Politics 571
Quantitative Methods I
Spring 2007
Prof. Josh Clinton
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OH: F 11am-12pm (or by appt.)

The use of quantitative methodology for characterizing the political environment and testing theoretically derived hypotheses is pervasive in political science. It is essential that students have the capacity to read and understand statistical methods given the amount of work being doing in political science using such methods. This course aims to prepare students to:

- Become comfortable with the language and tools associated with statistical inference.
- Model the political environment using econometric/statistical models.
- Understand the theoretical foundations of commonly used methods.
- Understand the trade-offs and assumptions inherent in econometric/ statistical models.
- Be able to learn methods not explicitly covered in class.
- Take Politics 572.

Broadly speaking, the class can be divided up into three segments. The first part of class uses the mathematical knowledge being acquired in POL 505 to define a set of concepts that can be used to assess relationships between concepts/variables. The middle half of the class discusses how to make inferences about unknown population parameters using observable data and some assumptions about the structure of the observable phenomena. The class concludes by deriving and discussing the statistical workhorse known as linear regression that will be developed further next semester.

There are many available books, none of which are particularly exceptional for the purposes of political science. The primary book for this class is a standard text in classes covering this material :

DeGroot and Schervish. 2002. *Probability and Statistics: Third Edition.*

For those interested in building a personal library, additional readings may be found in:

Amemiya. 1994. *Introduction to Statistics and Econometrics.*[1]
Rice. 1994. *Mathematical Statistics and Data Analysis.*[2]
Wasserman. 2004. *All of Statistics.*[3]

If you are really new to statistics, the aptly named *Statistics* by Freedman, Pisani and Purves is actually quite an engaging book and a worthwhile read.

For the computing assignments, you will have to be able to work from first principles. Consequently, programs like SPSS will not be useful. I don't care whether you use R or STATA – which program you use should not affect the estimates you get – but I use R except when implementing "off-the-shelf" estimators. R is freely available for Windows, Linux or OS X here.

For writing up your homework assignments, I recommend LaTeX, a free formatting program that handles mathematical notation, but with some start-up costs. Sadists are welcome to try to use Microsoft Word with equation editor. To use LaTeX, you need to install a version of LaTeX (Miktex works well for the PC) and a text editor (WinEdt is a nice and gentle editor).[4] For OS X users, I have found TeXShop to be a nice installation. You are encouraged to work together on the computing assignments, but you must write up the analysis individually.

Although you will undoubtedly find using LaTeX painful in the beginning, it is a useful tool to have and one that will serve you well in your many years ahead if you plan to use notation in your work. Scientific

[1] Short, to the point, very little discussion.
[2] More discussion, written for a statistician with no political science applications.
[3] See Amemiya (1994) review.
[4] WinEdt can also be configured to serve as a editor for R. Instructions for configuring WinEdt to work with R are located here.

Workplace is a GUI based version of LaTeX that is less flexible but more accessible. Several good books are available for teaching yourself LaTeX (in particular those by Leslie Lamport), and the internet contains many examples.

Grading:

20 % Midterm
40 % Problem Sets
40 % Final

Grades Don't Matter, Sources Say

Palo Alto, CA (AP) - Documents obtained by the Associated Press indicate that grades achieved in post-graduate classes have no effect on future prospects for students enrolled in academic institutions.

According to interviews with several current and past graduate students, "grades don't count," said former grad student and now billionaire Jerry Yang, co-founder of Yahoo! Inc. "I got mostly B's in grad school, which at Stanford was really really bad."

A poll conducted by the Los Angeles Times showed that over 85% of first year grads believe getting high marks "is worth the effort" and "a valuable way to spend my time". Fewer than 10% of fifth year students felt the same way.

In reality, neither employers nor your parents appear to care if you get an A or a B in your advanced Nonlinear Optimization class. "I'm just glad I don't have to pay for tuition any more," said a mother who wished to remain anonymous.

Reaction among graduate TA's was mixed, with some expressing shock that their late hours grading amount to nothing, while others showed visible relief that losing a student's final exam will not really ruin their life.

Sources close to academic faculty reveal that this fact is well known among professors. "Of course grades don't matter," said Prof. Smith, "we only care about the lab work." Grades only serve to "feed the ego of the smart students, and break the spirit of the mediocre ones."

NOW you tell me?? A grad student expresses frustration over the revelation

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Here is a preliminary schedule for what we are going to cover and when. Things will assuredly change once we get underway. Articles are available on Blackboard under "Course Materials : Articles."

Scholarly applications of the material and denoted with [A]. I hope to be able to set aside time in the denoted lecture to discuss each article, but the semesters at Princeton are very short and we have a lot to get through.

The lecture numbers are very preliminary and will assuredly change once we get underway and I get a better sense of the pace of the class. Each Topic Number is probably one or two lectures.

Topic Number	Topic
1	Course Introduction, Intro to Probability DS: ch 1.1 -1.10 [A] Kennedy: "Sinning in the Basement: What are the Rules?"
2	Conditional Probability, Independence and Bayes Rule DS: 2.1, 2.2, 2.3 [A] Pape: "The Strategic Logic of Suicide Terror"
3	Random Variables and Distribution Functions DS: 3.1, 3.2, 3.3, 3.4 [A] Mayhew: "The Case of the Vanishing Marginals"
4	Marginal, Conditional and Multivariate Distributions DS: 3.5, 3.6, 3.7, 3.8, 3.9
5	Expectations and Means DS: 4.1, 4.2, 4.5, 4.8
6	Dispersion, Covariance and Correlations DS: 4.3, 4.6, 4.7 [A] Alford, Funk and Hibbing "Are Political Orientations Genetically Transmitted"
7	Causality, Visualization and Computing [A] Tufte "Visualizing Information" Ch. 2 [A] Sehkon "Quality versus Quantity"]A] Freedman "Association and Causation" [A] Nagler "Coding Style" *An Introduction to R*
8	Moments: Moments, Binomial and Normal RVs DS: 4.4, 5.2, 5.6,
9	Limiting Distributions and the CLT DS: 5.7
10	Point and Interval Estimation DS: 6.1, 7.7
11	Best predictor and best linear predictor [A] Lewis-Beck & Rice "Forecasting Presidential Elections"
12	Maximum Likelihood Estimators DS: 6.5, 6.6
13	Sampling Distribution of Estimators: Sample Mean DS: 7.1, 7.3, 7.4, 7.5
14	Bayesian Estimators DS: 6.2, 6.3, 6.4
15	Sampling Distribution of Bayesian Estimators: Sample Mean DS: 7.6
16	Statistical Inference: Theory DS: 8.1, 8.2, 8.3, 8.4, 8.9
17	Statistical Inference: T-Test DS: 8.5, 8.6 [A] Tufte: ch 2 [A] Krehbiel "Are Congressional Committees Composed of Preference Outliers"
18	Simple Linear Regression (Derived via: ML, Method of Least Squares) DS: 10.1,
19	Simple Linear Regression (Mathematical and Statistical Properties) DS:10.2
20	Simple Linear Regression (Fit & Statistical Inference) DS: 10.3 Tufte: ch 3 [A] Freedman "Statistical Models and Shoe Leather