University of Maryland
Department of Criminology and Criminal Justice

CCJS 710
Limited Dependent Variables in Criminology

Fall 2017

Time and Place:
Class: Thursdays, 4:00 – 6:45 PM, Room 1101 Susquehanna

Instructor:
Laura Dugan
2131 LeFrak Hall
Telephone: 301-405-4070
Email: Use ELMS email for course correspondence
Office Hours: Tuesdays 2:00-6:00 & by appointment.

Course Objectives: This primary objective of this course is to extend the basic linear model to deal with outcome variables which cannot be treated as continuous. A secondary objective is to turn students into educated consumers of a variety of advanced quantitative methods used in empirical criminological research. Importantly, this often means understanding what the method *cannot do*, as much as what it can. As such, this course is will cover several advanced topics in applied econometrics and psychometrics, including models for binary, ordinal, count and censored dependent variables, plus basic panel models. Time permitting, we will consider some other interesting topics including bootstrapping and nonparametric regression. Theoretical foundations of topics will be introduced and developed; however, the emphasis will be on the **empirical applications** of each topic. In addition to the regular lectures, we will also be using meeting times to discuss empirical papers and go through computer examples in class.

Course Prerequisites:
Proficiency in basic statistics and regression (e.g., the material that covered in CCJS 621) is essential to go forward in this course. If you are not current or proficient, I strongly suggest that you review that material and/or revisit this course at a later point in your doctoral studies. Given the advanced nature of this course, a strong willingness to put in appropriate time and effort to do quality, quantitative empirical research in criminology/criminal justice is also a necessity. This means spending time outside of the lectures and assignments to learn and master the material. If you have questions about this, be sure to speak to me as soon as possible. **I will treat this course as a responsibility and opportunity to train future colleagues; thus, I expect you to reciprocate and take this responsibility and opportunity seriously.**

Software
I will demonstrate in class and provide examples and support for most applications using **Stata**. If you want to use a different package for your assignments, see me first.

Required Texts:

Long, Scott J. *Regression Models for Categorical and Limited Dependent Variables*. Sage. (ISBN-10: 0803973748; ISBN-13: 978-0803973749)

Eliason, Scott R. *Maximum Likelihood Estimation Logic and Practice*. Sage. (ISBN- 978-0-8039-4107-6)

Supplemental Texts:

These are part of the SAGE Series in Quantitative Applications in the Social Sciences. They are designed to introduce topics to the readers. I find them to be excellent resources to help us wrap our heads around the material. I encourage you to purchase these so that you have them as a resource for this class and the remainder of your careers.

Liao, Tim Futing. *Interpreting Probability Models Logit, Probit, and other Generalized Linear Models*. Sage (ISBN- 0-8039-4999-5).

Breen, Richard. *Regression Models Censored, Sample Selected, or Truncated Data*. Sage. (ISBN-0-8039-5710-6).

Borooah, Vani K. *Logit and Probit Ordered and Multinomial Models*. Sage (ISBN- 0-7619-2242-3).

Journal Articles and Additional Readings

Also, as an educated consumer, you should be able to read and understand more quantitatively sophisticated articles relating to the analysis of crime and criminal behavior. Therefore, we will be reading multiple empirical articles to see how these methods and concepts are used in practice. All articles are found on ELMS, and their references are on the last page of this syllabus.

On certain occasions, I assign other readings from various other sources, in which case I will make them available to you at least two weeks in advance. Also, you will likely find a Stata help manual to be of great help. The following are suggestions:

Acock, Alan C. *A Gentle Introduction to Stata*, 2nd Ed., Stata Press.
Longest, Kyle C. *Using Stata for Quantitative Analysis*, 2nd Ed., Sage.
Kohler, Ulrich and Frauke Kreuter *Data Analysis Using Stata*, Stata Press.

Course Requirements: Your final grade for the course will be determined using the following formula:

Empirical Projects	40%
Midterm Exam	25%
Final Exam	25%
Participation	10%

Notice that the greatest weight is put on the projects, which purposefully corresponds to the mission of the course—to learn to analyze data and interpret results. Additionally, you will be expected to be prepared and participate in each class. Given the advanced nature of the course, this is essential for learning the material.

Grade Distribution:

A+	97% - 100%	B-	80% - 82%	D	63% - 66%
A	93% - 96%	C+	77% - 79%	D-	60% - 62%
A-	90% - 92%	C	73% - 76%	F	Less than 60
B+	87% - 89%	C-	70% - 72%		
B	83% - 86%	D+	67% - 69%		

Class Attendance
All students are expected to attend class regularly and come prepared to participate. While you will not directly lose points for missing class, note that too many absences will affect your participation, and hence, your final grade.

Disability Accommodations
Persons with a documented disability requesting reasonable accommodations should contact me *by the second class meeting*. We will then work with Disability Support Services (DSS) to make arrangements with you to determine and implement appropriate academic accommodations.

Religious Observances
Any student who anticipates the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to me, in writing, *by the second class meeting*. The request should not include travel time.

Late Work and Incomplete Grades
Extensions for assignments of exams will not be given except in cases of a medical or family emergency. Proper accompanying written documentation is required. Any problems that a student encounters must be brought to my attention as soon as possible. Incomplete grades are strongly discouraged and will be given only in situations where (a) a student has completed a majority of the course requirements and (b) shows substantial proof of hardship that necessitates more time to meet those requirements. As noted elsewhere, no late homework will be accepted. In the event of either of the above circumstances, a make-up assignment will be given.

Technology in the Classroom
I will pass out a hard copy of my lecture notes each week which you may use to follow along in the lecture, meaning you will have no need for any type of digital device during class. Please do not use your laptops, phones, tablets, etc. during class.

Academic Dishonesty
Plagiarism will not be tolerated in this course under any circumstances. People suspected of violating the university guidelines on academic integrity will be notified of my concern and then dealt with according to the official printed policy of the University of Maryland.

Empirical Projects

There will be 4 homework assignments throughout the semester, which will roughly correspond to the length of time spent on topics. Each project will count equally as far as the final grade. The project will be due at the beginning of class on the due date (uploaded to ELMS). Late homework will not be accepted and will count as a zero for that assignment. You may, and in fact are encouraged, to discuss solution strategies in groups. However, each student **must turn in individually written answers** to the homework assignments (this includes your own set of interpretations of any joint results). Solution sets will be made available when the assignments are returned.

Midterm Exam and Final Exam

I will make more information, including the format, available to you as the dates near.

Participation

This class will move faster than CCJS 621, as it is a PhD level class and we have a lot of advanced material to cover. This course will involve a lot of lecturing, and **questions and discussion are highly encouraged**!! In order to learn the material, you are expected to do all readings prior to coming to class. Some of these text readings can be dense, so you are encouraged to discuss them with one another if you are having difficulty understanding them. I have included supplemental readings for some of the material, which should help you better understand the main reading. Furthermore, I want you to be obsessive about reading and understanding the journal articles, and I reserve the right to have you lead the discussion in class about one of the articles assigned for that week. Some weeks I will have you write up a summary of the assigned articles, for which your response will count toward your participation grade.

Tentative Schedule (next page)
This is an extremely aggressive list of topics which may need to be modified. Thus, I reserve the right to adjust the schedule of topics. Also, time permitting, we may add additional topics, in which instance, I will make sure all assigned reading in done at least two weeks in advance.

Class	Date	Topic	Reading
1	8/31	Class Introduction; Review of OLS and Probability Theory	Long 1.1-1.3; 2.1-2.5
2	7/7	Understanding other Probability Distributions and Their Processes; Maximum Likelihood Estimation	Rothschild & Logotheis; Eliason Ch. 1; Long 2.6
3	9/14	Binary Response Models I: LPM, Logit	Long 3.1-3.9; Supplemental: Liao pp 1-21
4	9/21	Binary Response Models II: Probit, Post Estimation	Liao 21-25; 4.1-4.4
5	9/28	Categorical and Ordered Outcome Models	Long 5.1-5.7; Liao Ch. 4; Supplemental: Liao Ch. 5; Borooah Chs. 1 & 2
6	10/5	Multinomial Outcome Models	Long 6.1-6.10; Supplemental: Liao Ch. 6; Borooah 45-72
7	10/12	**Midterm Exam**	
	10/19	Median and Quantile Regression	Koenker & Hallock; Buchinsky; Britt
8	10/26	Censored Normal Dependent Variables I – Tobit Estimation	Long 7.1-7.7; Tobin; Supplemental: Breen Ch. 2
9	11/2	Censored Normal Dependent Variables II – Semiparametric Models	Chay & Honoré; Chay & Powell
10	11/9	Sample Selection Models	Berk; Bush, Johnson, & Slocum; Supplemental: Breen Ch. 3
11	11/16	**ASC**	
	11/23	**Thanksgiving**	
12	11/30	Count Data; Poisson and Negative Binomial Regression	Long 8.1-8.7; Berk and MacDonald; Osgood; Supplemental: Liao Ch. 8
13	12/7	Pooled Cross-section and Panel Data; Difference-in-Difference Estimation; Intro to Fixed and Random Effects Models	TBD (D&D); Dugan pp. 754-758
	12/14	**FINAL EXAM**	

Additional Readings:

These readings are on ELMS, and are required for the lectures for which they are assigned.

Berk, Richard A. 1983. An Introduction to Sample Selection Bias in Sociological Data. *American Sociological Review*, 48(3): 386-398.

Berk, Richard and John M. MacDonald. Overdispersion and Poisson Regression. *Journal of Quantitative Criminology*, 24: 269-284.

Britt, Chester L. (2009). Modeling the Distribution of Sentence Length Decisions Under a Guidelines System: An Application of Quantile Regression Models. *Journal of Quantitative Criminology*, 25: 341–370.

Buchinsky, Moshe. (1998). Recent Advances in Quantile Regression Models: A Practical Guideline for Empirical Research. *The Journal of Human Resources*, 33(1): 88-126.

Bushway, Shawn, Brian D. Johnson, and Lee Ann Slocum. (2007) Is the Magic Still There? The Use of the Heckman Two-Step Correction for Selection Bias in Criminology. *Journal of Quantitative Criminology*, 23: 151-178.

Chay, Kenneth Y. and Bo E. Honoré. (1998). Estimation of Semiparametric Regression Models: An Application to Changes in Black-White Earnings Inequality During the 1960s. *The Journal of Human Resources*, 33(1): 4-38.

Chay, Kenneth Y. and James L. Powell. (2002). Semiparametric Censored Regression Models. *The Journal of Economic Perspectives*, 15(4): 29-42.

Dugan, Laura (2010) "Estimating Effects over Time for Single and Multiple Observations." In A. Piquero and D. Weisburd (Eds.) *Handbook of Quantitative Criminology*. (pp. 741-763) New York: Springer.

Koenker, Roger, and Kevin F. Hallock. (2001). Quantile Regression. *Journal of Economic Perspectives*, 15: 143-156.

Osgood, D. Wayne. (2000). Poisson-Based Regression Analysis of Aggregate Crime Rates. *Journal of Quantitative Criminology*, 16: 21-43.

Rothschild, V. and N Logothetis. (1986). *Probability Distributions*. Chichester: John Wiley & Sons Inc.

Tobin, James. (1958). Estimation of Relationships for Limited Dependent Variables. *Econometrica*, 26(1): 24-36.