

## M. JAHANGIR ALAM, PhD

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## Job Market Paper:

**Differential Effects of Monetary Policy on Capital Misallocation**, with Pedro Bento and Tatevik Sekhposyan.

**Abstract:** This research examines the supply-side effects of monetary policy interventions on capital misallocation, a less explored area compared to demand-side impacts. We first derive various measures of capital misallocation and efficiency, using the methodological framework of Hsieh & Klenow (2009). Using the Compustat database and high-frequency financial market data, we identify monetary policy shocks through a local projections–instrumental variables (LP-IV) approach. Our results indicate that a 100 basis point increase in the two-year Treasury rate increases capital misallocation by approximately 2% and reduces efficiency by more than 1%. Additionally, our empirical results indicate that contractionary monetary policy exacerbates financial frictions, showing that tighter monetary policy affects young, small, and low net worth firms more than their counterparts, leading to increased resource misallocation and consequently reduced economic efficiency.

## Online Textbook:

- *Data Science with Generative AI for Economic and Social Issues*
  - Applies machine learning techniques to causal estimation methods, forecasting, and practical Python exercises for data analysis.
  - Learning aids include summaries, exercises, replication codes, LaTeX slides, and Python code access via Google Colab and GitHub.
  - Incorporates AI tools like ChatGPT and ChatBot for interactive Q&A, coding assistance, and personalized learning experiences.

## Professional Experience:

- **Visiting Assistant Professor, Texas A&M University, 2023 - 2024**
  - Taught Intermediate Macroeconomics, Data Science for Economic and Social Issues, Financial Econometrics (MA), and Industrial Organization.
  - Led ongoing research projects utilizing the Census Bureau’s confidential databases, accessed through the Federal Statistical Research Data Center (FSRDC), to document the differential effects of monetary policy on firm-level trade and resource misallocation.
  - Conducted research and wrote an online textbook applying modern machine learning tools to traditional causal estimations and forecasting.
  - Led a research project using ChatGPT with RAG to predict inflation expectations for the United States, Canada, and globally in collaboration with Huiyu Li, Research

Advisor at the Federal Reserve Bank of San Francisco, and Tatevik Sekhposyan, Professor at Texas A&M University.

- Organized a series of workshops to establish a generative AI practice at Texas A&M University, supporting faculty to implement Generative AI teaching.

- **Visiting Assistant Professor, Western Michigan University, 2021-2023**

- Taught graduate courses in Macroeconomic Theory (MA) and Monetary Economics (PhD) with an emphasis on forecasting and structural estimations as well as Intermediate Macroeconomics, Principles of Macroeconomics, and Principles of Microeconomics.
- Conducted macroeconomic research and forecasting using advanced econometric techniques.

- **Temporary Assistant Professor, Truman State University, 2019-2021**

- Taught Intermediate Macroeconomics, Economic Growth and Development (Macro), Principles of Macroeconomics, Principles of Microeconomics, and Econometrics.
- Conducted extensive research applying causal estimation techniques and utilized large confidential business databases.

- **Post-Doctoral Fellow, HEC Montréal, 2017-2019**

- Worked at Statistics Canada to create a synthetic database for Canadian business database.
- Identified the cause-effect of the Canada-US Free Trade Agreement on productivity and product price dispersion.

## Education

- Doctor of Philosophy, Economics, University of Calgary, Canada, 2017.
- Master of Arts, Economics, University of Calgary, Canada, 2011.

## Published Papers, R&R, Submitted

- The Long-Run Effects of Monetary Policy: The Role of R&D Investment in Economic Growth, May 2024, with Eskander Alvi, *Economic Modeling*, Vol. 137.
- Capital Misallocation: Cyclicalities and Sources, March 2020, *Journal of Economic Dynamics and Control*, Vol. 112(C).
- Applying Data Synthesis for Longitudinal Business Data across Three Countries, with Benoit Dostie, Jörg Drechsler, Lars Vilhuber, August 2020, *STATISTICS IN TRANSITION new series*, 21(3): 223-247.
- Price Dispersion and Trade Policy: Evidence from the Canada-US Free Trade Agreement, *Review of International Economics* (R&R).
- Effect of Monetary Policy on Productivity: Frictions in High-Tech Firms, with Haydory Akbar Ahmed and Khandokar Istiak, *North American Journal of Economics and Finance* (R&R).

- Spatial Misallocation and Its Determinants in Canada, with Herb Emery, *Canadian Journal of Regional Science* (R&R).
- Place-Based Scholarships: Treatment Effects from the Kalamazoo Promise, with W. Jason Beasley, *Applied Economics* (R&R).
- The Convenience Yield Channel of Monetary Policy and International Stock Prices, with Matthew Schaffer and Rashed Sardar, *Journal of Empirical Finance* (Submitted).
- Welfare Effects of the Canada-U.S. Free Trade Agreement: A Product-Level Analysis, *Economics Letters* (Submitted).

## Research using AI and ML:

- Applying ML Methods in Causal Estimation: Analyzing the Benefits of College Athletic Success, with Gerard Tetegan, *Journal of Machine Learning Research* (submitted)
  - Compare the effectiveness of machine learning algorithms (Logistic Regression, K-Nearest Neighbors, Random Forest, Gradient Boosting, Support Vector Machine, Artificial Neural Network) in estimating causal effects.
- Identifying Macro Determinants of Natural Disaster: Applying Machine Learning Approach, with Pallab Mozumder, *Computational Economics* (submitted)
  - Apply Single and Double Lasso regression techniques to identify key macroeconomic determinants of natural disasters.
- Inflation Expectations Through the Lens of Artificial Intelligence, with Huiyu Li and Tatevik Sekhposyan.
  - Conducted research on the economic implications of AI and technology, providing insights into policy and strategy for AI development.
- Dispersion of News Sentiment and Stock Price Return: Applying Deep Learning Approach, with Maksim Isakin
  - Applied AI and advanced NLP techniques, including transformers and Long Short-Term Memory (LSTM) networks, for sentiment analysis and stock price prediction, delivering actionable insights for financial decision-making.

## Will Submit Soon & Work in Progress

- Monetary Policy Shocks and Allocative Efficiency across U.S. Firms, with Pedro Bento and Eskander Alvi.
- Misallocation and Trade Policy, with Huju Liu.
- Estimating the Impacts of the COVID-19 Shock on Household Consumption Patterns, with Nazneen Ahmad.
- Differences in Firm Growth across Countries: Does it Explain GDP Differences?
- Productivity Gains from International Trade: Does Firm Age Matter?

## Invited Presentations

- 2024: Algoma University (Brampton, Canada).
- 2023: Texas A&M University (College Station, USA); Western Michigan University (Kalamazoo, USA).
- 2022: Cleveland State University (Cleveland, USA); Western Michigan University (Kalamazoo, USA).
- 2021: Western Michigan University (Kalamazoo, USA).
- 2019: Statistics Canada (Ottawa, Canada); Statistics Canada (Ottawa, Canada).
- 2018: Bank of Canada (Ottawa, Canada); Canada Mortgage and Housing Corporation (Ottawa, Canada); Carleton University; HEC Montréal (Montréal, Canada).
- 2017: Statistics Canada (Ottawa, Canada).

## Conference Presentations

- 2024: CEA Annual Meeting (Virtual).
- 2023: CEA Annual Meeting; Midwest Economic Association Annual Meeting (Cleveland, USA).
- 2022: Northeast Ohio Workshop Program (Federal Reserve Bank of Cleveland, USA); Southern Economic Association Conference (Fort Lauderdale, USA); Midwest Economic Association Annual Meeting (Minneapolis, USA); CEA Annual Meeting (Ottawa, Canada).
- 2021: Virtual WEAI Annual Conference; CEA Annual Meeting (Vancouver, Canada).
- 2020: Eastern Economic Association (EEA) Conference (Boston, USA).
- 2019: Comparative Analysis of Enterprise Data (CAED) Conference (Michigan, USA); CEA Annual Meeting (Banff, Canada).
- 2018: SEA Annual Conference (Washington, DC, USA); Canadian Research Data Centre Network (CRDCN) National Conference (Hamilton, Canada); CEA Annual Meeting (Montréal, Canada); WEAI Annual Conference (Vancouver, Canada).
- 2017: CEA Annual Meeting (Nova Scotia, Canada); WEAI Annual Conference (San Diego, USA).
- 2015: CEA Annual Meeting (Toronto, Canada).
- 2011: EAERE Conference (Rome, Italy).

## Non-Academic Experience:

- **Founder, AiEconLab, 2023 - 2024**

- Integrated AI into real-world applications in collaboration with Richard Fung, Senior Software Engineer at Databricks.
- Developed and optimized PlusMind AI quiz generation system with LMS export, enhancing it through faculty feedback.
- Deployed and evaluated AI-driven educational tools, including course-specific chatbots, at TAMU on Azure and GCP.

- **Founder, AIRE Institute: AI Research & Innovation, 2024 - 2024**

- Spearheaded the establishment of the AIRE Institute, aimed at driving global competitiveness through AI-driven solutions in manufacturing and education, with a focus on innovation, sustainability, and strategic partnerships.
- Lead initiatives to develop specialized AI training programs and foster collaboration between academic institutions and industry leaders, enhancing the adoption of AI technologies for resilient and future-ready industries.

## Programming Skills

- Python, R, MATLAB, STATA, SAS, SQL.

## Data Science Skills

- Data Manipulation: Pandas, dplyr.
- Data Visualization: Matplotlib, Seaborn, ggplot2.
- Statistical Analysis: Hypothesis Testing, Regression.
- Data Cleaning and Preprocessing, Feature Engineering, Exploratory Data Analysis.
- Model Evaluation and Validation, Time Series Analysis.
- Natural Language Processing (Sentiment Analysis).
- Big Data Technologies: Spark.
- Deep Learning: TensorFlow, Keras, PyTorch.

## Leadership and Service

- Advisor, Truman Economics Club, Truman State University, USA, 2021.
- President, Economics Graduate Association (EGA), University of Calgary, Canada, 2013.
- Undergraduate Coordinator, BRAC University, Bangladesh, 2008 – 2010.

## References

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