Quantitative and Analytical Social Science

WMH00001 | Spring 2020

Instructor:	Gaku Ito (IDEC 506)	**Time:**	Wednesdays 12:50 pm – 4:05 pm
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Course Description and Objectives: Unpacking causal effects lies at the core of social science research. For example, does poverty cause domestic unrest? Does aid provision to some country reduce poverty in the recipient country? Does economic development foster democratic transition and consolidation? Does land abundance negatively affect economic development and state-building? These questions of causation have continuously attracted the interests of social scientists. In principle, however, we can only observe *correlations* or other forms of associations or dependence between a set of variables instead of a *causal effect* of a variable on another. How, then, can we go beyond observing correlations and isolate the underlying causal effects? This course introduces students to the minimum but concrete methodological knowledge and provides practical training of social science research to tackle these questions.

With continuous interests in causation, the past several decades have witnessed rapid expansion of quantitative and analytical approaches in a variety of fields of social science. Formal modeling has become a dominant form of theoretical studies, and quantitative social science has increasingly flourished in empirical studies. Reflecting the advances in quantitative and analytical approaches, qualitative researchers have also developed and sophisticated relevant research designs to examine causal effects. Regardless of their own methodological approaches, students of social science would benefit from concrete understanding of quantitative and analytical social science to tackle relevant research questions of causal effects.

The objectives of this course are twofold. The first objective is to introduce students to worthwhile approaches and core building-blocks of social science research. Our primary focus is on the ideas and concepts of *causal inference* among other approaches and topics. Depending on the backgrounds of the students, we would also take a closer look at *descriptive inference*, formal modeling, and/or experiments in social science research. The second is to provide students with practical training to review existing literature and conduct their own empirical researches. As described below, this course starts with sharing rough research ideas and potential challenges with each other. The concepts and methods introduced by the lectures and classroom discussion will guide students to sharpen their research projects.

Prerequisites: This course has no formal prerequisites. However, note that we will use four arithmetic operations. Familiarity with introductory (undergraduate-level) econometrics, experimental methods, and game theory will be helpful, but not required.

Also note that this course expects the students taking this course to be first-year master students and the students with limited methodological knowledge and training. Students do not have to involve in quantitative and analytical approaches, but are expected to understand and conduct *scientific* study of social phenomena. Although this course will not be going

into advanced econometric and statistical techniques, students familiar with the concepts and statistics of causal inference and formal modeling are also welcomed.

Requirements and Grade Policy: Students are expected to do all the assigned readings, attend to every lecture, and participate in classroom discussion. Grades will be based on participation in classroom discussion (30%), first research project presentation (30%), and final research paper and presentation (40%). Each week, we have a two- to three-period (90– to 135–minute) lecture followed by a one- or two-period (45– to 90–minute) classroom discussion. No exams are assigned. Details on the requirements and expectations for the assignments will be announced 2–4 weeks before the deadlines. Acts of cheating and plagiarism will be punished according to Hiroshima University's policy.

The length of the final research paper will be 3,000–5,000 words in English (or 6,000–10,000 characters in Japanese) and cover a related topic to the course (economic, social, or political phenomena). Students are required to (1) present their initial research ideas with core research question(s), literature review, and tentative research design to the class in the second week, and (2) revise and complete the project during the semester as the final research paper with empirical analysis.

Students taking this course should regularly follow major academic debates and recently published articles in the major journals of their fields, as well as keeping up on relevant world events by reading news media. For example, major journals relevant to students studying political science and related fields include: *American Political Science Review*, *American Journal of Political Science*, *Journal of Politics*, *Quarterly Journal of Political Science*, *Annual Review of Political Science*, *International Organization*, *World Politics*, *International Studies Quarterly*, *International Security*, *Journal of Conflict Resolution*, *Journal of Peace Research*, *Conflict Management and Peace Science*, *British Journal of Political Science*, *Political Science Research and Method*, *Cooperation and Conflict*, *Comparative Political Studies*, and *Comparative Politics*, among others. Depending on their research interests, students are also strongly recommended to consult major journals in related fields such as *American Economic Review*, *Quarterly Journal of Economics*, *Econometrica*, *Journal of Political Economy*, *Journal of Business and Economic Statistics*, *Economic Letters*, *Economics and Politics*, *Review of Economic Studies*, and *Political Analysis*.

Main References:

Main Text

1. Imai, Kosuke. 2017. *Quantitative Social Science: An Introduction*. Princeton: Princeton University Press.
   ⇝ Hereafter **QSS book**
2. Johnson, Janet Buttolph, H. T. Reynolds, and Jason D. Mycoff. 2020. *Political Science Research Methods*, 9th edition, Thousand Oaks, CA: CQ Press.
   ⇝ Hereafter **PSRM book**
3. King, Gary, Robert O. Keohane, and Sidney Verba. 1994. *Designing Social Inquiry: Scientific Inference in Qualitative Research*. Princeton: Princeton University Press.
   ⇝ Hereafter **DSI book**

Books

4. Hernán, Miguel A. and James M. Robins. 2020. *Causal Inference: What If*. Boca Raton: Chapman & Hall/CRC.

⇝ PDF copy available at the authors' website
https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/

5. van Evera, Stephen. 1997. *Guide to Methods for Students of Political Science*. Ithaca: Cornell University Press.

Book Chapters and Journal Articles

6. Dunning, Thad. 2008. "Improving causal inference: Strengths and limitations of natural experiments." *Political Research Quarterly* 61(2): 282–293.
7. Duflo, Esther, Rachel Glennerster, and Michael Kremer. 2008. "Using Randomization in Development Economics Research: A Toolkit." T. Schultz and John Strauss, eds., *Handbook of Development Economics. Vol.4*. Amsterdam and New York: North Holland.
8. Elwert, Felix, and Christopher Winship. 2014. "Endogenous Selection Bias: The Problem of Conditioning on a Collider Variable." *Annual Review of Sociology* 40: 31–53.
9. Gerring, John, and Rose McDermott, 2007. "An Experimental Template for Case Study Research." *American Journal of Political Science* 51(3): 688–701.
10. Holland, Paul. W. 1986. "Statistics and causal inference." *Journal of the American Statistical Association* 81(396): 945–960.
11. Keele, Luke. 2015. "The Statistics of Causal Inference: A View from Political Methodology." *Political Analysis* 23(3): 313–335.
12. Keele, Luke, Randolph T. Stevenson, and Felix Elwert. 2020. "The causal interpretation of estimated associations in regression models." *Political Science Research and Methods* 8(1): 1–13.
13. King, Gary. 2020. "So You're a Grad Student Now? Maybe You Should Do This." In *The SAGE Handbook of Research Methods in Political Science and International Relations*, edited by Jr. Robert J. Franzese and Luigi Curini, pp.1–4. London: Sage Publications. Available at: https://gking.harvard.edu/files/gking/files/soyoureagradstudent.pdf.
14. Montgomery, Jacob M., Brendan Nyhan, & Michelle Torres. 2018. "How Conditioning on Posttreatment Variables Can Ruin Your Experiment and What to Do about It." *American Journal of Political Science* 62(3): 760–775.

Course Page:

- Course materials will be available at https://gaku-ito.github.io and Bb9.

Tentative Class Schedule:

PART I ***Introduction to Social Science Research***

Week 1 **Course Introduction** ..... April 15

- Lecture followed by a brief discussion session to share research interests

Week 2 **Scientific Inference: Descriptive Inference and Causal Inference** ..... April 22

- Lecture and classroom discussion
- **First take-home assignment will be announced.**

Readings (for Weeks 1–2)

Required:

- *DSI* book, Preface–Chapter 3
- *PSRM* book, Preface–Chapter 4

Recommended:

- van Evera. 1997. Chaps. 4–5 and Appendix
- King (2020).

Week 3 **Student (Lighting) Presentation** ..... TBD
Students present and discuss rough ideas of their research project, with (1) primary research question(s), (2) literature review, and (3) tentative research design.

- Student presentation and classroom discussion

PART II ***Foundations of Scientific Inference***

Week 4 **Identification Problem (1): Confounders and Omitted Variable Bias, or the Bias Induced by Common Causes** ..... TBD

- Lecture and classroom discussion

Readings (for Weeks 4–6)

Required:

- *DSI* book, Chaps. 3–6
- *PSRM* book, Chaps. 2 & 6
- *QSS* book, Chaps. 2–4 (you may skip the R statistical language sections)
- Dunning (2008)
- Hernán & Robins (2020) Chaps. 1–3 & 7–8
- Holland (1986)
- Duflo et al. (2008)
- Elwert & Winship (2014)
- Gerring & McDermott (2007)
- Keele (2015)
- Keele et al. (2020)
- Montgomery et al. (2018)

Week 5 **Identification Problem (2): Colliders and Sample Selection Bias, or the Bias Induced by Common Effects** ..... TBD

- Lecture and classroom discussion

Week 6 **Causal Inference: Identification Strategy** ..... TBD

- Lecture and classroom discussion

PART III ***Formal Modeling OR Experiment OR Scientific Case Study***

Week 7 TBA (Guest Lecture) ..... TBD

Week 8 **Presentation & discussion (final research paper)** ..... TBD
Students present drafts of their final research projects to the class, followed by a classroom discussion. Students are expected to submit their manuscript before the presentation and revise and resubmit it as the final research paper.