

THE HELLER SCHOOL FOR SOCIAL POLICY AND MANAGEMENT
BRANDEIS UNIVERSITY
HS405A2
Econometrics
Spring 2017

Instructor:	Stephen F. Fournier	Time:	Tues & Thurs 10:30—11:50
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Website:	LATTE.Brandeis.edu	TA:	TBA

Course Description: This full semester course starts with a review of regression analysis. Much of the work will involve looking at modifications to this basic model to account for a number of fundamental violations to the regression model. In HS404B1 we moved from a continuous dependent variable to limited dependent variable models. The initial models we examined focused on the introduction of categorical dependent variables. We started with two-category models, namely logit and probit, and developed the rationale and implications for such models. We then moved to models with dependent variables having more than two categories and those having ordered categories (both multinomial logit and ordered logit). During this process we examined the need for and the implications of moving to models using Maximum Likelihood Estimation techniques (MLE) along with an examination of a number of cumulative probability distribution functions (normal, logistic, Weibull, etc.).

The next set of models we will examine will focus on count data: for example, models to estimate the number of visits to a doctor in a year. These types of models make assumptions about the underlying distribution of results and are based on probability distributions such as the Poisson distribution and the Negative binomial distribution.

Towards the end of the course, we will turn back to issues related to multiple regression models with the focus on truncated and/or censored data and how to correct for these effects; tobit and heckit models.

Many of the models we have developed and used assume that all observations are independent and have constant variance. We have examined a few cases where these assumptions have been violated and have learned to correct for them (e.g. correction for heteroscedasticity). But these types of correlated observations can also arise when observations cluster within higher-level units such as schools and hospitals. This condition can also occur when observations are taken on multiple measurements of the same subject; clearly these observations are not independent. The models used to correct and control for these effects come under the heading of linear mixed models which we will examine at the end of the semester.

Course Requirements: There will be both readings and assigned problem sets (graded) for each session. Problem sets will be provided on Thursdays and need to be electronically submitted before the Tuesday class begins (as solution sets will be posted and discussion of the work done will comprise the first part of the next session). Students will be expected to have prepared thoroughly for class (reading the assigned text and completing problem sets) and can assume that they will be called upon to contribute to in-class discussions. These problem sets are a crucial aspect of this course as they provide the basis for assessing how well the material is being both conveyed and, more importantly, understood. We will have both a mid-term (in-class and take-home parts), a practice paper (take-home) and a final (take-home).

The take-home final will be based on a dataset that you have chosen and cleaned either from public data available at sites such as ICPSR or data that you have that is of interest to you. This paper will involve not only finding, obtaining and cleaning the data, but will require a literature review for use in developing and running the final model. We will speak early about this process and start it as soon as possible. Individual help will be provided as needed.

Class times and computer lab: The class will meet twice a week, Tuesday and Thursday from 10:30 – 11:50 for **lecture** and discussion. Computer presentation is an integral part of the teaching so almost all of the basic instruction will be conducted using a computer display in class. We will discuss the computer lab arrangements during the first class.

Course Reading: There is no *officially required* textbook but we will draw heavily from Jeffrey M. Wooldridge, *Introductory Econometrics, A Modern Approach*. We will read a number of chapters from this text (provided on line) as well as numerous handouts that will be made available on the LATTE site.

Other texts we will use are readily available on-line; the electronic textbook from StatSoft (<http://www.statsoftinc.com/textbook/stathome.html>) and the HyperStat online Textbook (<http://davidmlane.com/hyperstat/>). I have already provided you with a number of chapters from Crown, *Statistical Models for the Social and Behavioral Sciences*, Praeger Publishers, 1998. Finally, we will make great use of the UCLA Stata website.

Grading: The grade will be based upon a number of factors which are weighted approximately as: class participation (10%), problem sets (30%), midterm (25%) and the final (35%).

Provisions for Feedback: Feedback will be provided along a number of paths. The problem sets offer a rich weekly source on your progress, as well as in-class interactions. The midterm and final will also provide strong indications of your progress. I will also offer a minimum of two hours a week of office time during which I will be available if you have any problems/concerns about your work. As I spend much of my time online, e-mail questions are absolutely welcomed and I will respond as quickly as possible. The TA is also available for individual or group work and will provide me another channel for feedback from students. I am absolutely available to any individual who would like to speak with me: just ask.

Academic Integrity: Academic integrity is central to the mission of educational excellence at Brandeis University. Each student is expected to turn in work completed independently, except when assignments specifically authorize collaborative effort. It is not acceptable to use the words or ideas of another person without proper acknowledgement of that source. This means that you must use footnotes and quotation marks to indicate the sources of any phrases, sentences, paragraphs or ideas found in published volumes, on the internet, or created by another student. Violations of university policies on academic integrity, described in Section 3 of *Rights and Responsibilities*, may result in failure in the course or on the assignment, and could end in suspension from the University. If you are in doubt about the instructions for any assignment in this course, you must ask for clarification.

Notice: If you have a documented disability on record at Brandeis University and require accommodations, please bring it to the instructor's attention prior to the second meeting of the class.