

POEC 6344.001: Categorical and Limited Dependent Variables

Fall Semester 2008, CRN 11831
Tuesdays, 4:00pm to 6:45pm
Location: WSTC 1.224 (*Note the change!*)

DRAFT, July 23, 2008

Professor Contact Information

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Office Hours: Wednesday 2-5, and by appointment.

Teaching Assistant

TBA
Office Hours: TBA

Course Pre-requisites

POEC 5316 or the equivalent is required. In other words, you should have a strong grounding in Ordinary Least Squares (OLS) regression at the level of the Damodar Gujarati, *Basic Econometrics* (chapters 1-9) or better. A familiarity with the basics of calculus and matrix algebra is very helpful, although not required.

Course Description

The estimation of empirical models is essential to public policy analysis and social science research. Ordinary Least Squares (OLS) regression analysis is the most frequently used empirical model, and is appropriate for analyzing continuous dependent variables that meet certain distributional assumptions. This course examines several types of advanced regression models for dependent variables that violate one or more of the assumptions of the OLS regression model. For example, some dependent variables may be categorical, such as pregnant or not, employed or not, etc. Other dependent variables may be truncated or censored, such as contributions to an individual retirement account that are limited by law to certain dollar amounts. Still others may be counts of things, like the number of children born to a given woman or the number of traffic accidents on a given day. The principal models examined in the course are binary logit and probit, multinomial logit, ordinal logit and probit, tobit, and the family of Poisson regression models. The Heckman correction for selection and Event History Analysis are also addressed. All these models are estimated using maximum likelihood estimation (MLE). The course focuses on the application and interpretation of the models, rather than statistical theory.

Student Learning Objectives/Outcomes

- Students will learn the theory and practice of regression models for limited and categorical dependent variables, including logit, probit, ordinal logit, ordinal probit, multinomial logit, Poisson regression, Tobit and related models, and event history analysis.
- Students will learn how to interpret these models by reviewing published papers drawn from social science literature.
- Students will develop proficiency in applying and interpreting these models using data provided by the instructor.
- Students will demonstrate mastery of the material by writing an empirical paper using one or more of the models discussed in class and presenting their analysis and findings in class.

Required Textbooks and Materials

J. Scott Long, *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage. Use throughout the course. Essential.

Mario Cleves, William W. Gould, Roberto G. Gutierrez, and Yulia Marchenko. 2008. *An Introduction to Survival Analysis Using Stata*, 2nd Edition. Stata Press. Used for the event history analysis, aka survival analysis, part of the course.

Recommended Course Materials

Long, S. J. and Freese, J. 2001. *Regression Models for Categorical Dependent Variables Using Stata*. College Station, TX: Stata Press. This book is a companion to the Long book, and contains more “nuts and bolts” on estimating models, and describes customized tools for helping to interpret the results of the models.

Paul D. Allison, *Event History Analysis: Regression for Longitudinal Event Data*. Quantitative Applications in the Social Sciences, #46. Thousand Oaks, CA: Sage. This small book is an easy, compact introduction to event history analysis that may be useful complement to Cleves *et al.*

Gudmund R. Iversen, *Calculus*. Quantitative Applications in the Social Sciences, #110. Thousand Oaks, California: Sage. This course does not require calculus, but it would be helpful to know the basics. I will cover the basics in class, but if you want some additional back up, this “little green book” is a painless introduction to calculus.

Alternatively, for a more in depth treatment, you could check out a calculus text from the library, but Iversen’s is much briefer and will suffice for our purposes.

Course Software.

The software for the course is Stata version 10, although any recent version will probably work just fine. Certainly, there is no need to upgrade from version 9 unless you want to have the latest and greatest. (However, you should make sure you loaded all the patches and bug-fixes. Type “update query” at the command line while connected to the internet to check.) You do not need to buy anything, because Stata software is available in the computing lab. However, if you choose to buy Stata, you will get a substantial discount via the “Grad Plan” that has been set up for UTD. You will want the Intercooled version (\$95 for a one-year license, \$155 for a perpetual license). Please contact StataCorp directly:

Phone: 800-782-8272 (Monday through Friday 8:00 to 5:00 Central Time)

Online: <http://www.stata.com/order/new/edu/gradplans/gp-direct.html>

If ordering online, be sure to include your "*@utdallas.edu*" email address when ordering to qualify for the UT Dallas discount. Typically, orders are shipped within 1 or 2 business days after the order is placed.

Requirements

1. Students are required to take a midterm and a final examination in class. The exams are open-note, open-book.
2. There are several short problem sets with due dates as indicated on the schedule. The lowest problem set score will be dropped.
3. Students must complete an empirical paper on an approved topic using one or more of the techniques covered in this course. A typical paper will be 15 to 20 double spaced pages.
4. On the indicated dates, students will be asked to turn in a proposed paper topic and a first draft of the empirical paper. These items will not be graded.

Grading Policy

The grading in the course is based on the problem sets, examinations, and the empirical paper. The weights assigned to each are as follows:

Problem Sets (lowest dropped)	25%
Midterm Examination	25%
Final Examination	25%
Empirical Paper	25%

Starting in Fall of 2008, certain plus and minus grades will be allowed for graduate courses. After computing the student semester average on a 100-point numeric scale, letter grades will be assigned as follows:

<u>Numeric Range</u>		<u>Letter</u>	<u>Grade</u>
<u>min</u>	<u>max</u>	<u>Grade</u>	<u>Point</u>
93.0	100.0	A	4.00
90.0	92.9	A-	3.67
87.0	89.9	B+	3.33
83.0	86.9	B	3.00
80.0	82.9	B-	2.67
77.0	79.9	C+	2.33
70.0	76.9	C	2.00
0	69.9	F	0.00

Assignments & Academic Calendar

The following are subject to change. For the latest schedule, readings, and assignments, consult the schedule posted on the course website within WebCT.

Preliminary Schedule, Readings and Assignments		
* = Optional		
1	Aug. 26	<p>Introduction to Course Review of OLS and Its Limitations Long, Sections 2.1-2.5 * Gujarati, Chapters 2-9, especially 7-8 * Stock and Watson, Chapters 4-7, especially 6-7</p> <p>Background Information (review if/as needed): <u>1. Probability and Statistics</u> * Paul Jargowsky and Rebecca Yang, “Descriptive and Inferential Statistics” * Gujarati, Appendix A * Stock and Watson, Chapters 2 and 3</p> <p><u>2. Basic Calculus</u> * Iverson, Chapters 1-2, and part of 4 (“Maximum and Minimum”) * Iverson, Chapter 3 and the rest of 4.</p> <p><u>3. Matrix Algebra</u> * Gujarati, Appendix B, “Rudiments of Matrix Algebra”</p> <p><u>4. Introduction to Stata Programming</u> * Long and Freese, Chapter 2</p>

Preliminary Schedule, Readings and Assignments

* = Optional

2	Sep. 2	<p>Principles of Maximum Likelihood Estimation Myung (2003), "Tutorial on Maximum Likelihood Estimation," Journal of Mathematical Psychology 47:90-100 * Long, Section 2.6 (Technical)</p> <p>Binary Dependent Variables: Logit and Probit Long, Sections 3.1-3.4, 3.7-3.9 Explore "Logit Function of XiB.xls" and "Probit Function of XiB.xls" Williams and Nesiba (1997), "Racial, Economic, and Institutional Differences in Home Mortgage Loans," Journal of Urban Affairs 19: 73-103 * J.S. Cramer, "The Origins and Development of the Logit Model"</p>
3	Sep. 9	<p>Interpretation and Hypothesis Testing in Logit and Probit Models Long, Sections 4.1, 4.3 * Long, Section 4.2 * Long and Freese, Chapter 4 Brown (1997), "Explaining the Black-White Gap in Labor Force Participation Among Women Heading Households," American Sociological Review 62: 236-252, especially pages 244-248. Weil (2001), "Assessing OSHA Performance: New Evidence from the Construction Industry," Journal of Policy Analysis and Management 20: 651-674. <i>Problem Set 1 Due</i></p>
4	Sep. 16	<p>Ordinal Dependent Variables: Ordinal Logit and Ordinal Probit Long, Sections 5.1-5.4 * Long and Freese, Chapter 5 Winship and Mare (1984), "Regression Models with Ordinal Dependent Variables, American Sociological Review 49: 512-525. Hughes and Waite (2002), "Health in Household Context: Living Arrangements and Health in Late Middle Age," Journal of Health and Social Behavior 43:1-21. (Focus on Table 2 results.) * Alvarez and Brehm (1998), "Speaking in Two Voices: American Equivocation About the Internal Revenue Service," American Journal of Political Science 42: 418-452. (Model is heteroskedastic ordered probit.) <i>Problem Set 2 Due</i></p>
5	Sep. 23	<p>Nominal Dependent Variables: Multinomial Logit Long, Sections 6.1-6.2, 6.4-6.6 * Long and Freese, Sections 6.1-6.7 Stratton, O'Toole, and Wetzel (2008). "A Multinomial logit model of college stopout and dropout behavior," Economics of Education Review 27: 319-331. <i>Problem Set 3 Due</i></p>

Preliminary Schedule, Readings and Assignments

* = Optional

6	Sep. 30	Nominal Dependent Variables: Conditional Logit Long, 6.7-6.10 * Long and Freese, Sections 7.1, 7.2 Sections 1 and 2 of Alvarez and Nagler (1998), "When Politics and Models Collide: Estimating Models of Multiparty Elections," American Journal of Political Science 42: 55-71. <i>Problem Set 4 Due</i>
7	Oct. 7	Nominal Dependent Variables: Multinomial Probit * Long and Freese, Chapter 7.3 Sections 3-5 of Alvarez and Nagler (1998), "When Politics and Models Collide: Estimating Models of Multiparty Elections," American Journal of Political Science 42: 71-96. Carole J. Wilson (2008). "Consideration Sets and Political Choices," Political Behavior 30: 161-183. * Hausman and Wise (1978), "A Conditional Probit Model for Qualitative Choice: Discrete Decisions Recognizing interdependence and Heterogenous Preferences," Econometrica 46: 403-426. <i>Problem Set 5 Due</i>
8	Oct. 14	Midterm Exam Open book, open note Bring a calculator
9	Oct. 21	Censored and Truncated Dependent Variables: Tobit Long, Chapter 7 Beron (1990), "Child Support Payment Behavior: An Econometric Decomposition," Southern Economic Journal 56: 650-663. * McDonald and Moffitt (1980), "The Uses of Tobit Analysis," The Review of Economics and Statistics 62: 318-321. <i>Proposed Empirical Paper Topic Due</i>
10	Oct. 28	Censored and Truncated Dependent Variables: Extensions Jargowsky, "Using Stata's ML Utility" Gould (1992), "At Home Consumption of Cheese: A Purchase-Infrequency Model," American Agricultural Economics Association 74: 453-459 Winship and Mare (1992), "Models for Selection Bias," American Sociological Review 18: 327-350 (Focus on examples of selection bias and the Heckman estimator) * James J. Heckman (1979), "Sample Selection Bias as a Specification Error," Econometrica 47: 153-161 <i>Problem Set 5 Due</i>

Preliminary Schedule, Readings and Assignments		
* = Optional		
11	Nov. 4	Count Dependent Variables: Poisson Regression and Related Models Long, Chapter 8 Hughes & Waite (2002), "Health in Household Context: Living Arrangements and Health in Late Middle Age," Journal of Health and Social Behavior 43: 1-21 (Yes, it's the same article as before. This time look at the Poisson results.) * Minkoff (1997), "The Sequencing of Social Movements," American Sociological Review 62: 779-799
12	Nov. 11	Event History Analysis: Theory Cleves, Chapters 1-4 * Allison, Chapters 1-3 <i>First Draft of Empirical Paper Due</i>
13	Nov. 18	Event History Analysis: Interpretation and Implementation Cleves, Chapters 5-7, 9.1, 12.1, 13.1-13.3 * Allison, Chapter 4 Finocchiaro and Lin (2000), "The Hazards of Incumbency," unpublished paper. * Cox, D. R. (1972), "Regression Models and Life Tables," Journal of the Royal Statistical Society, Series B 34: 187-220. (Cited over 9000 times!)
14	Nov. 25	Student Presentations <i>Empirical Paper Due</i>
15	Dec. 2	Course Review
	Dec. 12	Final Exam Open-book, open-note Bring a calculator

Course & Instructor Policies

Late Work. Problem sets will not be accepted late, because the answers are discussed in class on the day they are due. Due to a medical emergency or other valid reason, you may be excused from turning in a problem set. In such cases, the grade will be computed based on the remaining problem sets. Consult me *in advance of the due date*, if at all possible, if such a contingency should arise. Likewise, I cannot give early or late examinations. Arrange your schedule now to avoid potential conflicts.

Calculator. A calculator is a virtual necessity for this class. However, any basic scientific calculator will do. The following functions are necessary: square root, y^x , e^x ,

and $\ln(x)$. Such calculators can often be obtained for under \$10. You will not need graphing capability or programmability.

Attendance. Attendance is entirely optional. However, be advised that you are responsible for any material covered in the class, whether or not it was in the readings or lecture notes. You are also responsible for any announcements made in class. For most students, attendance is simply essential to learning the material. If you do need to miss a class, be sure to consult with a fellow student to learn what transpired.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog.

Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

The University of Texas at Dallas, SU 22

PO Box 830688

Richardson, Texas 75083-0688

(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or

assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.