Advanced Econometrics: Panel Data

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Objectives

The aim of the course is to give a broad overview of empirical models used to analyse panel data, with a focus on microeconomics applications, explaining the agents' economic decisions or outcomes. The main econometric models and methods for panel data will be discussed, and the students will do hands on exercises learning how to apply the techniques in empirical applications such as, possibly, their own research.

Content

Economic agents often make similar decisions repeatedly over time, taking account of changes in prices and other factors driving preferences, opportunities, or expected outcomes. Examples are consumption expenditures, savings and portfolio choice, or investment decisions in housing of private households; labour force participation and labour supply decisions, decisions on smoking, drinking and other kinds of health related behaviour of individuals, etc. Similarly, firms have to decide on hiring and firing, investing in human capital (by training their workers) or physical capital and in research and development, etc.

To analyze how economic agents make these decisions and the consequences of these decisions, empirical researchers make more and more use of panel data techniques. Panel data are data in which decisions of many economic agents are observed several times, usually at different points in time. For example, many socio-economic household surveys have data on wealth and household assets for a number of consecutive years, allowing for an analysis of the determinants of decisions to buy life insurances or other specific retirement plans, stocks and bonds, etc. Panel data techniques are also useful for the analysis of economic experiments where the same subjects make a number of consecutive decisions in the same experiment.

This course presents theory and applications of panel data models, focusing on models that explain decision making by individuals, households, or firms. Students will learn the main econometric models and techniques for estimation, testing and model selection. They will study articles that apply these models and techniques to a variety of micro-economic issues. In addition, they will learn how to apply these models and techniques themselves by doing exercises and assignments using STATA.

Applications will come from labour economics, economics of consumer behaviour, development economics, environmental economics, and health economics.

Recommended Reading

- M. Verbeek, A Guide to Modern Econometrics (4th edition), Wiley, Chichester, (2012). Particularly Chapter 10 and parts of the earlier chapters
- A.C. Cameron and P.K. Trivedi (2005), Microeconometrics: Methods and Applications, Cambridge University press, New York. Particularly Chapter 23.
- A selection of applied articles (see the provisional list at the end).

More Advanced Reading for Interested Students:

- B. Baltagi, Econometric Analysis of Panel Data (5th edition), Wiley, Chichester, (2013).
- J.W. Wooldridge, Econometric Analysis of Cross Section and Panel Data (2nd edition), MIT Press, Cambridge MA, (2010).
- M. Arellano and B. Honoré (2001), Panel data models: some recent developments, in J. Heckman and E. Leamer (eds.), Handbook of Econometrics Volume 5, North-Holland, Amsterdam, pp. 3229-3296.

Required Prerequisites

A solid introductory course in econometrics; preferably some basic knowledge of Stata

Schedule

There will be a short welcome meeting at 19:00 on Sunday 19th, followed by dinner.

The daily schedule for Monday – Thursday will be:

7:00 - 9:00	Breakfast
9:00 - 10:30	First session
10:30 - 11:00	Coffee break
11:00 - 12:30	Second session
12:30 - 14:00	Lunch break

14:00 - 15:30 Third session
15:30 - 16:00 Coffee break
16:00 - 17:30 Fourth session
17:30 - 19:00 Free time
19:00 Dinner

The schedule for Friday will be the same except that we stop at 16:00 so that there is enough time to travel back home.

Overview

The morning sessions will be devoted to the econometric models and techniques, with some applications to illustrate these. In the afternoon sessions, students will use Stata to do their own empirical analysis using case studies.

Note: Participants are expected to bring their own laptop with Stata installed. If this is not possible, unfortunately, you are not able to take part in the course.

Day 1: Static linear panel data models with random effects or fixed effects; GLS, WG and FE-IV estimation; Hausman test

Day 2: Dynamic linear panel data models; GMM and the Arellano-Bond and Blundell-Bond estimators

Day 3: Static and dynamic binary choice models with random and fixed effects; ML and Conditional ML estimation

Day 4: Censored regression models; ML estimation for random effects models and Honoré's estimators for fixed effects models

Day 5: Discrete choice models for panel data (Multinomial choice, ordered choice, count data); ML and Conditional ML estimation

Provisional list of applications in journal articles

Day 1:

Khandker, S.R. (2005), Microfinance and poverty: evidence using panel data from Bangladesh, *World Bank Economic Review*, 19, 263-286.

Khanna, J., J. Posnett and T. Sandler (1995), Charity donations in the UK: New evidence based on panel data, *Journal of Public Economics,* 56, 256-272.

Powdthavee, N. (2010), How much does money really matter? Estimating the causal effects of income on happiness. *Empirical Economics, 39, 77-92.*

Muto, M. and T. Yamano (2009), The impact of mobile phone coverage expansion on market participation: panel data evidence from Uganda, *World Development*, 37, 1887-1896.

Day 2:

Arellano, M. and S. Bond (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies*, 58, 277-297.

Blundell, R. and S. Bond (1998), Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics*, 87(1), 115-143.

Witt, R., A. Clarke and N. Fielding (1999), Crime and economic activity: a panel data approach, *British Journal of Criminology*, 39(3), 391-400.

Day 3:

Gibbons, R., D. Hedeker, S. Charles and P. Frisch (1994), A random effects probit model for predicting medical malpractice claims, *Journal of the American Statistical Association,* 89(427), 760-767.

Banfi, S., M. Farsi, M. Filippini and M. Jakob (2008), Willingness to pay for energy-saving measures in residential buildings, *Energy Economics*, 30, 503-516.

Heitmueller, A. (2007), The chicken or the egg? Endogeneity in labour market participation of informal carers in England, *Journal of Health Economics,* 26, 536-559.

Arulampalam, W. and S. Bhalotra (2006), Sibling death clustering in India: state dependence *versus* unobserved heterogeneity, *Journal of the Royal Statistical Society*, 169, 828-849.

Poggi, A. (2007), Does persistence of social exclusion exist in Spain? *Journal of Economic Inequality*, 5, 53-72.

Day 4:

Vella, F. and M. Verbeek (2001), Two-step estimation of panel data models with censored endogenous variables and selection bias, *Journal of Econometrics,* 90, 239-263.

Grzybowski, L and P. Pereira (2008), The complementarity between calls and messages in mobile telephony, *Information Economics and Policy*, 3(9), 279-287.

Kang, S.J. and M.-J. Lee (2003), Analysis of private transfers with panel fixed-effect censored model estimator, *Economics Letters*, 80, 233-237.

Rettenmaier, A.J. and Z. Wang (2006), Persistence in Medicare reimbursements and personal medical accounts, *Journal of Health Economics,* 25, 39-57.

Day 5:

Groot, W. and H. Maassen-van den Brink (2003), Firm-related training tracks: A random effects ordered probit model, *Economics of Education Review,* 22, 581-589.

Revelt, D. and K. Train (1998), Mixed logit with repeated choices: household choices of appliance efficiency level, *Review of Economics and Statistics*, 80, 647-657.

Hausman, J., B.H. Hall and Z. Griliches (1984), Econometric models for count data with an application to the patents-R&D relationship, *Econometrica,* 52, 909-938.

Lee, K.J. and S. Kobayashi (2001), Proportional treatment effects for count response panel data: effects of binary exercise on health care demand, *Health Economics*, 10, 411-428.