

## Course Syllabus

**Advanced Econometrics**  
**Seminar in Discrete Choice Methods**  
**AEB 6933 – Section 03DB/7745**  
**Summer Semester, 2018**  
(Prerequisite: Fundamentals of Econometrics)

**INSTRUCTOR:** Pilar Useche.  
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Email: [useche@ufl.edu](mailto:useche@ufl.edu)

**CLASSROOM:** MCCB, room 2102.

**CLASS MEETINGS:** T R, Periods 02-03, W Period 03.

**OFFICE HOURS:** directly after class, or by appointment.

**COURSE DESCRIPTION:** In this seminar we will study the econometrics and economics of discrete choice models. The focus of the class is on the correct application of these empirical methods and on the correct interpretation of their results under the light of sound economic theory. Students' knowledge is tested through weekly and comprehensive problem sets. Article presentations are also required, presenting papers which use the methods discussed in class. Presentations are graded based on students' ability to transfer to other students main and often complex paper ideas and developments. Over the course there is a nice progression of models where each new model builds on previous ones and addresses some of the weaknesses of its predecessor(s). Similarly, the problem sets do progressively lead the students from the most basic types of estimations (using standard econometric packages) to the ones that require programming, simulation and other complex ways of data analysis. We will use real data for the problem sets and STATA/R and GAUSS to program our models.

**The aims of the class include:** to gain a thorough understanding of the most important discrete choice models available and the methods to estimate them; to be able to program your own models for estimation, including simulation procedures, and to be able to apply your knowledge

to choice decisions in different settings.

STATA, R and GAUSS use: students can access Stata and R through UF Apps, R is also available online for no cost. Gauss will be provided by the ApTech enterprise after registration in the course. Please contact our IT support personnel (Ed Howard) If you have any problems with the software.

### **RECOMMENDED TEXTBOOKS:**

Train, K. (2012) *Discrete Choice Methods with Simulation*, Cambridge University Press, Cambridge.

Louviere JJ, Hensher DA & Swait JF (2000) *Stated Choice Methods and Analysis*. Cambridge: Cambridge University Press.

Green, W. (2012) *Econometric Analysis*, Prentice Hall (Pearson). Selected chapters.

### **COURSE GRADING:**

Your course grade will be determined by your work on the problem sets and your presentation/s. There will be computer-oriented problem sets (based on codes and datasets provided to you) and presentations of complementary readings. For the presentation/s, **you should email me your slides at least 24 hours before you present**. Regarding problem sets, you should hand in two separate files: your code (with numbered files), your answers (including tables and explanations, making reference to code line numbers). I will grade all assignments as: check-plus, check, or check-minus. Your course grade will be A if you receive a check or check-plus for all of them. Your grade will be reduced by one step (eg from A to A-, A- to B+) for each check-minus that you receive. Your grade will also be reduced by two steps (eg from A to B+, B+ to B-) for each presentation you miss or problem set that you do not turn in.

#### *Attendance*

Attendance is important. The student's success in this class will be dependent upon their participation and the amount and quality of effort expended. Students will be held responsible for material covered in class. As a courtesy to fellow students and the instructor, students are expected to arrive on time. If the student cannot arrive on time because of extenuating circumstance, the student is strongly encouraged to meet with the instructor during the first week of classes.

**Absences and tardiness will reduce grades** as follows: More than two late arrivals/early departures will reduce the student's grade by one step. More than one unexcused/non-documented absence will reduce the student's grade by two steps. In extreme cases, lack of student engagement in class could also lead to a grade reduction.

*Lids Down/Messaging Policy*

Laptops are only permitted to be used in class for the purpose of using statistical and econometric software. If students want to review readings during class, they will need to bring a printed copy of these, not read in the laptops. Text messaging, cell phones and other forms of cyber communication are not to be used in class, unless there is an exceptional circumstance and the student has notified the teacher in advance.

**SCHEDULE:**

*Week 1*

- Review of syllabus and general course overview.
- Introducing discrete choice & drawing from densities.
- Properties of Discrete Choice Model
- Logit
  - Start Problem Set 1

*Readings:*

Textbook, Ch.1 and Sections 9.1-9.2, Ch.2 and 3

D. McFadden, "Conditional Logit Analysis of Qualitative Choice Behavior," in P. Zarembka (ed.), *Frontiers of Econometrics*, New York, NY, Academic Press, 1974

K. Train, "A Validation Test of a Disaggregate Mode Choice Model," *Transportation Research*, Vol. 12, pp. 167-174, 1978.

*Week 2*

- Numerical Maximization.
  - Start Problem Set 2
- Generalized Extreme Value
- Nested Logit
  - Start Problem Set 3

*Readings:*

Textbook, Ch.8, Ch 4.

D. McFadden, "Modeling the Choice of Residential Location," in A. Karlquist, et al. (eds.), *Spatial Interaction Theory and Planning Models*, Amsterdam, North-Holland Publishing Company, 1978.

K. Train, *Qualitative Choice Analysis*, Cambridge, MA, MIT Press, 1986, Ch. 8: Automobile Ownership and Use

K. Train, D. McFadden, and M. Ben-Akiva, "The Demand for Local Telephone Service: A Fully Discrete Model of Residential Calling Patterns and Service Choices," *RAND Journal of Economics*, Vol. 18, No. 1, pp. 109-123, 1987.

### *Week 3*

- Mixed Logit
  - Start Problem Set 4
- Individual Level Coefficients

### *Readings:*

Textbook, Ch.6, Ch 11.

D. Revelt and K. Train, "Mixed Logit with Repeated Choices," *Review of Economics and Statistics*, Vol. LXXX, No. 4, pp. 647-657, 1998.

D. Brownstone and K. Train, "Forecasting New Product Penetration with Flexible Substitution Patterns," *Journal of Econometrics*, Vol. 89, No. 1-2, pp. 109-129, 1998/99.

D. McFadden and K. Train, "Mixed MNL Models of Discrete Response," *Journal of Applied Econometrics*, Vol. 15, No. 5, pp. 447-470, 2000.

K. Train, "Recreation Demand Models with Taste Variation," *Land Economics*, Vol. 74, No. 2, pp. 230-239, 1998.

K. Train and M. Weeks, "Discrete Choice Models in Preference Space and Willingness-to-pay Space," in *Applications of Simulation Methods in Environmental and Resource Economics*, R. Scarpa and A. Alberini, eds., Springer, Dordrecht, 2005.

P. Useche, Barham, Bradford L. and Foltz, Jeremy D., *Integrating Technology Traits and Producer Heterogeneity: A Mixed-Multinomial Model of Genetically Modified Corn Adoption*. *American Journal of Agricultural Economics*, Vol. 91, No. 2, pp. 444-461, May 2009.

J. Walker, M. Ben-Akiva, and D. Bolduc, "Identification of Parameters in Normal Error Component Logit Mixture (NECLM) Models," *Journal of Applied Econometrics*, Vol. 22, pp 1095-1025, 2007.

*Week 4*

- Probit.
- Variance Reduction and Simulation Assisted Classical Estimation

*Readings:*

Textbook, Ch.5, Sect. 9.3. Ch 10.

J. Hausman and D. Wise, "A Conditional Probit Model for Qualitative Choice: Discrete Decisions Recognizing Interdependence and Heterogenous Preferences," *Econometrica*, Vol. 48, No. 2, pp. 403-426, 1978.

S. Lerman and C. Manski, "On the Use of Simulated Frequencies to Approximate Choice Probabilities," in C. Manski and D. McFadden (eds.), *Structural Analysis of Discrete Data with Econometric Applications*, Cambridge, MA, MIT Press, 1981.

M. Ben-Akiva and D. Bolduc, "Multinomial Probit with a Logit Kernel and a General Parametric Specification of the Covariance Structure," working paper, 1996, Department d'Economique, Universite Laval, Quebec, Canada.

A. Boersch-Supan and V. Hajivassiliou, "Smooth Unbiased Multivariate Probability Simulators for Maximum Likelihood Estimation of Limited Dependent Variables," *Journal of Econometrics*, Vol. 58, pp. 347-368, 1993.

V. Hajivassiliou, D. McFadden, and P. Ruud, "Simulation of Multivariate Normal Rectangle Probabilities and Their Derivatives," *Journal of Econometrics*, Vol. 72, No. 1-2, pp. 85-134, 1996.

*Week 5*

- Bayesian Estimation
- Hierarchical Bayes Estimation of Mixed Logit
- Problem Set 5 Available.

*Readings:*

Textbook, Ch.12.

S. Chib and E. Greenberg, "Understanding the Metropolis-Hastings Algorithm," *The American Statistician*, Vol. 49, pp. 327-335, 1995.

J. Huber and K. Train, "On the Similarity of Classical and Bayesian Estimates of Individual Mean Partworths," *Marketing Letters*, Vol. 12, No. 3, pp. 257-267, 2001.

J. Albert and S. Chib, "Bayesian Analysis of Binary and Polychotomous Response Data," *Journal of the American Statistical Association*, Vol. 88, No. 422, pp.669-679, 1993.

*Week 6*

- Endogeneity: BLP, Control functions, Latent instruments.

*Readings:*

Textbook, Ch.13.

S. Berry, "Estimating Discrete Choice Models of Product Differentiation," *The Rand Journal of Economics*, Vol. 25, No. 2, pp. 242-262, 1994.

S. Berry, A. Pakes, and J. Levinsohn, "Automobile Prices in Equilibrium," *Econometrica*, Vol. 63, No. 4, pp. 841-890, 1995.

S. Berry, A. Pakes, and J. Levinsohn, "Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Vehicle Market," *Journal of Political Economy*, Vol. 112, No. 1, pp. 68-105, 2004.

K. Train and C. Winston, "Vehicle Choice Behavior and the Declining Market of US Automakers," *International Economic Review*, Vol. 48, No. 4, pp. 1469-1496, 2007

A. Petrin and K. Train, "A Control Function Approach to Endogeneity in Consumer Choice Models," *Journal of Marketing Research*, Vol. 47, No. 1, pp. 3-13, 2010.

**Other papers relevant to the use or design of discrete choice methods**

### **Choice of a beef product**

Jae Bong Chang and Jayson L. Lusk (2010) “Mixed logit models: accuracy and software choice”,  
Journal of Applied Econometrics.

Chang, J.B., J.L. Lusk, and F.B. Norwood (2009) “How Closely Do Hypothetical Surveys and  
Laboratory Experiments Predict Field Behavior?” American Journal of Agricultural Economics, 91,  
pp. 518-34.

*References:* Journal of Applied Econometrics data archive : <http://jae.wiley.com/jae/> .

### **Choice of Brand for Crackers, Catsup and Yogurt**

Jain, Dipak C., Naufel J. Vilcassim and Pradeep K. Chintagunta (1994) “A random-coefficients logit  
brand-choice model applied to panel data”, Journal of Business and Economics Statistics, 12(3), 317.

*References:* Journal of Business Economics and Statistics web site :

<http://www.amstat.org/publications/jbes/> .

### **Choice of Brand for Crakers 2**

Jain, Dipak C., Naufel J. Vilcassim and Pradeep K. Chintagunta (1994) “A random-coefficients logit  
brand-choice model applied to panel data”, Journal of Business and Economics Statistics, 12(3), 317.

Paap, R. and Philip Hans Frances (2000) “A dynamic multinomial probit model for brand choices  
with different short-run effects of marketing mix variables”, Journal of Applied Econometrics, 15(6),  
717-744.

### **Choice of Brand for Ketchup**

Kim, Byong-Do, Robert C. Blattberg and Peter E. Rossi (1995) “Modeling the distribution of price  
sensitivity and implications for optimal retail pricing”, Journal of Business Economics and Statistics,  
13(3), 291.

### **Choice of Brand for Tuna**

Kim, Byong-Do, Robert C. Blattberg and Peter E. Rossi (1995) “Modeling the distribution of price  
sensitivity and implications for optimal retail pricing”, Journal of Business Economics and Statistics,  
13(3), 291.

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### **Choice of Fishing Mode**

Herriges, J. A. and C. L. Kling (1999) “Nonlinear Income Effects in Random Utility Models”,  
Review of Economics and Statistics, 81, 62-72.

*References* Cameron, A.C. and P.K. Trivedi (2005) Microeconometrics : methods and applications,  
Cambridge, pp. 463-466, 486 and 491-495.

### **Mode Choice for the Montreal-Toronto Corridor**

Bhat, Chandra R. (1995) “A heteroscedastic extreme value model of intercity travel mode choice”,  
Transportation Research Part B, 29(6), 471-483.

Koppelman Franck S. and Chieh-Hua Wen (2001) “The paired combinatorial logit model: properties, estimation and application”, *Transportation Research Part B*, 75-89.

Wen, Chieh-Hua and Franck S. Koppelman (2001) “The generalized nested logit model”, *Transportation Research Part B*, 627-641.

### **Ranked data for gaming platforms**

Denis Fok, Richard Paap, and Bram van Dijk (2010) “A Rank-Ordered Logit Model with Unobserved Heterogeneity in Ranking Capabilities”, *Journal of Applied Econometrics*

### **Choice among residential telephone service options for local calling**

Walker J.L., Ben-Akiva M. and D. Bolduc (2007) “Identification of parameters in normal error component logit-mixture (NECLM) models”, *Journal of Applied Econometrics*, 22, 1095–1125.

Train K.E., Mc Fadden D. and M. Ben-Akiva (1987) “The demand for local telephone service: a fully discrete model of residential calling patterns and service choices”, *Rand Journal of Economics*, 18(1), 109–123

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### **Stated Preference Performance**

Chang, J.B., J.L. Lusk, and F.B. Norwood (2009) “How Closely Do Hypothetical Surveys and Laboratory Experiments Predict Field Behavior?” *American Journal of Agricultural Economics*, 91, pp. 518-34.

### **Stated Preferences survey for a toll road**

Kenneth A. Small, Clifford Winston, Jia Yan (2005) “Uncovering the distribution of motorists’ preferences for travel time and reliability”, *Econometrica*, 73(4), 1367-1382.

### **Stated Preferences for Train Traveling**

Meijer, Erik and Jan Rouwendal (2005) “Measuring welfare effects in models with random coefficients”, *Journal of Applied Econometrics*, forthcoming.

Ben-Akiva, M., D. Bolduc and M. Bradley (1993) “Estimation of travel choice models with randomly distributed values of time”, *Transportation Research Record*, 1413, 88–97.

Carson, R.T., L. Wilks and D. Imber (1994) “Valuing the preservation of Australia’s Kakadu conservation zone”, *Oxford Economic Papers*, 46, 727–749.

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### **Discrete Choice and Social Networks**

Francisco X. Aguilar, Zhen Cai, Brett Butler, Yanguang Chen. (2017) Proximal Association of Land Management Preferences: Evidence from Family Forest Owners. *PLOS ONE* 12:1, e0169667.

T. J. Richards, S. F. Hamilton, W. J. Allender. (2014) Social Networks and New Product Choice. *American Journal of Agricultural Economics* 96:2, 489-516.

Elisabetta Cherchi. (2017) A stated choice experiment to measure the effect of informational and normative conformity in the preference for electric vehicles. *Transportation Research Part A: Policy and Practice* 100, 88-104.



Fangfang Wei, Ning Jia, Shoufeng Ma. (2016) Day-to-day traffic dynamics considering social interaction: From individual route choice behavior to a network flow model. *Transportation Research Part B: Methodological* 94, 335-354.

Susan Pike, Mark Lubell. (2016) Geography and social networks in transportation mode choice. *Journal of Transport Geography* 57, 184-193.

Michael Maness, Cinzia Cirillo. (2016) An indirect latent informational conformity social influence choice model: Formulation and case study. *Transportation Research Part B: Methodological* 93, 75-

Caspar G. Chorus. (2015) Models of moral decision making: Literature review and research agenda for discrete choice analysis. *Journal of Choice Modelling* 16, 69-85.

Frank Goetzke, Tilmann Rave. (2015) Automobile access, peer effects and happiness. *Transportation* 42:5, 791-805.

Frank Goetzke, Regine Gerike, Antonio Pérez, Elenka Dugundji. (2015) Social interactions in transportation: analyzing groups and spatial networks. *Transportation* 42:5, 723-731.

Michael Maness, Cinzia Cirillo, Elenka R. Dugundji. (2015) Generalized behavioral framework for choice models of social influence: Behavioral and data concerns in travel behavior. *Journal of Transport Geography* 46, 137-150.

### **Food, Valuation & Experiments**

Drichoutis, Andreas C. & Lusk, Jayson L. & Pappa, Valentina, 2016. "Elicitation formats and the WTA/WTP gap: A study of climate neutral foods," *Food Policy*, Elsevier, vol. 61(C), pages 141-155.

Marette, Stéphan & Martin, Christophe & Bouillot, Fabienne, 2017. "Two experiments in one: How accounting for context matters for welfare estimates," *Food Policy*, Elsevier, vol. 66(C), pages 12-24.

McFadden, Brandon R. & Lusk, Jayson L., 2015. "Cognitive biases in the assimilation of scientific information on global warming and genetically modified food," *Food Policy*, Elsevier, vol. 54(C), pages 35-43.

Disdier, Anne-Célia & Marette, Stéphan, 2012. "How do consumers in developed countries value the environment and workers' social rights in developing countries?," *Food Policy*, Elsevier, vol. 37(1), pages 1-11.

Marette, Stéphan & Messéan, Antoine & Millet, Guy, 2012. "Consumers' willingness to pay for eco-friendly apples under different labels: Evidences from a lab experiment," *Food Policy*, Elsevier, vol. 37(2), pages 151-161.

## **UNIVERSITY POLICIES:**

**Academic Honesty:** The University of Florida requires all members of its community to be honest in all their endeavors. Students are required to commit themselves to academic honesty by signing a prescribed basic statement, including the Student Honor Code, as part of the registration process. A fundamental principle is that the whole process of learning and pursuit of knowledge are diminished by cheating, plagiarism, and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the University will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff, and administration members who practice dishonest or demeaning behavior.

### **Acts of Academic Dishonesty**

#### *I. Taking Information*

- ! copying graded homework from another student
- ! working together on a take-home test or homework when specifically prohibited by the professor
- ! looking at another student's paper during an exam

#### *II. Tendering Information*

- ! giving your work to another to be copied
- ! giving someone answers to exam questions during the exam
- ! after taking an exam, informing a person in another section, of questions that appear on the exam
- ! giving or selling a term paper to another student

#### *III. Plagiarism*

- ! copying homework answers from your text and handing them in for a grade
- ! quoting text or other works on an exam, term paper or homework without citation
- ! handing in a paper purchased from a term paper service
- ! re-typing a friend's paper and handing it in as your own
- ! taking a paper from fraternity/sorority files and handing it in as your own

#### *IV. Conspiracy*

- ! planning with one or more students to commit any form of academic dishonesty together
- ! giving your term paper to another student who you know will plagiarize it

#### *V. Misrepresentation*

- ! having another student do your computer program
- ! lying to a professor to increase your grade

#### *VI. Bribery*

- ! offering money, any item or service to a faculty member or any other person to gain academic advantage for yourself or another

**UF Services:** Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

**Accommodations for Students with Disabilities:** Students with disabilities, who need reasonable modifications to complete assignments successfully and otherwise satisfy course criteria, are encouraged to meet with the instructor as early in the course as possible to identify and plan specific accommodations. Students WILL be asked to supply a letter from the Office for Students with Disabilities to assist in planning accommodations. Please see instructor outside of class time to discuss any accommodations you might need.