

AGEC 690: Applied Nonparametric Econometrics
Department of Agricultural Economics
Purdue University
Spring 2018

Course Details:

Professor: Michael S. Delgado
Class Schedule: MW 9:30-11:20 KRAM G007
Office: KRAM 635
Office Hours: Walk-in or by appointment
Email: delgado2@purdue.edu

Course Description:

This course covers the basics of nonparametric estimation, emphasizing application of nonparametric methods. We will cover estimation of densities, regression functions, and testing. Further topics will include incorporation of discrete data into a nonparametric framework, semiparametric regression, and instrumental variables regression. Throughout each section we will read empirical papers that have deployed the methods to gain further empirical insight.

Textbook and Materials:

Applied Nonparametric Econometrics, Henderson and Parmeter, 2015
Nonparametric Econometrics: Theory and Practice, Li and Racine, 2007

I will primarily teach from Henderson and Parmeter, but anyone wishing to study a more theoretical treatment should follow along using Li and Racine.

Software:

You may use whatever software you wish, but the estimation done for your homework needs to be manually programmed. This will help you gain a hands-on understanding of the methods, and provide you with skills to program more complex models that are not yet available in estimation packages. I use R, so I may not be much help if you are using another language.

Grading Policy:

The grade for this course will be based on one comprehensive homework assignment, class participation, and a final exam. Semester grades will be determined according to the following weights:

Homework: 25%
Participation: 50%
Final Exam: 25%

Homework Assignment:

For a dataset of your choosing, the homework assignment will take you through a variety of common nonparametric models. The assignment is due by the last day of class. Late homeworks will not be accepted unless there is a university approved absence.

Class Participation:

Within each section we will read empirical papers that have applied nonparametric techniques to economic data. Students are expected to read over the papers before class; since we have few students, I will try to facilitate the discussion as much as possible, but I believe it is valuable for us to have open discussions of these papers. Your class participation grade will depend on your participation in class discussions.

Final Exam:

Make-up final exams will not be given unless there is a documented university approved absence.

Communication:

My primary method of communication will be through your Purdue email address. Please check it often.

Campus Emergencies:

In the unusual event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. To get information about changes in this course contact me by email or call me at my office. To report an emergency, call 911. To obtain updates regarding an ongoing emergency, sign up for Purdue Alert text messages, view www.purdue.edu/ea. There are nearly 300 Emergency Telephones outdoors across campus and in parking garages that connect directly to the PUPD. If you feel threatened or need help, push the button and you will be connected immediately. If we hear a fire alarm during class we will immediately suspend class, evacuate the building, and proceed outdoors. Do not use the elevator. If we are notified during class of a Shelter in Place requirement for a tornado warning, we will suspend class and shelter in the basement. If we are notified during class of a Shelter in Place requirement for a hazardous materials release, or a civil disturbance, including a shooting or other use of weapons, we will suspend class and shelter in the classroom, shutting the door and turning off the lights. Please review the Emergency Preparedness website for additional information: <http://www.purdue.edu/ehps/emergency-preparedness/index.html>.

Academic Dishonesty:

University policy on academic dishonesty is clear: academic dishonesty in any form is strictly prohibited. Anyone found to be cheating or helping someone else cheat will be referred directly to the Dean of Students for disciplinary action. Academic dishonesty includes citing someone else's work as your own, using cheat sheets, or sharing your answers with someone else. If you are unsure whether your planned action constitutes academic dishonesty, seek clarification from the instructor. Details of the Purdue University academic integrity policies can be found here: http://www.purdue.edu/purdue/about/integrity_statement.html.

Special Needs:

If you have a disability that requires academic adjustments, please make an appointment to meet with me during the first week of classes to discuss your needs. Please note that university policy requires all students with disabilities to be registered with the Disability Resource Center in Young Hall (765-494-1247) before classroom accommodations can be provided. Accommodations will be made based on documentation from the Purdue University Disability Resource Center.

Course Outline and Reading List:

1. Introduction: Parametric vs Nonparametric

Henderson and Parmeter, Chapter 1

Li and Racine, Preface and start of Chapter 1

- (a) Yatchew, A., 1998. "Nonparametric Regression Techniques in Economics," *Journal of Economic Literature*, 37, 669-721. (Introduction)
- (b) Heckman, J. J. and E. J. Vytlačil, 1999. "Local Instrumental Variables and Latent Variable Models for Identifying and Bounding Treatment Effects," *Proceedings of the National Academy of Sciences*, 96, 4730-4734.

- (c) Matzkin, R., 2007. "Nonparametric Identification," *Handbook of Econometrics, Volume 6B*, Chapter 73. (Introduction pages 5310 - 5312)
2. Univariate Density Estimation
Henderson and Parmeter, Chapter 2
Li and Racine, Chapters 1 and 5
3. Multivariate Density Estimation
Henderson and Parmeter, Chapter 3
Li and Racine, Chapter 1
- (a) Racine, J. and A. Ker, 2006. "Rating Crop Insurance Policies with Efficient Non-parametric Estimators that Admit Mixed Data Types," *Journal of Agricultural and Resource Economics*, 31, 27-39.
- (b) Li, Q. and J. Racine, 2004. "Predictor Relevance and Extramarital Affairs," *Journal of Applied Econometrics*, 19, 533-535.
- (c) Delgado, M. S., C. F. Parmeter, V. Hartarska and R. Mersland, 2015. "Should All Microfinance Institutions Mobilize Microsavings? Evidence from Economies of Scope" *Empirical Economics*, 48, 193-225.
4. Regression
Henderson and Parmeter, Chapter 5
Li and Racine, Chapter 2
- (a) Ordas Criado, C., S. Valente and T. Stengos, 2011. "Growth and Pollution Convergence: Theory and Evidence," *Journal of Environmental Economics and Management*, 62, 199-214.
- (b) Henderson, D. J., C. Papageorgiou and C. F. Parmeter, 2012. "Growth Empirics without Parameters," *Economic Journal*, 122, 125-154.
- (c) Delgado, M. S., D. J. Henderson and C. F. Parmeter, 2014. "Does Education Matter for Economic Growth?" *Oxford Bulletin of Economics and Statistics*, 76, 334-359.
5. Semiparametric Regression
Henderson and Parmeter, Chapter 9
Li and Racine, Chapters 7-9
- (a) Anglin, P. M. and R. Gencay, 1996. "Semiparametric Estimation of a Hedonic Price Function," *Journal of Applied Econometrics*, 11, 633-648.
- (b) Delgado, M. S., N. McCloud and S. C. Kumbhakar, 2014. "A Generalized Empirical Model of Corruption, Foreign Direct Investment, and Growth," *Journal of Macroeconomics*, 42, 298-316.
- (c) Ozabaci, D. and D. J. Henderson, 2015. "Additive Estimates of Returns to Schooling," *Empirical Economics*, 48, 227-251.
- (d) Sam, A. G. and Y. Zheng, 2010. "Semiparametric Estimation of Consumer Demand Systems with Micro Data," *American Journal of Agricultural Economics*, 92, 246-257.
6. Discrete Variables
Henderson and Parmeter, Chapters 7-8
Li and Racine, Chapters 3-4
- (a) Min, I., C. Fang and Q. Li, 2004. "Investigation of Patterns in Food Away From Home Expenditure in China," *China Economic Review*, 15, 457-476.

- (b) Wilson, P. W. and K. Carey, 2004. "Nonparametric Analysis of Returns to Scale in the US Hospital Industry," *Journal of Applied Econometrics*, 19, 505-524.
7. Testing in Nonparametric Models
 Henderson and Parmeter, Chapter 6
 Li and Racine, Chapters 12-13
- (a) Liu, W., 2014. "Modeling Gasoline Demand in the United States: A Flexible Semi-parametric Approach," *Energy Economics*, 45, 244-253.
8. Instrumental Variables
 Henderson and Parmeter, Chapter 10
 Li and Racine, Chapters 16-17
- (a) Henderson, D. J., C. Papageorgiou and C. F. Parmeter, 2013. "Who Benefits from Financial Development? New Methods, New Evidence," *European Economic Review*, 63, 47-67.
- (b) Cohen, M., P. Shaw and T. Chen, 2008. "Nonparametric Instrumental Variable Estimation in Practice," *working paper*.
9. Panel Data
 Henderson and Parmeter, Chapter 11
 Li and Racine, Chapter 19
- (a) Zhang, J. and C. Wang, 2011. "Co-Benefits and Additionality of the Clean Development Mechanism: An Empirical Analysis," *Journal of Environmental Economics and Management*, 62, 140-154.
- (b) Azomahou, T., F. Laisney and P. H. Van, 2006. "Economic Development and CO2 Emissions: A Nonparametric Panel Approach," *Journal of Public Economics*, 90, 1347-1363.
- (c) Amini, S. M. S. Delgado, D. J. Henderson and C. F. Parmeter, 2012. "Fixed vs Random: The Hausman Test Four Decades Later," *Advances in Econometrics*, Volume 29, 479-513.
10. Constrained Nonparametric Estimation
 Henderson and Parmeter, Chapter 12
- (a) Parmeter, C. F., K. Sun, D. J. Henderson and S. C. Kumbhakar, 2014. "Estimation and Inference Under Economic Restrictions," *Journal of Productivity Analysis*, 41, 111-129.
- (b) Henderson, D. J., S. C. Kumbhakar, Q. Li and C. F. Parmeter, 2015. "Smooth Coefficient Estimation of a Seemingly Unrelated Regression," *Journal of Econometrics*, 189, 148-162.