

Economics 850

Introduction:

Economics 850 is the first course of a two-course sequence in econometrics intended for Ph.D. students. It is assumed that all students have taken a serious masters-level econometrics course. Since that course may not have been ECON 852, there will inevitably be some overlap with the latter course. However, ECON 850 will be taught at a considerably higher level than ECON 852.

Many of the lectures will be based on:

- R. Davidson and J. G. MacKinnon, *Econometric Theory and Methods*, Oxford University Press, 2004, henceforth **ETM**.

Copies of this book are available from the Queen's bookstore and from numerous on-line vendors. Corrections may be obtained from the World Wide Web. The book's home page is <http://qed.econ.queensu.ca/ETM/>.

The first two-thirds of the course will be based on draft chapters from the incomplete second edition of *Econometric Theory and Methods*, henceforth **ETM2**. These will be made available by the instructor. Limited use will be made of material from

- R. Davidson and J. G. MacKinnon, *Estimation and Inference in Econometrics*, New York, Oxford University Press, 1993, henceforth **EIE**.

There is no need to purchase EIE, although it would certainly be useful to have access to a copy.

A set of supplementary notes will be provided. All equations and figures will be shown on the screen.

Topics:

The following list of topics may be modified slightly depending on what material students have previously covered in sufficient depth.

1. Introductory material based on Chapter 1 of ETM2.
2. *The Geometry of Least Squares*. Chapter 2 of ETM2.
3. *Basic Properties of OLS and Asymptotic Theory*. Chapter 3 of ETM2.
4. *Hypothesis Testing*. Chapter 4 of ETM2.
5. *Confidence Intervals*. Chapter 5 of ETM2.
6. *Bootstrap Methods*. Chapter 6 of ETM2.
7. *Nonlinear Least Squares*. Chapter 6 of ETM, plus material from the supplementary notes.
8. *Generalized Least Squares*. Chapter 7 of ETM.
9. *Instrumental Variables*. Chapter 8 of ETM.

Computers:

All students are assumed to have access to and be familiar with a computer capable of running Stata, Gretl, R, TSP, or some other suitable program. Students are advised to learn a modern program, such as R, Stata, or perhaps Gretl. Since R and Gretl are free software, personal copies can easily be acquired.

It is also possible to use a matrix language, such as Matlab, Ox, Octave, or Julia. Matlab is now available free for Queen's students.

Data for the problem sets and class notes may be obtained from the ECON 850 home page.

Marking:

There will be a number of assignments, which collectively will account for 20% of the final mark. These assignments will make extensive use of the computer. There will also be a midterm examination, which will account for 20%, and a final examination, which will account for 60%. The instructor may modify these proportions in exceptional circumstances, but only if it is in the interest of the student to do so.

Additional References:

- Cameron, A. C. and P. K. Trivedi, *Microeconometrics*, New York, Cambridge, 2005.
- W. H. Greene, *Econometric Analysis*, Seventh Edition, New York, Prentice-Hall, 2011.
- F. Hayashi, *Econometrics*, Princeton University Press, 2000.
- J. G. MacKinnon, "Bootstrap inference in econometrics," *Canadian Journal of Economics*, **35**, 2002, 615–645.
- J. G. MacKinnon, "Bootstrap methods in econometrics," *Economic Record*, 2006, **82**, S2–S18.
- J. G. MacKinnon, "Bootstrap hypothesis testing," *Handbook of Computational Econometrics*, Wiley, 2009.
- J. G. MacKinnon, "Thirty years of heteroskedasticity-robust inference," in *Recent Advances and Future Directions in Causality, Prediction, and Specification Analysis*, ed. Xiaohong Chen and Norman R. Swanson, New York, Springer, 2012, 437–461. [also QED Working Paper No. 1268]
- Newey, W. K. and D. L. McFadden, "Large sample estimation and hypothesis testing," Chapter 36 in *Handbook of Econometrics*, Volume IV, R. F. Engle and D. L. McFadden, eds., Elsevier, 1994.
- J. M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, Second Edition, Cambridge, Mass., MIT Press, 2009.

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