

Arman Khachiyan

Economics Department, UNIVERSITY OF CALIFORNIA, SAN DIEGO

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CONTACT INFORMATION

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EDUCATION

PhD Candidate in Economics, University of California, San Diego, expected completion June 2022
Committee: Gordon Dahl (Chair), Gordon Hanson, Judson Boomhower, Alexander Gelber, James Fowler
B.A., Economics, Minor in Public Policy, University of California Berkeley, 2013

REFERENCES

Gordon Dahl, University of California, San Diego, gdahl@ucsd.edu, (858) 822-0644
Gordon Hanson, Harvard University, gordon_hanson@hks.harvard.edu, (617) 496-1074
Judd Boomhower, University of California, San Diego, boomhower@ucsd.edu, (858) 534-7040

FIELDS OF INTEREST

Labor, Environmental, Urban/Spatial

TEACHING

Instructor: Econometrics (120B, SU 20)

Teaching Assistant: Econometrics (120B, WI 18 & 19), Education (147, FA 17 & 18), Labor (139, SP 18), Public (134, SP 19 & 20; 406, SP 21), PhD Labor Methods (250, FA 18, 19, 20 & 21), Advanced GIS/Remote Sensing (444, WI 19 & 20)

Reader: Labor (139, SP 17), Micro Intro (1, FA 16), Micro A (100A, WI 17)

RELEVANT POSITIONS HELD

Research Intern in Human Resources, Microsoft, 2019
Senior Research Assistant, Federal Reserve Bank of Boston, 2013-2016
Economic Analysis Intern, US Bureau of Labor Statistics, 2012-2013

FELLOWSHIPS, HONORS, AND AWARDS

Russell Sage Foundation Project Grant for Computational Social Sciences (\$174,702, 2019-2021)
UCSD: First-year Fellowship, Summer Research Fellowship, Candidacy Fellowship
UC Berkeley: Highest Honors, Gilman Scholarship, Pedrozzi Scholarship

RESEARCH

“The Impacts of Fracking on Microspatial Residential Investment”

Job Market Paper

As fracking has become the dominant method of oil and gas extraction in the US, the population living within 1 mile of a well has quadrupled to over 10 million. While environmental externalities of this extraction are most concentrated within 1 mile, profits predominantly flow out of the host county. Measuring the intensity and distribution of fracking impacts on adjacent neighborhoods requires outcomes with high spatial resolution. I study changes in total neighborhood income and population which are derived from machine learning models trained to identify urban growth in daytime satellite imagery. Coupled with a precise shale geology instrument, my microspatial approach identifies that fracking exposure as far as 20 miles away leads to a 2 percent decline in neighborhood income. The spatial gradient and associated mechanisms of this effect indicate that it is driven by local industrialization rather than direct environmental externalities. While this effect is exacerbated by more extraction, it completely attenuates in areas with strong environmental protections or employment specialization in relevant sectors.

“Using Neural Networks to Predict Micro-Spatial Economic Growth” with Anthony Thomas, Huye Zhou, Gordon Hanson, Alex Cloninger, Tajana Rosing, and Amit Khandelwal

AER: Insights, Conditionally Accepted

We apply deep learning to high-resolution satellite imagery to predict changes in income and population at very high spatial resolution in US data. For spatial units with dimensions of 1.2km and 2.4km, our model predictions achieve R^2 values of 0.85 to 0.91 in levels, and 0.32 to 0.46 in decadal changes. These results far exceed the accuracy of existing models. At these spatial resolutions, nighttime lights have minimal predictive power for changes in economic activity. Our model can be used to create outcome variables for economic analysis where survey data are sparse or non-existent.

“Occupational Skill Portability: How Mobility Patterns Can Enhance Existing Skills Data”

Rich data on the multi-dimensional task requirements of each occupation has sparked a breadth of economic literature examining the portability of human capital across the labor market. A primitive in such analyses is constructing a norm over the vectors of occupational skills to create a continuous measures of skill distance between occupation pairs. While the existing literature has centered around factor analysis and angular separation as the leading norms, I show that using a regression framework derived from an Eaton, Kortum, Roy model of occupation switching directly implies a novel, empirical norm which is disciplined by observed occupation switching patterns. This approach relieves key limitations of existing measures, such as linearity and the inability to distinguish directional differences in skill portability, and allows for an analysis of which skill dimensions are critical in the portability of human capital, and which are not. Implications for existing results on skill portability are discussed, along with immediate policy applications to alleviate adjustments costs of workers switching occupations mid-career. Skill portability measures are aggregated, showing that compositional changes in employment by occupation since 1976 have lead to increased overall skill portability. Finally, using this novel measure of skill portability, network analysis shows that the incidence of a recession on job loss across the occupation network is related to the severity and duration of employment effects overall and by occupation.

“The Impacts of Clustered Attrition on Retention and Performance” with Jacob LaRiviere

Using a comprehensive five-year panel dataset of tens of thousands of employees in a large technology firm, we study how clustered team-level attrition impacts rates of promotions, bonuses and attrition among remaining employees. We deploy a novel identification strategy leveraging changes in the firm's stock vesting schedule to isolate random variation in clustering of voluntary attrition. While a change to smoother vesting schedules leads to smoother attrition patterns, we find no evidence that attrition concentrated within a team within a short time span meaningfully impacts remaining teammates.

“Changing Patterns in Informal Work Participation in the United States 2013-2015” with Anat Bracha and Mary Burke

Federal Reserve Bank of Boston Current Policy Perspectives, 2015

In light of the weak labor market conditions in the United States from 2008 until recently, one might have expected that participation in alternative income-generating activities, such as informal side-jobs, would have increased during that period. By the same logic, participation in informal work should have declined more recently, as conditions in the formal labor market improved. However, recent technological innovations have created a number of new opportunities for engaging in informal work. Such innovations may have promoted structural increases in informal work participation; if so we would expect informal work participation to remain elevated or increase further even as the economy improves. To test these predictions the authors designed the Survey of Informal Work Participation, fielded within the Federal Reserve Bank of New York's Survey of Consumer Expectations. The survey was fielded in December 2013 and again in January 2015, on two separate, nationally representative samples. The first survey was designed mainly to assess the extent and intensity of participation in paid informal work activities and its determinants, the types of activities engaged in, and the extent to which such activities helped individuals to compensate for negative economic shocks during and after the recession. The second survey was designed to follow up on the main outcomes of the first and to determine whether the motivations for engaging in informal work and/or the types of people drawn to such work, had changed as the labor market improved.

CONFERENCE PRESENTATIONS

Southern California Graduate Conference in Applied Economics (November 2021)

Online Summer Workshop in Environment, Energy, and Transportation Economics (October 2021)

Urban Economics Association North America (October 2021)

All California Labor Economics Conference (September 2021)

UEA Summer School in Urban Economics (September 2021)

Chicago Booth Summer Institute in Machine Learning in Economics (August 2021)

Geospatial Analysis for Development (December 2020)

Machine Learning in Economics – Burke Lab @ GPS (December 2019)

Empirical Studies of Conflict (May 2019)

UCSD Seminars: Applied Lunches, Omni Methods Group, Graduate Student Research Seminar, Political Science Panel on Remote Sensing, Global Policy and Strategy Workshop on Remote Sensing

OTHER INFORMATION

Computer Skills: Stata, Latex, ArcGIS, Python, R, SQL, z-Tree

Personal: Naturalized US Citizen (Born in Yerevan, Armenia), Married