




Gaurav Doshi

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Research Interests

Energy and Environmental Economics, Industrial Organization

Education

Ph.D. in Applied Economics, University of Wisconsin-Madison	Expected 2023
B.S. & M.S. in Economics, Indian Institute of Technology Kanpur	May 2017

Research

Publications

“Transmission Integration and the Market for Congestion Revenue Rights.” With Sheldon (Xiaodong) Du, 2021. *The Energy Journal* 42(5), 247-281.

Working Papers

“Wiring America: The Short- and Long-Run Effects of Electricity Grid Expansion.” (*Job Market Paper*)

“Market Structure and Technology Adoption in Renewable Energy.” With Sarah Johnston

“An Equilibrium Analysis of Power Purchase Agreement.” With Yeon Ju Baik

“Substitution and Complementarity in the Consumption of Alcohol, Cannabis, and Opiates in a Legal Regime: Insights from Historical Data.” With Siddharth Chandra

Pre-doctoral Research

“Trade Growth Accounting in Goods and Services: An Empirical Exercise.” With S.K. Mathur, S. Singh, and A. Shrivastava, 2017. In: Mathur S., Arora R., Singh S. (eds) *Theorizing International Trade*. Palgrave Macmillan, Singapore.

Honors, Fellowships, and Awards

Bromley Prize for Best Dissertation Paper, UW Madison AAE	2022
Student Research Grant Competition Award, UW Madison	2021, 2022
Barbara Forrest Paper Prize for Best Pre-Dissertation Paper, UW Madison AAE	2020
Kenneth and Pauline Parsons Graduate Award, UW Madison AAE	2019

Academic Excellence Award, Indian Institute of Technology Kanpur	2017
Graduate Research Award for Masters' Research, Government of India	2016 - 17
Merit-cum-Means Scholarship, Indian Institute of Technology Kanpur	2015 - 16

Conference and Seminar Presentations

2022 Allied Social Sciences Association (ASSA) Annual Meeting (virtual); Association of Environmental and Resource Economists (AERE) Annual Summer Conference (Miami, FL); Camp Resources (Asheville, NC) (<i>scheduled</i>); Environment and Natural Resources (ENR) Seminar UW-Madison AAE
2021 MEA Annual Meeting (virtual); Online Summer Workshop in Environment, Energy, and Transportation (virtual); AERE Summer Conference (virtual); Empirical Methods in Energy Economics Summer Workshop (virtual); ENR Seminar UW-Madison AAE
2020 ENR Seminar UW-Madison AAE
2019 Agricultural and Applied Economics Association (AAEA) Annual Meeting (Atlanta, GA)
2018 ENR Seminar UW-Madison AAE

Teaching Experience (TA)

AAE 722: Machine Learning in Applied Economic Analysis (4.43/5)	Summer 2019
AAE 350: World Hunger and Malnutrition (4.56/5)	Spring 2019

Research Experience

Research Assistant to Prof. Sarah Johnston, UW-Madison	2020 - 22
Research Assistant to Prof. Sheldon Du, UW-Madison	2017 - 18
Research Assistant to Prof. Siddharth Chandra, Michigan State University	2016 - 17

Service

Referee: <i>The Energy Journal</i>	
Coordinator, Student Research Colloquium, AAE, UW-Madison	2019 - 21
Mentor, LGBTQ+ Peer Mentor Program, UW-Madison	2020 - 21
Mentor, Undergraduate Research Scholars Program, UW-Madison	2020 - 21

Additional Information

Programming Languages: R, Stata, Matlab, L^AT_EX, Julia, Python (basic)
Spoken Languages: English (fluent), Hindi (native)
Citizenship: India (F-1 Visa)

Abstracts

Wiring America: The Short- and Long-Run Effects of Electricity Grid Expansion (*Job Market Paper*)

The US needs massive investments in expanding the power grid to decarbonize in the following decades. This paper examines the impact of large-scale grid expansion on price-cost markups and emissions from fossil fuel generators in the short-run and wind investment in the long-run. I focus on the rollout of a grid expansion project that linked windy areas in west Texas to population centers in the east. Results suggest moderate declines in markups and emissions with total annual benefits of roughly \$100 million. Counties that received investment in transmission infrastructure saw significantly higher wind capacity in the long-run, avoiding \$271 million worth of carbon emissions in 2019. However, growing wind generation but inadequate transmission capacity in Texas has led to higher wind curtailments near these counties, thereby eroding potential gains from grid expansion in the short-run.

(JEL codes: L11, Q40, Q41, Q53)

Market Structure and Technology Adoption in Renewable Energy, with Sarah Johnston

We study the effect of market structure on technology adoption in the solar and wind power industries. Using data on U.S. solar and wind projects, we estimate models of technology adoption as a function of whether the project is located in a restructured electricity market. Restructured markets are designed to promote competition while traditional markets are dominated by regulated monopolists. Solar projects in restructured markets are 21 percent less likely to adopt frontier technology, while the effect for wind projects is negative but statistically insignificant. We provide evidence this negative relationship between competition and technology adoption is explained by differences in financing costs across the two market types.

(JEL Codes:)

Transmission Integration and the Market for Congestion Revenue Rights, with Sheldon Du, 2021. *The Energy Journal*, 42(5), 245-281

Texas electricity market saw a recent integration of electricity transmission as a part of Competitive Renewable Energy Zones (CREZ). Exploiting the commissioning date of CREZ based transmission integration as an exogenous shock, we analyze the effect of transmission expansion on market clearing prices of Congestion Revenue Rights (CRR). Reduced form estimates suggest that excess transmission led to a lowering of CRR prices for contracts at all Times of Use. We find strong evidence of spatial, distributional, and firm specific heterogeneity. The paper shows that transmission expansion enhanced efficiency of the CRR market in terms of a spatial convergence in prices and a decrease in aggregate auction expenditure of approximately \$260 million over a period of 4.5 years post CREZ.

(JEL Codes: L51, L94, Q41)

An Equilibrium Analysis of Power Purchase Agreement, with Yeon Ju Baik

Electricity market participants in the US use long-term contracts called Power Purchase Agreements (PPAs) to sell and purchase power from renewable sources at a fixed price over long periods. These contracts are vital to secure the financing of renewable projects. This paper investigates the link between wholesale market risk and the equilibrium prices of these contracts. We first present a stylized model to build intuition on the relationship between PPA prices, wholesale prices, and market volatility. We then test the model predictions using data on all utility-scale wind projects. Results suggest that mean retail and wholesale electricity prices are positively associated with PPA prices, whereas wholesale price volatility shows a negative association. These findings result from higher participation amongst risk-averse developers in the PPA market to avoid risk in the wholesale market, highlighting the role of government policy in promoting the entry of renewable developers.

(JEL Codes:)

References

Prof. Sarah Johnston (main advisor)

Assistant Professor,
Agricultural and Applied Economics
University of Wisconsin-Madison
sarah.johnston@wisc.edu

Prof. Sheldon (Xiaodong) Du

Renk Agribusiness Chair, and
Associate Professor,
Agricultural and Applied Economics
University of Wisconsin-Madison
xdu23@wisc.edu

Prof. Daniel Phaneuf

Henry C. Taylor Professor,
Agricultural and Applied Economics
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Prof. Siddharth Chandra

Director, Asian Studies Center,
Professor, James Madison College, and
Professor (by courtesy), Department of Epidemiology and Biostatistics,
Michigan State University
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