

ECONOMETRICS I

MSc in ECONOMIC ANALYSIS
Universidad Carlos III de Madrid

First Semester 2016/17

Instructor: Carlos Velasco.
Room: 15.1.07
Phone: 9646
e-mail: carlos.velasco@uc3m.es
web page: www.eco.uc3m.es/~cavelas

SYLLABUS

PART I: PROBABILITY THEORY

- 1.- Probability spaces and random elements.
- 2.- Integration and differentiation.
- 3.- Distribution and its characteristics.
- 4.- Conditional expectations.
- 5.- Asymptotic theorems.

PART II: STATISTICAL INFERENCE

- 1.- Population, sample and moments.
- 2.- Statistical inference.
- 3.- Asymptotic criteria and inference.
- 4.- Estimation in parametric models.
- 5.- Hypotheses tests.

PART III: LINEAR MODEL

1. Modeling linear and nonlinear relations.

2. Finite sample inferences using OLS and ML.
3. Asymptotic inferences.
4. Identification and misspecification.
5. GMM/IV estimation.

COURSE OUTLINE AND OBJECTIVES

This first course in Econometrics for the Economics Ph. D. program at University Carlos III de Madrid provides the probability and statistics background for Econometrics II as well as the rest of quantitative courses taught in our Ph.D. program. The course assumes that the student has knowledge of Calculus, Algebra and Statistics needed for standard Econometrics courses at a undergraduate level. At the end of the course the student is expected to acquire the probability and statistical tools needed to read research articles in professional journals.

GRADING

1 Midterm + 3 sets of problems: 40 %

Final exam: 60 %

ASSIGNMENTS

First assignment:

Chapter 1: 5, 10, 12, 30, 31, 34, 36, 37, 40, 45, 46, 50, 51, 52, 55, 56, 65, 70, 74, 78, 83, 85, 86, 91, 98, 99

Second assignment:

Chapter 1: 118, 121, 122, 128, 137, 140, 144, 146, 152, 154, 156, 161, 164.

Chapter 2: 9, 13, 19, 22, 67, 68, 82, 83, 84, 92, 97, 98, 99, 101,

Third Assignment:

From Shao book:

Chapter 2: 105, 111, 116, 119, 121, 125, 126, 129, 130.

Chapter 3: 101, 103, 107, 110.

Chapter 4: 96, 119, 120, 131, 143, 144, 151

Chapter 6: 48, 51, 71, 92, 95, 98, 99.

From Hayashi book:

Chapter 1: 4, 5, 6, 7. Chapter 2: 6, 7, 8, 12

BASIC TEXTBOOKS

Parts I and II of the course follows closely Parts I and II of this textbook:

Shao, J. (2003): Mathematical Statistics. Springer. Slides-1, Slides-2

Solved problems can be found in:

Shao, J. (2005) Mathematical Statistics: Exercises and Solutions. Springer.

Part III of the course is based on

Hayashi, F. (2000): Econometrics. Princeton University Press.

SOME REFERENCE TEXTBOOKS IN PROBABILITY STATISTICS

Ash, R. (2000), Probability and Measure Theory, 2nd Edition. Academic Press.

Bickel, P.J. and K.A. Doksum (2001): Mathematical Statistics, vol. 1,2. Prentice-Hall.

Billingsley, P. (1986): Probability and Measure, Willey.

Casella, R. and J. Berger (2002), Statistical Inference, 2nd Edition. Duxbury.

Chow, Y.S. and H. Teicher (1997): Probability Theory, Springer.

Cramer, H. (1946), Mathematical Methods of Statistics. Princeton.

Davidson, J. (1994): Stochastic Limit Theory, Oxford Economic Press.

Fuller, W. (1996), Introduction to Statistical Time Series, 2nd Edition. Wiley.

Jacod, J. and P. Protter (2003), Probability Essentials. 2nd Edition, Springer.

Lehman, E.L. (2004): Elements of Large-Sample Theory, Springer.

Lehman, E.L. and Casella, G. (2001): Theory of Point Estimation, Springer.

Lehman, E.L. and Romano, J.R. (2005): Testing Statistical Hypothesis, Springer.

Mittelhammer, R. (1992), Mathematical Statistics for Economics and Business. Springer-Verlag.

Mood, A., F. Graybill., and D. Boes (1974), Introduction to the Theory of Statistics. McGraw Hill.

Rao, C.R. (1973): Linear Statistical Inference and its Applications. Wiley.

Rohatgi, V. (1984), Statistical Inference. Dover.

Scelling, R.L. (2005): Measures, Integrals Martingales. Cambridge University Press.

Serfling, R. (1980), Approximation Theorems of Mathematical Statistics. Wiley.