

Contact Information

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Education

Ph.D., Economics, University of Washington, Expected (2017).
M.A., Economics, University of Washington, 2013.
B.S., Economics (with honors) and minor in Philosophy, University of Chicago, 2008.

References

Patrick Bajari (Chair)
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Research Interests

Applied Microeconomics, Machine Learning, Environmental Economics

Experience

Research Assistant, Kindle Devices Economics Team at Amazon, 2016
Graduate Fellow, Center for Environmental Politics, University of Washington, 2014-2016
eScience Institute Data Science for Social Good Fellow, University of Washington, 2015
Research Assistant, Economics Team at Amazon, 2013-2014
Economic Research Assistant, U.S. Department of Justice - Antitrust Division, 2009-2011
Analyst, J.P. Morgan Investment Bank, 2008-2009
Research Assistant to Prof. Suraj Srinivasan, University of Chicago, 2006-2007

Teaching

Instructor

Intermediate Macroeconomics, University of Washington, 2016
Intermediate Microeconomics, University of Washington, 2015-2016
Introduction to Microeconomics, University of Washington, 2014

Teaching Assistant

Introduction to Macroeconomics, University of Washington, 2012-2013
Introduction to Microeconomics, University of Washington, 2012-2013

Awards and Fellowships

Grover and Greta Ensley Fellowship, University of Washington, 2016
Corkery Fellowship, University of Washington, 2013
York Fellowship, University of Washington, 2011-2012
Dean's List, University of Chicago, 2004-2008

Computer Skills R, Python, Matlab, Stata, L^AT_EX, ArcGIS

Research

Machine Learning for Causal Inference: An Application to Air Quality Impacts on House Prices (Job Market Paper)

Hedonic models are commonly used to recover the implicit prices of house attributes and local non-market public goods such as environmental quality. Yet they are plagued by omitted variable bias when variables that are correlated with the attribute in question are unobservable. Typically, researchers have relied on fixed effects, instrumental variables, or quasi-randomness to control for this. However, these methods require strong underlying assumptions that are often a priori implausible. The increase in availability of big data and unstructured data in the form of text and images allow for a more extensive set of variables that are relevant to consumers to be included in hedonic methods. Unstructured data are high-dimensional and require machine learning methods that are robust to multicollinearity and irrelevant variables. I collect a rich and comprehensive dataset of property listings from Zillow.com and extract features from house descriptions and curbside view images using natural language and computer vision tools. I apply machine learning techniques to estimate the effects of air pollution on house prices in Pennsylvania. Coupled with the inclusion of more data, this approach nests previous methods to further reduce bias. My results show that omitting important variables can understate the negative effects of air pollution on house prices by more than half.

The Effects of Zoning Regulations on Housing Affordability

Relaxing zoning regulations by allowing for denser housing can encourage more efficient land use and more affordable housing. The restrictions increase the sale prices by limiting supply as well as encouraging more expensive house structures. Standard boundary discontinuity design assumes that all other attributes are random at the boundary. Using a high-dimensional Zillow dataset on house transactions in Seattle, I apply Lasso-type methods to test this assumption. These methods are suitable for high-dimensional data because they conduct variable selection. In this paper, I find that a large number of variables are also discontinuous at zoning boundaries and that zoning encourages more luxurious homes. My results indicate that controlling for features that are discontinuous at the boundary increases the effect of zoning on house prices from 9% to 14%.

Working Papers

“Machine Learning in a Hedonic Model: Estimating the Impact of Fracking on House Prices” with Miaoyu Yang

“Medium-term Implications of Labor Cost Shocks on Firm Survival: Evidence from Seattle’s \$15 per Hour Minimum Wage Hike” with Amy Lastuka and Carlos A. Manzanares

“Revisiting School Quality and Boundary Discontinuity Design with High-Dimensional Data”

“Air Quality and Health in Northern Africa: Use of Satellite Imagery”

Presentations

POMS 2017 Annual Conference, Seattle, 2017

Economic Graduate Student Conference at Washington University in St. Louis, 2015

Duck Family Graduate Workshop in Environmental Politics and Governance, University of Washington, 2015