Sayantan Roy

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Education

- Ph.D. Economics, Purdue University   2021-Present
- M.A. Economics, Madras School of Economics   2019
- B.S. Economics, R.K.M.R College, Narendrapur   2017

Areas of Interest

- Primary: Macroeconomics
- Secondary: Labor Economics, Time Series Econometrics, Computational Methods

Academic Research

- County Population Size and the Employment Effects of Fiscal Policy [JMP]

  - Does \$1 per capita in stimulus create the same number of jobs everywhere? I document an inverted-U relationship between local employment responses and county population size. Using county-level variation in American Recovery and Reinvestment Act (2009-12) spending, I find that local employment responses are largest in mid-sized counties (approximately 100,000 residents) and substantially smaller in both small counties (approximately 10,000 residents) and large counties (approximately 1 million residents). To understand these patterns, I develop a multi-region new Keynesian model with representative agents, search-and-matching labor market frictions and endogenous labor force participation, calibrated to reflect conditions during the zero lower bound. The model rationalizes the empirical findings through distinct mechanisms operating at different county sizes: small counties experience significant demand leakages due to their economic openness, while large counties face constrained job creation despite stimulus spending, as high prevailing vacancy posting costs limit firms' incentives to post new vacancies. These results demonstrate that the aggregate effectiveness of fiscal stimulus depends critically on its geographic distribution. Targeting mid-sized labor markets during the Great Recession may have improved the employment impact of a finite stimulus. Reallocating 35% of ARRA funds from large to mid-sized counties reduces the cost per job-year by about \$1,050 (to \$47,687) and adds roughly 103,000 job-years (+2.2%). A full reallocation reduces the cost per job-year by about \$2,900 (to \$45,851) and yields roughly 295,000 additional job-years (+6.3%).

- Gender Gaps in Employment Seasonality: The Role of Unemployment Insurance [Ongoing]

  - Labor market risk naturally arises due to seasonal shocks. For example, construction employment peaks in summer and slows in December, while retail surges in December and dips in

January. A key question is whether this seasonality also appears in the number of workers receiving Unemployment Insurance (U.I.) benefits each month. While U.I. is designed to protect against unexpected shocks, seasonal fluctuations in insured unemployment may still occur as firms lay off excess workers during off-peak periods. The imperfect experience-rated tax structure of U.I. incentivizes firms to retain surplus workers, with layoffs following these seasonal cycles. I document significant seasonal differences in insured unemployment between men and women. Gendered patterns in employment and caregiving responsibilities likely contribute to the distinct seasonality observed for women.

Languages & Frameworks

- Python, MATLAB, SQL, Pyspark, Stata, Git, Julia
- Code Samples: Available on GitHub

Teaching Experience

- (Head TA) Macroeconomic Theory III for Prof. Seungki Hong   2023S, 2024S
- (Head TA) Money and Banking for Prof. Seungki Hong   2023S, 2024S, 2024F, 2025F
- (TA) Intermediate Macroeconomics for Prof. Trevor Gallen   2022S

Industry Experience

Data Scientist - Credit and Fraud Risk Division, American Express   July 2019 – June 2021

- Developed point in time revenue prediction using boosting methods (XGBoost)
- Developed arbitration logic for assigning best SIC code to commercial customers
- Developed variables to enhance the in-house classification model predicting the risk of default

Awards, Grants, and Honors

- Krannert Doctoral Students' Research Symposium Winner, Purdue University   2024
- Novshek-Watts Scholarship, Purdue University   2021
- Graduate Excellence Award, Madras School of Economics   2019
- Academic Fellowship, Madras School of Economics   2017-19
- Academic Excellence Award, R.K.M.R College Narendrapur   2017