EC486 Econometric Methods
LSE MSc in Management and Economics
2008/09

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This is the first half of a masters level course in econometrics. The expectation is that students in this course have a thorough understanding of probability (e.g. conditional expectation) and statistics (e.g. construction of a t-statistic), and have completed an undergraduate introductory course in econometrics.

The MT part of the course will basically cover regression analysis, including extensions like instrumental variables and panel data, with a focus on estimating causal effects (e.g. whether our estimates will deliver answers to questions like: "what is the effect of a marketing program on sales?"). The emphasis will be on *understanding what various methods do*, rather than on the study of the mechanical and mathematical features of estimators. Nevertheless, to do the former we do have to learn some of the mechanics of the estimators we are interested in. The level of mathematical sophistication in the course will not be particularly high although we will use tools like multivariate calculus and simple matrix algebra at times. We will cover regression models and extensions from scratch, so in principle you can attend this course without any prior knowledge of econometrics. However, we will proceed fast (particularly on material I suppose you know), and I expect that no matter how good your preparation, some of the material will be new for you.

Lectures: Mondays, 10:00 – 12:00, D703

Classes: There will be weekly classes beginning in week 3

Text books:

Required: James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 2nd edition, Addison Wesley, 2007 (S&W)

Supplementary: Joshua D. Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press, 2008 (MHE) (The book is not yet published, excerpts will be made available on Moodle)

Optional: Jeffrey M. Wooldridge, *Introductory Econometrics, A Modern Approach*, 3rd edition, Southwestern, 2006
Terry E. Dielman, *Applied Regression Analysis*, 4th edition, Thomson, 2005

Comments on the books:
There is no single ideal textbook for this course.
S&W is an undergraduate introductory textbook. The level of the book is slightly below the level of this course. Although the main chapters are largely conceptual and not very mathematical, the book is rigorous in many respects (including mathematical material presented in the appendices and ch. 17 and 18). Hence, while you might find the book simple, it is not easy. Nevertheless, I like the approach in the book a lot, and it is the textbook closest to my own philosophy. You should read this book.

MHE is a book written primarily for PhD students with some prior training in econometrics. Hence, the level of the book is above the level of this course. Nevertheless, many sections are fairly accessible. I have therefore assigned those parts, as they will give you an idea about my own thinking (and when and where it might deviate from S&W), and supplement the reading from S&W. I recommend you read the relevant parts from MHE.
Wooldridge is also an excellent introductory text. If something doesn't make sense to you after reading S&W and/ or MHE, this is a good place to check for another exposition.
Neither of these books is particularly directed to management students. Dielman is a good but very basic text written for business students. I have added it here because it uses many more business related examples, which might be of interest to you.

Problem Sets:
There will be weekly problem sets. Some of these will be paper and pencil exercises, and some will be computer exercises. You will have to solve these using the statistical software Stata, and the data which will be provided on Moodle. You have to submit written answers to the problem sets before the class when they are discussed.

Evaluation:
There will be a three hour written exam during ST.

Outline of the Course and Readings:

1. Introduction
Causal questions and the selection problem
S&W ch. 1
MHE ch. 2

2. Bivariate Relationships in Data
Scatterplots, the conditional expectation function (CEF), linear regression, and basic properties of the CEF and linear regression
S&W ch. 4, 17
MHE sect. 3.1.1, 3.1.2

3. Samples and Estimation
Sampling and OLS regression, the sampling distribution, standard errors and hypothesis tests, homoskedasticity vs. heteroskedasticity
S &W ch. 5

4. Multivariate Regression
Regression and causality, the conditional independence assumption, short versus long regression and omitted variables bias, the regression anatomy formula
S&W ch. 6, 18
MHE sect. 3.2.1, 3.2.2

5. Inference in Multiple Regression
t-tests, F-tests, R-square, tests involving multiple coefficients and joint hypotheses
S &W ch. 7

6. Functional Form in Regression

Nonlinearity in variables, dummy variables, interactions, saturated models
S&W ch. 8
MHE 3.1.4

7. Assessing Regression Studies

Internal vs. external validity, omitted variables bias, the role of controls and bad control, measurement error
S&W ch. 9
MHE sect. 3.2.3

8. Regression Details

Weighting regression, binary dependent variables, logit, probit, and marginal effects
S&W ch. 11
MHE sect. 3.4

9. Panel Data and Differences-in-differences

S&W ch. 10
MHE sect. 5.1, 5.2

10. Instrumental Variables

S&W ch. 12
MHE sect. 4.1

11. Experiments and Quasi-experiments

S&W ch. 13

12. Time Series and Dynamic Causal Effects

S&W ch. 14, 15