



**PUBAFRS 7571: Multivariate Data Analysis
Autumn 2015 Syllabus**

Professor:

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Meets: TuTh 2:20 PM - 3:40 PM

Room: Page Hall 040

Credit hours: 3

Office Hours: MW 2-3pm, and by appointment

Prerequisite:

PUBAFRS 6070 or equivalent graduate level introductory statistics course.

Online course material:

Course material is available on Carmen at <http://www.carmen.osu.edu/>

Course Description:

This is an applied course in regression analysis. Through hands-on exercises both inside and outside of class, students will use multiple regression to make predictions and test hypotheses to help inform policy analysis. Topics include model fitting, regression diagnostics, limited dependent variables, and time series and forecasting. Emphasis is also placed on issues confronted when working with real data.

Course Objectives:

The primary objective of this course is to provide an understanding of regression techniques, both from a “producer’s” and a “consumer’s” perspective. Regression, which is a statistical method used to study the relationships among two or more variables, is the most widely used statistical technique in public policy analysis. It is almost impossible to learn statistical concepts without lots of practice using statistical methods, so the course focuses on applying the theory through multiple hands-on exercises, both inside of class in a lab format and outside of class with homework assignments. These exercises will also give students practice in how to use data from external sources and report statistical results in a clear manner. By the end of the course, students should not only be intelligent consumers who can readily interpret regression analysis performed by others, but they will also be equipped to test research hypotheses involving relationships among multiple variables. Students should also be able to identify the appropriate models to use based on the nature of their data.

Textbooks:

Required:

- Damodar Gujarati (2014), *Econometrics by Example, 2nd ed* (ISBN 9781137375018)
 - For links to data sets and other resources, see <http://www.palgrave.com/companion/gujarati-econometrics-by-example-2e/>

Optional Supplemental Text:

- Paul D. Allison (1998), *Multiple Regression: A Primer* (ISBN 9780761985334)
- For those who want more intuition regarding what regression is all about in “English”
- You can preview the first 32 pages in [Google books](#)

Additional supplemental materials will be linked to on Carmen.

Note: I will teach the class based primarily upon second edition of the Gujarati textbook that is listed above. If you find a used copy of the first edition, that will also work fine for you.

Students can access textbook information via the Barnes & Noble bookstore website: www.shopOhioState.com as well as from their BuckeyeLink Student Center. This information is disseminated by B&N to all area bookstores. You may buy from a store of your choice and/or shop for books (always use ISBN# for searches) online.

Software:

- The course uses Small Stata, v. 11, which is available on the computers in the 030 and 040 labs. Small Stata is designed for classes and is limited to 99 variables and 1,200 observations. If you have data with more observations, a full “IC” version of Stata 12 is also installed on some lab computers in 030 (030p07-030p12).
- See Carmen for a Stata getting started guide.
- Printed user manuals are in the 030 lab and a pdf version is installed with each copy of Stata.
- If you would like to purchase Stata for use on your own computer, pricing information is available at <http://www.stata.com/order/new/edu/gradplans/gp-campus.html>
- To purchase, call 800-782-8272 or go to the [StataCorp](#) site. The software is ordered either as a download from Stata or as media shipped directly to you.
- Note: While you may use different software (or no software) for the course, the classroom examples and labs will use Stata. Instructor support will be limited to Stata.

Course Format:

Class sessions will combine lectures that focus on the relevant material from the textbook readings with student participation. Many classes will be structured around addressing policy questions. To address the question, the relevant theory will be presented along with examples. We will practice using the concepts through examples using Stata software in labs every other class. Students are expected to prepare for class by reading the appropriate textbook and any additional readings *prior* to each class. Students are also expected to answer and ask questions during class and fully participate in labs. Class lecture notes will be available for download on Carmen before each class. If you miss a class, be sure that you get any additional notes from a classmate.

Academic Integrity:

While students may work together on preparing homework assignments, each student is required to turn in his or her own work. Collaboration on exams is strictly forbidden, and violators are subject to all Ohio State rules on academic misconduct.

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct* (<http://studentaffairs.osu.edu/csc/>) and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct." Failure to follow the rules and guidelines established in the University's *Code of Student Conduct* may constitute "Academic Misconduct." Sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

In the Ohio State University's *Code of Student Conduct*, Section 3335-23-04 defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Course Requirements and Evaluation:

The course grade will be based upon performance on homework assignments, two in-class exams, and the research paper. Each is weighted equally. While you do not receive an explicit grade for class participation, in the past I have found there to be a strong correlation between class participation and grades in the other three components. I typically adhere to the standard OSU grading scheme (93-100 A, 90-92 A-, 88-89 B+, 83-87 B, etc.).

Homework

The homework grade will be based upon the six highest homework grade scores. While students may collaborate on homework assignments, **each student must turn in a separate assignment with his or her own answers**. Assignments are due at the beginning of class, and late assignments will not be accepted. If you will miss a class when an assignment is due, please make arrangements to submit the assignment by the deadline.

For your homework assignments,

- Assignments will be posted and turned in on Carmen (be aware of when the dropbox closes)
- To receive full credit, show all work
- Feel free to use Stata as much as you can/want to
- When you use Stata to answer a problem
 - Provide the Stata output as part of what you turn in (a Stata log file will save results)
 - This is "showing your work" for Stata problems
 - Organize (properly label) your output
 - It should be obvious which output goes with which questions: It may be best to incorporate the output by cutting & pasting
 - Minimize the amount of output (and number of pages) if at all possible

- Make sure that you also directly answer the question
 - For example, it is not enough to provide the Stata output that shows that a mean is 1234. You should also tell me that the mean is 1234, as is indicated in the Stata output.

Exams

The two exams will be in-class, open book, and open notes. Collaboration on the exam is strictly forbidden (and unnecessary given the open book policy).

Research paper

The paper is intended to help integrate the course material and provide students an opportunity to demonstrate that they can set up a testable research hypothesis, test the hypothesis, and correctly interpret the results. Students should also demonstrate an awareness of the limitations of their analysis. Detailed instructions for the research paper will be distributed separately and posted to Carmen. An intermediate deliverables for the paper will be integrated into one of the weekly homework assignments.

Labs

The labs are designed to help you practice using the concepts from each class. They are also useful for completing assignments and for preparing for exams. They are ungraded, but I reserve the right to start grading them *without prior notice* if I find students are not participating.

Accommodation Policy

“Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.”

Student Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know is suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the **Office of Student Life Counseling and Consultation Services (CCS)** by visiting ccs.osu.edu or calling 614-292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 4th Floor of the PAES Building. 24 hour emergency help is also available through the National 24/7 Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Preliminary Course Outline

Week	Date	Topics	Text Readings		Assignment Due
1	25-Aug 27-Aug	L1. Course introduction: Linear Regression Overview Lab 1	Gujarati G 1	Allison A1-2,4-5	
2	1-Sep 3-Sep	L2. Statistics Review Lab 2	G Append 2		
3	8-Sep 10-Sep	L3. Hypothesis Testing and Multiple Regression Lab 3	G 1	A1-2,4-5	HW1
4	15-Sep 17-Sep	L4. Regression Functional Forms Lab 4	G 2	A 8	HW2
5	22-Sep 24-Sep	L5. Dummy Variables Lab 5	G 3		HW3
6	29-Sep 1-Oct	L6. Multicollinearity L7. Heteroscedasticity Lab 6	G 4 G 5	A 7 A 6	HW4
7	6-Oct 8-Oct	L8. Fun with Stata and Data Exam Review			
8	13-Oct 15-Oct	Midterm 1 Fall Break – No class			
9	20-Oct 22-Oct	L9. Autocorrelation Lab 7	G 6		
10	27-Oct 29-Oct	L10. Model Specification Lab 8	G 7	A 3, 9.6	HW5
11	3-Nov 5-Nov	L 11. Logit (and Probit) Lab 9	G 8	A 9.11	
12	10-Nov 12-Nov	L12. Multinomial and Ordinal Regression Lab 10 (On your own: No formal class)	G 9-10		HW6

13	Nov 17- Nov	L 13. Limited dependent variables and count data	G 11- 12	
		L14. Forecasting	G 16	
	19- Nov	Lab 11		
14	24- Nov	L 15. Panel data models	G 17	HW 7
		L 16. Survival analysis	G 18	
	26- Nov	No class - Thanksgiving		
15	1-Dec	Lab 12		
	3-Dec	Exam Review		
16	8-Dec	Midterm 2		
	11- Dec	Paper Due to Carmen Dropbox 5:45pm		

SAMPLE