The objective of this course is to deal with some important topics in the empirical analysis of micro data (households, firms, etc.). We will study issues in the specification, estimation and testing of different models with cross-sectional and with panel data. The emphasis of the course is both on the econometric techniques and in the economic applications. Therefore, this course will be useful for those interesting in studying these econometric techniques per se, and for those who see the econometric techniques as necessary tools to develop applied work using micro data.

The examples of applications will be from a wide range of fields: labour economics, health economics, economics of education, Industrial Organization, demand estimation, evaluation of public policies, etc.

Prerequisites: Econometrics I and Econometrics II. Students are expected to know well and review before the course GMM, MLE, and other Extremum Estimators. This includes asymptotic properties of these estimators, testing, and selecting optimal instruments (in a GMM setting).

**Program**

1. Linear Models for Panel Data


Dynamic models. Models with strictly exogenous and predetermined variables. The bias of the within-groups estimator. GMM estimation of dynamic panel data models. Specification tests.

Examples of applications of these methods:
- I.O.: Identification and Estimation of Production Functions (e.g. Productivity in the telecommunications equipment industry). Olley and Pakes (1996); Ackerberg, Caves and Fraser (2006); and its comparison with Arellano and Bover (1995) and Blundell and Bond (1998, 2000).

**2. Discrete Choice Models**


Binary choice models for panel data. Fixed-T solutions: static and dynamic models, random effects and fixed effects approaches to account for unobserved heterogeneity, identification problems and set identified parameters of interest. General solutions to fixed effects estimation (T is not fixed). Limitations of the linear index specification.

Structural dynamic discrete choice models and dynamic discrete games: Models, Estimation Methods, and Examples such as studying retirement decisions, occupational choices and career decisions, school drop-outs, patents renewal, estimation of demand and supply curves, effect of number of firms on the entry decision of a new firm, Auctions .

Examples of applied papers using these methods:

**3. Sample Selection Models**


4. Policy Evaluation


Examples of applied papers using these methods:


5. Quantile Regression

Medians and quantiles. LAD. Quantile regression. Asymptotic results. Endogenous quantiles and Quantile Treatment Effects.


6. Duration models


7. Introduction to Bayesian and Quasi-Bayesian Methods (if time permits)

Cameron and Trivedi (2005), Chapters 12-13
General Textbooks

Wooldridge or Cameron and Trivedi cover many of the topics, but no textbook covers all aspects. Arellano covers in depth the first chapter, but does not cover any other chapter. Further indications of chapters of these textbooks for each topic will be given in class.


An additional Textbook, not specific to microeconometrics, with a GMM-centered approach that you can use to review the Econometrics you should know as prerequisite for this course is: Hayashi, F. *Econometrics*. Princeton University Press, 2000.

References and Further Readings by topic

1.- Linear Models for Panel Data

Books and chapters in books


Papers

The Dynamics of Productivity in the Telecommunications Equipment Industry

Structural Identification of Production Functions
Ackerberg, D., K. Caves and G. Fraser (2006), mimeo, UCLA

Another Look at the Instrumental Variable Estimation of Error-Components Models

Initial conditions and moment restrictions in dynamic panel data models
Richard Blundell, Stephen Bond
*Journal of Econometrics*, 87 (1998), 115-143

GMM Estimation with Persistent Panel Data: An Application to Production Functions
Richard Blundell, Stephen Bond
Estimates of the Economic Return to Schooling from a New Sample of Twins
Orley Ashenfelter; Alan Krueger

Can Pay Regulation Kill? Panel Data Evidence on the Effect of Labor Markets on Hospital Performance
C. Propper and J. van Reenen (2010)

Pooling Cross Section and Time Series Data in the Estimation of a Dynamic Model: The Demand for Natural Gas
Pietro Balestra; Marc Nerlove

Specification Tests in Econometrics
J. A. Hausman

Estimation of Dynamic Models with Error Components
T. W. Anderson; Cheng Hsiao

Multivariate regression models for panel data
Gary Chamberlain

Formulation and estimation of dynamic models using panel data
T. W. Anderson, Cheng Hsiao

The Sensitivity of Consumption to Transitory Income: Estimates from Panel Data on Households
Robert E. Hall; Frederic S. Mishkin

Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations
Manuel Arellano; Stephen Bond

An Empirical Analysis of Cigarette Addiction
Gary S. Becker; Michael Grossman; Kevin M. Murphy

Efficient estimation of models for dynamic panel data
Seung C. Ahn and Peter Schmidt
2.- Discrete Choice Models

Books


Chapters in Books


Papers

A conditional probit model for qualitative choice: Discrete decisions recognizing interdependence and heterogeneous preferences
Hausman, J. and D. Wise

Analysis of Covariance with Qualitative Data
Chamberlain, G.
Specification tests for the multinomial logit model
Hausman, J. and D. McFadden

A Method for Minimizing the Impact of Distributional Assumptions in Econometric Models for Duration Data
Heckman, J.J., and B. Singer

Semiparametric Analysis of Random Effects Linear Models from Binary Panel Data
Manski, C.F.

Discrete Choices with Panel Data
Manuel Arellano
_Investigaciones Economicas_ 27 (2003), 423-458.

Panel Data Discrete Choice Models with Lagged Dependent Variables
Honore, B.E., and E. Kyriazidou

Binary choice panel data models with predetermined variables
Manuel Arellano and Raquel Carrasco

Jackknife and Analytical Bias Reduction for Nonlinear Panel Models
Jinyong Hahn and Whitney K. Newey.

Estimating dynamic panel data discrete choice models with fixed effects
Jesús M. Carro

Nonlinear Panel Data Analysis
M. Arellano and S. Bonhomme

Dynamic discrete choice structural models: A survey
Víctor Aguirregabiria and Pedro Mira

The Career Decisions of Young Men
Michael P. Keane; Kenneth I. Wolpin

Markov-Perfect Industry Dynamics: A Framework for Empirical Work
Richard Ericson and Ariel Pakes
Why Youths Drop out of High School: The Impact of Preferences, Opportunities, and Abilities

State dependence, serial correlation and heterogeneity in intertemporal labor force participation of married women
D. R. Hyslop (1999)
*Econometrica*, 67: 1255-1294

Estimating The Effects Of A Time-Limited Earnings Subsidy For Welfare-Leavers
D. Card and D. Hyslop (2005)

State dependence and heterogeneity in health using a bias corrected fixed effects estimator.

Estimating the Consumer Surplus and Welfare Gains from the Introduction of Minivans
Amil Petrin (2002)

Patents as Options: Some Estimates of the Value of Holding European Patent Stocks
Ariel Pakes (1986)

3.- Sample Selection Models

**Papers**

Estimation of Relationships for Limited Dependent Variables
James Tobin

Social Experimentation, Truncated Distributions, and Efficient Estimation
Jerry A. Hausman; David A. Wise

Sample Selection Bias as a Specification Error
James J. Heckman

Symmetrically Trimmed Least Squares Estimation for Tobit Models
James L. Powell

The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions
Thomas A. Mroz
Estimating Models with Sample Selection Bias: A Survey
Francis Vella

**4.- Policy Evaluation**

**Books**


**Papers**

**Empirical Strategies in Labor Economics**

**Estimating causal effects of treatments in randomized and nonrandomized studies**
*Journal of Educational Psychology*, 66:688--701.

**The Central Role of the Propensity Score in Observational Studies for Causal Effects**
Paul R. Rosenbaum; Donald B. Rubin

**Evaluating the Econometric Evaluations of Training Programs with Experimental Data**
Robert J. LaLonde

**Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records**
Angrist, J.D. (1990)

**Identification and Estimation of Local Average Treatment Effects**
Guido W. Imbens; Joshua D. Angrist

**Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania**
David Card; Alan B. Krueger

**Identification of Causal Effects Using Instrumental Variables**
Angrist, J.D., Imbens, G. W., and D.B. Rubin (1996)

**The Effect of Sample Selection and Initial Conditions in Duration Models: Evidence from**
Experimental Data on Training
John C. Ham; Robert J. Lalonde

Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme
James J. Heckman; Hidehiko Ichimura; Petra E. Todd

Matching as an Econometric Evaluation Estimator
James J. Heckman; Hidehiko Ichimura; Petra Todd

The interpretation of instrumental variables estimators in simultaneous equations models with an application to the demand for fish
Joshua D Angrist; Kathryn Graddy; Guido W Imbens

Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design
Hahn, J, Todd, P., & W. Van der Klaauw (2001)

The Role of Randomized Field Trials in Social Science Research: A Perspective from Evaluations of Reforms of Social Welfare Programs
Cemmap Working Paper cwp23/02, The Institute for Fiscal Studies, UCL.

Large Sample Properties of Matching Estimators for Average Treatment Effects
Abadie, A. and G. Imbens

Nonparametric Estimation of Average Treatment Effects under Exogeneity: A Review
Guido W. Imbens

How Much Should We Trust Difference-in-Difference Estimates?

Structural Equations, Treatment Effects, and Econometric Policy Evaluation

Estimating The Effects Of A Time-Limited Earnings Subsidy For Welfare-Leavers
D. Card and D. Hyslop (2005)

Preschool Television Viewing and Adolescent Test Scores: Historical Evidence from the Coleman Study
Dynamic Treatment Effect Analysis of TV Effects on Child Cognitive Development
Fali Huanga and Myoung-Jae Lee (2010)
Journal of Applied Econometrics, 25: 392-419

The Elite Illusion: Achievement Effects At Boston And New York Exam Schools
Econometrica, 82, 137-196.

5. Quantile Regression

Books and chapters in books


Papers

Quantile regression.
R. Koenker, and K. F. Hallock (2001)

Changes in the U.S. wage structure 1963-1987: Application of quantile regression
Moshe Buchinsky (1994)

Least absolute deviations estimation for the censored regression model
James L. Powell (1984)
Journal of Econometrics, 25(3):303.325

Instrumental Quantile Regression Inference for Structural and Treatment Effect Models
V. Chernozhukov and C. Hansen (2006)
Journal of Econometrics, 132, 491-525.

Regression Quantiles
Koenker, R. and G. Basset (1978)
Econometrica, 46, 33-50.

Quantile Regression Under Misspecification, With An Application To The U.S. Wage Structure

Counterfactual Decomposition of Changes in Wage Distributions Using Quantile Regression
6.- Duration Models

Books and chapters in books


Papers

**Econometric Models for the Duration of Unemployment**
T. Lancaster

**Unemployment Duration, Benefit Duration, and the Business Cycle**
O. Bover, M. Arellano, and S. Bentolila

**Unemployment Insurance and Unemployment Spells”**
B. Meyer
*Econometrica*, 58 (1990), 757-782.