POS 6933 – Section 04H1 – Fall 2014
Topics in Political Methodology: Maximum Likelihood Estimation (MLE)
Department of Political Science
University of Florida

Lectures: T: Periods 2-3; Room: TUR 2341

Instructor: Prof. Badredine Arfi
Office: 221 Anderson Hall
Office Hours:
Tuesdays 11:00am-12:00p.m. and 1:00-2:00pm
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Course Description and Objectives

The linear model is a limited tool to statistically study most political phenomena. The dependent variables of interest to political scientists do not usually fit the assumptions of the Classical Linear Regression Model (CLRM). Methodologists have developed sophisticated methods to address many important failures of the CLRM. To analyze, for example, data with qualitative and ordinal dependent variables, count models as well as situations where there are selection biases we need to go beyond the limitations of the CLRM. The maximum likelihood estimation – MLE – method is a general approach that enables researchers to estimate models with these and other difficulties. The maximum likelihood is a method that refers to a general estimation strategy, which means that it refers to a different way for thinking about data and parameters. In brief: we have a maximum likelihood methodology and there are many statistical models that are built using this methodology to address specific statistical problems.

The students are expected to understand the theory of maximum likelihood estimation and how it has been used to develop a number of important statistical models that political scientists use to study politics. The students are also expected to use these powerful statistical models to research problems that interest them.

The course consists of two parts. The first one deals with a number of models suited for analyzing problems with categorical and limited dependent variables. The second part consists of an introduction to the methodology of event history modeling.

Requirements and Evaluation

The requirement for this course is simple (as always): work diligently and persistently. This includes attending classes, doing the readings carefully before the seminar meets, and working regularly on the computer applications and the research paper. Each student should expect to be spending many hours learning how to excel in using the Stata software commonly used to estimate the models discussed in class.

There will be a number of homework assignments that the students must complete and turn in. The homework assignments are due on the specified dates; no late submission is acceptable. There will also be one mid-term take-home exam and one final take-home exam.

A major component of the course evaluation will be a term research paper. Each student will produce a manuscript of high quality using an appropriate modelling strategy.

Distribution of Grades

1. **20%: Weekly computer work:** read Long & Freese stata book chapter and submit a complete stata log file showing all the work for the chapter. Chapters included: Chap2 – Chap 9 → 8 reports.

2. **20%: Take-Home Mid-Term Examination:** The mid-term exam is a take-home and open-book, open-computer, open-anything-but-another-human-being.

3. **20%: Take-Home Final Examination:** The final exam is a take-home and open-book, open-computer, open-anything-but-another-human-being.

4. **30%: A Replication Paper** on a topic chosen by the student in consultation with the instructor (see down below). The goal is to produce a high quality manuscript, using a model (or models) discussed in the course. The research paper is due on the last day of classes.

5. **10%: Paper Presentation**. Each student will present his/her paper during the last class of the semester. The presentation will consist of a ppt presentation for about 10 minutes followed by 5 minutes of Q & A.

Required Texts

1. J. Scott Long. 1997. Regression Models for Categorical and Limited Dependent Variables. Sage. Available on reserve at Library West.

2. Janet M. Box-Steffensmeier and Bradford S. Jones. 2004. Event History Modeling: A Guide for Social Scientists. Cambridge University Press. Available on reserve at Library West.

3. J. Scott Long and Jeremy Freese. 2006. Regression Models for Categorical Dependent Variables Using Stata. Stata Press. Available on reserve at Library West.

4. Mario Cleves, William Gould, Roberto G. Gutierrez, and Yulia V. Marchenko. 2010. An Introduction to Survival Analysis Using Stata, Third Edition. Stata Press.

5. Extra readings from e-learning site for the course.

Computer Requirements

All models covered in this class will be estimated using the Stata software package. It is a must that you have a computer account and password so that you can use the computers in the Anderson datalab. Stata is available on all of the Anderson Hall datalab computers. Alternatively you can use your own computer should you own a copy of stata.

Important Notes:

- The instructor reserves the right to change any part or aspect of this document should a need for doing so emerge at any point in time during the semester.

- Students requesting classroom accommodation for disabilities must register with the Dean of Students Office and provide documentation from this office.

- All students are required to abide by UF standards of academic honesty laid out in the Student Honor Code, posted at http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/

Specifics on the Replication Paper

In order for the instructor to provide guidance in the preparation of the paper, you will be required to turn in various brief intermediate papers throughout the semester.

Each student must:

1. Find a published paper that interests you and that applies a statistical method comparable to the material covered in this course. **Date: September 16**
2. Obtain the data from ICPSR or elsewhere or the author if at all possible. **Date: October 21**
3. Replicate the published results as nearly as possible. **Date: November 18**
4. You **must extend** the analysis in some way. You could, for example:
   - Suggest a more appropriate functional form for the estimation and re-estimate.
   - Argue that one or a set of important variables were omitted and conduct the analysis anew.
   - Argue that the results are likely to be sensitive to sample selection or variable measurement etc. and then conduct appropriate analyses to address that possibility.
   - Extend the data or use a different data set to test the theory.
   - Any other good idea that you might have.
5. The final paper should be 15-20 pages long, including the bibliography. **Date: December 13**

Important Note:

The instructor reserves the right to change any part or aspect of this document should a need for doing so emerge at any point in time during the semester.

Holidays - no classes	**September 1: Labor Day** **October 17-18: Homecoming** **November 11: Veterans Day** **November 26-29: Thanksgiving break**

Note that in the table below:

SL: J. Scott Long
BSJ: Janet M. Box-Steffensmeier and Bradford S. Jones

Week	Date	TOPIC	Source
1	8 – 26	• Chap 3: Binary Outcomes: Linear Probability, Probit and Logit Models • Chap 4: Hypothesis Testing and Goodness of Fit	SL
2	9– 2	• Chap 5: Ordinal Outcomes: Ordered Logit and Ordered Probit Analysis	SL
3	9 – 9	• Chap 6: Nominal Outcomes: Multinomial Logit and Related Models	SL
4	9 – 16	• Chap 7: Limited Outcomes: The Tobit Model	SL
5	9 – 23	• Chap 8: Count Outcomes: Regression Models for Counts	SL
6	9 – 30	• Chap 9: Conclusions	SL
7	10 – 7	• Chap 2: The Logic of Event History Analysis • Chap 3: Parametric Models for Single-Spell Duration Data	BSJ
8	10 – 14	• Chap 4: The Cox Proportional Hazards Model	BSJ
9	10 – 21	• Chap 5: Models for Discrete Data • Chap 6: Issues in Model Selection	BSJ
10	10 – 27	• Chap 7: Inclusion of Rime-Varying Covariates	BSJ
11	11 – 4	• Chap 8: Diagnostic Methods for the Event History Model	BSJ
12	11 – 11	Veterans Day	
12	11 – 18	• Chap 9: Some Modeling Strategies for Unobserved Heterogeneity	BSJ
13	11 – 25	• Chap 10: Models for Multiple Events	BSJ
14	12 – 2	• More ….	
15	12 - 9	• Student Presentations	