Leiden University | Political Science

Quantitative Data Collection and Analysis

Research Master – Political Science & Public Administration
Semester 2, Block 3, 5 ECTS, Level 600, Course Code: 6446QN05

Monday, February 6 - March 26, 2012, 13:00-15:00

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Course Description

The aim of this course is to introduce students to different research designs for quantitative data collection as well as to the use of multivariate statistics for the analysis of quantitative data. It will build upon the knowledge that the student has gained in an introductory course in statistics. Such courses generally concentrate on univariate and bivariate statistics, whereas few phenomena can be explained using only one variable. This course will cover multivariate techniques that are most commonly found in the literature of political science and public administration, in particular multiple regression and logistic regression.

Method of Instruction

Lectures, discussion, and assignments.

Required Readings

Field, Andy. 2009. *Discovering Statistics Using SPSS*. 3rd ed. Thousand Oaks: Sage. [or equivalent]

Additional journal articles or book chapters.

Optional:
A website that introduces and explains a variety of statistical procedures (using SPSS):
G. David Garson. 1998-2012. *Statnotes: Topics in Multivariate Analysis*. Website. http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm
A very basic and general introduction to quantitative research methods and linear regression:
Kellstedt, Paul M., and Guy D. Whitten. 2009. *The Fundamentals of Political Science Research*. Cambridge: Cambridge University Press.
An advanced but accessible discussion of key issues with linear regression:
Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Assignments, Research Paper, and Participation

The main focus of this course is on building practical (statistical) data analysis skills. For this reason, the main workload will be a series of homework assignments with (mostly) statistical analyses. The final grade is based on five assignments, a research paper, and class participation.

5 Assignments:	60% (12% each)
Research Paper:	30%
Participation:	10%

Assignments. Students are expected to complete 5 (short!) individual homework assignments during the course. With the exception of the first assignment, the assignments involve the application of a statistical technique using data of their choice (such as NKO data). The statistical assignments have three components: (1) a written justification, description, summary, and interpretation of an analysis using a specific statistical technique, (2) an SPSS syntax file that will re-produce or replicate the analyses (included in the assignment as appendix), and (3) a short PowerPoint presentation that summarizes the key findings for potential presentation in class. The assignments need to be submitted electronically via Ephorus and as hard copy in class by the given date and time (usually at beginning of class). The PowerPoint presentation should be submitted (usually one day) earlier. Late submissions are *not* accepted.* The specific topics of the five assignments are:
1) Research Design: Randomized Experiment
2) Exploratory Data Analysis: Factor Analysis
3) Hypothesis Testing of Group Differences: t Test *or* ANOVA
4) Hypothesis Testing of Causal Relationships (1): Multiple Regression (OLS)
5) Hypothesis Testing of Causal Relationships (2): Logistic Regression
During the course, handouts with the specific requirements for each assignment will be available.

Research Paper. At the end of the course, students will write an individual research paper (ca. 3000 words) which can take one of two forms, an empirical research paper or a more detailed (quantitative) research proposal.
Option 1: For the empirical research paper, the basic idea is to choose a theory-based research question, do a short literature review and present a testable hypothesis, then use the appropriate data and statistical technique to test this hypothesis, and report the results. It will usually take the following format:

- Introduction
- Theory and Review (incl. conceptualization of variables & hypothesis)
- Methods (incl. operationalization of variables, sampling etc.)
- Results (incl. descriptive statistics & statistical test)
- Discussion and Conclusion

Note that it is possible to use one of the homework assignments as starting point and develop it further.
Option 2: For the research proposal, the idea is to choose a theory-based research question, do a short literature review and present a testable hypothesis, and then propose a more detailed quantitative research design that would allow you to test this hypothesis, e.g. an experiment. It will usually take the following format:

- Introduction (incl. scientific and social relevance)
- Theory and Review (incl. conceptualization of variables & hypothesis)
- Methods (incl. operationalization of variables, specific research design, sampling, data collection)
- Planned analyses

In either case, a short, one-page proposal for the research paper is due March 12, 2012. The final research paper is due on Monday, April 2, 2012. In both cases, late submissions are not accepted.*

***Deadlines**. Assignment and paper deadlines are final and late submissions are not accepted. Properly documented emergencies and *in advance* requested and permitted extensions are exempt from this rule.

Participation. The seminar requires active and informed participation of the students in class discussions. Students are expected to read the assigned readings before each class meeting and be prepared to present their homework assignments. Class attendance is mandatory. Students who miss more than one class will automatically fail the course. Properly documented emergencies and in advance requested and permitted absences are exempt from this rule.

If you have a physical, psychological, medical, or learning disability that may impact on your ability to carry out the assigned course work, please contact the staff in the Department of Political Science. All information and documentation of disability is confidential.

Plagiarism

Plagiarism is understood as presenting, intentionally or otherwise, someone else's words, thoughts, analyses, argumentations, pictures, techniques, computer programs, etc., as your own work. Plagiarism is not allowed and has serious consequences. Students must be familiar with Leiden University's rules about plagiarism. They are available at: http://www.regulations.leiden.edu/education-students/plagiarism.html

The departmental rules and procedures with regard to plagiarism can be found at: http://www.socialsciences.leiden.edu/politicalscience/students/postgraduate/regulations/plagiarism.html

Important note: Plagiarism occurs in both of the following situations:
- Quoting work from other (and outside) sources without attribution;
- Copying the work of others when completing individual assignments.

Course Schedule

February 6, 2012 — Course Introduction & Short Review — [SA21]

Methods

Review/How-To: Field, Ch. 1-3 (Introductory Chapters).

February 13, 2012 — Research Design: Causality & Experiments — [SA21]

Key Concepts: Causal Theories, Surveys, Experiments

Methods

McDermott, Rose. 2002. "Experimental Methods in Political Science." *Annual Review of Political Science* 5: 31-61.

Gaines, Brian J., James H. Kuklinski, and Paul J. Quirk. 2007. "The Logic of the Survey Experiment Reexamined." *Political Analysis* 15(1):1-20.

Review/How-To: Field, Ch. 4 (Exploring Data with Graphs) & 5 (Exploring Assumptions)

Applications

Tomz, Michael, and Robert P. Van Houweling. 2008. "Candidate Positioning and Voter Choice." *American Political Science Review* 102 (3): 303-318.

Goodin, Robert E., Werner Güth, and Rupert Sausgruber. 2008. "When to Coalesce: Early Versus Late Coalition Announcements in an Experimental Democracy." *British Journal of Political Science* 38 (1): 181-191.

Recommended

Morton, Rebecca B., and Kenneth C. Williams. 2010. *Experimental Political Science and the Study of Causality: From Nature to the Lab*. Cambridge: Cambridge University Press.

February 20, 2012 Measurement & Describing Data (1) [1A37]

>> Assignment 1 due: Research Design - Randomized Experiment

Key Concepts: Operationalization, Reliability & Validity, Visual Data Analysis, Factor Analysis

Methods

Review/How-To: Field, Ch. 17 (Exploratory Factor Analysis).

Adcock, Robert, and David Collier. 2001. "Measurement Validity: A Shared Standard for Qualitative and Quantitative Research." *American Political Science Review* 95 (3): 529-546.

Kritzer, Herbert M. 1996. "The Data Puzzle: The Nature of Interpretation in Quantitative Research." *American Journal of Political Science* 40 (1): 1-32.

Kastellec, Jonathan P., and Eduardo L. Leoni. 2007. "Using Graphs Instead of Tables in Political Science." *Perspectives on Politics* 5 (4): 755-771.

Recommended

Epstein, Lee, Andrew D. Martin, and Matthew M. Schneider. 2006. "On the Effective Communication of the Results of Empirical Studies, Part I." *Vanderbilt Law Review* 59: 1811-1872.

Epstein, Lee, Andrew D. Martin, and Christina L. Boyd. 2007. "On the Effective Communication of the Results of Empirical Studies, Part II." *Vanderbilt Law Review* 60: 799-846.

February 27, 2012 Statistical Inference & Significance Testing [SA23]

>> Assignment 2 due: Exploratory Data Analysis - Factor Analysis

Key Concepts: Statistical Tests, t Test, ANOVA

Methods

Review/How-To: Field, Ch. 9 (Comparing Two Means) & 10 (Comparing Several Means: ANOVA).

Cumming, Geoff, and Sue Finch. 2005. "Inference by Eye: Confidence Intervals and How to Read Pictures of Data." *American Psychologist* 60 (2): 170-180.

Cohen, Jacob. 1994. "The Earth is Round ($p < .05$)." *American Psychologist* 49 (12): 997-1003.

Recommended

Gill, Jeff. 1999. "The Insignificance of Null Hypothesis Significance Testing." *Political Research Quarterly* 52 (3): 647-674.

March 5, 2012 Linear Regression (1) - Basics [SA23]

>> Assignment 3 due: Hypothesis Testing of Group Differences - t Test *or* ANOVA

Key Concepts: Correlation, Bivariate & Multivariate OLS Regression, Assumptions

Methods

Review/How-To: Field, Ch. 6 (Correlation) & 7 (Regression).

Freedman, David A. 1991. "Statistical Models and Shoe Leather." *Sociological Methodology*: 291-313.

King, Gary. 1986. "How Not to Lie with Statistics: Avoiding Common Mistakes in Quantitative Political Science." *American Journal of Political Science* 30 (3) 666-687.

Downs, George W., and David M. Rocke. 1979. "Interpreting Heteroscedasticity." *American Journal of Political Science* 23 (4): 816-828.

March 12, 2012 Linear Regression (2) - Interpretation & Interactions [SA37]

>> Deadline: Proposal for Research Paper (one page)

Key Concepts: Interactions

Methods

Baron, Reuben M., and David A. Kenny. 1986. "The Moderator-Mediator Variable Distinction in social Psychological Research: Conceptual, Strategic, and Statistical Considerations." *Journal of Personality and Social Psychology* 51 (6): 1173-1182.

Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14 (1): 63-82.

Recommended

Friedrich, Robert J. 1982. "In Defense of Multiplicative Terms in Multiple Regression Equations." *American Journal of Political Science* 26 (4): 797-833.

Aiken, Leona S., and Stephen G. West. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks, CA: Sage.

March 19, 2012 Logistic Regression [SA35]

>> Assignment 4 due: Multiple Regression (OLS)

Key Concepts: Linear Probability Model, Maximum Likelihood, Logistic Regression

Methods

Review/How-To: Field, Ch. 8 (Logistic Regression).

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.

Recommended

Menard, Scott. 1995. *Applied Logistic Regression Analysis*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-106. Thousand Oaks, CA: Sage.

March 26, 2012 Measurement & Describing Data (2) [SA37]

>> Assignment 5 due: Logistic Regression

Key Concepts: Multidimensional Scaling

Methods

Review/How-To: Garson, G. David (2012). "Multidimensional Scaling", from *Statnotes: Topics in Multivariate Analysis*, at http://faculty.chass.ncsu.edu/garson/PA765/mds.htm

Weisberg, Herbert F. 1974. “Dimensionland: An Excursion into Spaces.” *American Journal of Political Science* 18 (4): 743-776.

Recommended

Kruskal, Joseph B., and Myron Wish. 1978. *Multidimensional Scaling*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-011. Beverly Hills, CA: Sage.

April 2, 2012 Research Paper due

Optional Meeting

TBA **Linear Regression (3) – Nonrecursive Models (2SLS)**

Key Concepts: Reciprocal Causation, Nonrecursive Models, Two Stage Least Squares

Methods

James, Lawrence R., and B. Krishna Singh. 1978. “An Introduction to the Logic, Assumptions, and Basic Analytic Procedures of Two-Stage Least Squares.” *Psychological Bulletin* 85 (5): 1104-1122.

Review/How-To: Garson, G. David (2010). "Two-Stage Least Squares (2SLS) Regression Analysis", from *Statnotes: Topics in Multivariate Analysis*, at http://faculty.chass.ncsu.edu/garson/PA765/2sls.htm

Application

Aarts, Kees, and Holli A. Semetko. 2003. “The Divided Electorate: Media Use and Political Involvement.” *Journal of Politics* 65 (3): 759-784.

Recommended

Berry, William D. 1984. *Nonrecursive Causal Models*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-037. Newbury Park, CA: Sage.

Bartels, Larry M. 1991. “Instrumental and 'Quasi-Instrumental' Variables.” *American Journal of Political Science* 35 (3): 777-800.

Sovey, Allison J., and Donald P. Green. 2011. “Instrumental Variables Estimation in Political Science: A Readers’ Guide.” *American Journal of Political Science* 55 (1): 188-200.