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SYLLABUS

Panel Data Methods Using Stata

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GOAL

This course presents econometrics methods used in analysis of panel data, with applications using the statistical package Stata. The course covers the major established methods for both short panels ($N \rightarrow \infty$) and long panels ($T \rightarrow \infty$), as well as more recently–developed methods for nonstationary long panels and correlation across individuals. In addition to the lectures computational exercises using Stata will be provided.

ORGANIZATION

9.00 - 10.30: First lecture
10.30 - 11.00: Break
11.00 - 12.00: Second lecture
12.00 - 13.30: Lunch
13.30 - 15.30: Third lecture

COURSE OUTLINE

Day 1: Short Panels: Basics
Data summary methods for panel data; pooled estimator; fixed effects estimator; random effects estimator; first difference estimator; Hausman test; clustered errors.; panel bootstrap.
Stata commands: xtset, xtdescribe, xtsum, xtdata, xtline, xttab, xttrans, reshape, xtreg, xtgee, xtgls, xtpcse, xtmixed, xtrc and add-on xtoverid

Day 2: Short Panels: Extensions
GMM estimator; clustered standard errors; instrumental variables estimator; Hausman-Taylor estimator; Arellano-Bond and Arellano-Bover estimator in dynamic models; short panel VAR.
Stata commands: xtivreg, xthtaylor, xtabond, xtdpd, xtdpdsys, and add-ons pvar, helm, sgmm

Day 3: Long Panels: Stationary Panels and begin Nonstationary Panels
Stationary panels; pooled estimators; heterogeneous panels; mean grouped estimator; common correlated effects estimator.
Stata commands: xtgee, xtgls, xtregar, and add-ons xtscc, xtmg

Day 4: Long Panels: Nonstationary panels
Nonstationary panels; unit root tests; cointegration; cross-country correlation.
Stata command: xtunitroot and add-ons xtdolshm, ltimbimata

Day 5: Further Topics
Cross-section correlation; nonlinear panel models.
Stata commands: xtgee, xtlogit, xtprobit, xtpoisson, xttobit and add-on xtpqml

COURSE MATERIAL

Stata programs, data sets and exercises will be posted at the course website
http://cameron.econ.ucdavis.edu/korea2013/

STATA

I assume you have access to Stata and ideally can run Stata during the lectures.

My programs are for Stata 12 but should also run in Stata 13, 11, and mostly in Stata 10.

The main panel changes in Stata 13 are that command `xtmixed` is now command `mixed`, and that several more panel commands (and `mixed`) will now give cluster-robust standard errors.

You need several Stata user-written add-ins.

These include xtoverid, pvar, helm, sgmm, xtscc, xtmg, xtdolshm, ltimbimata, xtpqml

REFERENCES - The listed journal articles are not required for this course

- For panel methods using Stata

  - A.C. Cameron and P.K. Trivedi (2009, 2010), *Microeconometrics using Stata*, Stata Press.
    Chapters 8-10 cover panel data. Either the first edition or the revised edition will do.

- For panel methods theory one of the following panel texts should do.

  - B.H. Baltagi (2008), *Econometric Analysis of Panel Data*, 4th edition, Wiley.
    Earlier editions will also do, except the latest edition will be more up to date on the final chapter on nonstationary panels. The course covers material in many of the chapters of this book.
  - A.C. Cameron and P.K. Trivedi (2005), *Microeconometrics: Methods and Applications*, Cambridge University Press.
    Chapters 21-22 cover linear panel models and chapter 23 nonlinear panel models. There is only a small amount on long panels.
  - J.M. Wooldridge (2004, 2012), *Econometric Analysis of Cross Section and Panel Data*, MIT Press.
    Chapters 10-11 cover linear models and selected parts of chapters 15-19 cover nonlinear models. Only short panels are covered.

- 1. Short Panels: Basics

  - Covered in many textbooks.

- 2. Short Panels: Extensions

  - Most material is in Cameron and Trivedi (2009, 2010).
  - For short panel single-equation with fixed effects and lagged dependent variables
    * 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, 277-298.
    * Roodman, David (2006): "How to Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata"
  - For short panel VAR with fixed effects
    * Holtz-Eakin, D., W. Newey, and H.S. Rosen (1988), "Estimating Vector Autoregressions with Panel Data," Econometrica, 56, 1371-1395.
    * Love, I. and Ziccino, L. (2006), "Financial Development and Dynamic Investment Behaviour: Evidence from Panel VAR," Quarterly Review of Economics and Finance, 46, 190-210.

- 3. Long Panels: Basics

  - Interactive Fixed Effects

    * Bai, J. (2009), "Panel data models with interactive fixed effects," Econometrica, 1229–1279.

  - Heterogeneous Panels (mean grouped estimator, common correlated effects estimator)

    * Pesaran, M.H. (2006), "Estimation and inference in large heterogeneous panels with a multifactor error structure," Econometrica, 74, 967–1012.
    * Eberhardt, M. (2012), "Estimating Panel Time Series Models with Heterogeneous Slopes," Stata Journal, 12, 61-71.
    * Eberhardt, M., C. Helmers, and H. Strauss (2013), "Do Spillovers Matter When Estimating Private Returns to R&D?," Review of Economics and Statistics, 95, 436-448.

- 4. Long Panels: Unit Roots and Cointegration

  - Panel Unit Roots and Cointegration Surveys

    * Banerjee, A. (1999), "Panel Data Unit Roots and Cointegration: An Overview," *Oxford Bulletin of Statistics*, 607-629. Very nice exposition of the literature to 1999.

    * Breitung, J., and M.H. Pesaran (2008), "Unit Roots and Cointegration in Panels," in L. Matyas and P. Sevestre (Eds.), *The Econometrics of Panel Data*, 279–322. Kluwer Academic Publishers. More recent and concerned about cross-section correlation.
    * Smith R.P., and A-M. Fuertes (2010), "Panel Time-Series." Lengthy survey used for a course taught at cemmap. http://www.ems.bbk.ac.uk/faculty/smith/RSpanel.pdf
    * Baltagi, B. (2008), Econometric Analysis of Panel Data, fourth edition, chapter 12.
    * Kirchgässner. G. (2013), Introduction to Modern Time Series Analysis, chapter 7, Springer.
    * Stata Manual [XT] Longitudinal Data / Panel Data entry xtunitroot / Method and Formulas summarizes several panel unit root tests.
    * Eviews 8 Users Guide II Chapter 16 summarizes several panel unit root tests and also covers panel cointegration tests and estimation.

  - Unit Root Tests without Cross-sectional Dependence

    * Im, K.S., M.H. Pesaran, and Y. Shin (2003), "Testing for Unit Roots in Heterogenous Panels," Journal of Econometrics, 115, 53–74.
    * Levin, A., and C. Lin, and C.J. Chu (1993), "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties, Journal of Econometrics," UCSD Economics Discussion Paper 92-23.
    * Levin, A., C. Lin, and C.J. Chu (2002), "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties, Journal of Econometrics," 108, 1–24.

  - Unit Root Tests without Cross-sectional Dependence

    * Breitung, J. and S. Das (2005), "Panel Unit Root Tests Under Cross Sectional Dependence," Statistica Neerlandica, 59, 414–433.
    * Pesaran, M.H. (2007), "A Simple Panel Unit Root Test in the Presence of Cross Section Dependence," Journal of Applied Econometrics, 22, 265–312.

  - Panel Cointegration Tests

    * McCoskey, S. and C. Kao (1998), "A residual-based test of the null of cointegration in panel data," Econometric Reviews, 17, 57-84.
    * Pedroni, P. (2004), "Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis," Econometric Theory, 20, 597-265.
    * Westerlund, J. (2007), "Testing for Error Correction in Panel Data," Oxford Bulletin of Economics and Statistics, 69, 709-748.
    * Westerlund, J. and D. Persyn (2008), "Error Correction Based Cointegration Tests for Panel Data," Stata Journal, 8, 232-241.

  - Panel Cointegration Estimation

    * Kao, C.-H., M.-H, Chiang, and B. Chen (2002), "International R&D Spillovers: An Application of Estimation and Inference in Panel Cointegration," Oxford Bulletin of Economics and Statistics, 61, 691-709.
    * Kao, C., and M.-H. Chiang (2001), "On the Estimation and Inference of a Cointegrated Regression in Panel Data," Advances in Econometrics, 15, 179-222.
    * Phillips, P.C.B. and H. Moon (1999), "Linear Regression Limit Theory for Nonstationary Panel Data," Econometrica, 67, 1057-1111.

  - Cross-Sectional Dependence in Panels with Cointegration

    * Bai, J. (2009), "Panel data models with interactive fixed effects," Econometrica, 1229–1279. http://onlinelibrary.wiley.com/doi/10.3982/ECTA6135/pdf
    * Eberhardt, M., C. Helmers and H. Strauss (2012), "Do Spillovers Matter When Estimating Private Returns to R&D?," *Review of Economics and Statistics*, forthcoming. Applies CCE and MG estimators.
      http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1966020
    * Marcus Eberhardt's website https://sites.google.com/site/medevecon/home This has many useful links to papers, data and Stata code, including Stata add-ons, for both cross-sectional dependence and unit roots.
    * Pedroni, P. (2001), "Fully modified OLS for heterogeneous cointegrated panels," Advances in Econometrics, 15, 93-130.
    * Bai, J. and S. Ng (2004), "A PANIC Attack on Unit Roots and Cointegration," Econometrica, 72, 1127-1177.

- 5. Nonlinear Panels

  - Most material is in Cameron and Trivedi (2009, 2010).

    * Fixed effects with incidental parameters problem
      · Fernández-Val, I. (2009), "Fixed effects estimation of structural parameters and marginal effects in panel probit models," Journal of Econometrics, 71-85.