

CIDE Summer School in Econometrics
Bertinoro (Forlì), Italy
Panel Data Analysis
Professor Badi H. Baltagi
June 9-13, 2008

Course Program

Required Text:

1. Baltagi, Badi H., 2008, *Econometric Analysis of Panel Data* (Chichester, England: John Wiley & Sons, 4th edition).

Recommended Texts:

1. Hsiao, Cheng, 2002, *Analysis of Panel Data* (Cambridge: Cambridge University Press, 2nd ed.).
2. Wooldridge, J.M., 2002, *Econometric Analysis of Cross-Section and Panel Data* (Cambridge: MIT Press).
3. Arellano, M., 2003, *Panel Data Econometrics* (Oxford: Oxford University Press).
4. Matyas, L. and P. Sevestre, eds., 1996, *The Econometrics of Panel Data: A Handbook of Theory and Applications* (Kluwer Academic Publishers).
5. Maddala, G.S., ed., 1993, *The Econometrics of Panel Data*, Volumes I and II (Cheltenham: Edward Elgar Publishing).
6. Baltagi, B.H., ed., 2003, *Recent Developments in the Econometrics of Panel Data*, Volumes I and II (Cheltenham: Edward Elgar Publishing).
7. Baltagi, B.H., ed., 2004, *Panel Data: Theory and Applications* (Heidelberg: Physica-Verlag).
8. Hsiao, C., K. Lahiri, L.F. Lee, and H. Pesaran, eds., 1999, *Analysis of Panel Data and Limited Dependent Variable Models* (Cambridge: Cambridge University Press).
9. Baltagi, B.H., ed., 2000, "Nonstationary Panels, Cointegration in Panels and Dynamic Panels," in *Advances in Econometrics* (Amsterdam: Elsevier Publishers).
10. Baltagi, B.H., ed., 2006, *Panel Data Econometrics: Theoretical Contributions and Empirical Applications*, (Amsterdam: Elsevier Publishers).
11. Frees, E.W., *Longitudinal and Panel Data*, Cambridge University Press, 2004.

Additional Readings:

Chamberlain, Gary, 1984, "Panel Data," in *Handbook of Econometrics*, Chapter 22.

Arellano, and Honoré, 2001, "Panel Data Models: Some Recent Developments," in *Handbook of Econometrics*, Chapter 53.

Two special issues of the *Journal of Econometrics*: Vol. 59, 1993, ed. by Carraro, Peracchi and Weber, and Vol. 68, 1995, ed. by Baltagi.

A special issue of the *Oxford Bulletin of Economics and Statistics*, 1999, Vol. 61, ed. by Banerjee.

A special issue of *Annales D'Économie et de Statistique*, 1999, Vol. 55–56.

A special issue of *Advances in Econometrics*, 2000, Vol. 15, ed. by Baltagi, Fomby and Hill.

Two special issues of *Econometric Reviews*, 2000, Vol. 19, No. 3 and 4, ed. by Maasoumi and Heshmati.

A special issue of *Empirical Economics*, 2004, Vol. 29, ed. by Baltagi.

A special issue of *Journal of Applied Econometrics*, 2007, Vol. 22, ed. by Baltagi and Pesaran.

Lectures 1 and 2:

Basic Review of Panel Data Methods: Estimation and Test of Hypotheses

Baltagi, Chapters 1-5

Hsiao, Chapters 1-5, Arellano, Chapters 2, 3

Matyas and Sevestre, Chapters 1-4

This will be supplemented by empirical applications and STATA 8.0 and EViews 5.0 output.

Applications:

Baltagi, Badi H. & James M. Griffin, 1983, "Gasoline Demand in the OECD," *European Economic Review*, Vol. 22, 117–37.

Baltagi, Badi H. & Nat Pinnoi, 1995, "Public Capital Stock and State Productivity Growth: Further Evidence from an Error Components Model," *Empirical Economics*, Vol. 20, 351–59.

Cardellicchio, Peter A., 1990, "Estimation of Production Behavior Using Pooled Microdata," *The Review of Economics and Statistics*, Vol. 72, 11–18.

Owusu-Gyapong, Anthony, 1986, "Alternative Estimating Techniques for Panel Data on Strike Activity," *The Review of Economics and Statistics*, Vol. 68, 526–31.

Glick, Reuven & Andrew Rose, 2002, "Does a Currency Union affect Trade? The Time-Series Evidence," *European Economic Review*, Vol. 46, 1125-1151.

Lecture 3:

Simultaneous Equations and Dynamic Panel Data Models

Baltagi, Chapters 7-8

Hsiao, Chapters 4-5 Arellano, Chapters 5-8

Matyas and Sevestre, Chapters 7-9

Simultaneous Equations Applications:

Cornwell, Christopher, and William N. Trumbull, 1994, "Estimating the Economic Model of Crime with Panel Data," *The Review of Economics and Statistics*, Vol. 76, 360–66.

Baltagi, Badi H., "Estimating An Economic Model of Crime Using Panel Data from North Carolina," *Journal of Applied Econometrics*, Vol. 21 (May-June, 2006), 543-547.

- Cornwell, Christopher, and Peter Rupert, 1988, "Efficient Estimation with Panel Data: An Empirical Comparison of Instrumental Variables Estimators," *Journal of Applied Econometrics*, Vol. 3, 149-155.
- Baltagi, Badi H., and Sophon Khanti-Akom, 1990, "On Efficient Estimation with Panel Data: An Empirical Comparison of Instrumental Variables Estimators," *Journal of Applied Econometrics*, Vol. 5, 401-06.

Dynamic Panel Data Applications:

- Acemoglu, Daron, Simon Johnson, James A. Robinson, and Pierre Yared, 2005, "From Education to Democracy?," *American Economic Review*, Vol. 95, 44-49.
- Arellano, Manuel, and Stephen Bond, 1991, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *The Review of Economic Studies*, Vol. 58, 277-97.
- Baltagi, Badi H., James M. Griffin, and Weiwen Xiong, 2000, "To Pool or Not to Pool: Homogeneous Versus Heterogeneous Estimators Applied to Cigarette Demand," *The Review of Economics and Statistics*, Vol. 82, 117-26.

Additional Readings:

1. Ahn, S.C., and P. Schmidt, 1995, "Efficient Estimation of Models for Dynamic Panel Data," *Journal of Econometrics*, Vol. 68, 5-27.
2. Alonso-Borrego, C., and M. Arellano, 1999, "Symmetrically Normalized Instrumental Variable Estimation Using Panel Data," *Journal of Business and Economic Statistics*, Vol. 17, 36-49.
3. Arellano, M., and O. Bover, 1995, "Another Look at the Instrumental Variables Estimation of Error-component Models," *Journal of Econometrics*, Vol. 68, 29-51.
4. Blundell, R., and S. Bond, 1998, "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics*, Vol. 87, 115-43.
5. Bowsher, C. G., 2002, On testing overidentifying restrictions in dynamic panel data models, *Economics Letters* 77, 211-220.
6. Ziliak, J.P., 1997, "Efficient Estimation with Panel Data When Instruments are Predetermined: An Empirical Comparison of Moment-condition Estimators," *Journal of Business and Economic Statistics*, Vol. 15, 419-31.

Lecture 4:

Unbalanced Panel Data, Rotating Panels, Pseudo-Panels, Spatial Panels, Limited Dependent Variables, Selection Bias

Baltagi, Chapters 9-11

Hsiao, Section 3.9, Chapters 7 and 8

Matyas and Sevestre, Chapters 10, 11, 16, and 18

Limited Dependent Variables Panel Data Applications:

Baltagi, Badi H., Jan Erik Askildsen & Tor Helge Holmas, "Wage Policy in the Health Care Sector: A Panel Data Analysis of Nurses' Labour Supply," *Health Economics* 12 (September, 2003), 705-719.

Ruhm, C.J. (1996), "Alcohol Policies and Highway Vehicle Fatalities," *Journal of Health Economics*, 15, 435-454.

Wooldridge, J.M., 2005, Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity, *Journal of Applied Econometrics* 20, 39-54.

Additional Readings:

1. Antweiler, W., 2001, "Nested Random Effects Estimation in Unbalanced Panel Data," *Journal of Econometrics*, Vol. 101, 295-313.
2. Baltagi, B.H., and P.X. Wu, 1999, "Unequally Spaced Panel Data Regressions with AR(1) Disturbances," *Econometric Theory*, Vol. 15, 814-23.
3. Baltagi, B.H. S.H. Song, and B.C. Jung, 2001, "The Unbalanced Nested Error Component Regression Model," *Journal of Econometrics*, Vol. 101, 357-81.
4. Davis, P., 2001, "Estimating Multi-way Error Components Models with Unbalanced Data Structures Using Instrumental Variables," *Journal of Econometrics*, Vol. 106, 67-95.
5. Honoré, B.E., 1992, "Trimmed LAD and Least Squares Estimation of Truncated and Censored Regression Models with Fixed Effects," *Econometrica*, Vol. 60, 533-65.
6. Honoré, B.E., and E. Kyriazidou, 2000, "Panel Data discrete Choice Models with Lagged Dependent Variables," *Econometrica*, Vol. 68, 839-74.
7. Keane, M.P., 1994, "A Computationally Practical Simulation Estimator for Panel Data," *Econometrica*, Vol. 62, 95-116.
8. Kyriazidou, E. 1997, "Estimation of a Panel Data Sample Selection Model," *Econometrica*, Vol. 65, 1335-64.
9. Lechner, M., 1995, "Some Specification Tests for Probit Models Estimated on Panel Data," *Journal of Business and Economic Statistics*, Vol. 13, 475-88.
10. Lee, M.J., 1999, "A Root-N-consistent Semiparametric Estimator for Related Effect Binary Response Panel Data," *Econometrica*, Vol. 67, 427-34.

11. Vella, F., and M. Verbeek, 1999, "Two-step Estimation of Panel Data Models with Censored Endogenous Variables and Selection Bias," *Journal of Econometrics*, Vol. 90, 239–63.
12. Wooldridge, J.M., 1995, "Selection Corrections for Panel Data Models under Conditional Mean Independence Assumptions," *Journal of Econometrics*, Vol. 68, 115–32.

Lecture 5:

Nonstationary Panels

Baltagi, Fomby and Hill (2000)

Banerjee (1999)

Baltagi, Chapter 12

Application:

Banerjee, A., Massimiliano M., and C. Osbat, 2005, "Testing for PPP: Should we use Panel Methods," *Empirical Economics*, Vol. 30, 77-91.

Additional Readings:

1. Hadri, K., 2000, "Testing for Stationarity in Heterogeneous Panel Data, *The Econometrics Journal*, Vol. 3, 148–61.
2. Harris, R.D.F., and E. Tzavalis, 1999, "Inference for Unit Roots in Dynamic Panels Where the Time Dimension is Fixed," *Journal of Econometrics*, Vol. 91, 201–26.
3. Kao, C., 1999, "Spurious Regression and Residual-based Tests for Cointegration in Panel Data, *Journal of Econometrics*, Vol. 90, 1–44.
4. Maddala, G.S., and S. Wu, 1999, "A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test," *Oxford Bulletin of Economics and Statistics*, Vol. 61, 631–52.
5. Moon, H.R., and P.C.B. Phillips, 1999, "Maximum Likelihood Estimation in Panels with Incidental Trends," *Oxford Bulletin of Economics and Statistics*, Vol. 61, 711–47.
6. Pedroni, P., 2000, "Fully Modified OLS for Heterogeneous Cointegrated Panels," *Advances in Econometrics*, Vol. 15, 93–130.
7. Pesaran, M.H., Y. Shin, and R. Smith, 1999, "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association*, Vol. 94, 621–34.
8. Phillips, P.C.B., and H.R. Moon, 1999, "Linear Regression Limit Theory for Nonstationary Panel Data," *Econometrica*, Vol. 67, 1057–11.
9. Levin, Andrew, Chien-Fu Lin, and Chia-Shang James Chu, 2002, "Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties," *Journal of Econometrics*, Vol. 108, 1–24.

10. Im, Kyung So, M. Hashem Pesaran, and Yongcheol Shin, 2003, "Testing for Unit Roots in Heterogeneous Panels," *Journal of Econometrics*, Vol. 115, 53–74.
11. Breitung, Jorg & M. Hashem Pesaran, "Unit Roots and Cointegration in Panels," forthcoming in the *Econometrics of Panel Data: A Handbook of the Theory with Applications*, Laszlo Matyas and Patrick Sevestre, editors, Kluwer Academic Publishers.
12. Bai, J. and S. Ng, "A PANIC attack on unit roots and cointegration," *Econometrica* 72 (2004), 1127–1177.
13. Baltagi, Badi H., Georges Bresson and Alain Pirotte, 2007, "Panel Unit Root Tests and Spatial Dependence," *Journal of Applied Econometrics*, 22 (2007), 339-360.

Contact Information:

Badi H. Baltagi

Distinguished Professor of Economics

and Senior Research Associate

Center for Policy Research

Syracuse University

426 Eggers Hall

Syracuse, New York 13244-1020

phone: (315) 443-1630

fax: (315) 443-1081

e-mail: bbaltagi@maxwell.syr.edu

<http://www-cpr.maxwell.syr.edu/faculty/baltagi>