LUISS Guido Carli

Econometric Theory – 2015/2016

Last updated: February 11, 2016

Instructor:
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web page: http://www.gragusa.org/teaching/et/

Contents

This is the syllabus for Econometric Theory. If you have questions about the course material, the best times to address them are in the scheduled class meetings or during office hours. We can probably resolve questions or concerns about the course administration over email, but if you have urgent questions please stop by my office.

1 Course Description

The purpose of the course is to provide the necessary tools for a thorough understanding of asymptotic theory in classical econometrics. The course will treat both cross-section and time series concepts. At the end of the course you will be able to

1. perform estimation and testing in linear cross-section regression models;
2. to feel sufficiently comfortable with asymptotic theory for linear models;
3. implement econometric methods as needed for writing an advanced master thesis.

The following topics will be covered:

- Asymptotic theory: law of large numbers and central limit theorems for iiid and time series data
- Parametric and semi-parametric estimation techniques
  - Maximum Likelihood Estimator
  - Method of Moments
- Properties of estimators
- Conditional expectation and related concepts with application to econometrics
- Single equation linear model and OLS estimation
  - Asymptotic properties of OLS under general setting
  - Properties of OLS under measurement error
- Instrumental variables estimation of single equation linear model
  - General treatment of two stage least squares (2SLS)
  - Asymptotic normality and efficiency of 2SLS
  - Hypothesis testing with 2SLS

  - Weak instrument problem

- Limited dependent variable models
- Panel Data models
  - Random effects methods
  - Fixed effects methods
  - First difference methods
- Univariate ARMA processes with stochastic and non-stochastic trends
  - Motivation
  - Properties
  - Estimation
- Vector Autoregression (VAR)
  - Motivation
  - Estimation
  - Reduced form and structural VAR
- Forecasting with ARMA and VAR models
- Special Topic: Generalized Method of Moments (GMM)

2 Class Website

The class website is http://www.gragusa.org/teaching/etmosec/. Please, be sure to visit the course web page regularly, as all materials for the class, occasional messages and any changes in the schedule will be posted there.

3 Textbooks

I will use different sources for this class. Most of the material presented in the first part of the class can be found in

- Wooldridge, J.M. (2010), *Econometric Analysis of Cross Section an Panel Data*, MIT Press.

The second part of the class will draw on:

- Hal White (2011), *Asymptotic Theory for Econometricians*, Academic Press
- Hamilton, James Douglas. Time series analysis. Vol. 2. Princeton: Princeton university press, 1994.

4 Exams and grades

There will be two in class exam. A midterm and a comprehensive final. The final grade will consist of a weighted average of these two exams and the problem set. The midterm will be held on April 1st, 2016.

5 Computer software

The software that will be used in this course is **Julia**. Julia's syntax is very similar to Matlab's, but the language is much better designed. The similarity of the syntax means that a lot of Matlab code will run almost unmodified. No prior knowledge of this software package is assumed. This package will be introduced by the TA.

6 TA Sessions

Siria Angino e Chiara Perricone will lead weekly sessions held in the computer lab. These sessions are in important part of the course and regular attendance is strongly advised.

7 Attendance

It is expected that all students attend both the lectures and the TA sessions, be up to date with their readings and be prepared to participate fully in class. Please ask questions in class or during office hours if you have problems with the material.

8 Cheating and other forms of dishonesty

I have no tolerance for cheating. I regard academic dishonesty as a very serious offense. Students caught cheating during exams will fail the class and will be reported to the appropriate officer of the college.

9 Cell phone policy

The use of cell phones during class will be regarded as a sign of disrespect and it will be treated accordingly.