Econometric Methods II: Microeconometrics

Daniel Kemptner

July 16, 2014

1 Course organization

- Lectures take place Fridays, 9 to 12:30, and there will be an exercise (time is to be announced)

- There will be 7 lectures and exercises (4+2)

- First session: begins after part I

- Grading: 2 assignments (20%) and a final exam (80%)

2 Course objectives

- Covers statistical methods relevant for the analysis of economic data

- Focus on methods for cross section and panel data

- The aim is to equip students with skills allowing them to carry out independent empirical research

- Exercises will include the use of software packages (Stata and either R or Matlab)

3 Main textbooks

- Greene, William H. (2012), Econometric Analysis, 7th edition, Prentice Hall.

- Train, Kenneth E. (2009), Discrete Choice Methods with Simulation, Cambridge University Press.

4 Contents

4.1 Simultaneous equations models

- Illustrative examples: market equilibrium model, macro model

- General framework, exogenous & endogenous variables, identification problem

- Estimation strategies: single equation estimation and system methods

- Reading list: Greene (2012), ch. 10.6; Rust (2013)

4.2 Linear panel data models

- Pooled model, fixed & random effects model, Hausman test, Mundlak's approach

- Lagged dependent variables: Anderson & Hsiao's IV estimator, GMM estimators

- Parameter heterogeneity: random coefficients model

- Reading list: Greene (2012), ch. 11; Bond (2002)

4.3   Static discrete choice models

- Binary choices:

  1. Cross section data: random utility model, functional form assumptions, estimation & inference
  2. Panel data: pooled model, random effects model, incidental parameter problem & conditional fixed effects model, lagged dependent variables

- Unordered multiple choices: IIA assumption & (nested) logit model, probit model, mixed logit model

- Ordered multiple choices: ordered logit & probit models, extensions for panel data

- Reading list: Greene (2012), ch. 17 & 18; Train (2009), ch. 1-5; McFadden (2001)

4.4   Limited dependent variables

- Censored data: censored regression model (Tobit model), two-part models, extensions for panel data

- Truncated data: truncated distributions, truncated regression model

- Incidental truncation & sample selection:

  1. Selection models: two-step & maximum likelihood estimation, non-linear models, panel data
  2. Treatment effects: regression analysis, propensity score matching, regression discontinuity design

- Reading list: Greene (2012), ch. 19; Heckman (2001); Imbens and Wooldridge (2009)

4.5   Event counts and duration

- Count data models:

  1. Poisson model, test for overdispersion, negative binomial model, extensions for panel data
  2. Two-part models: zero inflation & hurdle model

- Duration models: parametric estimation, heterogeneity, non- and semi-parametric approaches

- Reading list: Greene (2012), ch. 18.4 & 19.4; Kiefer (1988)

4.6   Simulation-assisted estimation

- Drawing from densities: pseudo-random & serially correlated draws, Choleski transformation

- Bootstrapping standard errors & confidence intervals

- When do we need simulation-assisted estimation? Example: mixed logit model

- Estimation techniques: method of maximum simulated likelihood & method of simulated moments

- Reading list: Greene (2012), ch. 15; Train (2009), ch. 9 & 10; van Soest (1995)

4.7   Dynamic discrete choice models

- General: dynamic vs. static models, dynamic optimization & Bellman's principle of optimality

- Dynamic programming discrete choice models: finite & infinite horizon, curse of dimensionality

- Example I: educational choices

  1. two periods, no uncertainty
  2. multiple periods, no uncertainty
  3. multiple periods & uncertainty

- Example II: optimal stopping

- Reading list: Adda and Cooper (2003), ch. 1 & 2; Train (2009), ch. 7.7; Rust (1987)

5 References

- Adda, J. and R. Cooper (2003), "Dynamic Economics: Quantitative Methods and Applications", The MIT Press.

- Bond, S. (2002), "Dynamic Panel Data Models: A Guide To Micro Data Methods And Practice", cemmap working paper CWP09/02.

- Greene, W. (2012), "Econometric Analysis", 7th edition, Prentice Hall.

- Heckman, J. (2001), "Micro Data, Heterogeneity, and the Evaluation of Public Policy: Nobel Lecture", *Journal of Political Economy*, 109 (4), pp. 673-748.

- Imbens, G. and J. Wooldridge (2009), "Recent Developments in the Econometrics of Program Evaluation", *Journal of Economic Literature*, 47 (1), pp. 5-86.

- Kiefer, N. (1988), "Economic Duration Data and Hazard Functions", *Journal of Economic Literature*, 26 (2), pp. 646-679.

- McFadden D. (2001), "Economic Choices", *The American Economic Review*, 91 (3), pp. 351-378.

- Rust, J. (1987), "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher", *Econometrica*, 55 (5), pp. 999-1033.

- Rust, J. (2013), "The Limits of Inference with Theory: A Review of Wolpin (2013)", discussion paper.

- Train, Kenneth E. (2009), "Discrete Choice Methods with Simulation", Cambridge University Press.

- van Soest, A. (1995), "Structural Models of Family Labor Supply: A Discrete Choice Approach", *The Journal of Human Resources*, 30 (1), pp. 63-88.