AEB 7572 – 101F Econometric Methods II - Spring 2017

SYLLABUS

University of Florida

Food and Resource Economics Department

Instructor:
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Office Hours: Wednesdays 1:30 PM- 2:30 PM, or by appointment.

Class Meeting Times:
Tuesdays 1:55-2:45 PM (MCCA 1142)
Thursdays 1:55-3:50 PM (MCCA 1142)

Course Description and Objectives:
This course is designed for first-year Economics Ph.D. students and graduate students from other majors who want to advance their econometrics knowledge. The basic methods of modern econometric theory are covered and will provide a foundation for applied research in economics. The focus of the course will be on the specification and estimation of linear models, with particular attention to different estimators (including Least Squares, Maximum Likelihood, and Generalized Method of Moments), their finite sample and asymptotic properties, and hypothesis testing. Some advanced topics such as Nonlinear Estimation, Introduction to Time Series and Panel Data will also be discussed as time permits. The prerequisite is AEB 7571 - Econometrics I (or, "Mathematical Statistics") in FRE, or its equivalent elsewhere.

Course Website:
The course website will be available through UF's Canvas "E-learning"system (http://lss.at.ufl.edu/). Important information related to the course, including homework assignments, solutions, and additional readings will be posted on this web site.

Required Materials:
The primary text for the class is *Econometric Analysis*, 7th edition (2011) by William Greene. In class, I will use exercises from this textbook and a variety of other sources.

Other textbooks worth consulting (but not required!):

1. Hayashi, F. (2000) Econometrics, MIT Press.
2. Ruud, P. (2000) *An Introduction to Classical Econometric Theory*, Oxford University Press.
3. Wooldridge, J. (2010) *Econometric Analysis of Cross-Section and Panel Data*, MIT Press.
4. Kennedy, P.A. (2008) *A Guide to Econometrics*, Wiley (excellent as a less-technical supplement to the required text).
5. Davidson and MacKinnon (1993) *Estimation and Inference in Econometrics*, Oxford U. Press.
6. Bruce Hansen's online (and free!) Econometrics text: http://www.ssc.wisc.edu/~bhansen/econometrics/Econometrics.pdf

Policies:

- *Teaching Philosophy:* I want our section to be a friendly environment, where everyone is allowed to make mistakes and ask any questions they may have without feeling shy about doing so.

- *Grading:*

Homework assignments	35%	
Midterm Exam	30%	March 16, 2017 in class
Final Poster Project	35%	On **February 9th, Thursday** you will submit a single-page outline describing your topic, methods, and data. Poster presentation session is scheduled for **April 14th Friday** (Location: TBA). Electronic copies of posters and the software code accompanying empirical results are due on **April 18th, Tuesday** (in class).

Final course scores will be converted to a final course grade according to the following scale:

A	93	-	100	4.00
A-	87	-	92	3.67
B+	84	-	86	3.33
B	81	-	83	3.00
B-	78	-	80	2.67
C+	75	-	77	2.33
C	72	-	74	2.00
C-	69	-	71	1.67
D+	65	-	68	1.33
D	60	-	64	1.00
D-	56	-	59	0.67
E	<56			0.00

- *Attendance:* Please, review relevant sections in the textbook before coming to class. If you miss a lecture, make sure you get the lecture notes from a classmate. Please be punctual.

- *Cell Phones/ Tablets / Laptops:* Please refrain from using tablets/phones etc. during lectures.

- *Assignments:* The only way to learn this material is to practice. I will regularly assign homework problems and discuss examples in class to encourage applying the theoretical material, but the more problems you can work on your own, the better. I do encourage you working in groups if this suits you; however, make sure when turning in a problem set that the final write-up is done on your own (carbon-copying the software code or write up of assignments may be considered as plagiarism).

  There will be approximately five problem sets. Problem sets will be turned in at the beginning of the lecture on the day they are due. Late submissions will not be accepted, unless an extraordinary circumstance warrants it (these circumstances need to be communicated to me BEFORE the due date).

  Some problems will require working with data. You'll be free to use any software supporting matrix programming (SAS/IML, GAUSS, MATLAB, R, Python etc.,), but I will only provide support for SAS/IML. The reason that I limit software options is because these will force you to actually code up the matrix algebra involved in many of our estimators.

- *Exams/make up:* There will be no final exam for the course. Instead, each of you will prepare an empirical term project in a poster format, and will present it at a poster event at the end of the semester. The exact logistics of the poster session will later be announced in class. No Make-up exam will be given for the midterm except for well-documented extraordinary circumstances (court appearance, surgery, etc.). You need to communicate these circumstances to me well BEFORE the exam date. In all other cases, you will receive zero credit for the missed exam.

- *Software:* We will use SAS/IML for the empirical exercises. SAS/IML is the matrix programming module in SAS software. Using a matrix programming language is essential for this course as it reinforces our understanding of the underlying theory. Although some familiarity with statistical software is useful, you do not need to have prior experience with SAS/IML; I will be providing necessary tutorials to get you started.

  That being said, if you are already proficient in another matrix programming language (GAUSS, MATLAB, R, Python etc.,), you may use that instead of SAS/IML. Please be advised that I will only provide support for SAS/IML. Whichever software you choose to use, you must provide all the code and the key output supporting your homework assignments and your poster projects.

  There are multiple options to use academic version of SAS as illustrated here: http://www.sas.com/en_us/offers/14q1/122603-sas-for-academia/overview.html I personally recommend obtaining *Educational Analytical Suite* through the Help Desk at the Hub or the UF Bookstore for a small fee. The annual renewal licenses after initial purchase are free for UF students (For details, see https://software.ufl.edu/agreements/sas/student/) SAS version 9.4 is also available on computers in the FRE graduate computer lab.

Term Project & Poster Presentation:

This is essentially an applied econometrics research project. A poster is very brief version of a complete, written research paper. Every poster needs conform to the following formatting requirements:

Your poster must be 36inch (H)x 48inch(W), and must have the following section headings:

Introduction: Give some background, describe the problem and tell the audience why it is an interesting one.
Model: The economic and/or econometric model behind your research question.
Methods and Data: Describe the econometric method you use and your data.
Findings: This section should only have graphs, charts, and tables with minimal text.
Discussion: What are your conclusions from the findings?

Other important guidelines for the project:

- The project must be empirical, using real data. You can either extend a research paper written by someone else, or carry out an original analysis that adds an econometric component to a research question (or, this may be a preliminary work for your dissertation, second year paper etc).
- The project must be distinct from other class projects you might have assigned, and it must be feasible so that it can be completed by the due date in April.
- Due to limited time, I recommend that you focus on a narrow topic with a single research question and use data to which you already have access (consider data sources that are open to public or available through the UF Library such as USDA, BLA, BEA, Federal Reserve Bank, World Bank, NBER etc).
- You do not have to go beyond basic econometric methods that we will discuss in the course. The main purpose of the project is to give you an overall experience in designing empirical research

and using econometric methods appropriate for answering your particular research question. That being said, if you feel motivated, you are more than welcome to use econometric methods/tests that we have not covered in class.

- Do not use a class/homework data set verbatim. One of our objectives with this term project is having you organize the acquisition and cleaning of data. You may, however, take a classic data set from a seminal paper and update it with additional observations and/or variables.
- To find an interesting topic for your project, I suggest getting in touch with faculty members working in the areas you find interesting. This is also an excellent time to identify a potential advisor, if you don't have one yet. Scanning recent empirical journals and working papers (e.g. Journal of Applied Econometrics (provides data sets), American Journal of Agricultural Economics, IDEAS, AgEcon Search, the NBER working paper series) is another good way of finding an interesting research question.
- Examples of acceptable forms of contribution for the term project, besides starting an original work, includes extending a data set previously used (e.g., more observations, different industries, countries, regions), adding/testing alternative variables, conducting different specification tests, or using alternative conceptual frameworks.
- About a month into the semester (see the exact date on page 2), you will submit a two-page outline of your proposed topic with brief descriptions of the research question, the econometric techniques you will employ, and the data you will use (data size, type, variables, source, availability etc.). The purpose of this first proposal is for me to determine the feasibility of your project. If you are going to extend analysis from another paper, please attach a copy of the original paper to your two-page proposal. You must get my approval before finalizing your research topics.
- You must write your own code for the analysis and send it to me at the end of the semester along with main output supporting the results you have on the poster. However, unlike your homework assignments, you are not restricted to using only matrix programming language (SAS-IML); you may use any software of your choice (canned or not).
- I highly recommend that you to use Power Point for making your poster. A poster is a single large PPT slide (A PPT slide can be as big as 56inchx56 inch). Here is a good set of tips for designing your poster in Power Point: http://www.aaea.org/UserFiles/file/Poster_Powerpoint_AgEcon_Search.pdf
- You will need to print your poster for the poster event at the end of the semester. UF has a printing facility in the HUB 224 for large format printing. Details here: http://helpdesk.ufl.edu/application-support-center/department-paid-printing/poster-print-information/
- Easiest way to design a poster is to use a template. You may use any template as long as its dimension are 36x48 inches. Here is a sample 36x48 inch template from UF Help Desk : http://helpdesk.ufl.edu/wp-content/uploads/2012/11/Poster_Template_36X48.pptx

Tentative Course Outline

Numbers prefixed with H refer to chapters in Hayashi, G to chapters in Greene.

I. The Multiple Regression Model (MRM)

A. Ordinary Least Squares (H1.1- 1.2, G2 - 3)

B. The Gauss-Markov Theorem (H1.3, G4.1 - 4.3)

C. Sampling distributions induced by normality and tests of linear restrictions (H1.4, G4.4 - 4.5, G5.1 -5.3, 5.5)

D. The method of maximum likelihood (ML) and the Likelihood Principle (H1.5, G14.1-14.3, Greene Appendix E.3)

E. Specification analysis, the algebra of ellipsoids, and the value of information (G4.7, G5.9 -5.10)

F. Prediction (G4.6) – no lectures

II. Asymptotic Approximations to Sampling Distributions
(H2.1, Greene Appendix D, G4.4)

A. Convergence in probability and the weak law of large numbers
B. Convergence in distribution and the Central Limit Theorem
C. Asymptotic properties of ML and test statistics related to ML (G5.6 -5.7, G14.4-14.6)
D. Inverting test statistics to obtain confidence regions

III. Nonspherical Disturbances

A. The general case of non-scalar disturbance covariance matrix
(G9, H1.6)
   1. Generalized Least Squares (GLS) and ML estimation
   2. Feasible GLS - asymptotic properties
B. Heteroskedasticity (G9.4 -9.6, H2.3-2.8)
   1. consequences for OLS
   2. testing
   3. estimation
C. Serial correlation (H2.10, H8.7)
   1. consequences for OLS
   2. testing
   3. estimation
D. Consistent covariance matrix estimation (H2.2-2.5, H2.9, G9.4.4)
E. The bootstrap (Bruce Hansen's text)

IV. Nonlinear Regression Models

A. Nonlinear Least Squares Estimator (G7.2)
B. Large Sample Properties of the Nonlinear Least Squares Estimator
C. Hypothesis Testing and Parametric Restrictions
D. Modeling and Testing for a Structural Break (G6.4)

V. Simultaneity

A. Systems of equations (H2.9, H3.1-3.4, G10)
B. Errors in variables (H3.2, G8.5)
C. Lagged endogenous variables with serially correlated disturbances
D. Identification
E. Estimation
   1. Instrumental variables and endogeneity testing (G8.3)
   2. Limited information estimation (2SLS and LIML) (H3.4, H3.8, H8.6)
   3. Full information estimation (3SLS and FIML) (H8.5)
   4. Generalized Method of Moments (H3.4, G13.4 -13.6)

VI. Introduction to Time Series Econometrics (as time allows)

A. Stationarity, and ARIMA processes (H 6.2 G20.3)
B. Unit Roots (H9 G21.2)
C. Cointegration (H10 G21.3)

Disclaimer:
The syllabus is a general plan for the course; deviations may be necessary. I hold the right to make changes to this syllabus anytime during the semester as circumstances warrant.

UF POLICIES

Grades and Grade Points
Information on current policies for assigning grade points, see
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Academic Honesty, Software Use, Campus Helping Resources, Services for Students with Disabilities

Academic Honesty
In 1995 the UF student body enacted an honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students. **The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**
On all work submitted for credit by students at the university, the following pledge is either required or implied: **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office. *(Source: 2012-2013 Undergraduate Catalog)* It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

Software Use:
All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources
Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* **www.counseling.ufl.edu/cwc/**
  Counseling Services
  Groups and Workshops
  Outreach and Consultation
  Self-Help Library
  Training Programs
  Community Provider Database

- *Career Resource Center,* First Floor JWRU, 392-1601, **www.crc.ufl.edu/**

Services for Students with Disabilities
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.
-0001 Reid Hall, 352-392-8565, **www.dso.ufl.edu/drc/**