Econometrics II
Econ 8375 - 01
Fall 2018

Course & Instructor:

Instructor:	Dr. Diego Escobari
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Office Hours:	MT 3:00 p.m. – 5:00 p.m., and by appointment
Lecture Time:	R 4:40 p.m. – 7:10 p.m.
Lecture Venue:	Weslaco Center for Innovation and Commercialization 2.206

Course Objective:

The course objective is to provide students with the main methods of modern time series analysis. 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. Through readings, lectures, written assignments and computer applications students are expected to become familiar with these techniques to read and understand applied scientific papers. At the end of this semester, students will be able to use computer based statistical packages to analyze time series 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 (ISQM/QUMT 8310 and ISQM/QUMT 8311)

Textbooks:

Main Textbooks:

(E) Walter Enders, *Applied Econometric Time Series*, John Wiley & Sons, Inc., 4th Edition, 2015. ISBN-13: 978-1-118-80856-6.

Additional References:

(H) James D. Hamilton, *Time Series Analysis*, Princeton University Press, 1994. ISBN-10: 0-691-04289-6
Classic reference for graduate time series econometrics.

(D) Francis X. Diebold, *Elements of Forecasting*, South-Western Cengage Learning, 4th Edition, 2006. ISBN-13: 978-0-324-32359-7. ISBN-10: 0-324-32359-X
A good modern forecasting textbook.

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

(G) William H. Greene, *Econometric Analysis*, Pearson Prentice Hall, 7th edition, 2012. ISBN-13: 978-0-13-6003383-0. ISBN-10: 0-13-600383-4
Used in Econometrics I. It has a whole section on time series econometrics.

(W) Jeffrey M. Wooldridge, *Introductory Econometrics*, South-Western Cengage Learning, 5th edition, 2013. ISBN-13: 978-1111531041. ISBN-10: 1111531048
Suggested in Econometrics I. Part 2 and Chapter 18 provide a good (less advance) treatment of time series methods.

(H2) Bruce E. Hansen, *Econometrics*, 2017.
This is a first-year graduate econometrics textbook at the level of Greene (2012). It is open source and it can be found at: http://www.ssc.wisc.edu/~bhansen/econometrics/

(C) John H. Cochrane, *Time Series for Macroeconomics and Finance*, 1997.
This is a graduate time series econometrics textbook at the level of Hamilton (1994). It is open source and it can be found at:
http://faculty.chicagobooth.edu/john.cochrane/research/papers/time_series_book.pdf

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 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 October 4. The proposal should include (1) the main question of interest (2) data description or how you will obtain it, 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.

IN-CLASS PRESENTATION:

Each student should select a paper to present during class time. The paper needs to be related to one of the class topics, either being an empirical application or a methodological paper. Submit your paper to the class instructor for approval early in the semester to schedule the presentations. Note that there is a limited number of topics, so topics will be assigned on a first-come, first-serve basis. Prepare your presentations to be 30 minutes long, including questions.

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%, which includes a paper presentation during the last day of the semester), 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:

$$90.00 - 100.0 \Rightarrow A$$
$$80.00 - 89.99 \Rightarrow B$$
$$70.00 - 79.99 \Rightarrow C$$
$$0.00 - 69.99 \Rightarrow F$$

Tentative Course Outline and Readings:

† Required reading; ‡ Suggested reading; ⋆ Empirical paper; ⋄ General reference.

1. Introduction   Aug 30

   Ch 1† *(E)*; Ch 10‡ *(W)*

   Granger C.W.J. & P. Newbold (1974). "Spurious regressions in econometrics," *Journal of Econometrics* 35, 143-159.⋄

   Phillips, P.C.B. (1986). "Understanding spurious regression in econometrics," *Journal of Econometrics* 33, 311-340.⋄

2. Difference Equations   Sep 6

   Ch 1† *(E)*; Ch 1‡, 2‡ *(H)*

3. Autoregressive and Moving Average Models, Stationarity, ARIMA Models   Sep 13

   Ch 2† *(E)*; Ch 3‡ *(H)*; Ch 8‡, 13‡ *(D)*; Ch 3‡ *(C)*

4. Autocorrelation, Partial Autocorrelation Functions and Box-Jenkins   Sep 20, 27

   Ch 2† *(E)*; Ch 4‡ *(H)*; Ch 4‡ *(C)*

5. Modeling Volatility: ARCH, GARCH, ARCH-M, DCC-GARCH   Oct 4

   Ch 3† *(E)*; Ch 16‡, 21‡ *(H)*; Ch 14‡ *(D)*

   Engle, R. (2001). "GARCH 101: The use of ARCH/GARCH models in applied econometrics," *Journal of Economic Perspectives* 15, 157-168.‡,⋆

   Engle, R. (1982). "Autoregressive conditional heteroskedasticity with estimates of variance of U.K. inflation," *Econometrica* 50, 987-1007.‡,⋄

   Bollerslev, T. (1986). "Generalized autoregressive conditional heteroskedasticity," *Journal of Econometrics* 31, 307-327.⋄

   Bollerslev, T., R.Y. Chou & K.F. Kroner (1992). "ARCH modeling in finance: A review of the theory and empirical evidence," *Journal of Econometrics* 52, 5-59.‡,⋄

   Escobari, D. & J. Lee (2013). "Demand uncertainty and capacity utilization in airlines," *Empirical Economics* 47, 1-19.⋆

Engle, R.F. (2002). "Dynamic conditional correlation," *Journal of Business and Economic Statistics* 20, 339-350.⋄

Chiang, T.C., B.N. Jeon, & H. Li (2007). "Dynamic correlation analysis of financial contagion: Evidence from Asian markets," *Journal of International Money and Finance* 26, 1206-1228.⋆

Cappiello, L., R.F. Engle, & K. Sheppard (2006). "Asymmetric dynamics in the correlations of global equity and bond returns," *Journal of Financial Econometrics* 4, 537-572.⋄

Mellado, C. & D. Escobari (2015). "Virtual integration of financial markets: A dynamic correlation analysis of the creation of the Latin American Integrated Market," *Applied Economics* 47, 1956-1971.⋆

6. Trends and Unit Roots, Dickey Fuller and Augmented Dickey Fuller Tests   Oct 11

Ch 4[†] *(E)*; Ch 17[‡], 18[‡] *(H)*; Ch 18[‡] *(W)*; Ch 10[‡] *(C)*

Dickey, D.A. & W.A. Fuller (1979). "Distribution of the estimators for autoregressive time series with a unit root," *Journal of the American Statistical Association* 74, 427-431.[‡],⋄

Dickey, D.A. & W.A. Fuller (1981). "Likelihood ratio tests for autoregressive times series with a unit root," *Econometrica* 49, 1057-1072.[‡],⋄

Phillips, P.C.B. & S. Durlauf (1986). "Multiple time series regression with integrated processes," *Review of Economic Studies* 53, 473-495.⋄

Phillips, P.C.B. & P. Perron (1988). "Testing for a unit root in time series regression," *Biometrika* 75, 335-346.⋄

Park J.Y. (2003). "Bootstrap unit root tests," *Econometrica* 71, 1845-1895.⋄

Lee, J. & M. Strazicich (2003). "Minimum LM unit root tests with two structural breaks," *Review of Economics and Statistics* 75, 335-346.⋄

Sharma, S. & D. Escobari (2018). "Identifying price bubble periods in the energy sector," *Energy Economics* 69, 418-429.⋄

Phillips, P.C.B., S-P. Shi & J. Yu (2015). "Testing for multiple bubbles: Historical episodes of exuberance and collapse in the S&P 500," *International Economic Review*, 56, 1043-1078.⋄

Exam 1 (During class time)   Oct 18

7. Intervention Analysis and Transfer Function Models   Oct 18

Ch 5[†] *(E)*

Box, G.E.P. & G.C. Tiao (1975). "Intervention analysis with application to economic and environmental problems," *Journal of the American Statistical Association* 82, 276-282.⋄

8. Vector Autogregression, Impulse Responses and Variance Decompositions   Oct 25

Ch 5[†] *(E)*; Ch 11[‡] *(H)*; Ch 11[‡] *(D)*; Ch 15.1-15.4[‡] *(H2)*; Ch 5[‡] *(C)*

Sims, C.A. (1980). "Macroeconomics and reality," *Econometrica* 48, 1-49.[◇]

Sims, C.A. (1982). "Policy analysis with econometric models," *Brookings Papers on Economic Activity* 1, 107-152.[◇]

Runkle, D. E. (1987). "Vector autoregressions and reality," *Journal of Business and Economics Statistics* 5, 437-442.[◇]

Blanchard, O.J. & R. Perotti (2002). "An empirical characterization of the dynamic effects of changes in government spending and taxes on output," *Quarterly Journal of Economics* 117, 1329-1368.[⋆]

9. Cointegration and Error-Correction Models   Nov 1

Ch 6[†] *(E)*; Ch 19[‡] *(H)*; Ch 18[‡] *(W)*; Ch 15.8[‡] *(H2)*; Ch 11[‡] *(C)*

Engle, R.E. & C. Granger (1989). "Co-integration and error-correction: representation, estimation and testing," *Econometrica* 55, 251-276.[◇]

Dickey, D.A., D.W. Jansen & D.L. Thornton (1991). "A primer on cointegration with an application to money and income," *Federal Reserve Bulletin, Federal Reserve Bank of St. Louis* March/April, 58-78.[◇]

Park, J.Y., (1992). "Canonical cointegrating regressions," *Econometrica* 60, 119-143.[◇]

Phillips, P.C.B. & S. Ouliaris (1990). "Asymptotic properties of residual based tests for cointegration," *Econometrica* 58, 165-193.[◇]

Johansen, S. (1988). "Statistical analysis of cointegration vectors," *Journal of Economic Dynamics and Control* 12, 231-154.[◇]

Johansen, S. & K. Juselius (1990). "Maximum likelihood estimation and inference on cointegration: with applications to the demand for money," *Oxford Bulletin of Economics and Statistics* 52, 169-210.[◇]

Hansen, B.E. & B. Seo (2002). "Testing for two-regime threshold cointegration in vector error-correction models," *Journal of Econometrics* 110, 293-318.[◇]

Damianov, D. & D. Escobari (2016). "Long-Run Equilibrium Shift and Short-Run Dynamics of U.S. Home Price Tiers during the Housing Bubble," *Journal of Real Estate Finance and Economics* 53, 1-28.[⋆]

10. Nonlinear Time Series Models   Nov 8

Ch 7[†] *(E)*; Ch 22[‡] *(H)*

Hamilton, J.D. (1989). "A new approach to the economic analysis of nonstationary time series and the business cycle," *Econometrica* 57, 357-384.[◇]

Filardo, A.J. (1994). "Business cycle phases and their transitional dynamics," *Journal of Business and Economic Statistics* 12, 299-308.[◇]

Rogers, J.H. (1992). "The currency substitution hypothesis and relative money demand in Mexico and Canada," *Journal of Money, Credit, and Banking* 24, 300-318.[⋆]

Lokshin, M. & Z. Sajaia (2004). "Maximum likelihood estimation of endogenous switching regression models," *The Stata Journal* 4, 282-289.[‡]

Bradley, M.D. & D.W. Jansen (2004). "Forecasting with nonlinear models of the stock market and real output," *International Journal of Forecasting* 20, 321-342.[⋆]

Escobari, D. (2013). "Asymmetric price adjustments in airlines," *Managerial and Decision Economics* 34, 74-85.[◇]

11. Dynamic Panels   Nov 15

Ch 15[‡] *(G)*

Anderson, T.W. & C. Hsiao (1981). "Estimation of dynamic models with error components," *Journal of the American Statistical Association* 76, 598-606.[‡,◇]

Arellano, M. & S. Bond (1991). "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations," *Review of Economic Studies* 58, 277-297.[‡,◇]

Arellano, M. & O. Bover (1995). "Another look at the instrumental variable estimation of error-components models," *Journal of Econometrics* 68, 29-51.[‡,◇]

Blundell, R.W. & S. Bond (1998). "Initial conditions and moment restrictions in dynamic panel data models," *Journal of Econometrics* 87, 115-143.[‡,◇]

Bun, M.J.G. & J.F. Kiviet (2006). "The effects of dynamic feedbacks on LS and MM estimator accuracy in panel data models," *Journal of Econometrics* 132, 409-444.[◇]

Nickell, S. (1981). "Biases in dynamic models with fixed effects," *Econometrica* 49, 1417-1426.[◇]

Escobari, D. (2012). "Dynamic pricing, advance sales, and aggregate demand learning in airlines," *Journal of Industrial Economics* 60, 697-724.[⋆]

Presentations and Final Papers Due   Nov 29

Exam 2 (5:45 p.m. – 7:30 p.m.)   Dec 13

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:

The UTRGV academic calendar can be found at `http://my.utrgv.edu` at the bottom of the screen, prior to login. Some important dates include:

August 27	First day of classes
August 30	Last day to add a course or register for fall 2018
September 3	Labor Day, no classes
November 14	Last day to drop a course; will count toward the 6-drop rule
November 22 - 24	Thanksgiving Holiday, no classes
December 6	Study Day, no classes
December 7 - 13	Final Exams
December 14 - 15	Commencement Exercises

Students with Disabilities:

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

Pregnancy, Pregnancy-related, and Parenting Accommodations
Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

Student Accessibility Services
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 `ability@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 `ability@utrgv.edu`.

Mandatory Course Evaluation:

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

Oct. 4 Oct. 10 – Fall 2018 Module 1
Nov. 29 Dec. 5 – Fall 2018 Module 2
Nov. 15 Dec. 5 – Fall 2018 (full semester)

Scholastic 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.