Queen's University
Department of Economics

ECON 452 – Applied Econometrics
Winter 2015

Professor: Stephen Snudden
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Lectures: Tuesday 8:30 - 9:50 am and Friday 10:00 – 11:20 am in Dunning 10.
Office Hours: Friday 11:30-12:30 (after class).
Website: http://www.econ.queensu.ca/snudden/teaching/ECON452/W15

Teaching Assistant: Jenny Watt, MA A422, wattj@econ.queensu.ca
Teaching Assistant Office Hours and Tutorials: 2:30-3:30 Tuesdays in Dunning Hall Lab, DUN 350

Course Description: This is a project-based course in time series econometric methods. The first third of the course will focus on the theory of univariate time series econometric methods. The middle part of the course focuses on identification and forecasting with univariate time series models. The last third of the course focuses on the multivariate methods including vector auto regressions and structural vector auto regressions, dynamic factor models, and panel data. The objective of this course is twofold: provide students with the ability to evaluate macroeconomic theories using time series data and provide an introduction to modern methods of forecasting. Special emphasis will be placed on structural estimation and forecasting with application to monetary policy, commodity markets, and the macroeconomy. There will extensive use of linear algebra and statistics throughout the course. Students will be taught and are expected to gain competency in Stata programming.

Textbooks: There are no required textbooks for this course. Lecture notes will be provided. You will be provided with exercises, programs, and published articles in Moodle that will be used for the lectures and homework. A list of possible reference texts include:

- Box, G.E.P. and Jenkins, G.M., 1976, Time Series Analysis: Forecasting and Control, (Holden-Day Publishers).
- Brockwell, P.J. and Davis, R.A., 2002, Introduction to Time Series and Forecasting, (Springer Science and Business Media).
- Enders, W., 2004, Applied Econometric Time Series, (John Wiley & Sons, Inc.).
- Hamilton, James, D., 1994, Time Series Analysis, (Princeton University Press).

Prerequisites: ECON 255; ECON 351 or STAT 361 is required prior to taking this course.

Grading: Your final mark will be determined by a programming assignment, a univariate project, a presentation, a final project, and participation in unmarked biweekly homework. The marks will be allocated according to the following grading scheme:

Homework.....10%
Assignment.....15%
Univariate Project.....20%

Presentation.....5% (or 0%)
Final Project…….....50% (or 55%)

Homework: Homework is given biweekly. You are expected to post completed homework on Moodle on the due date. Full marks for participation will be awarded if it is clear that you put forth effort to complete the exercise as instructed. The homework is designed to prepare you for completing the assignment and projects. For example, the first homework will ask you to conduct programming helpful for the assignment. Later homework will focus on developing code specifically for your projects. Homework will be discussed in class. Problems can be brought to the TA for clarification. **You are required to complete the homework independently. No late homework will be accepted.**

Programming assignment: There is programming assignment in Stata due at the end of the first month of class. The assignment asks you to construct artificial data for a univariate model with a known data generating process, estimate the coefficients using matrix methods, and conduct Monte-Carlo exercises. The assignment will also include conducting and evaluating recursive out-of-sample forecasts. The objective is twofold: learn how to program and gain a deeper understanding of the methods before moving to higher level macro commands in Stata. **You are required to complete the programming assignment independently. No late assignments will be accepted.**

Univariate Project: The univariate project requires you to follow a Box-Jenkins analysis of a univariate time series model for their individually chosen data. A typical Box-Jenkins project involves the following steps: model identification, estimation, diagnostics checking, and forecasting. Although this project is relatively simple, it is designed to provide you with the skills for identification and forecasting required for more advanced methods. Guidance will be given to appropriate time series variables for the project. The methodology and the programming tools will be presented in class. You will have time in class as well as in the homework to practice and build the code needed to complete the project. The assignment shall be programmed in Stata statistical language. **You are encouraged to either work in groups of two or independently.** Marking will be the same either way. **No late projects will be accepted.**

Final Project: The final project requires you to examine an important economic question using a multivariate time series methodology and contribute to the literature to some degree. Unlike the univariate project, the final projects will be more varied and the methodology used will be the best to answer your economic question of interest. Guidance will be given in selecting the time series variables and models to use for the project. The methodologies and the programming tools will be presented in class and you will practice and build the code needed to complete the project in the homework. **You are encouraged to either work in groups of two or independently.** Marking will be the same either way. The assignment shall be programmed in Stata statistical language. **The project is due mid-April. No late projects will be accepted.**

Presentations: You have the option of presenting the preliminary results for your final project during the last week of class. The presentation is to encourage you to have results before classes end, practice summarizing results, and to receive feedback from your professor and peers. The presentation is optional, and if you choose not to present, the 5% will be added to the final project without penalty. If you choose not to present, attending class during the presentations is highly recommended, as presentations can provide ideas and clarifications for your own project. Presentations are to be 10 minutes in length: 5 minutes to present and 5 minutes for feedback. There is not a time slot for every group, so presentations are first come, first serve. You will still have the ability to receive feedback from the professor and the TA during their office hours even if you choose not to present.

Tentative Course Outline: Due to time constraints, some subjects will be given more focus. Additional materials will be made available on the course website.

Course Outline and Due Dates

I. Univariate Time Series Methods
- Week 1. Econometric review (Jan. 6, 9)
- Week 2. Intro to time series (Jan. 13, 16); **HW1. Due (Jan. 15)**
- Week 3. Forecasting (Jan. 20, 23)
- Week 4. ARIMA(p,d,q) (Jan. 27, 30); **HW2. Due (Jan. 26)**; **Assig Due (Jan. 31)**

II. Box-Jenkins Methodology
- Week 5. Box-Jenkins analysis (Feb. 3, 6)
- Week 6. Box-Jenkins Examples (Feb. 10, 13); **HW3. Due (Feb. 9)**
- Week 7. Midterm Reading Week – No classes! (Feb. 17-20)

III. Multivariate time series methods
- Week 8. Vector Auto Regressions (Feb 24, 27); **Project Due (Feb 28)**
- Week 9. Structural Vector Auto Regressions (March 3, 6)
- Week 10. Dynamic Factor Models (March 10, 13) **HW4. Due (March 9)**
- Week 11. Panel Data (March 17, 20)
- Week 12. **Presentations (March 24, 27)**
- Week 13. **Presentations (March 31)**
- **Final Project Due (April 15th)**

Miscellaneous: Questions to the professor should be sent via Moodle and will be answered on the online Moodle forums. Please do not send questions the night before the due date of an assignment project.

Statement of Academic Integrity: Academic integrity will be strictly upheld. Please read the statement of academic integrity and familiarize yourself with common violations. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1), on the Arts and Science website (http://www.queensu.ca/artsci/sites/default/files/AcademicRegulations.pdf).

Papers and assignments should be checked for plagiarism by the student prior to submission as they *will* be checked by the professor and TA. Given the seriousness of plagiarism, failure to uphold academic integrity will carry sanctions that can range from loss of grades, the failure of a course, or withdraw from the university.