EMPIRICAL INDUSTRIAL ORGANIZATION

1 module, 2024/2025 academic year

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Course information

Course Website: TBA

Instructor's Office Hours: by appointment

Class Time: TBA

Room Number: TBA

TAs: TBA

Course description

This course covers research methods in applied empirical industrial organization. The primary focus will be on the use of econometric analysis   for descriptive and measurement purposes, and to test the predictions of economic theories. It consists from 14 lectures and 6 seminars.

Course requirements, grading, and attendance policies

Prerequisites: Econometrics 1-2, Micro 1-4, basic knowledge of Stata and Matlab.
Final grade is based on two problem sets (40% of final grade) and written final exam (60% of final grade). Make up will be hold in written form too.

Course contents

The course will cover empirical methods in demand and supply estimation, empirical game theory methods and other recent developments in empirical IO.

Description of course methodology

Every class will be accompanied with lecture notes. Problem sets will consist with empirical exercises (3/4 of questions) and some theoretical questions (1/4 of questions)

Sample tasks for course evaluation

TASK 1

A researcher wants to estimate demand for cars. There are 8 options: 1= Lada Kalina, 2=Renault Logan, 3=Hyundai Solaris, 4=KIA Rio, 5=Toyota Corolla, 6 Volkswagen Golf, 7=BMW (116i model) , 8= public transport.

She(he) assumes that utilities of using option i are as following:

$U(i)_n = \beta_0 + \beta_1 Price_i + \beta_2 Horsepower_i + \beta_3 I(made\ in\ Germany)_i + \beta_4\ I(male)_n + \beta_5 Age_n + e_{in}$; for i=1,..7
$U(8)_n = e_{in}$; for i=8

After running mlogit, she(he) got that $(\beta0,\beta1,\beta2,\beta3,\beta4,\beta5) =(-1,2,1,2,1,0)$. Besides she (he) got that choice probabilities for female of 30 age old are (P1,...,P7)=(0.2,0.1,0.2,0.1,0.05,0.05,0.05)

a) Derive formula for derivative of probability of choosing Hyundai Solaris with respect to price of Kia Rio.
b) Calculate this derivative for female who is 20 years old.
c) Researcher suspect that first 4 options are more closer substitutes among each others, as well as last three options (options 5,6,7)
What do this assumption tell us about structure of error terms? Be precise.
d) Which model one need to use in this case (case of part c)? Check IIA for alternatives 1, 3, and 5.

TASK 2

Researcher analyzes presence of collusion in olygopoly markets.
a) Discuss how one can identify presence of collusion using only static (one-period) data
b) Now you get access to panel data on firm performance as well as on market characteristics etc. Discuss how one can identify collusion using dynamic aspects of collusion behavior.

Course materials

Required textbooks and materials

Key literature:
K.Train Discrete Choice Methods with Simulation
Aviv Nevo, 2011. Empirical Models of Consumer Behavior. *Annual Review of Economics.* 3: 51-75 ;
Ariel Pakes and Steven Berry lecture notes on graduate IO
Lecture slides
Papers

Additional materials

STATA (requred), Matlab

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.

DETAILED PLAN

PART1. Review of econometric methods, hedonic demand and supply models

- Literature: any econometric textbook
For example, J. Stock and M. Watson, Introduction to Econometrics

Lecture 1. Review of econometric methods.

- OLS, IV
- Source of bias: omitted variables, simultaneous regressions, measurement errors etc
- Discrete Choice Models
-OLS, Logit, Probit
- ML

PART 2. Demand Estimation. Behavioral models

Literature:
-K.Train Discrete Choice Methods with Simulation
-Nevo (2010), Empirical models of consumer behavior, Annual Review of Economics, 2011, vol. 3, issue 1, pages 51-75
-S. Berry, J. Levinsohn and A. Pakes, "Automobile Prices in Market Equilibrium," EMA, July 1995, 841-90
-other papers

Lecture 2. Introduction to Behavioral Models

> -Properties of Discrete Choice Models
> - The Choice Set
> - Derivation of Choice Probabilities
> - Specific Models
> - Identification of Choice Models
> - Aggregation
> - Forecasting

Literature:
-K.Train Discrete Choice Methods with Simulation
-Lecture slides

Lecture 3. Logit
> - Choice Probabilities
> - The Scale Parameter
> - Power and Limitations of Logit
> - Representative Utility
> - Consumer Surplus
> - Derivatives and Elasticities
> - Estimation
> -Case Study: Forecasting for a New Transit System

Literature:
-K.Train Discrete Choice Methods with Simulation
-Lecture slides

Lecture 4 GEV

- Nested
- Three-Level Nested Logit
- Overlapping Nests
-Heteroskedastic Logit

Literature:
-K.Train Discrete Choice Methods with Simulation
-Lecture slides

Lecture 5 Mixed Logit

- Choice Probabilities
-Random Coefficients
- Error Components
- Substitution Pattern, Approximation to Any Random Utility Model

Literature:
-K.Train Discrete Choice Methods with Simulation
-Lecture slides

Lecture 6 Probit

- Choice Probabilities, Identification
- Taste Variation
- Substitution Patterns and Failure of IIA
- Panel Data
- Simulation of the Choice Probabilities

Literature:
-K.Train Discrete Choice Methods with Simulation
-Lecture slides

Lectures 7   Differentiated products (BLP)
Literature:
-K.Train Discrete Choice Methods with Simulation
-Nevo (2010), Empirical models of consumer behavior, Annual Review of Economics, 2011, vol. 3, issue 1, pages 51-75
-S. Berry, J. Levinsohn and A. Pakes, "Automobile Prices in Market Equilibrium," EMA, July 1995, 841-90
- Lecture slides

Part 3. SUPPLY ESTIMATION. EXTENTIONS.

Lecture 8. Supply estimation: Competition and Olygopoly
-Ariel Pakes and Steven Berry lecture notes on graduate IO
-I Bresnahan, T. (1989): "Empirical Studies of Industries with Market Power," in HIO
- Lecture slides

Lecture 9. Bertrand and Cournot in Differentiated Products
-Ariel Pakes and Steven Berry lecture notes on graduate IO
- Elisson, "Theories of Cartel Stability and the Joint Executive Committee", Rand Journal of Economics, 1994
Borenstein, S. and A. Shepard (1996) "Dynamic pricing in Retail Gasoline Markets,", Rand Journal of Economics, 27, 429-451
- Lecture slides

Lecture 10 and 11. Forward looking agents/firms

Rust John 1987 "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher" (1987) *Econometrica* **55–5**, 9991033.
Aguirregabiria V., and P. Mira, 2010, "Dynamic discrete choice structural models: A survey", Journal of Econometrics, 156, (2010) 38-67
Hotz, V., and Miller, R. (1993): "Conditional Choice Probabilities and the Estimation of Dynamic Models," The Review of Economic Studies 60, 497531
- Lecture slides

Lecture 11 and 12. Estimation of Discrete Games

Bajari, P., Hong, H., Krainer J. and Nekipelov D., 2011, Game Theory and Econometrics: A Survey of Some Recent Research
Yakovlev, Evgeny Peers and Alcohol: Evidence From Russia., 2012
 - Lecture slides

Lecture 13. Productivity, Cost functions
Christensen, L. and W. Greene (1976) "Economies of Scales in U.S. Electric Power Generation," Journal of Political Economy, 655-676
- Lecture slides

Lecture 14. Tentative: Behavioral Economics in IO   or   Machine learning In Demand Estimation
- Psychology and Economics: Evidence from the Field, Stefano Della Vigna, JEL, 2009
- Lecture slides
- Patrick Bajari , Denis Nekipelov , Stephen P. Ryan, and Miaoyu Yang, 2017, Demand Estimation with Machine Learning and Model Combination

Possible extensions

a. Entry, Exit
S. Berry, and J. Waldfogel, "Free Entry and Social Inefficiency in Radio Broadcasting," *RJE*, 1999, 397-420
Dunne, T., M. Roberts and L. Samuelson (1988) "Patterns of Firm Entry and Exit in U.S. Manufacturing Industries," Rand Journal of Economics, 19, 495-515

b. Choice Frictions: Search Costs and Switching Costs
Search Costs
* A. Hortacsu and C. Syverson, "Product Differentiation, Search Costs and Competition in the Mutual Fund Industry", QJE, 2004, 403-456.
Switching Costs
* B. Handel, "Adverse Selection and Switching Costs in Health Insurance Markets: When Nudging Hurts," UC-Berkeley working paper, 2011.

c. Auctions
K. Hendricks and R. Porter, "An Empirical Perspective on Auctions," *HIO Chapter 32*, Vol. 3, 2007, 2073-2413.