

Zhiruo (Rachel) Zhang

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School of Economics, College of Business and Law
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Graduate Studies

Adelaide University

2022-present

Ph.D. Candidate in Economics and Econometrics
Expected Completion Date: June 2026

REFERENCES

Prof. Firmin Doko Tchatoka

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Adelaide University
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A/Prof. Qazi Haque

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A/Prof. Virginie Masson

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Prior Education

Monash University, Australia

July 2016 – July. 2021

- *Master of Applied Econometrics*

Dissertation: Empirical Analysis of a Time-varying Vector Autoregression Model
Supervisor: Prof. Jiti Gao

- *Bachelor of Business*

Major: Finance; Minor: Business Statistics

Fields

Primary: Macroeconometrics, Bayesian Time Series and Panel Data Econometrics

Secondary: Machine Learning, Nonlinear Time Series Models

Job Market Paper

“Adaptive Bayesian Shrinkage of High-Dimensional Panel VARs.” 2025.

With Firmin Doko Tchatoka and Qazi Haque

This paper develops a Bayesian framework for estimating high-dimensional panel vector autoregressions (PVARs). We propose a novel approach that combines Bayesian shrinkage with adaptive variable selection to effectively tackle over-parameterization and sparsity common in high-dimensional panels. By employing Laplace-based spike-and-slab priors on model coefficients, the framework flexibly captures both cross-sectional inter-dependencies and unit-specific heterogeneity, offering a powerful and robust tool for structured inference. Monte Carlo simulations demonstrate that our method outperforms existing regularization techniques in terms of estimation accuracy and forecasting performance. Empirically, the framework uncovers asymmetric financial contagion within euro area sovereign bond markets and produces stable, reliable forecasts across a multi-country macroeconomic panel. These findings highlight the effectiveness of adaptive shrinkage in modeling heterogeneous and evolving linkages within complex panel data systems.

Working Papers

“Bayesian Network Estimation for High-Dimensional Panel VARs.” 2025.

With Firmin Doko Tchatoka and Qazi Haque.

This paper develops a Bayesian Graphical Network Lasso to estimate sparse precision matrices in high-dimensional panel VAR models with exogenous variables (PVARX). By directly targeting the inverse error covariance matrix, the method identifies contemporaneous conditional dependencies across macroeconomic units in a structure-aware and order-invariant way. We incorporate both adaptive and non-adaptive shrinkage priors, offering flexibility in modeling heterogeneous sparsity patterns. Monte Carlo simulations show strong performance in recovering the underlying graphical structure. In an empirical application, we analyze the global transmission of natural disaster shocks across high-income economies, uncovering a sparse but economically meaningful network of international macroeconomic spillovers.

Selected Work in Progress

- [1] Disentangling Spillover Networks and Transmission Channels in Panel VARs
- [2] Structural Transformation, Green Technology, and Labor Reallocation (with Xiyu Ni)

Teaching Experience

Tutor, Adelaide University

- *ECON 1012 Data Analytics* (Semester 1, 2026)

Tutor, The University of Adelaide

- *ECON3530 Applied Econometrics III* (Semester 1, 2024; Semester 1, 2025)
- *ECON3510 International Finance III* (Semester 2, 2024; Semester 2, 2025)

- *ECON2508 Financial Economics II* (Semester 1, 2024)
- *ECON2513 Global Economic History II* (Semester 2, 2025)
- *ECON2514 Managerial Economics II* (Semester 2, 2024)
- *ECON2515 Intermediate Applied Econometrics II* (Semester 2, 2023)
- *ECON1005 Introduction to Mathematical Economics I* (Semester 1, 2024; Semester 1, 2025)

Other Teaching Assistant Roles

- Converted econometrics teaching materials from **Stata** to **R**
- Developed code examples and solution templates.

Professional Experience

Casual Administration Coordinator, Adelaide University 2026

- Provided administrative support for academic and professional activities within the School of Economics and Public Policy.
- Assisted with event coordination, communications, scheduling, and logistics for seminars, workshops, and conferences.

Lab Assistant, Adelaide Laboratory for Experimental Economics, Adelaide University
2025

- Supported the administration and implementation of behavioural and experimental economics research activities.
- Assisted with participant coordination, laboratory preparation, and data collection for experimental economics studies.

Professional Activities

Presentations

- 2025**
- World Congress of the Econometric Society 2025
 - 39th Annual Australian PhD Conference in Economics and Business
 - 10th Workshop of the Australasian Macroeconomics Society (WAMS + LAEF 2025)
- 2024**
- Australasian Meeting of the Econometric Society
 - Continuing Education in Macroeconometrics
 - Australian Conference of Economists
 - Africa Meeting of the Econometric Society
 - The 32nd Australia New Zealand Econometric Study Group Meeting
- 2023** The 31st Australia New Zealand Econometric Study Group Meeting (Poster)

Seminar

2024 Adelaide University SEPP HDR Internal Seminar

2023 The School of Economics and Public Policy Brown Bag Workshop

Conference Service

2026 - Australasian Meeting of the Econometric Society
— *Local Organizing Committee, Secretary*

2024 - Australian Conference of Economists (*Volunteer*)
- Continuing Education in Macroeconometrics (*Volunteer*)

Scholarships and Grants

Adelaide International Graduate Research Scholarship, Adelaide University 2022–2026

Travel Grants, School of Economics, Adelaide University 2024–2025

Technical Skills

Programming Languages: MATLAB, R, Stata, Julia

Scripting & Workflow Tools: Git, Bash, Slurm (HPC)

Document Preparation: L^AT_EX, Markdown, HTML

Languages

Mandarin (native), English (fluent), Russian (intermediate)

Last updated: May 11, 2026