YSS3336 Quantitative Methods in Global Affairs

Yale-NUS College
Spring 2022

Instructor:	XU Jian	**Time:**	Mon&Thu 19:30 - 21:00
Email:	jianxu@nus.edu.sg	**Place:**	Y-PgRm1.

Office Hours: Mon&Thu 21:00 - 22:00 or by appointment

Module Description:
This module offers training in quantitative tools to conduct empirical research in Global Affairs. It builds upon the foundations of QR and the Methods in the Social Sciences. Topics include the challenges in causal inference, potential outcomes framework, regression analysis, matching analysis, experimental/quasi-experimental (RDD, Dif-in-Dif) methods, instrumental variable analsysis, and diagnostics and presentation of data. Students learn statistical and econometric theories and concepts, while gaining hands-on coding experiences using R-programming. The module provides quantitative skill sets applicable for GA Capstone projects, especially in international relations, international development, and transboundary phenomena such as globalization, global health, and international migration.

Objectives:
By the end of this course, students should be able to conduct empirical quantitative analysis utilizing advanced methodologies to answer their research questions. Students will be familiar with a wide range of quantitative analytical tools and select the most appropriate one to address the question at hand, based on their understandings of the underlying statistical theories and the availability of data sources.

Main References: This is a list of resources that will be touched during the course.

- (MHE) Angrist, Joshua D., and Jörn-Steffen Pischke. *Mostly harmless econometrics.* Princeton university press, 2008.
- (QSS) Imai, Kosuke. *Quantitative social science: an introduction.* Princeton University Press, 2018.
- (CIM) Cunningham, Scott. Causal Inference. *Yale University Press*, 2021.
- (FE) Gerber, Alan S., and Donald P. Green. *Field experiments: Design, analysis, and interpretation.* WW Norton, 2012.

Optional References:

- Li, Quan. *Using R for Data Analysis in Social Sciences: A Research Project-oriented Approach.* Oxford University Press, 2018.
- King, Gary, Robert O. Keohane, and Sidney Verba. *Designing social inquiry.* Princeton university press, 2021 (new edition)

Grading Criteria:
Class Participation: 10%
In-class quizzes (4): 20% (4 x 5%)
Problem sets (4): 40% (4 x 10%)
Final replication/paper project: 30%
Final grade:

A+:100-97; A:96-94; A-:93-90; B+:89-87; B:86-84; B-:83-80; C+:79-77; C:76-74; C-:73–70; D+: 69-67; D:66-60; F:59-0

Course Schedule:

- Week 1 (Jan 10 & 13)

  Introduction and Reviews of Quantitative Research Methodology

  Recommended Reading:

  - QSS Chapter 1 (1.3)

  - Quan Li book (Optional)

- Week 2 (Jan 17 & 20)

  Overview of the Potential Outcomes Framework, Descriptive Inference, Causal Inference.

  Recommended Reading:

  - Imbens, G.W. and Rubin, D.B., 2015. Causal inference in statistics, social, and biomedical sciences. Cambridge University Press. (Chapters 1-2)

  - James, G., Witten, D., Hastie, T. and Tibshirani, R., 2013. An introduction to statistical learning. New York: springer. (Chapters 1-2)

- Week 3 (Jan 24 & 27)

  Review: Linear Regressions, Sampling Distribution, Point and Interval Estimation, Hypothesis Testing.

  Recommended Reading:

  - MHE Chapter 3

  - QSS Chapter 6, 7

- Week 4 (Feb 3) Quiz 1

  Prediction with Regression

  Recommended Reading:

  - QSS Chapter 4 (4.1,4.2)
  - James, G., Witten, D., Hastie, T. and Tibshirani, R., 2013. An introduction to statistical learning. New York: springer. (Chapters 3)

- Week 5 (Feb 7 & 10)

  Causal Inference with Regression I: DAGs, Randomization, Randomized Inference

  Recommended Reading:

  - QSS Chapter 4 (4.3)

  - CIM: Directed Acyclic Graphs, Potential Outcomes Causal Model

- Week 6 (Feb 14 & 17)

  Causal Inference with Regression II: Instrumental Variable Approach

  Recommended Reading:

- MHE Chapter 4
- CIM: Instrumental Variables

- Week 7 (Feb 28 & Mar 3) Quiz 2
  Causal Inference with Regression III: Regression Discontinuity Designs
  Recommended Reading:
  - MHE Chapter 6
  - CIM: Regression Discontinuity

- Week 8 (Mar 7 & Mar 10)
  Causal Inference with Regression IV: Difference-in-Differences Approach
  Recommended Reading:
  - MHE Chapter 5
  - CIM: Difference-in-Differences

- Week 9 (Mar 14 & Mar 17)
  Causal Inference with Regression V: Matching
  Recommended Reading:
  - CIM: Matching and Subclassification

- Week 10 (Mar 21 & Mar 24) Quiz 3
  Causal Inference with Randomized Experiments I: the Basics
  Recommended Reading:
  - MHE Chapter 2
  - QSS Chapter 2 (2.1-2.4)
  - FE Chapters 1-2

- Week 11 (no class: the ISA conference)

- Week 12 (April 4 & 7)
  Causal Inference with Randomized Experiments II: Complications
  Recommended Reading:
  - FE Chapters 4,5,9

- Week 13 (April 11 & 14) Quiz 4
  Real world data problems: measurements, types, and biases of data
  Recommended Reading:
  - QSS Chapters 3 & 5
  - FE Chapter 12

Important Dates:

Quiz #1	3 Feb, 2022
Quiz #2	3 Mar, 2022
Quiz #3	24 Mar, 2022
Quiz #4	14 April , 2022
Problem Set #1	30 Jan (23:59), 2022
Problem Set #2	27 Feb (23:59), 2022
Problem Set #3	20 Mar (23:59), 2022
Problem Set #4	10 Apr (23:59), 2022
Final project	29 Apr (23:59), 2022

Assignments

- All four quizzes will be conducted in-class comprised of only multiple choice questions.
- Problem sets are due one week after being published on Canvas. Submission is comprised of both R (R markdown preferred) and pdf/text files.
- Final project (5-10 pages) can be either (1) an original an analysis of a dataset (or datasets) that uses causal inference methods; or (2) a replication of an existing causal inference paper with some methodological extensions and/or revisions.
- Useful source: https://dataverse.harvard.edu/

Other Policies

- Late Submission Policy: Students are expected to plan and manage their workloads, and to ensure they do not lose work through IT malfunction or poor planning. Your assignment will be considered late if it misses the deadline without you having secured advance permission. For every late assignment, there will be a penalty, as your grade will go down by 1/10 of the full grade if you do not submit by the deadline. The grade will further fall by 1/10 of the full grade per 24 hours after the deadline. You will not be penalized for late submission of work if you receive a Medical Certificate or AD Note.
- Academic Integrity: When you submit assignments via Canvas, you will be required to check a box that confirms that all of your work is your own, and that all sources, quotations, and paraphrasing are noted and cited appropriately. All student submissions will be screened through Turnitin to check for potential plagiarism. By a vote of the Faculty at Yale-NUS College, professors must refer any suspected instances of academic dishonesty to the Academic Integrity Committee for assessment and adjudication.