APPLICATION FOR NBER INNOVATION RESEARCH BOOT CAMP 2025

Joy Bayan
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Reference: Rupal Kamdar: rkamdar@iu.edu
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Dear Selection Committee,

I am writing to express my interest in attending the NBER Innovation Research Boot Camp 2025. As a fourth-year Ph.D. student in Economics, my research examines the role of trade openness in shaping inflation unemployment dynamics across U.S. metropolitan areas, with a particular focus on the U.S regional Phillips Curve. I believe this boot camp will be invaluable in deepening my understanding of the connection between macroeconomic dynamics and urban economics.

I analyze how trade openness alters the slope of the Phillips Curve and the transmission of foreign inflation into domestic price levels. This work contributes to the broader literature on inflation dynamics by incorporating regional heterogeneity, themes that align with the nature of this bootcamp.

Attending the boot camp will provide an opportunity to refine my analytical approach, engage with leading scholars, and explore how innovation shapes urban and regional economics. I am particularly eager to gain insights into regional import exposure, and their interaction with labor market— crucial in understanding inflationary pressures. The exposure to cutting-edge research in the economics of innovation will enhance my ability to integrate regional patterns into macroeconomic models.

I have listed my reference and also attached my curriculum vitae with a list of my Ph.D. coursework, and a one-page research statement outlining my current and future research.

Thank you for your time and consideration.

JOY BAYAN

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EDUCATION

Indiana University
Ph.D. in Economics, 2021–2026 (Expected)
University of Minnesota
M.A. in Public Policy (Advanced Data Analysis), 2017
Honors B.A. in Global Studies, German Minor, 2013

Ph.D. COURSES: Machine learning, Computational macroeconomics, macro-econometrics, Empirical Macro, Econometrics (1,2,3), macroeconomics (1, 2), microeconomics (1, 2), international trade (1, 2), Advanced Industrial Organization, Game theory, Seminar in money

RESEARCH INTERESTS

Computational Macro, Monetary Policy, Machine Learning, Regional and Urban Economics

RESEARCH EXPERIENCE

SUPERVISION AND CREDIT (05-08/2024), FEDERAL RESERVE BANK OF SAN FRANCISCO
- Analyzed large datasets on commercial real estate and bank loans using Python and R.
- Managed and examined banking deposits and loan data.
- Developed and validated mathematical machine learning models.

MACHINE LEARNING RESEARCH ASSISTANT, Prof. Yoosoon Chang, Indiana University
- Developed Functional Investment Curve distribution and proxy vector autoregression

MACROECONOMICS RESEARCH ASSISTANT, Prof. Todd Walker, Indiana University
- Solved RBC and DSGE models, plotted impulse response functions, PDFs, and CDFs

MACHINE LEARNING RESEARCH ASSISTANT, Prof. Mostafa Beshkar, Indiana University
- Analyzed and categorized 1,229 UNCTAD dispute cases of foreign direct investment

CONFERENCE PRESENTATIONS

-Regional and Aggregate Phillips Curve before and after 2001: Instrumental Variable Approach, Hoosier Conference, Indiana University (2024)
- Humphrey Hawkins Act &Monetary Policy, Federal Reserve Banks of Minneapolis, (2017)
- Women Deliver Conferences, Copenhagen, Denmark; Vancouver, Canada (2016, 2019)
- What You Need to Know for the 2020 Census, MN State Demographic Center (2018)
- Evaluation of City of Brooklyn Park's Rebranding, Center for Regional & Urban Affairs of University of Minnesota (2017)

TEACHING EXPERIENCE

Associate Instructor, Intro to Macroeconomics, Indiana University, (09/2021–Present)
- Designed course material and led discussions on macroeconomic models

Teaching Assistant, (09/2021–09/2024)
- Courses: Intro to Statistics, Intro to Macroeconomics, Intro to Gender Economics

PROFESSIONAL EXPERIENCE

MINNESOTA DEPARTMENT OF HEALTH
Senior Research Analyst (08/2021)

- Independently analyzed and published public dashboards on COVID-19 using Tableau, R Shiny, and web services.

- Provided data analysis for the Governor's office, media, and public briefings.

MINNESOTA DEPARTMENT OF REVENUE
Management Analyst 3, Research Analyst 1 (08/2017–04/2019)

- Developed query tools and custom SQL queries for relational databases.

- Conducted statistical analysis on county tax data and created real-time SQL reports.

MINNESOTA DEPARTMENT OF ADMINISTRATION
Research Analyst, Visiting Star of the North Fellow (01/2018–07/2018)

- Led population forecasting for Census 2020 using STATA.

- Conducted policy and financial analysis on redistricting processes.

TECHNICAL SKILLS

- Programming & Software: Python, R, MATLAB, Julia, SQL, SAS, STATA

- Data Visualization & Modeling: Tableau, SQL Server Reporting Services, Machine Learning

CITIZENSHIP

United States, Mongolia

RESEARCH STATEMENT

My research interests lie in leveraging micro-level data to answer macro level questions. My latest research uses a New Keynesian framework extended to metro-level heterogeneity and examines how increased national imports alter inflation pass-through and the sensitivity of inflation to slack. I use how national trade openness influences the Phillips Curve relationship across U.S. metropolitan areas**.** My research interest are the connections between U.S metro-level inflation, unemployment, and import shares for estimating macroeconomic concepts such as Phillips Curve coefficient.

My preliminary findings indicate that metro areas with higher import penetration exhibit a flatter Phillips Curve, suggesting that global price pressures play a greater role in shaping local inflation. This has implications for monetary policy transmission, as traditional measures of slack may be less predictive of inflation in more trade-exposed regions. Further, I explore the role of firm-level price-setting behavior in shaping these regional inflation patterns, connecting my work to broader questions in innovation research, particularly around technological diffusion and global supply chains.

Moving forward, I aim to incorporate Covid-19 import disruptions to examine how supply-chain influences regional inflation dynamics. Covid-19 is an unusual macroeconomic shock and can't easily be categorized as an aggregate supply or demand shock as it is a messy combination of disaggregated sectoral supply and demand shocks. The NBER Innovation Research Boot Camp presents an exciting opportunity to engage with scholars. I hope to refine my understanding of how supply chain shock affects inflation at the regional level.

This boot camp will provide the theoretical and empirical foundation necessary to expand my research into how innovation, trade openness, and regional economic structure shape inflationary trends in the modern economy. I look forward to the research community at NBER and contributing to the discourse on macroeconomic and innovation policy.