



Introduction to Quantitative Methods

Fabrizio Bernardi

Autumn 2011

Monday 11:00 - 13:00

Seminar Room 2, Badia Fiesolana

Registrations with: Monika.Rzemieniecka@eui.eu

The aim of this seminar is to give researchers in sociology and political sciences practical knowledge of the application of basic quantitative techniques, which are commonly used in sociology and political sciences, while using one of the major statistical software packages STATA. The seminar centers on the linear regression model. A correct understanding of its proper functioning and limitations is an essential precondition for venturing into more advanced techniques. It also provides an introduction to the logistic regression model. In this seminar, therefore, you can expect to learn:

- How to estimate a multivariate linear regression model and interpret correctly its results
- How to estimate and correctly interpret interaction effects
- How to apply regression diagnostics tools
- How to estimate a logistic regression and interpret its results

You will also learn some basics notions of statistical inference and some hints on useful topics in applied research such as how to deal with missing cases and how and when to use weights. The seminar is much focused on real research examples and formalization is kept to a minimum.

As reference books, we use:

- Treiman, D. (2009). *Quantitative Data Analysis. Doing Research to Test Ideas*, Jossey Bass.
- Firebaugh, G. (2008). *Seven Rules for Social Research*, Princeton, NJ: Princeton University Press.

The EUI library has a number of copies of these books on the seminar shelf.

You should bring your laptop to the seminar because part of the teaching will consist of interactive examples using STATA in the class. At the moment I am trying to sort out how to provide access to STATA to each participant to the seminar. Those who register to the seminar will be informed on this issue.

The most important part of the seminar is not attending the two-hour sessions, but making the exercises that are assigned each week. A special *dropbox* folder will be created where you will find the weekly exercises and the materials used in class. The teacher assistants for this seminar are Carolina Zuccotti (carolina.zuccotti@eui.eu) and Nina Liljeqvist (nina.liljeqvist@eui.eu), both second year SPS researchers. Participants will be divided in two groups and the TAs will teach a one hour practical class every week (time and place tbc), where they will provide feedback on your exercises and go through examples on related topics. Attendance to these practical classes is not compulsory but highly recommended. The TAs will also have office hours to provide assistance with STATA and with the making of the exercises (again time and place tbc).

Making all exercises is the condition for certification of sufficient attendance. These exercises have to be posted in a dedicated folder of the seminar dropbox 24 hours before each session (thus before Sunday 11.00 AM). You can team in groups of two for making the exercises.

Note that there will be already a first assignment due for 2nd of October. The last assignment (due for the 11th of December) consists of a small paper (4 pages plus tables) where you should carry out a multivariate analysis and interpret the results, using the skills you have learned through-out the seminar. For this final exercise participants are encouraged to use their own data (not necessarily the data one will use in his/her thesis). Researchers without applicable data has to contact me and the TAs in order to find proper data for this exercise.

More details on seminar practicalities and the final assignment will be given during the first introductory class. Registration before September 27 is obligatory. Please register with Monika Rzemieniecka (Monika.Rzemieniecka@eui.eu, Tel. 2233).

Schedule (might slightly change):

WEEK 1 (Oct 3th): Introduction and overview of seminar. How to make and comment properly a table. Process of elaboration: spurious, intervening and conditional relationship.

Readings: Treiman: Chapters 1, 2, 3 and 4

WEEK 2 (Oct 10th): Bivariate regression and correlation. The logic of OLS estimation. How to comment your findings.

Readings: Treiman: Chapter 5

Firebaugh: The Second Rule. Look for Differences That Make a Difference, and Report Them (Chapter 2)

WEEK 3 (Oct 17th): Problems related to linear regression. Outliers, truncation, regression fallacy, ecological fallacy.

Readings: Treiman: Chapter 5

WEEK 4 (Oct 24th): Basic of statistical inference. Null hypothesis, type I and type II errors. Confidence intervals.

Readings:

[Chapter 3 from](#) Bohrnstedt and Knoke, Statistics for social data analysis, in the dropbox. Chapters 16, 26 and 29 from Freedman, Pisani and Purves, Statistics, in the dropbox.

WEEK 5 (Oct 31th): Multiple regression.

Readings: Treiman: Chapter 6

Philip A. Schrodtt (2010), *Seven Deadly Sins of Contemporary Quantitative Political Analysis* <http://polmeth.wustl.edu/media/Paper/Schrodtt7SinsAPSA10.pdf>

Additional readings

Young, C. 2009. "Model Uncertainty in Sociological Research: An Application to Religion and Economic Growth." *American Sociological Review*. 74: 380–97.

<http://asr.sagepub.com/content/74/3/380.full.pdf+html>

Special issue of Conflict management and peace studies, V. 22, 4, 2005

WEEK 6 (Nov 7th): Regression diagnostics.

Readings: Treiman: Chapter 7



WEEK 7 (Nov 14nd): Interactions

Readings: Brambor, Clark and Golder (2006) *Political Analysis* on interaction effects
http://homepages.nyu.edu/~mrg217/pa_final.pdf

WEEK 8 (Nov 21th): Introduction to logistic regression

Readings: Acock, A. (2006) *A gentle introduction to Stata*, Stata Press (chapter 11)

More advanced

Mood, C. (2010). "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It." *European Sociological Review* 26:67-82.

WEEK 9 (Nov 28th) Miscellaneous. a) how to deal with missing data. b) To weight or not to weight? c) Statistical inference when the data are not a random sample (for instance, population data).

Readings:

Treiman: Multiple Imputation of Missing Data, Chapter 8

Berk (2004), *Regression analysis. A constructive Critique*, Sage, Chapter 4.

WEEK 10 (Dec 5th) Limits of the regression model.

Readings: Firebaugh, The fifth rule. Compare like with like. Chapter 5