Econ 883-5: Econometrics III-A

Adam Rosen
adam.rosen@duke.edu

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Tuesdays and Thursdays, 08:30 – 09:45, Social Sciences 111.

Description

ECON 883.05 is the first component of the third semester of the core PhD sequence in econometrics. Our primary focus will be on the theoretical properties of m-estimators and generalized method of moments estimators, which are widely used in empirical practice. Most of our time will be spent studying classical results widely applicable to many commonly used estimators, but we will also introduce empirical process methods applicable for m-estimators with non-smooth objective functions. To illustrate the methods we will consider a variety of examples along the way. At the end of the course we will briefly study some GMM estimators that are widely used in panel data econometrics.

Our primary source will be the Handbook of Econometrics chapter Newey and McFadden (1994), but we will refer to several other complementary sources throughout the term, referenced below.

Background

Students are expected to have taken Econometrics I and II, which comprise the first year of the PhD Econometrics Core sequence.

Office Hour

Adam Rosen: Tuesdays 2:00pm – 3:00pm through October 15. Social Sciences 221B.

Assessments

Grades will be determined by four equally-weighted problem sets. You may work in teams of up to three individuals, but everyone must turn in their own written-up problem set solutions. Collaborators must be acknowledged at the top of each submission.

Schedule and Reading List

The schedule is tentative and subject to change.

- Tuesday 27 August: Introduction, motivation, and overview. Some parametric examples.

  Primary references: Newey and McFadden (1994) Section 1.

- Thursday 29 August: Review of convergence concepts. Characteristic functions. Proof of Lindeberg-Levy CLT.

  Primary references: Amemiya (1985) Chapter 3, , Van Der Vaart (1998) Chapter 2-3.
  Secondary references: Billingsley (1995), Rao (1973). Some material will overlap with your notes from ECON 703.

- Tuesday 3 September: Point identification of parameters that maximize an objective function.

  Primary references: Newey and McFadden (1994) Section 2.2, Bowden (1973), Rothenberg (1971).
  Secondary references: Koopmans (1949, 1950), Fisher (1959, 1961, 1965).

- Thursday 5 September: The "basic" consistency theorem. Uniform convergence and continuity.

  Primary references: Newey and McFadden (1994) Sections 2.1, 2.3.
  Secondary references: Amemiya (1985) Chapter 4, Van Der Vaart (1998) Chapter 5.1-5.2, Wooldridge (2010) Chapter 12.2.

- Tuesday 10 September: Consistency of extremum estimators. Some examples and extensions.

  Primary references: Newey and McFadden (1994) Section 2.
  Problem Set 1 due.

- Thursday 12 September: Stochastic equicontinuity and uniform convergence.

  Primary references: Newey and McFadden (1994) Sections 2.7, 2.8. Secondary references: Andrews (1994), Van Der Vaart (1998), Van Der Vaart and Wellner (1996) Chapter 12.3.

- Tuesday 17 September: Asymptotic normality of extremum estimators.

  Primary references: Newey and McFadden (1994) Section 3. Secondary references: Amemiya (1985) Chapter 4, Van Der Vaart (1998) Chapter 5.3, Wooldridge (2010) Chapter 12.3.

- Thursday 19 September: Asymptotic normality of extremum estimators: MLE.

  Primary references: Newey and McFadden (1994) Sections 3, 4.2, 5.1. Secondary references: Van Der Vaart (1998) Chapter 5.5, 7, 16, Wooldridge (2010) Chapter 13.

- Tuesday 24 September: Asymptotic normality of extremum estimators: MLE.

  Primary references: Newey and McFadden (1994) Sections 3, 4.2, 5.1. Secondary references: Van Der Vaart (1998) Chapter 5.5, 7, 16, Wooldridge (2010) Chapter 13.
  Problem Set 2 due.

- Thursday 26 September: Asymptotic normality of extremum estimators: GMM.

  Primary references: Newey and McFadden (1994) Sections 3, 4.3, 5.2 – 5.6, 6, 9.5 – 9.6. Secondary references: Hansen (1982), Hansen and Singleton (1982), Wooldridge (2010) Chapter 14.

- Tuesday 1 October: Asymptotic normality of extremum estimators: GMM.

  Primary references: Newey and McFadden (1994) Sections 3, 4.3, 5.2 – 5.6, 6, 9.5 – 9.6. Secondary references: Hansen (1982), Hansen and Singleton (1982), Wooldridge (2010) Chapter 14.

- Thursday 3 October: Linear panel data models (1).

  Primary references: Wooldridge (2010) Chapters 10 – 11. Secondary references: Arellano (2003).
  Problem Set 3 due.

- Tuesday 8 October: No class, fall break.

- Thursday 10 October: Linear panel data models (2)

  Primary references: Wooldridge (2010) Chapters 10 – 11. Secondary references: Arellano (2003).

- Tuesday 15 October: Finish linear panel data models. Introduction of asymptotics for non-smooth objective functions, time-permitting.

  Primary references: Newey and McFadden (1994) Section 7. Secondary references: Andrews (1994), Van Der Vaart (1998) Chapter 19, Van Der Vaart and Wellner (1996).
  Problem Set 4 due.

References

Amemiya, T. (1985): *Advanced Econometrics*. Harvard University, Cambridge, MA.

Andrews, D. W. K. (1994): "Empirical Process Methods in Econometrics," in *The Handbook of Econometrics*, ed. by R. F. Engle, and D. L. McFadden, vol. 4, pp. 2247–2294. North-Holland.

Arellano, M. (2003): *Panel Data Econometrics*. Oxford University Press, Norfolk, U.K.

Billingsley, P. (1995): *Probability and Measure*. John Wiley & Sons, New York, NY.

Bowden, R. (1973): "The Theory of Parametric Identification," *Econometrica*, 41(6), 1069–1074.

Hansen, L. P. (1982): "Large Sample Properties of Generalized Method of Moments Esitmators," *Econometrica*, 50(4), 1029–1054.

Hansen, L. P., and K. J. Singleton (1982): "Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models," *Econometrica*, 50(5), 1269–1286.

Newey, W., and D. McFadden (1994): "Large Sample Estimation and Hypothesis Testing," in *The Handbook of Econometrics*, ed. by R. F. Engle, and D. L. McFadden, vol. 4, pp. 193–281. North-Holland.

Rao, C. R. (1973): *Statistical Linear Inference and Its Applications*. John Wiley & Sons, Inc., New York, NY.

Rothenberg, T. J. (1971): "Identification in Parametric Models," *Econometrica*, 39(3), 577–591.

Van Der Vaart, A. W. (1998): *Asymptotic Statistics*. Cambridge University Press, Cambridge, U.K.

Van Der Vaart, A. W., and J. Wellner (1996): *Weak Convergence and Empirical Processes*. Springer, New York.

Wooldridge, J. M. (2010): *Econometric Analysis of Cross Section and Panel Data, Second Edition*. MIT Press, Cambridge, MA.