EKT 814: PANEL DATA ECONOMETRICS
DEPARTMENT OF ECONOMICS
UNIVERSITY OF PRETORIA
2017

1. GENERAL INFORMATION

This is a post-graduate course in econometrics which draws on the knowledge acquired in previous time series and cross section econometrics courses that you have done. It also requires a fairly good knowledge of matrix algebra.

Lecture time and venue: Friday 09:00 - 12:00, Tukkiewerf 1-27 (computer lab).

2. INSTRUCTOR

Prof. Reneé van Eyden, Tukkiewerf 1-11, 012 420 3456, renee.vaneyden@up.ac.za.
Consultation by appointment.

3. DESCRIPTION OF THE COURSE

In this course "panel data" refers to the pooling of observations on a cross-section of countries, households, firms, individuals, etc. over a number of time periods. Panel data often allows for more informative results, more variability, more degrees of freedom and more efficiency. The course covers techniques applicable to both stationary and non-stationary panel data sets, as well as static and dynamic model specifications.

We begin the discussion with the static linear model in a panel data setting. We start with the fixed effects (FE) model and pay attention to the least squares dummy variable (LSDV) estimator and the within transformation (within estimator). As an alternative way to eliminate the individual effects, we look at the first-difference (FD) estimator and the difference-in-difference estimator. We distinguish between one-way and two-way error component models. Relevant hypothesis testing include testing for the validity of fixed effects, i.e. pooling of slope and intercept coefficients vs. only pooling the slopes (Baltagi, Chapters 1, 2).

We continue the discussion by assuming a case where individual effects can be considered random factors, independently and identically distributed over cross-sections, i.e. the random effects (RE or EGLS) estimator (Baltagi, Chapters 2,3). We also discuss making a choice between FE and RE. Relevant hypothesis testing includes testing the validity of random effects and the Hausman specification (endogeneity) test (Baltagi, Chapter 4). We also consider tests for heteroscedasticity and serial correlation in panel data models; testing for it and the correction thereof (Baltagi, Chapter 5).

The next topic is simultaneous equations with error components: we consider endogeneity of regressors; Instrumental variable (IV) estimation (Within 2SLS, Between 2SLS, Error component 2SLS, Generalized 2SLS); Endogeneity occurring through the unobserved individual effects; and Hausman and Taylor estimator (Baltagi, Chapter 7 and Wooldridge, Chapters 4, 5, 8, 9).

The above is followed by dynamic panel data models (Baltagi, Chapter 8). We cover dynamic relationships and sources of persistence; Nickell (1981) bias and corrections; Arellano and Bond (1991) DIF-GMM estimator; Arellano and Bover (1995) estimator; Blundell and Bond (1998) SYS-GMM estimator; and Keane and Runkle (1992) estimator.

We next revisit panel heterogeneity, also paying attention to cross-sectional dependence (Lecture Notes). We consider models that extend heterogeneity in intercept coefficients to

heterogeneity in slope coefficients: Mean Group (MG) estimator of Pesaran and Smith (1995); Pooled Mean. Group (PMG) estimator of Pesaran, Shin & Smith (1997, 1999); Swamy's (1970) Random Coefficients (RC) estimator; Zellner's (1962) Seemingly Unrelated Regression (SUR) estimator. We also consider cross-section (between group) dependence: SUR and Pesaran's (2006) Common Correlated Effects (CCE) estimator.

We conclude the course with a discussion on non-stationarity in panels (Baltagi, Chapter 12), focussing on panel unit root tests assuming cross-section independence and panel unit root tests assuming cross-sectional dependence. We also discuss the concept of spurious regressions in panel data and panel cointegration tests. We conclude this section with a discussion on estimation and inference in panel cointegration models.

4. ASSESSMENT

Assessment is done via weekly assignments, a closed-book test on 1 September, and the final exam.

Final mark calculation:

Semester mark: (50%)

1. Practical assignments.
2. Semester test, 1 September.

Exam: (50%)

Exam during November, date to be announced.

5. SOFTWARE

The software of choice is STATA, with selected parallel referencing to EViews capabilities.

6. OVERVIEW OF THE COURSE

You will receive lecture notes, article references, weekly assignments, programs, data, memoranda etc. via email. Please make sure that I have your correct and preferred email address.

Topics:

Stationary Panel Data

1. Introduction
2. One-way error component models
3. Two-way error component models
4. Hypothesis testing
5. Heteroscedasticity and serial correlation

IV and Dynamic Panel Data

1. Instrumental variables
2. Dynamic Panel Data models

Panel Heterogeneity revisited, Cross-sectional Dependence

1. Heterogeneity in slope coefficients
2. Cross-sectional dependence

Non-Stationary Panel Data

1. Overview of the issues
2. Unit root tests
3. Estimation with non-stationary time series
4. Cointegration tests

7. REFERENCES:

1. Arellano, Manuel. *Panel Data Econometrics*. Oxford: Oxford University Press, 2003.
2. Baltagi, Badi, H. *Econometric Analysis of Panel Data*. 4th Edition. Chichester: John Wiley and Sons, 2008.
3. Hsiao, Cheng. *Analysis of Panel Data*. Cambridge: Cambridge University Press, 2003.
4. Wooldridge, Jeffrey, M. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press, 2002.
5. Wooldridge, Jeffrey, M. *Introductory Econometrics. A Modern Approach.* 2nd Edition. Thomson Learning, 2009.
6. Selected journal articles (*Refer to references in Course material).*
7. Lecture notes.

The Baltagi and Wooldridge texts will be our principal references. Each unit in the lecture notes contains references to applied work in academic journals. A reading list also accompanies each practical assignment.

8. LECTURE DATES

Venue: Tukkiewerf 1-37

	DATE	**SCOPE AND PRINCIPAL TEXT BOOK SOURCE**
1	21 July	*Introduction, One-way error component models (Baltagi, Ch 1,2)*
2	28 July	*One-way error component models; two-way error component models (Baltagi, Ch 2,3)*
3	4 August	*Two-way error component models (Baltagi, Ch 3)*
4	11 August	*Lab Practical*
5	18 August	*Two-way error component models; Hypothesis testing (Baltagi, Ch 3,4)*
6	25 August	*Heteroscedasticity and serial correlation (Baltagi, Ch 5)*
7	1 September	***Class test (Baltagi, Ch 1-5)***
8	8 September	*Instrumental variables (Baltagi, Ch 7, Wooldridge, Ch 4, 5, 8, 9)*
9	15 September	*Dynamic panel techniques (Baltagi, Ch 8)*
10	22 September	*DIF-GMM, SYS-GMM*
11	29 September	*Panel heterogeneity revisited; Cross-sectional dependence*
	6 October	*Recess*
12	13 October	*Panel Time series: Panel unit roots (Baltagi, Ch 12)*
13	20 October	*Panel cointegration (Baltagi, Ch 12)*