Econometrics I

Econ 8370 - 01

Fall 2015

Course & Instructor:

Instructor:	Dr. Diego Escobari
Office:	BUSA 218D
Phone:	956.665.3366
Email:	diego.escobari@utrgv.edu
Web Page:	http://faculty.utpa.edu/escobarida/teaching
Office Hours:	MW 3:00–6:00 p.m., and by appointment
Lecture Time:	R 4:40–7:10 p.m.
Lecture Venue:	Performing Arts Comlex B 1.128

Course Objective:

The course objective is to provide students with a number of commonly used econometric tools and how they can be implemented in empirical research and practical applications. Emphasis will be placed on appreciating its scope, understanding the essentials underlying the various methods, and developing the ability to relate the methods to important issues. At the end of this semester, students will be able to use computer based statistical packages to analyze data, will understand how to interpret the output and will be confident to carry out independent analysis.

Prerequisites:

Applied multivariate data analysis I and II (QUMT 8310 and QUMT 8311).

Textbooks:

Main Textbooks:

(G) William H. Greene, *Econometric Analysis*, Pearson Prentice Hall, 7th edition, 2011. ISBN-13: 978-0131395381 ISBN-10: 0131395386

(W1) Jeffrey M. Wooldridge, *Introductory Econometrics*, South-Western Cengage Learning, 5th edition, 2012. ISBN-13: 978-1111531041 ISBN-10: 1111531048

Additional References:

(S) STATA, *User's Manual*, release 14.
A fantastic source with some mathematical explanations and empirical examples of all the built-in commands in Stata. `http://www.stata.com/`

(W2) Jeffrey M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, 2002. ISBN-10: 0-262-23219-7
Advanced graduate textbook that focuses on microeconometrics methods. Has an excellent description of various nonlinear models.

(B1) Badi H. Baltagi, *Econometrics*, Springer, 4th edition, 2008. ISBN-13: 978-3-540-76516-5
Starts with some basic econometric methods at the undergraduate level, but then covers more advanced topics in spatial correlation, panel data, limited dependent variables and time series using matrix algebra. Its main strength are the theoretical exercises at the end of each chapter.

(H) Bruce E. Hansen, *Econometrics*, 2015.
This is a first-year graduate econometrics textbook at the level of Greene (2009). It is open source and it can be found at: `http://www.ssc.wisc.edu/~bhansen/econometrics/`

(K) Peter Kennedy, *A Guide to Econometrics*, Wiley-Blackwell, 6th edition, 2008. ISBN-13: 978-1-4051-8257-7
Intuitive and almost nontechnical discussion of the most commonly used econometric tools.

(C1) A. Colin Cameron & Pravin K. Trivedi, *Microeconometrics: Methods and Applications*, Cambridge University Press, 2005. ISBN-10: 0-521-84805-9
Has a broad coverage of topics that are more current than in Greene (2008). The author's website contains the data along with the Stata codes to replicate the exercises in the book.
`http://cameron.econ.ucdavis.edu/mmabook/mma.html`

(C2) A. Colin Cameron & Pravin K. Trivedi, *Microeconometrics using Stata*, Stata Press, 2009. ISBN-13: 978-1-59718-048-1
Focuses on the use of Stata and explains the most common microeconometrics models. Very useful to conduct applied research.

(B2) Ernst R. Berndt, *The Practice of Econometrics: Classic and Contemporary*, Addison-Wesley Publishing, 1991. ISBN-13: 978-0-20149-900-1
This is a classic textbook to start with applied econometric research. Each chapter is organized around a large applied literature, where the relevant economic theory is discussed along with the empirical facts and the econometrics.

Software:

Main Software:

The Stata software will be used throughout. Stata is a powerful statistical program with a broad set of pre-programmed econometric and statistical tools. Versions 9 and later have

the MATA matrix programming language. MATA is similar to more flexible programming software like R, GAUSS or MATLAB. You will be required to work on a term paper and Stata may be necessary to conduct the project. I will go over some Stata tutorials and examples during lectures. However, you may use any other software packages you prefer for assignments or projects as long as they can perform required tasks.

Other Software:

GAUSS (`www.aptech.com`), MATLAB (`www.mathworks.com`) and Ox (`www.oxmetrics.net`) are high-level matrix programming languages with a variety of built-in statistical functions. Here you have complete control of your analysis, but you have to do most of the programming yourself. R (`www.r-project.org`) and *gretl* (`www.gretl.sourceforge.net`) are open source (free) software. The first is a very flexible statistical software that has a large amount of packages contributed by third parties (e.g. nonparametric, spatial, stochastic frontier.) *gretl* has many built-in procedures, mostly for time series. EViews (`www.eviews.com`), RATS (`www.estima.com`), LINDEP (`www.lindep.com`), TSP (`www.tspintl.com`) and SAS (`www.sas.com`) are other popular software with a variety of built-in procedures.

Empirical Project:

The empirical project should employ econometric tools covered in the course. Each student must submit a proposal by September 22. The proposal should include (1) the main question of interest (2) data sources and description, and (3) your suggested econometric models. The final version of the term paper is due the last day of classes. The paper should follow the structure of an empirical journal article, containing the following parts (i) abstract, (ii) introduction, (iii) description of the data, (iv) econometric model, (v) estimation results and interpretation, and (vi) conclusions. You may include additional output tables or computer codes in the appendix.

Exams:

There will be two non-cumulative exams; each will count 25% towards your final grade. You must have a valid University excuse in order to take a make-up exam.

Grading:

In addition to the two exams (25% each) and the term paper (20%), there will be two problem sets of 10% each and one in-class presentation (10%). No additional credit will be given. The cutoffs for the A-F grading system are given by:

$$\begin{aligned} 90.00 - 100.0 &\Rightarrow \text{A} \\ 80.00 - 89.99 &\Rightarrow \text{B} \\ 70.00 - 79.99 &\Rightarrow \text{C} \\ 0.00 - 69.99 &\Rightarrow \text{F} \end{aligned}$$

Tentative Course Outline and Readings:

† Required reading; ‡ Suggested reading; ⋆ Empirical application; ◇ General reference.

Part I. Basics of Regression Analysis

1. Carrying Out an Empirical Project. Sep 3

   Ch 1† *(G)*; Ch 19† *(W1)*; Ch 22‡ *(K)*

   Nerlove, M. (1963). "Returns to Scale in Electricity Supply," in C. Christ, ed., *Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfield* Stanford: Stanford University Press.⋆

   Hammermesh, D.S., & J.E. Biddle (1994). "Beauty and the Labor Market," *American Economic Review* 84, 1174-1194.⋆

   Laband, D.N., & M.J. Piette (1995). "Does Who Teaches Principles of Economics Matter?," *American Economic Review* 85, 335-338. ‡,⋆

2. Linear Regression Models, OLS, Assumptions and Properties Sep 10, 17

   Ch 2,† 3,† 4† *(G)*; Ch 2,† 3,† 5† *(W1)*; Ch 4‡ *(W2)*; Ch 4‡ *(B2)*; Ch 3,‡ 4‡ *(B1)*; Ch 3‡ *(K)*

3. Inference, Functional Forms, Specification and Prediction Sep 24

   Ch 5,† 6,† 7† *(G)*; Ch 4,† 6,† 7,† 9† *(W1)*; Ch 5‡ *(K)*

4. Additional Issues: Autocorrelation, Heteroskedasticity, and Multicollinarity Oct 1

   Ch 8,† 4.8,† 19† *(G)*; Ch 8,† 12† *(W1)*; Ch 5‡ *(B1)*; Ch 8,‡ 10,‡ 12‡ *(K)*

   Breusch, T. S., & A. R. Pagan (1979). "A Simple Test for Heteroscedasticity and Random Coefficient Variation," *Econometrica* 47, 1287-1294.◇

   White, H. (1980). "A Heteroskedasticity-consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity," *Econometrica* 48, 817-838.◇

   Newey, W., & K. West (1987). "A Simple, Positive - Definitive Heteroskedasticity and Autocorrelation Consistent Covariance Matrix," *Econometrica* 55, 703-708.◇

   Hill, C., & L. Adkins (2001). "Collinearity," in B. Baltagi, ed., *A Companion to Theoretical Econometrics* Oxford: Blackwell.‡,◇

Part II. Endogeneity, IV and System of Equations

5. Simultaneity and IV Estimation Oct 8

   Ch 12,† 13† *(G)*; Ch 15† *(W1)*; Ch 5‡ *(W2)*; Ch 9‡ *(K)*

   Levitt, S.D. (1997). "Using Electoral Cycles in Policy Hiring to Estimate the Effect of Police on Crime," *American Economic Review* 87, 270-290.‡,⋆

Hausman, J.A. (1978). "Specification Tests in Econometrics" *Econometrica* 46, 1251-1271.$^{\diamond}$

Angrist, J.D. & A.B. Krueger (1991). "Does Compulsory School Attendance Affect Schooling and Earnings?," *Quarterly Journal of Economics* 106, 979-1014.*

Angrist, J.D. & A.B. Krueger (2001). "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments," *Journal of Economic Perspectives* 15, 69-85.‡,*

6. System of Equations — Oct 15*

Ch 10,† 13† *(G)*; Ch 16† *(W1)*; Ch 7‡ *(W2)*

Srivistana, V. & T. Dwivendi (1979). "Estimation of Seemingly Unrelated Regression Equations: A Brief Survey," *Journal of Econometrics* 10, 15-32.$^{\diamond}$

Zellner, A. (1962). "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests of Aggregation Bias," *Journal of the American Statistical Association* 57, 500-509.$^{\diamond}$

Mundell, A. (1990). "Why Has Productivity Declined? Productivity and Public Investment," *New England Economic Review* 3-22.*

Working, E. (1926). "What Do Statistical Demand Curves Show?," *Quarterly Journal of Economics* 41, 212-235.*

Part III. General Estimation Methods

7. Nonlinear Least Squares Estimation — Oct 22, 29

Ch 11† *(G)*; Ch 5‡ *(C1)*

Jennrich, R.I. (1961). "The Asymptotic Properties of Nonlinear Least Squares Estimators," *Annals of Statistics* 2, 633-643.$^{\diamond}$

Exam 1 (During class time) — Nov 5

8. Generalized Method of Moments (GMM) and Minimum Distance Estimation — Nov 12

Ch 15† *(G)*; Ch 8,‡ 14‡ *(W2)*; Ch 6‡ *(C1)*

Hall, R. (1978). "Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence," *Journal of Political Economy* 86, 971-987.$^{\diamond,\star}$

Hansen, L.P. (1982). "Large Sample Properties of Generalized Method of Moment Estimators," *Econometrica* 50, 1029-1054.$^{\diamond}$

Wooldridge, J.M. (2001). "Applications of Generalized Method of Moments Estimation," *Journal of Economic Perspectives* 15, 87-100.‡,*

Escobari, D. (2012). "Dynamic Pricing, Advance Sales, and Aggregate Demand Learning in Airlines," *Journal of Industrial Economics* 60, 697-724.‡,*

9. Maximum Likelihood Estimation (MLE) and QMLE Nov 19

Ch 16[†] *(G)*; Ch 13[‡] *(W2)*; Ch 5[‡] *(C1)*

White, H. (1982). "Maximum Likelihood Estimation of Misspecified Models," *Econometrica* 50, 1-25.[◇]

Escobari, D. & J. Lee (2014). "Demand Uncertainty and Capacity Utilization in Airlines," *Empirical Economics* 47, 1-19.[‡,⋆]

Part IV. Panel Data and Additional Topics[1]

[1] We will cover panel data (topic 10) and based on the class interests we will cover one or two of the topics 11 through 14.

10. Panel Data. Nov 26*

Ch 9[†] *(G)*; Ch 13,[†] 14[†] *(W1)*; Ch 12[‡] *(B1)*; Ch 18[‡] *(K)*; Ch 21[‡] *(C1)*

Balestra, P. & M. Nerlove (1966). "Pooling Cross Section and Time Series Data in the Estimation of a Dynamic Model: The Demand for Natural Gas," *Econometrica* 34, 585-612.[◇,⋆]

Mundlak, Y. (1978). "On the Pooling of Time-Series and Cross Section Data," *Econometrica* 46, 69-85.[◇]

Hausman J. & W. Taylor (1981). "Panel Data and Unobservable Individual Effects," *Econometrica* 49, 1377-1398.[◇]

Anderson, T. W. & Hsiao, C. (1982). "Formulation and Estimation of Dynamic Models using Panel Data," *Journal of Econometrics* 18, 47-82.[◇]

11. Models for Discrete Choice. Dec 3

Ch 23[†] *(G)*; Ch 17[†] *(W1)*; Ch 15[‡] *(W2)*; Ch 13[‡] *(B1)*; Ch 16[‡] *(K)*; Ch 14,[‡] 15[‡] *(C1)*

Amemiya, T. (1981). "Qualitative Response Models: A Survey," *Journal of Economic Literature* 19, 481-536.[◇]

Dhrymes, P. (1984). "Limited Dependent Variables," in Z. Griliches & M. Intriligator, eds., *Handbook of Econometrics* Vol. 2, Amsterdam: North Holland.[◇]

Maddala, G. & A. Flores-Lagunes (2001). "Qualitative Response Models," in B. Baltagi, ed., *A Companion to Theoretical Econometrics* Oxford: Blackwell.[‡,◇]

Escobari, D. & C. Mellado (2014). "The Choice of Airport, Airline, and Departure Date and Time: Estimating the Demand for Flights," In: James Peoples (Ed.) *The Economics of International Airline Transport* (Advances in Airline Economics), Volume 4, Emerald Group Publishing. 177-198.[‡,⋆]

12. Mixture Models. Dec 3

Henry, M., Y. Kitamura & B. Salanie. (2014). "Partial Identification of Finite Mixtures in Econometric Models," *Quantitative Economics* 5, 123-144.[‡,◇]

Gan, L. & M. Hernandez. (2013). "Making Friends with your Neighbors? Agglomeration and Tacit Collusion in the Lodging Industry," *Review of Economics and Statistics* 93, 1002-1017.[‡,◇]

Escobari, D. & M. Hernandez. (2015). "Screening and Price Discrimination with Unobserved Consumer Types: Evidence from Airlines," UTPA Working Paper.[‡,⋆]

13. Censoring and Sample Selection Models. Dec 3

Ch 24[†] *(G)*; Ch 17[†] *(W1)*; Ch 16,[‡] 17[‡] *(W2)*; Ch 17.3[‡] *(K)*; Ch 16[‡] *(C1)*

Heckman J.J. (1979). "Sample Selection Bias as a Specification Error," *Econometrica* 47, 153-161.[◇]

Mroz, T.A. (1987). "The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions," *Econometrica* 55, 765-799.[◇,⋆]

Amemiya, T. (1984). "Tobit Models: A Survey," *Journal of Econometrics* 24, 3-63.[◇,⋆]

14. Regression-Discontinuity Design. Dec 3

Imbens, G.W. & J.M. Wooldridge. (2009). "Recent Developments in the Econometrics of Program Evaluation," *Journal of Economic Literature* 47, 5-86.[†,◇]

Imbens, G.W. & K. Kalyanaraman. (2012). "Optimal Bandwidth Choice for the Regression Discontinuity Estimator," *Review of Economic Studies* 79, 933-959.[‡]

Calonico, S., M.D. Cattaneo & R. Titunik. (2014). "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs," *Econometrica* 82, 2295-2326.[‡]

Escobari, D., N.G. Rupp, & J. Meskey. (2015). "Advance-Purchase Discounts and Price Discrimination in Airlines: Evidence using a Regression-Discontinuity Design," UTPA Working Paper.[‡,⋆]

Presentations and Final Papers Due. Dec 10*

Exam 2 (5:45 p.m.–7:30 p.m.) Dec 17

Learning Goals:

PhD Learning Goal:	This course contributes to the following PhD learning objectives:	Assessment method:
Discipline knowledge	X	Exams
Advanced theoretical or practical research skills for the specialization	X	Term paper
Preparation for teaching responsibilities	X	Presentations
Dissertation competency preparation	X	Term paper

Important University Dates:

Monday, August 31.	First day of classes.
Monday, September 7.	Labor Day Holiday (no classes).
Wednesday, September 16.	Census day.
Wednesday, November 18.	Drop/Withdrawal deadline.
Thursday, Nov 26 - Friday, Nov 27.	Thanksgiving Holiday (no classes).
Thursday, December 10.	Study Day (no classes or exams).
Friday, Dec 11 - Thursday, Dec 17.	Final examinations.

Mandatory Course Evaluation:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Online evaluations will be available Nov. 18 Dec. 9, 2015. Students who complete their evaluations will have priority access to their grades.

Available Assistance:

If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

Academic Integrity:

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

Sexual Harassment, Discrimination, and Violence:

In accordance with UT System regulations, your instructor is a responsible employee for reporting purposes under Title IX regulations and so must report any instance, occurring during a students time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.