

Syllabus

Course Name: Empirical Industrial Organization

Faculty:

2026 SECOND SEMESTER

COURSE OUTLINE

This course focuses on the estimation of static and dynamic discrete choice models, both with and without strategic interactions between agents. These models form the basis of many applications in fields such as Industrial Organization, Political Economy, Health Economics, Labor, and Trade. This course will introduce these classes of models and discuss various methods used to estimate and solve them. Estimating these models is often complex, so we will emphasize the practical implementation of these methods.

COURSE PROGRAM

1. Estimation of (static) discrete choice models: Multinomial Logit, Nested Logit, Random Coefficients Logit
2. Estimation of search (price dispersion) models
3. Estimation of static games of complete and incomplete information
4. Estimation of dynamic discrete choice models (single agent and games)

BIBLIOGRAPHY

- **Estimation of (Static) Discrete Choice Models**

1. Berry, S., & Haile, P. (2021). Foundations of Demand Estimation. In K. Ho, A. Hortacsu, & A. Lizzeri (Eds.), *Handbook of Industrial Organization* (Vol. 4, pp. 3-62). Elsevier.
2. Train, K. (2009). *Discrete Choice Models with Simulation* (3rd ed.). Cambridge University Press.
3. Anderson, S. P., de Palma, A., & Thisse, J. F. (1992). *Discrete Choice Theory of Product Differentiation*. MIT Press.
4. Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd ed.). MIT Press.
5. Berry, S., Levinsohn, J., & Pakes, A. (1995). Automobile Price in Market Equilibrium. *Econometrica*, 63, 841-890.
6. Nevo, A. (2000). A Practitioner's Guide to Estimation of Random Coefficient Logit Models of Demand. *Journal of Economics and Management Strategy*, 9, 513-548.

7. Berry, S., Levinsohn, J., & Pakes, A. (2004). Differentiated Products Demand System from a Combination of Micro and Macro Data: The New Car Market. *Journal of Political Economy*, 112(1), 68-105.
8. Dubé, J., Fox, J., & Su, C. (2012). Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation. *Econometrica*, 80(5), 2231-2267.
9. Lee, J., & Seo, K. (2015). A computationally fast estimator for random coefficients logit demand models using aggregate data. *The RAND Journal of Economics*, 46(1), 86-102.
10. Petrin, A. (2002). Quantifying the Benefits of New Products: The Case of the Mini-van. *Journal of Political Economy*, 110, 705-729.
11. Gentzkow, M., & Shapiro, J. M. (2010). What drives media slant? Evidence from US daily newspapers. *Econometrica*, 78(1), 35-71.
12. Dinerstein, M., & Smith, T. D. (2021). Quantifying the supply response of private schools to public policies. *American Economic Review*, 111(10), 3376-3417.
13. Costa, Francisco, Leticia Nunes, and Fabio Miessi Sanches. "How to attract physicians to underserved areas? Policy recommendations from a structural model." *Review of Economics and Statistics* 106.1 (2024): 36-52.
14. Miravete, E. J., Seim, K., & Thurk, J. (2018). Market power and the Laffer curve. *Econometrica*, 86(5), 1651-1687.
15. Finkelstein, A., Gentzkow, M., & Williams, H. (2016). Sources of geographic variation in health care: Evidence from patient migration. *The Quarterly Journal of Economics*, 131(4), 1681-1726.
16. Verboven, F. (1996). International price discrimination in the European car market. *The RAND Journal of Economics*, 27(2), 240-268.
17. Goldberg, P., & Hellerstein, R. (2013). A Structural Approach to Identifying the Sources of Local-Currency Price Stability. *Review of Economic Studies*, 80, 175-210.
18. Bronnenberg, B. J., Dubé, J. P., & Gentzkow, M. (2012). The evolution of brand preferences: Evidence from consumer migration. *American Economic Review*, 102(6), 2472-2508.
19. Hausman, J., Leonard, G., & Zona, J. (1994). Competitive Analysis with Differentiated Products. *Annales d'Economie et de Statistique*, 34, 159-180.
20. Nevo, A. (2000). Mergers with Differentiated Products: the Case of the Ready-to-Eat Cereal Industry. *The RAND Journal of Economics*, 31, 395-421.
21. Miller, N., & Weinberg, M. (2017). Understanding the price effects of the Miller-Coors joint venture. *Econometrica*, 85, 1763-1791.
22. Donna, J. D., Pereira, P., Pu, Y., Trindade, A., & Yoshida, R. (2024). Direct Sales and Bargaining. *The RAND Journal of Economics* (forthcoming).

23. Barahona, N., Otero, C., & Otero, S. (2023). Equilibrium effects of food labeling policies. *Econometrica*, 91(3), 839-868.

- **Estimation of search (price dispersion) models**

1. Gavazza, A., & Lizzeri, A. (2021). Frictions in Product Markets. In K. Ho, A. Hortacsu, & A. Lizzeri (Eds.), *Handbook of Industrial Organization* (Vol. 4, No. 1, pp. 433-484). Elsevier.
2. Hong, H., & Shum, M. (2006). Using Price Distribution to Estimate Search Costs. *RAND Journal of Economics*, 37, 257-275.
3. Moraga-González, J. L., & Wildenbeest, M. (2007). Maximum Likelihood Estimation of Search Costs. *European Economic Review*, 52, 820-848.
4. Sanches, F., Silva Junior, D., & Srisuma, S. (2016). Minimum Distance Estimation of Search Costs using Price Distribution. *Journal of Business and Economic Statistics*, 36(4), 658-671.
5. Wildenbeest, M. (2011). An Empirical Model of Search with Vertically Differentiated Products. *RAND Journal of Economics*, 42, 729-757.
6. Mysliwski, M., Sanches, F., Silva Junior, D., & Srisuma, S. (2024). Identification and Estimation of a Search Model with Heterogeneous Consumers and Firms. Working paper.
7. Moraga-González, J. L., Sándor, Z., & Wildenbeest, M. R. (2023). Consumer Search and Prices in the Automobile Market. *The Review of Economic Studies*, 90(3), 1394-1440.
8. Salz, T. (2022). Intermediation and Competition in Search Markets: An Empirical Case Study. *Journal of Political Economy*, 130(2), 310-345.
9. Allen, J., Clark, R., & Houde, J. F. (2019). Search Frictions and Market Power in Negotiated-Price Markets. *Journal of Political Economy*, 127(4), 1550-1598.

- **Estimation of static games of complete and incomplete information**

1. Berry, S., & Reiss, P. (2007). Empirical Models of Entry and Market Structure. In M. Armstrong & R. Porter (Eds.), *Handbook of Industrial Organization* (Vol. 3, pp. 1845-1886). Elsevier.
2. Bresnahan, T., & Reiss, P. (1991). Empirical Models of Discrete Games. *Journal of Econometrics*, 48, 57-81.
3. Bresnahan, T., & Reiss, P. (1991). Entry and Competition in Concentrated Markets. *Journal of Political Economy*, 99(5), 977-1009.
4. Ciliberto, F., & Tamer, E. (2009). Market Structure and Multiple Equilibria in Airline Markets. *Econometrica*, 77(6), 1791-1828.

5. Bajari, P., Hong, H., & Ryan, S. (2010). Identification and Estimation of a Discrete Game of Complete Information. *Econometrica*, 78(5), 1529-1568.
6. Bajari, P., Hong, H., Krainer, J., & Nekipelov, D. (2010). Estimating Static Models of Strategic Interactions. *Journal of Business and Economic Statistics*, 28(4), 469-482.
7. Ellickson, P. B., & Misra, S. (2011). Structural Workshop Paper—Estimating Discrete Games. *Marketing Science*, 30(6), 997-1010.
8. Grieco, P. L. (2014). Discrete Games with Flexible Information Structures: An Application to Local Grocery Markets. *The RAND Journal of Economics*, 45(2), 303-340.
9. Coelho, C., Mello, J., & Rezende, L. (2013). Do Public Banks Compete with Private Banks? Evidence from Concentrated Local Markets in Brazil. *Journal of Money, Credit and Banking*, 45(8), 1581-1615.
10. Berry, S. T. (1992). Estimation of a Model of Entry in the Airline Industry. *Econometrica: Journal of the Econometric Society*, 889-917.
11. Ciliberto, F., Miller, A., Nielsen, H., & Simonsen, M. (2016). Playing the Fertility Game at Work: An Equilibrium Model. *International Economic Review*, 57, 827-856.
12. Mazzeo, M. (2002). Product Choice and Oligopoly Market Structure. *RAND Journal of Economics*, 33(2), 221-242.
13. Seim, K. (2006). An Empirical Model of Firm Entry with Endogenous Product-Type Choices. *RAND Journal of Economics*, 37(3), 619-640.
14. Rennhoff, A. D., & Owens, M. F. (2012). Competition and the Strategic Choices of Churches. *American Economic Journal: Microeconomics*, 4(1), 152-170.
15. Walrath, M. W. (2016). Entry Models Applied to Churches: Could Protestants Use a Catholic Bishop to Solve Excess Entry? *The Journal of Industrial Economics*, 64(3), 557-588.

- **Estimation of dynamic discrete choice models (single agent and games)**

1. Aguirregabiria, V., & Nevo, A. (2010). Recent Developments in Empirical IO: Dynamic Demand and Dynamic Games. In *Advances in Economics and Econometrics* (Vol. III). Cambridge University Press.
2. Aguirregabiria, V., Collard-Wexler, A., & Ryan, S. P. (2021). Dynamic Games in Empirical Industrial Organization. In K. Ho, A. Hortacsu, & A. Lizzeri (Eds.), *Handbook of Industrial Organization* (Vol. 4, No. 1, pp. 225-343). Elsevier.
3. Ericson, R., & Pakes, A. (1995). Markov-Perfect Industry Dynamics: A Framework for Empirical Work. *The Review of Economic Studies*, 62(1), 53-82.
4. Rust, J. (1987). Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher. *Econometrica*, 57, 1027-1058.

5. Hotz, V. J., & Miller, R. A. (1993). Conditional Choice Probabilities and the Estimation of Dynamics Models. *The Review of Economic Studies*, 60(3), 497-529.
6. Pesendorfer, M., & Schmidt-Dengler, P. (2008). Asymptotic Least Squares Estimators for Dynamic Games. *The Review of Economic Studies*, 75(3), 901-928.
7. Aguirregabiria, V., & Mira, P. (2007). Sequential Estimation of Dynamic Discrete Games. *Econometrica*, 75(1), 1-53.
8. Bajari, P., Benkard, L., & Levin, J. (2007). Estimating Dynamic Models of Imperfect Competition. *Econometrica*, 75(5), 1331-1370.
9. Hotz, V. J., Miller, R. A., Sanders, S., & Smith, J. (1994). A Simulation Estimator for Dynamic Models of Discrete Choice. *The Review of Economic Studies*, 61(2), 265-289.
10. Arcidiacono, P., & Miller, R. A. (2011). Conditional Choice Probability Estimation of Dynamic Discrete Choice Models with Unobserved Heterogeneity. *Econometrica*, 79(6), 1823-1867.
11. Arcidiacono, P., & Jones, J. B. (2003). Finite Mixture Distributions, Sequential Likelihood, and the EM Algorithm. *Econometrica*, 71(3), 933-946.
12. Kasahara, H., & Shimotsu, K. (2009). Nonparametric Identification of Finite Mixture Models of Dynamic Discrete Choices. *Econometrica*, 77(1), 135-175.
13. Komarova, T., Sanches, F., Silva Junior, D., & Srisuma, S. (2018). Joint Analysis of the Discount Factor and Payoff Parameters in Dynamic Discrete Choice Models. *Quantitative Economics*, 9(3), 1153-1194.
14. Sanches, F. A. M., Silva-Junior, D., & Srisuma, S. (2016). Ordinary Least Squares Estimation of a Dynamic Game Model. *International Economic Review*, 57(2), 623-634.
15. Sweeting, A. (2013). Dynamic Product Positioning in Differentiated Product Markets: The Effect of Fees for Musical Performance Rights on the Commercial Radio Industry. *Econometrica*, 81(5), 1763-1803.
16. Jeziorski, P. (2014). Estimation of Cost Efficiencies from Mergers: Application to US Radio. *The RAND Journal of Economics*, 45(4), 816-846.
17. Igami, M., & Uetake, K. (2020). Mergers, Innovation, and Entry-Exit Dynamics: Consolidation of the Hard Disk Drive Industry, 1996–2016. *The Review of Economic Studies*, 87, 2672-2702.
18. Almagro, M., & Domínguez-lino, T. (2024). Location Sorting and Endogenous Amenities: Evidence from Amsterdam. No. w32304. National Bureau of Economic Research.
19. Duflo, E., Hanna, R., & Ryan, S. (2012). Incentives Work: Getting Teachers to Go to School. *American Economic Review*, 102, 1241-1278.

20. De Groot, O., & Verboven, F. (2019). Subsidies and Time Discounting in New Technology Adoption: Evidence from Solar Photovoltaic Systems. *American Economic Review*, 109, 2137-2172.
21. Corbi, R., & Sanches, F. (2024). Church Tax Exemption and Structure of Religious Markets: A Dynamic Structural Analysis. Working paper.

GRADING

Problem sets (x 2) 40%
Paper presentation 20%
Term paper/research proposal 40%

CONTACT