Econometrics: Course Outline

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Required mathematical and Statistical background

- Probability
- Random variables and probability distributions
- Normal probability distribution, related PDFs
- Classical statistical inference
- Estimators
- Sampling distributions from a normal population
- Interval estimation
- Confidence intervals and tests of hypotheses
- Combining independent tests

Course outline

Mathematical and statistical foundations

- Probability and Measure
- Borel Measurability, Integration, and Mathematical Expectations
- Conditional Expectations
- Consistency
- Laws of Large Numbers
- Asymptotic Normality
- Central Limit Theory

Econometrics

- What is Econometrics?
- Simple Regression
- Multiple Regression
- Misspecification(s)
- Geometric represenation of Regression

References

Mathematical and statistical foundations

- Bierens J. Herman, 2005, *Introduction to the mathematical and statistical foundations of Econometrics*, Themes in modern Econometrics, Cambridge University Press.
- White Halbert, 2000, *Asymptotic theory for Econometricians*, Academin Press.
- Pitman Jim, 1997, *Probability*, Springer texts in statistics, Springer

Econometrics

- Wooldridge M. Jeffrey, 2012, *Introductory Econometrics: A Modern Approach*, South -Western Pub
- Stock H. James & Watson W. Mark, 2010, *Introduction to Econometrics*, Pearson
- Maddala G.S. & Lahiri Kajal, *Introduction to Econometrics*, Wiley
- Greene, W. H., *Econometric Analysis (7th. edition ed.*, Prentice-Hall.
- Kleiber C, Zeileis, *Applied Econometrics with R*, Springer-Verlag, New York.

Motivations

Mathematical and statistical foundations This course provides the statistical and probability theoretic foundations of econometrics, and will have practical value to Economics, Finance and Statistics students.

The principal goals are:

- to present some basic notions of statistical, mathematical and probability theory necessary for understanding regression
- a more in depth understanding of the underlying concepts of Econometrics

The short run goal of the course is for the student to understand the implications in Econometrics of measure theory, probability theory, mathematical expectation, modes of convergence, limit theorems and asymptotics.

Motivations

Econometrics This course provides the basic notions of undergraduate econometrics, and will have practical value to Economics, Finance and Statistics students.

The principal goals are:

- to present the Regression model
- to underlyine the consequences of possible misspecification
- To revisit the Regression model using a geometrical representation