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Department of Economics
Department of Agricultural and Resource Economics
Center for Environmental and Resource Economic Policy
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EDUCATION

North Carolina State University
Ph.D., Economics

Raleigh, NC
expected 2018

Dissertation: *Essays on Deforestation and Forest Ecosystem Services: An Economic Perspective*
Committee: Erin O. Sills (Chair), Walter Thurman, Mitch Renkow, Zachary S. Brown

North Carolina State University (NCSU)
M.R., Economics

Raleigh, NC
2014

Beijing Forestry University (BFU)
B.M., Agricultural and Forest Economics

Beijing, China
2012

FIELDS

Environmental and Resource Economics, Agricultural Economics
Development Economics, Forest Economics, Regional Economics

WORKING PAPERS

Yu Wu and Erin O. Sills. 2017. The Evolving Relationship between Market Access and Deforestation on the Amazon Frontier. [Job Market Paper]

Recognition of tropical deforestation as a major source of carbon emissions has invigorated efforts to reduce deforestation in the Brazilian Amazon. Previous studies throughout the tropics have found that market access, one of the key drivers of deforestation, is positively correlated with deforestation. This relationship has been explained by the effect of market access on farm gate prices for agricultural and/or timber products. However, access to markets also means access to urban centers, which has multiple influences on household decisions. This study incorporates these multiple dimensions of “urban access” into a household production framework, showing that their combined effect on deforestation is ambiguous and could change over time. We test whether the effect of distance to cities has changed over time in a region typical of the agrarian reform settlements established by the Brazilian federal government throughout the Amazon. Specifically, we test for structural shifts in the relationship between distance to cities and deforestation by modeling deforestation over 24 years on approximately 8,800 farm properties. Estimation results for a two-part, “within-between” Random Effects model show that after controlling for forest stock and other drivers of deforestation, the relationship between distance to cities and deforestation changed from negative to positive around 2004. Further investigation suggests that the diminishing role of transportation cost in farm gate price combined with the increasing enforcement of environmental laws forced the effect of distance on deforestation from negative to positive. Regional heterogeneities underlying the general evolving relationship are consistent with observed variation in urban development.

Yu Wu, Katrina Mullan, Trent Biggs, Jill Caviglia-Harris, Daniel Harris, and Erin O. Sills. 2017. Forest Watershed Services on An Old Frontier in the Brazilian Amazon.

Tropical deforestation affects ecosystem services at multiple scales, from global to local. At the local scale, deforestation is known to affect watershed processes including erosion rates, water chemistry, base flow, and groundwater recharge. These processes in turn affect ecosystem services including the quality and availability of water for livestock and crops immediately downstream. However, in humid tropical regions such as the Amazon, where the terrain is relatively flat and water is relatively abundant, it is unclear whether and which forest watershed services are valuable to local farmers. We test whether the extent of forest in upstream drainages affects downstream farm production in agricultural colonization settlements, which have some of the highest rates of deforestation and a large fraction of the farming population in the Brazilian Amazon. In our study site, dairy is the primary agricultural activity. We begin by estimating milk production as a function of hydrological and other inputs, using an inverse hyperbolic sine latent class panel Tobit model with controls for temporal and spatial fixed effects. We find that the amount of forest in the watershed does not influence productivity or net farm revenues when water is abundant. However, when water is scarce, i.e. in small watersheds, dry seasons, and drought years, milk production per cow as well as the stocking rate of cows per hectare of pasture are higher on farms with more mature forest in the drainage that supplies their water. This suggests a forested drainage provides a form of insurance against drought to farmers in agricultural colonization settlements in the Amazon. This insurance function is likely to become more important in the future as rainfall in the region becomes more variable with global climate change. These findings should encourage consideration of the benefits of standing forest in land use policy.

WORK IN PROGRESS

Hedonic Analysis of the Non-Market Value of Game Lands (with Erin O. Sills)

The NC Wildlife Resource Commission manages game lands to provide hunting, fishing, trapping, and other outdoor recreational opportunities. Similar to other open spaces, game lands may also offer aesthetic, recreational, and other environmental values to neighboring populations. To quantify these values, we estimate hedonic price models using data on residential property sales in the counties surrounding the game lands. We are exploring different metrics of proximity to game lands to tease out the various possible amenities and disamenities (e.g. noise and safety issues associated with hunting) that they offer.

RESEARCH EXPERIENCE

Research Assistant, NCSU
(for Professor Erin O. Sills)

2013-present

Living with Deforestation: Analyzing Transformations in Welfare and Land Use on an Old Amazonian Frontier, NSF Project SES-0752936

Determining Use, Economic Impacts and Value of Game Lands in North Carolina, funded by the NC Wildlife Resources Commission

Valuation of Forest Ecosystem Services, funded by the USFS

Working Group Member, SESYNC 2015-present
Forest, Agriculture, and River (FAR) Systems in the Brazilian Amazon: Evaluating the Impacts of Forest Cover Change on Hydrological Services

Principal Investigator, BFU 2010-2011
Urban Agglomerations in Ethnic Minority Border Regions of China
the grant of the National Innovation Training Plan for College Students, funded by Ministry of Education of China, 20,000 RMB

TEACHING EXPERIENCE

Lab Instructor, NCSU Fall 2017
• EC 205 Fundamentals of Economics

Teaching Assistant, NCSU Fall 2016
(for Professor Laura Taylor)
• ARE/EC 336 Resource & Environmental Economics

Teaching Assistant, NCSU Spring 2016
(for Professor Laura Taylor and Professor Zachary S. Brown)
• ECG 515 Environmental and Resource Policy
• ECG 716 Topics in Environmental and Resource Economics

Teaching Assistant, NCSU Fall 2015
(for Professor Laura Taylor)
• ARE/EC 336 Resource & Environmental Economics

PRESENTATIONS

AAEA Annual Meeting, Washington D.C., Selected Paper August 2018
“The Evolving Relationship between Market Access and Deforestation on the Amazon Frontier”

AAEA Annual Meeting, Washington D.C., Selected Paper August 2018
“Do Forests Provide Watershed Services to Local Populations in the Humid Tropics? Evidence from the Brazilian Amazon”

NAREA Annual Meeting, Philadelphia, PA, Selected Paper June 2018
“Modeling Tropical Deforestation: A Function of Market Access or Urban Access?”

Interdisciplinary Ph.D. Workshop in Sustainable Development at Columbia University (IPWSD), New York, NY, Selected Paper April 2018
“Forest Watershed Services on an Old Frontier in the Brazilian Amazon”

The National Socio-Environmental Synthesis Center (SESYNC) workshop, Annapolis, MD
“Forest Watershed Services on an Old Frontier in the Brazilian Amazon” March 2018

Annual MEAS-FER (Marine, Earth, and Atmospheric Sciences and Forestry and Environmental Resources) Research Symposium, Raleigh, NC, Speed Talk August 2017
“Forest Watershed Services on an Old Frontier in the Brazilian Amazon”

Camp Resources XXIV, Wrightsville Beach, NC, Selected Paper August 2017
“Forest Watershed Services on an Old Frontier in the Brazilian Amazon”

The National Socio-Environmental Synthesis Center (SESYNC) workshop, Annapolis, MD

“Local Benefits of Forest Watershed Services”	January 2017
The National Socio-Environmental Synthesis Center (SESYNC) workshop, Annapolis, MD	
“Market Access Drivers of Deforestation”	June 2016
The Center for Environmental and Resource Economic Policy (CEnREP) Colloquium, Raleigh, NC, invited talk	April 2016
“Drivers of Deforestation in the Western Brazilian Amazon”	
3rd Latin American Research Symposium, Raleigh, NC, Poster	February 2016
“Drivers of Deforestation in the Western Brazilian Amazon”	

PUBLICATIONS

Yu Wu. 2011. *Characteristics and Development Strategies of Urban Agglomerations in Ethnic Minority Border Regions--A Case study of "Wen Yan Qiu Ping" Urban Agglomerations*, Economic Forum 4: 127-132. DOI: 10.3969/j.issn.1003-3580.2011.04.030

Yu Wu. 2010. *Analysis on Regional Differences of Forestry Development in China*. Resource Development & Market 3: 219-222. DOI: 10.3969/j.issn.1005-8141.2010.03.009

Translations:

Kevin J. Boyle and Thomas P. Holmes. “*Choice Experiments and Valuing Forest Attributes*”, Chapter 9 in Kant, S., & Alavalapati, J. (eds) *Handbook of Forest Resource Economics*, Routledge, 2014. Translated by Yu Wu (into Chinese). China Forestry Publishing House, forthcoming.

Neelam C. Poudyal and Donald G. Hodges. “*Valuation of Open Spaces in Urban Environments*”, Chapter 11 in Kant, S., & Alavalapati, J. (eds) *Handbook of Forest Resource Economics*, Routledge, 2014. Translated by Yu Wu (into Chinese). China Forestry Publishing House, forthcoming.

Erin O. Sills. “*Economics of the Evolution of the Amazon Frontier*”. Chapter 26 in Kant, S., & Alavalapati, J. (eds) *Handbook of Forest Resource Economics*, Routledge, 2014. Translated by Yu Wu (into Chinese). China Forestry Publishing House, forthcoming.

AWARDS AND HONOR

Provost Doctoral Recruitment Fellowship, NCSU, Raleigh, NC	2014-2015
Graduate Research & Teaching Assistantships, NCSU, Raleigh, NC	2013-2018
Outstanding Bachelor’s Thesis award, BFU, Beijing, China	2012
Outstanding Academic Performance Fellowship, BFU, Beijing, China	2011
Liang Xi Fellowship, BFU, Beijing, China	2011
3rd Place award of the 14th National Forestry and Economics Conference for College Students, and 2nd Place award in the BFU competition area, Yunnan & Beijing, China	2011
Outstanding Academic Performance Fellowship, BFU, Beijing, China	2010
Liang Xi Fellowship, BFU, Beijing, China	2010
1st Place award in the 7th Academic Paper Competition of the College of Economics and Management, BFU, Beijing, China	2009
Liang Xi Fellowship, BFU, Beijing, China	2009

Liang Xi Honored Program, BFU, Beijing, China 2008-2012

OTHER EXPERIENCE

Mentor for student intern, Global Engagement in Academic Research (GEAR) Jul.2017
summer program, NCSU, Raleigh, NC

Participant, NCSU Graduate School Professional Development Program, Mar. – Aug. 2017
Sessions included “Intercultural communication in the US Classroom” and
“Career Path Panel”

Selected attendee, Berkeley/Sloan Summer School in Environmental and Aug.2016
Energy Economics, University of California, Berkeley, CA

Treasurer, NCSU Chapter of the International Society of Tropical Foresters 2014-2015
(ISTF), Raleigh, NC

Intern, The Nature Conservancy (TNC), Kunming, Yunnan, China Jul.2011-Aug.2011

Intern, Forestry Bureau of Fujian Province, Sanming, Fujian, China Jun.2011-Jul.2011

Intern, Tongyuanpu State-owned Forest Farm, Liaoning, China May2011-Jun.2011

Intern, Forestry Bureau of Qiubei County, Qiubei, Yunnan, China Jul.2010-Aug.2010

MEMBERSHIPS

American Economic Association (AEA)
Agricultural and Applied Economics Association (AAEA)
Association of Environmental and Resource Economists (AERE)
Northeastern Agricultural and Resource Economics Association (NAREA)
International Society of Tropical Foresters (ISTF)
Latin American Student Association at NCSU (LASA)

SKILLS

• Data Analysis: STATA, SAS, MATLAB, R, SPSS, Eviews • Geospatial Analysis: ArcGIS
• Data Management: SQL • Languages: English (Fluent), Mandarin Chinese (Native)

REFERENCES

Erin O. Sills

Edwin F. Conger Professor and Director of
International Programs
North Carolina State University
Email: sills@ncsu.edu
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Walter Thurman

Wm. Neal Reynolds Distinguished Professor
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Katrina Mullan

Associate Professor

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Laura O. Taylor

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