

**THE GEORGE WASHINGTON UNIVERSITY**  
**Department of Economics**

**ECON 379.10 (CRN 13651) Lab in Econometrics Spring 2011**

**Time:** Tuesday 06:10pm-08:00pm and 08:10pm-10:00pm  
Monroe 323 – John Kendrick Seminar Room

**Place:** 2115 G Street NW, Monroe Government Hall 101

**Instructor:** Fred Joutz,  
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**Office Hours:** Tuesday 4-5pm, after class, and by appointment

**Course Description:**

This course will cover issues regarding the methodology, practice, and implementation of econometric modeling with economic time series. Model building is an attempt to characterize the properties of observed data using simple parametric relationships which remain reasonably constant over time, account for the findings of previous models, and are interpretable in an economic sense. Time series models in macroeconomics, finance, and energy will be explored. The lectures will approach applied econometric issues from the LSE or Hendry tradition. In-class empirical presentations on the PC will demonstrate the approach and econometric questions as they arise.

The course focuses on three key aspects of empirical model building: *data properties*, including integration and cointegration; *dynamic specification*, including the use of error correction models; and *model evaluation and design*. Macro-economic data from both developed and developing countries are analyzed. We will be using the **Blackboard** for sharing class notes, data, and e-mail. Information on the class account will be provided to the students. Check the course site particularly the day before of class. Lecture titles and brief descriptions appear below, and are followed by a selected course bibliography.

**There are three main learning objectives:**

- 1) Learn how to analyze time series data
- 2) Learn how to present the analysis and results from research, and
- 3) Write a research paper in applied time series econometrics.

## **Lectures and Software:**

The class time will be combination of lectures on econometric theory, concepts, and methodology and interactive computer use. I will demonstrate techniques and applications using data from real world applications, simulated data and data you provide. We will in some case cases work simultaneously on PCs. The interactive sessions are an important part of the class and demand student participation. Learning econometrics and research techniques requires both the science from economics and statistics, but also the art of applied research. This comes from working with different data sets and the issues they present.

The in class examples will be performed using the econometrics packages, **PC-GIVE and possibly EViews**. Both packages are available on the computers in GW labs. You may obtain a free copy of the **GIVEWIN/PC-GIVE** software from me. Register the software by filling out the license form. You may purchase **EViews** at a deep discount for about \$100. Obtain the license from me. I recommend that you fax the form into the **EViews** folks. They are very quick at processing and sending your software. If you use another package, that is fine and are free to do so. The caveat is that I will not be able to help you as much with actual programming.

## **Outline for the Course**

### **1. Introduction to Applied Time Series Econometric Modeling**

- a) Adrian Pagan's Empirical Modeling Frontier and Research Strategy Tradeoffs
- b) Haavelmo's General Principles
- c) Congruency
- d) Objectives of the Time Series Econometrician
- e) Decomposition of an Economic Series

### **2. The Nature of Models**

- a) Integration: Analytics and Testing
- b) Cointegration: Analytics and Testing
- c) Error Correction Models and Dynamic Specification

### **3. The Construction of Models**

- a) The Process of Reduction
- b) Model Evaluation and Model Design
- c) Model Evaluation and Diagnostic Testing
- d) General-to-Specific Modeling
- e) Modeling Strategies and Policy Analysis

## **Evaluation: (due dates)**

20% - 4 problem sets

10% - Research Proposal Presentation Abstract and Submission ( February 8<sup>th</sup> )

10% - Literature Review and Database Presentation and Submission (March 1<sup>st</sup> )

60% - Final Presentation and Paper Submission (May3rd )

There are penalties for missing due dates. I will assign several problem sets during the course of the semester. They will comprise 20% of your grade. I strongly encourage you to work together on these and turn in the assignment together. Please limit the size of groups to 2-3 no more than four. There are diminishing returns to learning the material.

Your grade will be primarily determined by your research project. The project will take you the entire semester. Because of the nature of the course you will learn material, in some cases the most “important” in the last few lectures. Despite that perception, do not put off working on the paper during the semester. Every student will make at least three in-class presentations..

The first will be at the fourth lecture, February 8th. This will be an abstract and should take about 2-5 minutes. You will need to have identified a research topic by then, started reading the literature, and identified the data set you will use. The last item is essential in order for you to complete the project. You must meet with me or communicate with me about your project before the presentation and not within 24-48 hours before hand. I will provide you with instructions for the abstract presentation. You may present your research abstract before the fourth lecture.

The second presentation will be three weeks later on March 1st. You will present an over view of your database. You will provide written documentation containing a draft literature review, description of your database, and conduct a simple analysis of your data using transformations, summary statistics and graphs of the time series properties of the most important series. You will be given more complete instructions before that date.

The third presentation will be during the exam period, TBA. The format will be like a conference session. Each person will have 15 minutes to present their work. It is assumed to be a rough draft. You will be assigned a discussant who must receive your draft ahead of time. They will have up to 5 minutes of comments on your paper. After the discussant, the floor will be open to the class. You must submit to me your data set in **EViews** or **PC-GIVE** format beforehand as well. We will attempt to demonstrate the most important result(s) of your research on the PC. There will not be any make-ups, present what you have. I will provide you with instructions and hints for your presentations and role as discussants.

Your final paper will be due about Tuesday May 3<sup>rd</sup>. The text of the paper cannot be longer than 10 pages. References and appendices for figures, tables, or other exhibits do not count toward the ten pages. All references must be cited; all figures, tables, and exhibits must be numbered and referenced in the text. I cannot give you the exact days at this point because the university exam schedule has not been given out. Your grade will be based on the presentations and your role as a discussant but primarily on the paper.

**Textbook(s):**

Applied Econometric Time Series, by Walter Enders, John Wiley & Sons, Inc. 2010  
New York, NY. 3rd edition (AETS) **required**

Econometric Modeling: A Likelihood Approach, by David F. Hendry and Bent Nielsen,  
Princeton University Press, 2007 (paperback) **recommended**

The Cointegrated VAR Model: Methodology and Applications , Katarina Juselius,  
Oxford University Press, ISBN10: 0199285675 (paper) **recommended**

New Directions in Econometric Practice, Charemza and Derek Deadman, Edgar Elgar,  
1997, Northampton, MA. (NDEP) **recommended**

Testing Exogeneity, by Neil Ericsson and John Irons, Oxford University Press, 1994,  
Oxford. **recommended**

Time Series Models for Business and Forecasting, Philip Franses, Cambridge University  
Press, 1998 (TSMBF) **recommended**

Applied Time Series Modelling and Forecasting, Richard Harris, Robert Sollis Wiley  
Publishers, 2003 **recommended**

Course Notes and additional readings on Blackboard

**Disability:** Any student who feels he/she may need an accommodation based on the impact of a disability should contact the Disability Support Services office in the Marvin Center, Suite 242, 994-8250, to establish eligibility and to coordinate reasonable accommodations. Please do so. If you are entitled to the accommodations, then take them. Do not hesitate to ask questions! For additional information, please refer to <http://gwired.gwu.edu/dss/>

**Academic Integrity:** All graded work must be completed in accordance with The George Washington University Code of Academic Conduct. Plagiarism in any form is a violation of this Code. Examples of plagiarism include:

- buying or borrowing a paper;
- copying a paper entirely or in part from any source;
- summarizing a source without adequate citation;
- using thoughts (including wording) belonging to someone else without citation, etc.
- It is also a violation of the Code if the research paper has been used in its entirety in another class. (A previous paper of yours may be the basis for further research, but you must discuss this with me in advance).

A violation of the Code results in a grade of F, notification of the Office of Academic Integrity, and a possible hearing before the Academic Integrity Council.

All students must read the Code of Conduct. check the web-site at <http://www.gwu.edu/~ntegrity/code.html> .

**Possible Paper Topics:**

1. The Determination of Money Wages
2. Money Demand or an Examination of the P-star concept
3. A Consumption Function Reexamination
4. An Exchange Rate Determination Model
4. Demand for Motor Gasoline
5. Sectoral Demand for Natural Gas
6. Sectoral Electricity Demand Modeling
7. Electricity Demand for a Mid-Atlantic private utility
8. Economic Growth
9. Modeling Inflation and Mark-up Models
10. Modeling Exports and Imports
11. Housing Supply and Demand
12. Examination of small-macro models.
13. Models of Credit Spreads
14. Modeling the Demand for Unemployment Insurance

**Suggested Outline for an Empirical Paper**

0. Title page with abstract
1. Statement of the Problem
2. Review of the Literature
3. Formulation of a General Model
4. Data: Sources and Description
5. Econometric Issues and Hypothesis Tests
6. Empirical Results
7. Conclusion
8. References
9. Plots of Data and Figures (All figures must be labeled and referenced in the text.)
10. Tables (All tables must be labeled and referenced in the text.)

**\*\*\* Tentative \*\*\* Course Outline**

**Lecture 1 - January 11**

Introduction to Time Series Econometric Methods (handouts and readings)  
The Theory of Reduction (handouts)  
A Review of Difference Equations Ch. 1 (AETS)  
Key Features of Economic Time Series Ch. 1 and Ch.2 (TSMBF)  
Chapter I Introduction (Katerina Juselius)

**Lecture 2 - January 18**

A Review of Difference Equations continued Ch. 1 (AETS)  
ARMA Models (Identification, Estimation, and Forecasting) Ch. 2 (AETS)  
Building Stationary Univariate Linear Time Series Models (handouts)  
Useful concepts in Univariate Time Series Analysis Ch. 3 (TSMBF)  
An Introduction to the EViews and PC-GIVE Econometric Software

**Lecture 3 - January 25**

Stationary Time Series Models (handouts and readings)  
ARMA Models (Identification, Estimation, and Forecasting) Ch. 2 (AETS)  
Useful concepts in Univariate Time Series Analysis Ch. 3 (TSMBF)  
Models with Deterministic and Stochastic Trends Ch 4 (AETS)

**February 1 – No Class**

**Lecture 4 - February 8**

Models with Deterministic and Stochastic Trends Ch 4 (AETS)  
Integration: Analytics and Testing - handouts  
Testing for Trends and Unit Roots Ch 4 (AETS)  
Trends Ch. 4 TSMBF  
Cointegration Analysis p85-122 Ch 5 (NDEP)

***REQUIRED: Initial Student Paper Abstract and Presentation in class***

**Lecture 5 - February 15**

An Introduction to General-to-Specific Modeling (handouts and readings)  
An Introduction to the Theory of Reduction (David Hendry and Jennifer Castle)  
Multiequation Time-Series Models I handouts

**Lecture 5 - February 22**

Introduction to VARs Ch. 5 (AETS)  
Multivariate Time Series Ch 9 (TSMBF)  
Vector Autoregression: Forecasting, Causality, and Cointegration Ch 6 (NDEP)

**Lecture 6 – March 1**

Multiequation Time-Series Models II Ch. 5 (AETS)  
Vector Autoregression: Forecasting, Causality, and Cointegration Ch 6 NDEP  
Impulse Response Functions – To Respond or Not?

***REQUIRED: Student Presentation on Database in class and Literature Review***

**\*\*\* Tentative \*\*\* Course Outline**

**Lecture 7 - March 8**

Introduce Multivariate Integration Testing / Johansen  
Cointegration: Analytics and Testing Ch. 6 and handouts (AETS)  
Cointegration Analysis Ch 5 (NDEP)  
Chapter 8 Determination of Cointegration Rank (Katerina Juselius)  
Chapter 10 Testing restrictions for Beta (Katerina Juselius)  
Chapter 11 Testing restrictions for Alpha (Katerina Juselius)  
Examples of Johansen Test, Weak Exogeneity and Cointegrating Vector Tests

**Lecture 8 - March 22**

Cointegration: Analytics and Testing Ch. 6 and handouts (AETS)  
Modeling Economic Time Series (handouts and readings)  
Model Evaluation and Model Design (handouts and readings)  
Testing Model Constancy  
Chapter 12 Identification of the Long-run Structure for Beta (Katerina Juselius)  
Chapter 13 Identification of the Short-run Structure for Beta (Katerina Juselius)  
Cointegration Analysis Ch 5 (NDEP)

**Lecture 9 - March 29**

Cointegration: Analytics and Testing Ch. 6 and handouts (AETS)  
Modeling Economic Time Series (handouts and readings)  
Model Evaluation and Model Design (handouts and readings)  
Testing Model Constancy  
Cointegration Analysis Ch 5 (NDEP)

***Week of March 29<sup>th</sup> Required Status/Progress Report on Student Paper - Individual Basis***

**Lecture 10 – April 5<sup>th</sup>**

A Typology: The ADL(1,1) Specification as Motivator for Time Series Modeling  
Error Correction Models and Dynamic Specification (handouts and readings)  
Common Factors and Dynamic Misspecification  
Exogeneity (handouts and readings) Ericsson textbook  
Exogeneity and Structural Invariance Ch 7 (NDEP)  
Engle, R. F., Hendry, D. F., and Richard, J.-F. (1983). Exogeneity. *Econometrica*,  
**51**,  
277–304. Reprinted in Ericsson and Irons (1994) and Hendry (2000b).  
General-to-Specific Modeling (further handouts and readings)

**\*\*\* Tentative \*\*\* Course Outline**

**Lecture 11 - April 12**

Modeling Strategies and Policy Analysis (handouts and readings)  
“Modeling Inflation in Australia,” *Journal of Business and Economic Statistics*, G. de Brower and N. Ericsson.

**Lecture 12 - April 19**

Autometrics: General to Specific Modeling  
The Principles behind Autometrics  
Why never to use step-wise regressions  
The Experimental properties of Autometrics

**Lecture 13 - April 26**

**TBA**

**Final Student presentations May 3rd**

**Final Paper due May 3rd**