

# Applied econometrics

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*Ph.D. in Management*

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## Course Description

The aim of this course is to provide an introduction to the practice of econometrics. Both theoretical and practical aspects of econometrics will be covered. Concepts will be illustrated with real world applications, and real datasets. As far as econometric software is concerned, STATA will be used throughout the class.

### Duration of Lectures:

- 3 hours

### Structure of Lectures:

- Classroom teaching based on readings and method followed by exercises in Stata

## Textbooks

There are many graduate level econometric textbooks. My lecture will follow the treatment in

1. J.M. Wooldridge. Econometric analysis of cross section and panel data. The MIT press, 2002.

Other excellent references are:

2. J. D. Angrist and J. S. Pischke, Mostly Harmless Econometrics. Princeton university Press, 2008
3. A.C. Cameron and P.K. Trivedi. Microeconometrics: methods and applications. Cambridge Univ Pr, 2005.
4. W. H. Greene. Econometric analysis. Prentice hall, 2011.

The exercise in STATA will be mostly based on:

5. A.C. Cameron and P.K. Trivedi. Microeconometrics using stata. Stata Press, 2009.

Additional material will be distributed in class.

## Exams and grading policy

The final grade for the class is based on a final exam (40%), class participation (30%), and problem sets (30%). The final exam will be held during the last day of class (April, 22 2013). There will be two problem set. They will consist of real world cases which will require using STATA.

## Course plan

### **Lecture 1 (March, 13 2013) Statistics and probability: Preliminaries**

- Readings: Instructure notes; Wooldridge Chapter 1-3.

### **Lecture 2 (March, 15 2013) The Single-Equation Linear Model and OLS Estimation (Part I)**

- Readings: Wooldridge, Chapter 4; Angrist and Pischke, Chapter 3
- Exercise in Stata

### **Lecture 3 (March, 19 2013) The Single-Equation Linear Model and OLS Estimation (Part II)**

- Readings: Wooldridge, Chapter 4; Angrist and Pischke, Chapter 3
- Exercise in Stata

#### **Lecture 4 (March, 21 2013) Additional Single-Equation Topics (Part I)**

- Readings: Wooldridge, Chapter 6
- Exercise in Stata

#### **Lecture 5 (April, 4 2013) Additional Single-Equation Topics (Part II)**

- Readings: Wooldridge, Chapter 6
- Exercise in Stata

#### **Lecture 6 (April, 9 2013) Discrete Response Model**

- Readings: Wooldridge, Chapter 15
- Exercise in Stata

#### **Lecture 7 (April, 11 2013) Discrete Response Model: Logit and Probit**

- Readings: Wooldridge, Chapter 15
- Exercise in Stata

#### **Lecture 8 (April, 16 2013) Linear Unobserved Effects Models**

- Readings: Wooldridge, Chapter 11
- Exercise in Stata

#### **Lecture 8 (April, 18 2013) More Topics on Linear Unobserved Effects Models**

- Readings: Wooldridge, Chapter 11
- Exercise in Stata

#### **Exam (April, 22 2013)**

### **Prerequisite\***

Econometrics builds on probability and statistics. Even if the focus of the course is decidedly applied, in order to fully understand the various techniques introduced in class is necessary have a firm grasp of key statistical and probabilistic concepts.

Here a list of the concepts that I deem indispensable.

#### **1. Probability and Distribution Theory**

- Random variables

- Probability distributions
- Expectations (properties)
- Variance (properties)
- Specific distributions (Bernoulli, Multinomial, Normal,  $\chi^2$ ,  $t$ ,  $F$ )
- Joint distributions
- Expectation of joint distributions
- Conditioning: conditional expectations and conditional variance
- Multivariate normal distributions and its moments

## 2. Estimation and inference

- Sample and random sampling
- Descriptive statistics
- Point estimation of parameters
- Confidence intervals
- Hypothesis testing

## 3. Large Sample Distribution Theory

- Convergence in probability and in distributions
- Consistency of estimators
- Law of large numbers
- Central limit theorem.