

Duke University
Department of Economics
Federico A. Bugni
ECON 703 - Fall 2015
First year graduate econometrics

1 Contact information

My contact information is as follows:

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- *Homepage:* <http://www.econ.duke.edu/~fb32>
- *Office hours:* Tu 3:00pm-5:00pm or by appointment

The TAs of the course are:

- Zhao Liu, *E-mail:* zhao.liu@duke.edu
- Andrey Ordin, *E-mail:* andrey.ordin@duke.edu
- *Office hours:* (tentative) Zhao: Mon 5:00PM-6:00PM, Andrey: Wed 9:00A-10:00AM (Tentative)

2 Class time and place

- *Lectures:* Tu,Th 10:05am-11:20am in Physics 130
- *TA sessions #1:* Th 6:15PM-7:05PM in Gross Hall 230E
- *TA sessions #2:* Th 7:30PM-8:20PM in Soc Sci 311
- *Course website:* <https://sakai.duke.edu/portal>

3 Course Description

Econ 703 is the first course in the graduate sequence in econometrics. The course is composed of two parts: statistics and econometrics. In the first part, statistics, we introduce the necessary tools and techniques that are essential in econometric analysis. In the second part, econometrics, we study the estimation and inference of a several well-known econometric models and estimators. In this process, we will make extensive use of the statistical tools and techniques developed in the first part of the course.

4 References

4.1 Statistics

- Main reference: Casella and Berger (2002) (referred to as “CB”).
- Additional references: Billingsley (1995), Resnick (1999), Rice (1995).

4.2 Econometrics

- Main reference: [Hayashi \(2000\)](#) (referred to as “H”).
- Additional references: [Amemiya \(1985\)](#), [Wooldridge \(2002\)](#), [Stock and Watson \(2007\)](#), [Greene \(2012\)](#).

5 Grading scheme

- The final course grade is the result of: problem sets (10%), midterm exam (30%), final exam (60%).
- Midterm exam: Thursday, October 15, 10:05am - 11:20am, in the lecture classroom.
- Final exam: Sunday, December 13, 2:00pm - 5:00pm, in the lecture classroom.

6 Problems sets

- There will be a problem set (approximately) every week.
- The problem sets are (typically) due on Thursday before the TA section.
- The problems sets will be discussed in TA sections.
- You are encouraged to work on the problems sets in groups, but individual solutions sets are required.
- The problem sets will contain both theoretical and empirical questions. You are free to use any statistical/econometric software available for empirical questions.

7 Overview of the course

1. Statistics:

- (a) Probability theory, conditional probability, Bayes’ theorem, law of total probability, independence
CB: Chapter 1.1-1.3
- (b) Random variables, distribution functions: joint, conditional, marginal
CB: Chapter 1.4-1.6, 4
- (c) Properties of random variables: expectation, variance, other moments, independence, correlation
CB: Chapter 1.5-1.6, 2
- (d) Some selected distributions
CB: Chapter 3, 4
- (e) Introduction to inference: finite sample inference and large sample inference
CB: Chapter 5
- (f) Large sample inference
CB: Chapter 5, 10.1
- (g) Estimators: consistency, asymptotic normality, efficiency, and asymptotic efficiency
CB: Chapter 7
- (h) An estimator: maximum likelihood estimator (MLE)
H: Chapters 7, 8
- (i) Hypothesis testing: introduction and likelihood ratio test
CB: Chapter 8, 9

2. Econometrics:

- (a) Classical linear regression theory
H: Chapter 1
- (b) Small sample results for the linear regression model
H: Chapter 1
- (c) Large sample results for the linear regression model
H: Chapter 2
- (d) Generalized method of moments (GMM): identification, consistency, asymptotic distribution
H: Chapter 3

8 Some final remarks...

- This plan (structure of the course, dates, problem sets, required readings, etc.) is subject to revisions.
- Class participation is considered mandatory.

References

- AMEMIYA, T. (1985): *Advanced Econometrics*, Harvard University Press.
- BILLINGSLEY, P. (1995): *Probability and Measure*, John Wiley and Sons, Inc.
- CASELLA, G. AND R. L. BERGER (2002): *Statistical Inference*, Duxbury.
- GREENE, W. (2012): *Econometric Analysis: Seventh Edition*, Prentice Hall.
- HAYASHI, F. (2000): *Econometrics*, Princeton University Press.
- RESNICK, S. I. (1999): *A Probability Path*, Birkhauser.
- RICE, J. (1995): *Mathematical Statistics and Data Analysis*, Wiley.
- STOCK, J. H. AND M. W. WATSON (2007): *Introduction to Econometrics*, Pearson Education, Inc., 2nd edition ed.
- WOOLDRIDGE, J. (2002): *Econometric Analysis of Cross Section and Panel Data*, MIT Press.