University of Michigan — Department of Economics

Econ678: Advanced Econometrics I

Fall 2019

Lecture: TTh 4:00-5:20pm in G634 Haven Hall

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Office hours: W, 11:30am-12:30pm in 351C Lorch. Please send me an email.

Class web page: `umich.instructure.com`

Course objective: This is the first course of the second-year econometric theory field sequence in the Department of Economics. The second course (Econ679) will be offered again in Winter 2020. The main goal of this sequence is to provide students with the necessary background to: (i) take and pass the field examination in econometric theory, and (ii) carry out innovative research in theoretical and applied econometrics.

Econ678 provides an introduction to (i) the generalized method of moments, (ii) empirical process theory, (iii) resampling methods and asymptotic expansions, and, time permitting, (iv) quantile regression and (v) stationary and nonstationary time series theory. Several results from statistical large-sample theory will also be discussed during the semester when necessary. Some basic references for each portion of the class are provided below.

Prerequisites: Econ671, Econ672. The course is not open to masters students.

Evaluations: Your final grade will be based on problem sets (20 percent of the course grade) and a take-home final exam (80 percent). The problem sets may involve in-class presentations.

Course outline: The following is a tentative outline of the course readings. I will add or remove topics depending on how the course progresses. I may have to cancel or reschedule classes in November.

Generalized method of moments:

Andrews, D. W. K. (1994). Empirical process methods in econometrics. In *Handbook of Econometrics*, ed. by R. F. Engle and D. L. McFadden. Amsterdam, North-Holland, vol. 4, chap. 37.

Cattaneo, M. D. (2014). Notes on generalized method of moments. University of Michigan.

Newey, W. K. and D. L. McFadden (1994). Large sample estimation and hypothesis testing. In *Handbook of Econometrics*, ed. by R. F. Engle and D. L. McFadden. Amsterdam, North-Holland, vol. 4, chap. 36.

Pollard, D. (1985). New ways to prove central limit theorems. *Econometric Theory 1*, 295-313.

van der Vaart, A. W. (1998). *Asymptotic Statistics*. Cambridge University Press.

Resampling methods and randomization:

Andrews, D. W. (2000) Inconsistency of the bootstrap when a parameter is on the boundary of the parameter space. *Econometrica 68*, 399–406.

Davidson, R. and J. G. MacKinnon (2006). Bootstrap methods in econometrics. In *Palgrave Handbooks of Econometrics*, ed. by T. C. Mills and K. D. Patterson. Palgrave Macmillan, Basingstoke, vol. 1, chap. 23.

Horowitz, J. L. (2001). The bootstrap. In *Handbook of Econometrics*, ed. by J. J. Heckman and E. E. Leamer. Amsterdam, North-Holland, vol. 5, chap. 52.

Lehmann, E. L. and J. P. Romano (2005). *Testing Statistical Hypotheses* (3rd ed.). Springer, New York.

Politis, D. N., and J. P. Romano (1994). Large sample confidence regions based on subsamples under minimal sssumptions. *Annals of Statistics 22*, 2031–2050.

van der Vaart, A. W. (1998). *Asymptotic Statistics*. Cambridge University Press.

Topics in empirical process theory:

Andrews, D. W. K. and D. Pollard (1994). An introduction to functional central limit theorems for dependent stochastic processes. *International Statistical Review 62*, 119–132.

van der Vaart, A. W. (1998). *Asymptotic Statistics*. Cambridge University Press.

Quantile regression:

Chernozhukov, V. and C. Hansen (2013). Quantile models with endogeneity. *Annual Review of Economics 5*, 57–81.

Koenker, R. (2005). Quantile Regression. Cambridge University Press, New York.

Nonstationary time series theory:

Andrews, D. W. (1993) Tests for parameter instability and structural change with unknown change point. *Econometrica 61*, 821–856.

Stock, J. H. (1994). Unit Roots, Structural Breaks, and Trends. In *Handbook of Econometrics*, ed. by R. F. Engle and D. L. McFadden. Amsterdam, North-Holland, vol. 4, chap. 46.