
SA.600.907: Quantitative Methods in International Relations

Johns Hopkins School of Advanced International Studies - Bologna

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Course Info:

Spring 2015

Days and Time: M 1:00–3:20 PM

Room Number: 202

Course Description

This is a quantitative reasoning course, designed for students currently pursuing a master's degree. The course is meant to provide students with a thorough introduction to the use of statistical methodology in the analysis of international relations data. We will begin by discussing basic statistical techniques, and will gradually move to more sophisticated methods of analysis, including linear regression and models for limited dependent variables. Along the way, we will address a number of important pitfalls that can plague quantitative research. We will do all of this within the context of international relations. This approach will allow us to develop a familiarity with commonly used IR datasets, as well as with some of the most important works in empirical international relations.

Although this is a quantitative course, it will focus more on the practicalities of IR data analysis than on the underlying mathematical concepts. While we will address the more abstract statistical foundations of data analysis, we will generally do so in an applied manner. During the course, students will acquire hands-on experience in data analysis, using the R statistical computing environment. Through homework assignments and a final research project, students will become familiar with the statistical analysis of IR data, and learn how to produce and communicate statistical results. In order to ensure that students get the most from the material, some prior knowledge of statistics is assumed. Therefore, having fulfilled the statistics requirement is a prerequisite for the course.

The objectives of the course are threefold. First, by the end of the semester, students will have become smart consumers of IR research. They will have the ability to choose an empirical international relations article and understand (and even critique) the empirical analysis. Second, the emphasis on practical implementation and the completion of a final research project will put students on the road to becoming producers of knowledge. They will acquire the capacity to conduct intelligent analyses of common IR data, in response to theoretical questions. Finally, students will become familiar with the basics of practical statistical analysis. This will be a useful foundation for future quantitative coursework.

Grading Policies

Evaluations of student performance will be based on small homework assignments, class presentations, two exams, and an independent research project. Homework will be checked, but will be graded based on completion. Students are encouraged to work together on the homework (**not** on the exams or research project), but are expected to turn in their own, independent write-up. Final grades will be calculated in the following way:

- Homework/Presentations: 15%
- Midterm: 25%
- Research Project: 30%
- Final Exam: 30%

Research Project

During the semester, all students are expected to complete a research project. This will be a short research paper (approximately 10 pages), in which students pose an empirical question about international relations, describe an appropriate research design, and finally, carry out and interpret an analysis. In addition to the research paper, students will be expected to turn in their data, as well as the code used to generate the analysis, to ensure replicability of the results. The project will be evaluated on the thoroughness of the research design and its appropriateness with respect to the question being investigated. We will discuss the research project in more detail during the course.

Students are welcome to formulate their own research questions or to replicate a published work. In the latter case, however, the student will be expected to add some value to the analysis. In either case, students are strongly encouraged to discuss their ideas with the instructor in advance, or to submit potential topics for feedback. A formal proposal, accompanied by the relevant data, is due on the day of the midterm, and the final paper is due on the last day of class. **Unless arrangements for extenuating circumstances are agreed upon in advance, late work will incur a penalty of one letter grade (10%) per day.**

Readings

Readings will generally be a combination of statistical and substantive works, which will introduce the material that we will cover for the week. The assigned readings for each class will appear below the topic on the course outline. While both types of readings will be useful, the latter are especially important. We will spend a portion of the class examining the substantive readings in terms of their implementation of the week's concept, as well as on their own terms, as IR pieces. Each week, one student will be assigned to lead class discussion for each of the required,

substantive readings. A class handout is strongly encouraged. Readings marked with an asterisk (*) are recommended, but not required. Students are expected to have done the reading before coming to class.

The following book is required, and will serve as our primary statistical text:

Gujarati, Damodar N. 2009. *Basic Econometrics* (Fifth Edition). New York, NY: McGraw-Hill.

The R Statistical Computing Environment

In analyzing and examining data during this course, we will use make use of the R language. Using R for data analysis has a number of advantages. First and foremost, the software is free! Students can download their own copy of R (for Windows, OS X, or Linux) by going to <http://cran.r-project.org/mirrors.html> and selecting the appropriate version. Second, writing your own statistical code forces you to think carefully about the statistical assumptions that underlie your modeling decisions, in a way that using a point-and-click interface would not. Finally, if you find yourself needing to change software in the future, it is much easier to transition from R to more user-friendly statistical software (such as Stata or SPSS) than the other way around. We will talk more about R, its benefits, and its potential problems during the course.

I highly recommend taking a look at the official introduction to R and keeping it handy throughout the course. It is a useful reference guide. It can be found at <http://cran.r-project.org/doc/manuals/R-intro.pdf>. Another useful guide is Verzani's *Simple R — Using R for Introductory Statistics*, available at <http://cran.r-project.org/doc/contrib/Verzani-SimpleR.pdf>.

Honor Code

In all courses and all student activities at SAIS, students are expected to adhere to the rules and spirit of the school's Honor Code, which are detailed in the Student Handbook and posted on-line. In this course, although it is certainly acceptable for students to study together and to work together on homework assignments, all write-ups should be completed independently. All examinations are "closed book," meaning that no notes may be used during the examination nor may outside sources be consulted during the exam. The course requires a written research paper and students should be especially careful to understand what constitutes plagiarism and to avoid it. SAIS makes available to both faculty and students a software program known as Turnitin, which uses a very large data base to identify possible plagiarism. Students are encouraged to use the software as a self-checking mechanism to avoid inadvertent, but inappropriate inclusion of source material. Violation of the Honor Code in an assignment or activity will almost invariably result in failing that assignment and possibly more severe sanctions, including but not limited to course failure, depending on the specific circumstances.

Course Outline

Week 1

- Course Introduction
- Why Quantitative Methods?
- Intro to R and Common IR Datasets
 - Bueno de Mesquita, Bruce. 1985. "Toward a Scientific Understanding of International Conflict: A Personal View." *International Studies Quarterly* 29(2): 121-136.
 - Singer, J. David. 1972. "The 'Correlates of War' Project: Interim Report and Rationale." *World Politics* 24(2): 243-270.
 - Read at least one:
 - * **International Trade:** Barbieri, Katherine, Omar M. G. Keshk, and Brian M. Pollins. 2009. "Trading Data: Evaluating our Assumptions and Coding Rules." *Conflict Management and Peace Science* 26(5): 471-491.
 - * **International Conflict:** Ghosn, Faten, Glenn Palmer, and Stuart A. Bremer. 2004. "The MID3 Data Set, 1993-2001: Procedures, Coding Rules, and Description." *Conflict Management and Peace Science* 21(2): 133-154.
 - * **Democracy:** Jagers, Keith and Ted Robert Gurr. 1995. "Tracking Democracy's Third Wave with the Polity III Data." *Journal of Peace Research* 32(4): 469-482.
 - * **Power:** Singer, J. David. 1988. "Reconstructing the correlates of war dataset on material capabilities of states, 1816-1985." *International Interaction* 14(2): 115-132.
- **HW 1:** Exploring Data in R

Week 2

- OLS and Regression Theory: Part I
 - Gujarati Ch. 1-3
 - **Skim and review** Gujarati Appendix A

Week 3

- OLS and Regression Theory: Part II
 - Gujarati Ch. 7, 8
 - **HW 2:** Regression analysis in R

Week 4

- Applications: OLS and Descriptive Statistics in International Relations
 - Braumoeller, Bear F. and Anne E. Sartori. 2004. "The Promise and Perils of Statistics in International Relations." In *Models, Numbers, and Cases: Methods for Studying International Relations*, ed. Detlef F. Sprinz and Yael Volinsky-Nahmias. Ann Arbor: University of Michigan Press, pp. 129–151.
 - **Democratic Peace:** Weede, Erich. 1984. "Democracy and War Involvement." *Journal of Conflict Resolution* 28(4): 649–664.
 - **Regime Development:** Maoz, Zeev. 1989. "Joining the Club of Nations: Political Development and International Conflict, 1816–1976." *International Studies Quarterly* 33(2): 199–231.
 - **Domestic Politics and Foreign Policy:** Gartner, Scott Sigmund and Gary M. Segura. 1998. "War, Casualties, and Public Opinion." *Journal of Conflict Resolution* 42(3): 278–300.
 - **International Trade:** Morrow, James D., Randolph M. Siverson, and Tressa E. Tabares. 1998. "The Political Determinants of International Trade: The Major Powers, 1907–90." *American Political Science Review* 92(3): 649–661.

Week 5

- Binary Dependent Variables (LPM, Logit, and Probit)
 - Gujarati Ch. 15
 - **Democratic Peace:** Dixon, William J. 1994. "Democracy and the Peaceful Settlement of International Conflict." *American Political Science Review* 88(1): 14–32.
 - **Liberal Peace:** Oneal, John R., Frances H. Oneal, Zeev Maoz, and Bruce Russett. 1996. "The Liberal Peace: Interdependence, Democracy, and International Conflict, 1950–85." *Journal of Peace Research* 33(1): 11–28.
 - **Alliances:** Leeds, Brett Ashley. 2003. "Do Alliances Deter Aggression? The Influence of Military Alliances on the Initiation of Militarized Interstate Disputes." *American Journal of Political Science* 47(3): 427–439.
 - **HW 3:** Logit/Probit Analysis in R

Week 6

- Substantive Interpretation of Regression Results
- Midterm Review
 - King, Gary, Michael Tomz, and Jason Wittenberg. 2000. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44(2): 347–361.

- Signorino, Curtis S. and Ahmer Tarar. 2006. "A Unified Theory and Test of Extended Immediate Deterrence." *American Journal of Political Science* 50(3): 586–605.

Week 7

- Midterm Exam
- **Paper Topics Due**

Week 8

- Polytomous Dependent Variables
 - Long, J. Scott. 2012. "Regression Models for Nominal and Ordinal Outcomes." Available: <http://tinyurl.com/long-polytomous>
 - **War Outcomes:** Bennett, D. Scott and Allan C. Stam III. 1998. "The Declining Advantages of Democracy A Combined Model of War Outcomes and Duration." *Journal of Conflict Resolution* 42(3): 344–366.
 - **Civil War Outcomes:** DeRouen, Jr., Karl R. and David Sobek. 2004. "The Dynamics of Civil War Duration and Outcome." *Journal of Peace Research* 41(3): 303–320.
 - **State Compliance:** Morrow, James D. 2007. "When do States Follow the Laws of War?" *American Political Science Review* 101(3): 559–572.
 - **War Outcomes:** Slantchev, Branislav L. 2004. "How Initiators End Their Wars: The Duration of Warfare and the Terms of Peace." *American Journal of Political Science* 48(4): 813–829.
 - **HW 4:** Dependent Variables with Multiple Categories in R

Week 9

- Measurement and Specification Error
 - Gujarati Ch. 13
 - Signorino, Curtis S. 1999. "Strategic Interaction and the Statistical Analysis of International Conflict." *American Political Science Review* 93(2): 279–297.
 - Poast, Paul. 2010. "(Mis)Using Dyadic Data to Analyze Multilateral events." *Political Analysis* 18: 403–425.

Week 10

- Analyzing Panel Data
 - Gujarati Ch. 11–12

- **Capitalist Peace:** Gartzke, Erik. 2007. "The Capitalist Peace." *American Journal of Political Science* 51(1): 166–191.
- **Democratic Peace:** Green, Donald P., Soo Yeon Kim, and David H. Yoon. 2001. "Dirty Pool." *International Organization* 55(2): 441–468.
- **Capitalist Peace:** Dafoe, Allan. 2011. "Statistical Critiques of the Democratic Peace: Caveat Emptor." *American Journal of Political Science* 55(2): 247–262.
- **Democratic Peace:** Oneal, John R. and Bruce Russett. 2001. "Clean and Clear: The Fixed Effects of the Liberal Peace." *International Organization* 55(2): 469–485.
- **HW 5:** Panel Data Analysis in R

Week 11

- Rare Events and Impossible Events
 - King, Gary and Langche Zeng. 2001. "Explaining Rare Events in International Relations." *International Organization* 55(3): 693–715.
 - Lemke, Douglas and William Reed. 2001. "The Relevance of Politically Relevant Dyads." *Journal of Conflict Resolution* 45(1): 126–144.
 - Braumoeller, Bear F. and Austin Carson. 2011. "Political Irrelevance, Democracy, and the Limits of Militarized Conflict." *Journal of Conflict Resolution* 55(2): 292–320.
 - **Clash of Civilizations:** Chiozza, Giacomo. 2002. "Is There a Clash of Civilizations? Evidence from Patterns of International Conflict Involvement, 1946–97." *Journal of Peace Research* 39(6): 711–734.

Week 12

- Selection Effects
 - Signorino, Curtis S. 2002. "Strategy and Selection in International Relations." *International Interactions* 28(1): 93–115.
 - **Conflict Bargaining:** Fearon, James D. 1994. "Signaling Versus the Balance of Power and Interests: An Empirical Test of a Crisis Bargaining Model." *Journal of Conflict Resolution* 38(2): 236–69.
 - **Leaders:** Chiozza, Giacomo and H. E. Goemans. 2004. "International Conflict and the Tenure of Leaders: Is War Still *Ex Post* Inefficient?" *American Journal of Political Science* 48(3): 604–619.
 - **Deterrence:** Danilovic, Vesna. 2001. "Conceptual and Selection Bias Issues in Deterrence." *Journal of Conflict Resolution* 45(1): 97–125.
 - **HW 6:** Selection Effects in R

Week 13

- Research Presentations
- Course Wrap Up
- **Research Projects Due**