### **Education 265:  Applied Regression Analysis for Education and Social Research**

### Spring 2016

Lecture: Monday 9:00-11:30, Room 2024

Lab: Tuesday 2:00-3:30, Room 2024, please bring your laptops

**Professor:** Greg J. Duncan

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**TA Office Hours:** Thursdays 1:30-3:30

The purpose of this course is to provide students with an introduction to research uses of regression models and the statistical analysis of longitudinal data. Topics will include a review of the OLS regression model, logistic regressions models, causation and natural experiments, descriptive techniques for longitudinal data, event-history methods, and various other techniques for analyzing longitudinal data. The approach taken in the class will be a relatively intuitive one, with plenty of computer exercises between classes to become familiar with the material.

It is hoped that by the end of the course students will be able to understand the statistical underpinnings of most current social-science research using cross-sectional and longitudinal data. It is also a stepping stone to more advanced courses.

Mastering the material will require a careful reading of the course texts as well as persistent attention to the exercises that will be handed out each week. There is one formal class session each week—on Monday between 9:00 and 11:30. Each week’s problem set will be posted in advance and is due in electronic form in Duncan’s EEE dropbox by 9 am Friday of the week in which they are assigned.

I will require two papers during the quarter, one just before the middle and another due on the last day of class. The first paper is very short and requires students to invent a “natural experiment” to test a hypothesis of interest. The second paper will require an analysis of the data set we will be working with as part of the class. Students who wish to use their own data sets to do their papers are encouraged to do so. There will be one in-class exam around the middle of the quarter.

The class grade will depend on the following criteria:

10% — quality of contributions to class discussion

25% — quality of homework

10% — first paper

20% — exam

35% — second paper

My grading policy adheres to regulations in the UCI Academic Senate manual.

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There are two textbooks:

*Rachel A. Gordon, Regression Analysis for the Social Sciences, New York: Routledge, 2010.*

*Jeffrey M. Wooldridge, Introductory Econometrics, 2nd or 3rd edition, South-Western College Publishing.*

It is strongly recommended that you have one of these two books in your possession. Gordon is fairly new and written at a more elementary level. Wooldridge is a comprehensive and fairly accessible beginning econometrics text. I list readings from both below.

*Recommended:*

Paul D. Allison, *Multiple Regression: A Primer*, Pine Forge Press, 1999.

Paul D. Allison, *Event History Analysis,* Sage University Papers Series, Sage Publications, 1984

All articles listed in the syllabus are available through EEE or the UC-eLinks in Google Scholar.

**Week 1**, March 28: Introduction to the course, the class data set and Stata

Readings for class:

Chapters 1 and 2 in Gordon, Appendix A, B and C – review as needed

Chapters 3 and 4 in Gordon

Duncan, G., W. Yeung, and J. Brooks-Gunn. “How Much Does Childhood Poverty Affect the Life Chances of Children?” *American Sociological Review*, Volume 63, Number 3, June 1998, pp. 406-423.

“Introduction to the … class data set,” in EEE

“Heresy 101: Worthy statistical concerns for educational and developmental studies,” in EEE

*Exercises assigned: 1) Problem Set 1*

*2) Take Stata tutorial on* <http://www.ats.ucla.edu/stat/stata/notes/> *(3 movies under “Class Notes”—Entering, Exploring, Modifying). This will take approximately 2 hours.*

**Week 2**, April 4: Review/extensions of OLS model

Readings for class:

Chapters 5 and 6 in Gordon – review as needed

Chapters 7, 8 and 9 in Gordon

Chapters 1 and 2 (Sections 2.1-2.3) of Wooldridge, *Introductory Econometrics*

Christopher Winship and Stephen Morgan, “The Estimation of Causal Effects from Observational Data,” *Annual Review of Sociology*, Volume 25, 1999, pp. 659-668.

*Exercise assigned: Problem Set 2*

*2) Take Stata tutorial on* <http://www.ats.ucla.edu/stat/stata/notes/> *(2 movies under “Class Notes”— Managing, Analyzing Data). This will take approximately 1.5 hours.*

**Week 3**, April 11: Continued review of OLS

Readings for class:

Chapters 10 and 11 in Gordon

Chapters 2 (sections 2.4-2.6), 3, 6 (especially sections 6.1 and 6.2), 7 (sections 7.1-7.4) and Appendix A from Wooldridge, *Introductory Econometrics*

Fryer Jr., Roland and Levitt, Stephen (2006) “The Black-White Test Score Gap Through Third Grade” *American Law and Economics Review,* 8(2), pp. 249-281.

*Exercise assigned: Problem Set 3*

**Week 4**, April 18: Logistic regression

Readings for class:

Chapter 7 (section 7.5) and 17 (section 17.1) of Wooldridge, *Introductory Econometrics*

De Maris, Alfred. “A Tutorial in Logistic Regression” *Journal of Marriage and the Family*, 57, Nov. 1995, 956-968; OR Chapter 14 “Logistic Regression” from your Moore, McCabe and Craig book from George Farkas’s courses.

Scott, K., Mason, C. and Chapman, D. “The Use of Epidemiological Methodology as a Means of Influencing Public Policy” *Child Development*, 70: 1263-1272.

*Exercise assigned: Problem Set 4*

**Week 5**, April 25: Natural experiments and regression discontinuity models

Readings for class:

Duncan, G., Magnuson, K. and Ludwig, J. “The Endogeneity Problem in Developmental Studies” *Research in Human Development*, Vol. 1, Nos. 1&2, 2004, pp. 59-80.

Hanushek, E. and Raymond, M. “Does School Accountability Lead to Improved Student Performance?” *Journal of Policy Analysis and Management*, Spring 2005, Vol. 24(2): 297-327.

Wong, V. et al, “An Effectiveness-Based Evaluation of Five State Pre-Kindergarten Programs” *Journal of Policy Analysis and Management*, 27(1): 122-154.

*Exercise assigned: Problem Set 5*

**Week 6**, May 2: Change and other simple longitudinal models

Readings for class:

*Longitudinal Data Analysis Using Stata*, by Paul D. Allison, November 2007 (pdf, available on EEE)

## Chapter 14 (sections 14.1-14.2) in Wooldridge, *Introductory Econometrics*

## NICHD Early Child Care Research Network and Greg Duncan, “Modeling the Impacts of Child Care Quality on Children’s Preschool Cognitive Development”. *Child Development,* Vol. 74, No. 5, October 2003, pp. **1454-1475.**

Optional:

Curran et al., (1997) “The Relation Between Adolescent Alcohol Use and Peer Alcohol Use” *Journal of Consulting and Clinical Psychology*, 65(1): 130-140.

Duncan, Boisjoly, Kremer, Levy and Jacque Eccles (2005) “Peer Effects in Drug Use and Sex among College Students” *Journal of Abnormal Child Psychology*, 33(3): 375-385.

*Exercise assigned:* ***NONE*** *— study for the mid-term*

**Week 7**, May 9: More change models

***Mid-Term Exam: Second half of class (75 minutes)***

Readings for class:

Allison, Paul D. “Change Scores as Dependent Variables in Regression Analysis” in C.C. Clogg *Sociological Methodology*, Oxford: Basil Blackwell.

Duncan, Greg, Engel Mimi, Claessens, Amy and Chantelle Dowsett, “The Value of Replication for Developmental Science,” *Developmental Psychology*, published online on October 2, 2014,   DOI - 10.1037/a0037996

 “Paper writing guidelines”

*Exercise assigned: Problem Set 6*

**Week 8**, May 16: Event history methods

***Short paper on natural experiments due***

Readings for class:

Long, J. S., P.D. Allison, and R. McGinnis. “Rank Advancement in Academic Careers” *American Sociological Review*, 58, October 1993: 703-722.

*Recommended:* Paul D. Allison, *Event History Analysis,* Sage University Papers Series, Sage Publications, 1984

*Exercise assigned: Problem Set 7*

**Week 9-10**, May 23 & May 30 (need to reschedule owing to Memorial Day): Clustered data, standard errors and power calculations

Readings for class:

Users’ manual for the Optimal design software program (<http://sitemaker.umich.edu/group-based/optimal_design_software>)

Stata Library: Analyzing Correlated (Clustered) Data ([http://statistics.ats.ucla.edu/stat/stata/library/cpsu.htm)--concentrate](http://statistics.ats.ucla.edu/stat/stata/library/cpsu.htm%29--concentrate) on sections relevant to Stata.

Bloom, H. S. (1995). Minimum detectable effects a simple way to report the statistical power of experimental designs. *Evaluation review*, *19*(5), 547-556.

*Exercise assigned: Problem Set 8*

**Monday, June 6—*SECOND PAPER DUE***