

ECONOMICS 679: ADVANCED ECONOMETRICS II  
DEPARTMENT OF ECONOMICS, UNIVERSITY OF MICHIGAN

## 1 Introduction

This course constitutes the first class in the two-course block that forms the second year field sequence in Econometric Theory. The material covered in this class will provide the basic fundamental tools for large sample inference in the context of microeconometrics. The topics covered may be divided in three main categories: Large Sample Theory and Basic Results, (Semiparametric) Generalized Methods of Moments, and Topics in Econometrics. Lecture notes for each class will be given in advance, including exercises and references, which will be available in the course's website in ctools. Basic references for each portion of the class are provided below.

## 2 Useful Information

Instructor:       Matias D. Cattaneo  
Office Hours:     Fri 4:00p-5:30p, 307 Lorch  
Email:             cattaneo@umich.edu  
Website:          <http://www.umich.edu/~cattaneo>  
Lectures:         Tue-Thu 11:30a-1:00p, 373 Lorch  
Class Website:    <http://ctools.umich.edu>

## 3 Grading

Problem Sets:    20%    Weekly  
Mid-Term:        30%    Take-home Exam  
Final Exam:      50%    Take-home Exam

## 4 Main Topics

**Part I – Large Sample Theory and Basic Results:** Introduction; Stochastic Convergence; Maximum Likelihood, Z- and M- estimation; Local Asymptotic Normality and Efficiency; Empirical Processes. Some references:

Andrews, D.W.K. (1994): *Empirical Process Methods in Econometrics*. In R. F. Engle and D. McFadden (ed.), *Handbook of Econometrics*, vol. IV, Elsevier.

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

Pagan, A. and A. Ullah (1999): *Nonparametric Econometrics*. Cambridge.

Pollard, D. (1984): *Convergence of Stochastic Processes*, Springer-Verlag.

Serfling, R.J. (1980): *Approximation Theorems of Mathematical Statistics*, Wiley.

**Part II – (Semiparametric) Generalized Methods of Moments:** Inference in Parametric GMM; Kernel-based Nonparametric Estimation; Inference in Semiparametric GMM; Non-standard GMM Asymptotics (Many/Weak Instruments Asymptotics). Some references:

- Ai, C. and X. Chen (2003): “Efficient Estimation of Models with Conditional Moment Restrictions Containing Unknown Functions,” *Econometrica* 71(6), 1795-1843.
- Han, C. and P. Phillips (2006): “GMM with Many Moment Conditions,” *Econometrica* 74(1), 147-192.
- Chen, X., O. Linton and I. van Keilegom (2003): “Estimation of Semiparametric Models when the Criterion Function is not Smooth,” *Econometrica* 71(5), 1583-1600.
- Newey, W. (1990): “Semiparametric Efficiency Bounds,” *Journal of Applied Econometrics* 5(2), 99-135.
- Newey, W. (1994): “The Asymptotic Variance of Semiparametric Estimators,” *Econometrica* 62(6), 1349-1382.
- Newey, W. and D. McFadden (1994): *Large Sample Estimation and Hypothesis Testing*. In R. F. Engle and D. McFadden (ed.), *Handbook of Econometrics*, vol. IV, Elsevier.

**Part III – Topics in Econometrics:** Resampling Methods; Empirical Likelihood and High-order Properties of GMM; Nonparametric Identification; Partial Identification. Some references:

- Beresteanu A. and F. Molinari. (2008): “Asymptotic Properties for a Class of Partially Identified Models,” *Econometrica* 76(4), 763-814.
- Chernozhukov, V., H. Hong, and E. Tamer (2007): “Estimation and Confidence Regions for Parameter Sets in Econometric Models,” *Econometrica*, 75(5), 1243-1284.
- Horowitz, J.L. (2001): *The Bootstrap*. In J.J. Heckman and E. Leamer (ed.), *Handbook of Econometrics*, vol. V, Elsevier.
- Imbens, G.W. (2002): “Generalized Method of Moments and Empirical Likelihood,” *Journal of Business and Economic Statistics* 20(4), 493-506.
- Newey, W. and R. Smith. (2004): “Higher Order Properties of GMM and Generalized Empirical Likelihood Estimators,” *Econometrica* 72(1), 219-255.
- Newey, W. and F. Windmeijer. (2008): “GMM with Many Weak Moment Conditions,” forthcoming in *Econometrica*.
- Matzkin, R.L. (2007): *Nonparametric Identification*. In J.J. Heckman and E. Leamer (ed.), *Handbook of Econometrics*, vol. VIB, Elsevier.
- Politis, D.N., J.P. Romano, and M. Wolf (1999): *Subsampling*, Springer Verlag.