Topics in Econometrics: Nonparametric Econometrics

Lectures: F, 2:00pm – 4:40pm, Eggers 112

Instructor: Prof. Yoonseok Lee (Eggers 426, `ylee41@maxwell.syr.edu`)

Office Hours: by appointment

Course Description

This is a graduate level topics course in econometric theory. The pre-requisites are ECN 620, ECN 621, and ECN 622 (or their equivalents). Solid knowledge of linear algebra as well as graduate level of statistics and econometrics is essential.

This course covers the statistical foundation of the nonparametric and semiparametric models in econometrics. The course involves a development of the asymptotic distribution theory in depth. Selected current research topics are also covered depending on time and interest.

The class web page is available at `http://blackboard.syr.edu`. Announcements and additional course materials are to be posted there, so make sure to visit the site frequently. Hard copies of these materials will *not* be distributed.

Course Requirements

The requirement of this course is an original research prospectus (50%) and presentations (50%). Topics on the research prospectus should be on econometric theory; but topics on applied econometrics are allowed if the methodological contribution is significant enough—it should include not only a solid economic theory but also advanced econometrics tools with detailed data description. During the semester, students are encouraged to discuss about their research prospectus topics with me.

Presentation (50%): Each week, students have reading assignments and make presentations summarizing them. The slide of each presentation should be shared in the class.

Prospectus (50%): Each student can write up a complete paper (or a draft) instead of the prospectus, which could be used for the econometrics-field paper requirement as well. The complete prospectus or the first draft of the paper should be submitted by *5:00pm, Thursday, May 4, 2017 via email*.

References

The main reading assignments are based on:

Li, Q. and J. Racine (2007). *Nonparametric Econometrics: Theory and Practice*, Princeton University Press.

The following references will be frequently cited during the lecture as well.

General Econometric/Asymptotic Theory

Amemiya, T. (1985). *Advanced Econometrics*, Harvard University Press.

Billingsley, P. (1995). *Probability and Measure*, 3rd ed., Wiley-Interscience.

van der Vaart, A.W. (2000). *Asymptotic Statistics*, Cambridge University Press.

White, H. (2001). *Asymptotic Theory for Econometricians*, rev. ed., Academic Press.

Nonparametric Econometrics

Härdle, W., and O. Linton (1994). Applied Nonparametric Methods, *Handbook of Econometrics*,[1] R. Engel and D. McFadden eds., Vol. 4, p. 2295-2339.

Härdle, W., M. Müller, S. Sperlich, and A. Werwatz (2004). *Nonparametric and Semiparametric Models*, Springer.

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

Powell, J. (1994). Estimation of Semiparametric Models, *Handbook of Econometrics*, R. Engel and D. McFadden eds., Vol. 4, p. 2443-2521.

Course Outline

I. Review of Basics *(if needed)*

1. Review of Probability and Asymptotic Theory

2. Review of Extremum-Estimators (Nonlinear Models)

II. Kernel Density Estimation

1. Kernel Density Estimator and Its Statistical Properties

2. Bandwidth Parameter Choice

3. Additional Topics: Distribution Function Estimation; Testing Hypotheses about Densities

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[1] www.sciencedirect.com/science/handbooks/15734412

III. Nonparametric Regression

1. Nadaraya-Watson Estimator and Its Statistical Properties

2. Smoothing Parameter Choice and Confidence Intervals

3. Series Estimator and Its Statistical Properties

4. Other Estimators: Local Polynomial Estimator; k-Nearest Neighbor Estimator

IV. Semiparametric Models

1. Partially Linear Models

2. Single Index Models and Average Derivative Estimator

3. More Examples: Semiparametric Discrete Choice Models (Maximum score estimator, Maximum rank correlation estimator); Semiparametric Censored and Truncated Regression Models (Censored least absolute deviations estimator)

V. Additional Topics *(if time permits)*

1. Endogeneity in Nonparametric Regression

2. Semiparametric Efficiency Bounds

3. Non/Semi-parametric Panel Data Models

Academic Integrity Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information about the policy, see http://academicintegrity.syr.edu.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Accommodations for Students with Disabilities If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. For more information, see http://disabilityservices.syr.edu/faculty-staff/contact-us/.