. PSU Amount: \$165,077. Dates: 01/01/2017-12/31/2019.
2. "Better Connecting Kids to Community Contexts: Accessibility Measures of Health Community and Home Food Environments" Robert Wood Johnson Foundation. PI: Jennifer Van Hook. Role: Co-PI. Total Amount: \$190,000. Dates: 02/01/2017-07/31/2018.
3. "Modeling Wicked Problems with FEW Solutions: A Multi-Scale Environmental and Economic Assessment of Nutrient Pollution in the Chesapeake Bay." NSF INFEWS. Program PI: Erica Smithwick. Role: Co-PI. Total Amount: \$2,975,191. Dates: 10/01/2016-09/30/2020.
4. "Opportunities and Constraints for Irrigated Agriculture in India: Coupling Economic and Hydrologic Models to Assess Sustainable Pathways." NSF CNH. Program PI: Steve Froelking. Role: Co-PI. Total Amount: \$1,626,372; PSU Amount: \$759,712. Dates: 07/01/2016-06/30/2019.
5. "Climate Change, Extreme Events, and Spatial Sorting in the U.S." National Science Foundation Hazards SEES: Location as Adaptation, 2014. PI: Ian Sue Wing. Role: Co-PI. Submitted: 12/3/2014. Total Amount: \$2,587,318. PSU Amount: \$468,075. Dates: 07/2015-06/2019.

## **SERVICE**

### **Reviewer**

Agriculture and Applied Economics Association: Abstracts  
 American Journal of Agricultural Economics  
 Applied Economic Perspectives and Policy  
 Association of the Environmental and Resource Economists: Abstracts  
 Ecological Economics  
 Energy Economics  
 Environmental and Resource Economics  
 Growth and Change  
 Journal of the Association of Environmental and Resource Economists  
 Journal of Environmental Economics and Management  
 Journal of Regional Science  
 National Science Foundation  
 Regional Science and Urban Economics  
 Review of Environmental Economics and Policy

### **Graduate Student Advising**

2014-Present	Kyle Hoy (4 <sup>th</sup> Year)
2015-Present	Bo Zhang (3 <sup>rd</sup> Year)

### **Dissertation Committee**

2013-2016	Esha Zaveri (Standard University Post-Doc, 2016-present)
2014-2016	Iryna Demko (Ohio State University Post-Doc, 2016-present)
2016-Present	Aaron Cook (4 <sup>th</sup> Year)
2016-Present	Ben Scharadin (4 <sup>th</sup> Year)
2016-Present	Dong Soon Choi (4 <sup>th</sup> Year)

### **Outside Committee Member**

2016-Present	Hamid Firooz (3 <sup>rd</sup> Year) (Economics Department)
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2016-Present      Hamed Atrianfar (3<sup>rd</sup> Year) (Economics Department)

**Departmental Service: Agricultural Economics, Sociology, and Education, PSU**

2013-Present      AESE Seminar Committee

2014                AEREC PhD Qualifier Exam Committee

2013-Present      AEREC Graduate Committee

**Affiliations**

08/2016-Present    Population Research Institute (Penn State)

**PROFESSIONAL AFFILIATIONS**

Association of Environmental and Resource Economists  
Agricultural and Applied Economics Association