

Panel Data and Spatial Econometrics
Syracuse University

ECN 720
Fall 2020
TR: 9:30-10:50
Eggers 018

Professor Badi H. Baltagi

426 Eggers Hall
Office Hours: 11:30-12:30 (TR)
or by appointment
bbaltagi@maxwell.syr.edu

Required Text:

1. Baltagi, Badi H., *Econometric Analysis of Panel Data*, 5th Edition, John Wiley & Sons, 2013.
2. Baltagi, Badi H., *A Companion to Econometric Analysis of Panel Data*, John Wiley & Sons, 2009.

Recommended Texts:

1. Hsiao, Cheng, 2014, *Analysis of Panel Data* (Cambridge: Cambridge University Press, 3rd ed.).
2. Wooldridge, J.M., 2010, *Econometric Analysis of Cross-Section and Panel Data* (Cambridge: MIT Press).
3. Arellano, M., 2003, *Panel Data Econometrics* (Oxford: Oxford University Press).
4. Baltagi, B.H., ed., 2015, *Panel Data Econometrics: Critical Concepts in Economics*, Four Volumes, (New York: Routledge, Taylor & Francis Group).
5. Baltagi, B.H., ed., 2015, *Oxford Handbook of Panel Data*, (Oxford: Oxford University Press).

Additional Recommended Readings:

Handbook of Econometrics:(1984) Chapter 22 - "Panel Data" by Gary Chamberlain.

Handbook of Econometrics:(2001) Chapter 53 -"Panel Data Models: Some Recent Developments"by Arellano and Honoré

Pre-requisites:

Ecn 621. A solid course in statistics and at least one basic course in econometrics.

Requirements:

Replication (50%), Final (50%).

Course Outline:

I. Panel Data

1. Benefits and Limitations

Baltagi, *Econometric Analysis of Panel Data*, Chapter 1.

2. The One-Way Error Component Model

Baltagi, Chapter 2

3. The Two-Way Error Component Model

Baltagi, Chapter 3

4. Test of Hypotheses with Panel Data

Baltagi, Chapter 4

This will be supplemented by empirical applications and STATA and EViews 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.

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

5. Heteroskedasticity and Serial Correlation

Baltagi, Chapter 5

6. Seemingly Unrelated Regression

Baltagi, Chapter 6

7. Simultaneous Equation Models

Baltagi, Chapter 7

Applications:

Cornwell, Christopher & William N. Trumbull, "Estimating the Economic Model of Crime with Panel Data," *The Review of Economics and Statistics* 76 (May,1994), 360-366.

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

Cornwell, Christopher & Peter Rupert, "Efficient Estimation with Panel Data: An Empirical Comparison of Instrumental Variables Estimators," *Journal of Applied Econometrics* 3 (1988), 149-155.

Baltagi, Badi H. & Sophon Khanti-Akom, "On Efficient Estimation with Panel Data: An Empirical Comparison of Instrumental Variables Estimators," *Journal of Applied Econometrics* 5 (Oct.-Dec., 1990), 401-406.

Serlenga, Laura, and Yongcheol Shin, 2007, "Gravity Models of Intra-EU Trade: Application of the CCEP-HT Estimation in Heterogeneous Panels With Unobserved Common Time-Specific Factors," *Journal of Applied Econometrics*, Vol. 22, 361-381.

Hutchison, M.M. and I. Noy, How Bad Are Twins? Output Costs of Currency and Banking Crises, *Journal of Money, Credit, and Banking*, Vol. 37, No. 4 (August 2005), 725-751.

8. Dynamic Panel Data Models

Baltagi, Chapter 8

Applications:

Acemoglu, Daron, Simon Johnson, James A. Robinson, and Pierre Yared, 2005, "From Education to Democracy?," *American Economic Review* 95, 44-49.

Arellano, Manuel and Stephen Bond, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *The Review of Economic Studies* 58 (Apr., 1991), 277-297.

Baltagi, Badi H., James M. Griffin & Weiwen Xiong, "To Pool or Not to Pool: Homogeneous Versus Heterogeneous Estimators Applied to Cigarette Demand", *The Review of Economics and Statistics* 82 (Feb.,2000), 117-126.

Baltagi, Badi H., Panicos Demetriades and Siong Hook Law, 2009, "Financial Development and Openness: Evidence from Panel Data," *Journal of Development Economics*, Vol. 89, 285-296.

Additional Recommended Readings:

Ahn, S.C. and P. Schmidt, 1995, Efficient estimation of models for dynamic panel data, *Journal of Econometrics* 68, 5-27.

Ahn, S.C. and P. Schmidt, 1997, Efficient estimation of dynamic panel data models: Alternative assumptions and simplified estimation, *Journal of Econometrics* 76, 309-321.

Alonso-Borrego, C. and M. Arellano, 1999, Symmetrically normalized instrumental variable estimation using panel data, *Journal of Business and Economic Statistics* 17, 36-49.

Arellano, M. and O. Bover, 1995, Another look at the instrumental variables estimation of error-component models, *Journal of Econometrics* 68, 29-51.

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

Bowsher, C. G., 2002, On testing overidentifying restrictions in dynamic panel data models, *Economics Letters* 77, 211-220.

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* 15, 419-431.

9. Unbalanced Panel Data

Baltagi, Chapter 9

Additional Recommended Readings:

Antweiler, W., 2001, Nested random effects estimation in unbalanced panel data, *Journal of Econometrics*, 101, 295-313.

Baltagi, B.H. and P.X. Wu, 1999, Unequally spaced panel data regressions with AR(1) disturbances, *Econometric Theory* 15, 814-823.

Baltagi, B.H. S.H. Song and B.C. Jung, 2001, The unbalanced nested error component regression model, *Journal of Econometrics*, 101, 357-381.

Davis, P., 2001, Estimating multi-way error components models with unbalanced data structures using instrumental variables, *Journal of Econometrics*, 106, 67-95.

10. Limited Dependent Variables

Baltagi, Chapter 11

Additional Recommended Readings:

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), pp. 705-719.

Honoré, B.E., 1992, Trimmed LAD and least squares estimation of truncated and censored regression models with fixed effects, *Econometrica* 60, 533-565.

Honoré, B.E. and E. Kyriazidou, 2000, Panel data discrete choice models with lagged dependent variables, *Econometrica* 68, 839-874.

Keane, M.P., 1994, A Computationally practical simulation estimator for panel data, *Econometrica* 62, 95-116.

Kyriazidou, E. 1997, Estimation of a panel data sample selection model, *Econometrica* 65, 1335-1364.

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

Vella, F. and M. Verbeek, 1999, Two-step estimation of panel data models with censored endogenous variables and selection bias, *Journal of Econometrics* 90, 239-263.

Wooldridge, J.M., 1995, Selection corrections for panel data models under conditional mean independence assumptions, *Journal of Econometrics* 68, 115-132.

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.

11. Nonstationary Panels

Baltagi, Chapter 12

Application:

Banerjee, Anindya, Massimiliano Marcellino & Chiara Osbat, 2004, Testing for PPP: Should we use Panel Methods, *Empirical Economics*, 30 (2005), 77-91.

Additional Recommended Readings:

- Bai, J. and S. Ng, "A PANIC attack on unit roots and cointegration," *Econometrica* 72 (2004), 1127–1177.
- Baltagi, Badi H., Georges Bresson and Alain Pirotte, 2007, "Panel Unit Root Tests and Spatial Dependence," *Journal of Applied Econometrics*, 22 (2007), 339-360.
- Breitung, Jorg & M. Hashem Pesaran, "Unit Roots and Cointegration in Panels," in Laszlo Matyas and Patrick Sevestre, editors, *Panel Data Econometrics*, Springer, Heidelberg.
- Choi, I. (2006) , Nonstationary Panels, *Palgrave Handbooks of Econometrics*, Vol. 1, 511-539. Palgrave Macmillan: New York.
- Hadri, K., 2000, Testing for stationarity in heterogeneous panel data, *The Econometrics Journal* 3, 148-161.
- Harris, R.D.F. and E. Tzavalis, 1999, Inference for unit roots in dynamic panels where the time dimension is fixed, *Journal of Econometrics* 91, 201-226.
- Im, Kyung So, M. Hashem Pesaran, Yongcheol Shin, 2003, Testing for Unit Roots in Heterogeneous Panels, *Journal of Econometrics* 115, 53-74.
- Kao, C., 1999, Spurious regression and residual-based tests for cointegration in panel data, *Journal of Econometrics* 90, 1-44.
- Levin, Andrew, Chien-Fu Lin, Chia-Shang James Chu, 2002, Unit Root Tests in Panel Data: Asymptotic and Finite-Sample properties, *Journal of Econometrics* 108, 1-24.
- 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* 61, 631-652.
- Moon, H.R. and P.C.B. Phillips, 1999, Maximum likelihood estimation in panels with incidental trends, *Oxford Bulletin of Economics and Statistics* 61, 711-747.
- Pedroni, P., 2000, Fully modified OLS for heterogeneous cointegrated panels, *Advances in Econometrics* 15, 93-130.
- Pesaran, M.H., Y. Shin and R. Smith, 1999, Pooled mean group estimation of dynamic heterogeneous panels, *Journal of the American Statistical Association* 94, 621-634.
- Phillips, P.C.B. and H.R. Moon, 1999, Linear regression limit theory for nonstationary panel data, *Econometrica* 67, 1057-1111.
- Coe, D. and E. Helpman, "International R&D spillovers," *European Economic Review* 39 (1995), 859–887.
- Pesaran, M.H., "A simple panel unit root test in the presence of cross section dependence," *Journal of Applied Econometrics* 27 (2007), 265–312.
- Baltagi, Badi H., Qu Feng and Chihwa Kao , 2016, "Estimation of Heterogeneous Panels with Structural Breaks," *Journal of Econometrics*, Vol. 191, Issue 1, pp. 176-195. <http://dx.doi.org/10.1016/j.econom.2015.03>.
- Baltagi, Badi H., Chihwa Kao and Fa Wang, 2017, "Identification and estimation of a large factor model with structural instability," *Journal of Econometrics*, Vol. 197, Issue 1, pp. 87-100. <https://doi.org/10.1016/j.jeconom.2016.10.007>

12. Spatial Econometrics:

Readings:

- Anselin, Luc (1988), *Spatial Econometrics: Methods and Models*, Dordrecht: Kluwer.
- LeSage, J.P. and R.K. Pace (2004), editors, *Spatial and Spatiotemporal Econometrics*, Amsterdam: Elsevier.
- Baltagi, B.H., H. Kelejian and I. Prucha (2007), editors, *Analysis of Spatially Dependent Data*, *Journal of Econometrics*, Volume 140.

Spatial Panels: Baltagi, Chapter 13

- Anselin, L. and A.K. Bera (1998). Spatial dependence in linear regression models with an introduction to spatial econometrics. In A. Ullah and D.E.A. Giles, (eds.), *Handbook of Applied Economic Statistics*, Marcel Dekker, New York.
- Baltagi, B.H., S.H. Song and W. Koh, 2003, Testing panel data regression models with spatial error correlation, *Journal of Econometrics* 117, 123-150.
- Bell, K.P. and N.R. Bockstael (2000). Applying the generalized-moments estimation approach to spatial problems involving microlevel data. *Review of Economics and Statistics* 82, 72-82.
- Case, A.C. (1991). Spatial patterns in household demand. *Econometrica* 59, 953-965.
- Conley, T.G. and G. Topa (2002). Socio-economic distance and spatial patterns in unemployment. *Journal of Applied Econometrics* 17, 303-327.

Kapoor, M., H.H. Kelejian and I.R. Prucha, 2007, Panel data models with spatially correlated error components, *Journal of Econometrics*, 140, 97-130.

Kelejian, H.H. and I. Prucha, 1999, A generalized moments estimator for the autoregressive parameter in a spatial model, *International Economic Review* 40, 509–533.

Kelejian, H.H., Prucha, I.R., 2001. On the asymptotic distribution of the Moran I test statistic with applications, *Journal of Econometrics* 104, 219-257.

Pinkse, J., M.E. Slade and C. Brett (2002). Spatial price competition: A semiparametric approach. *Econometrica* 70, 1111-1153.

Applications

1. Baltagi, B. H., P. Egger, and M. Pfaffermayr. 2007. "Estimating models of complex FDI: Are there third country effects?," *Journal of Econometrics* 140:260–281.

2. Baltagi, B. H., P. Egger, and M. Pfaffermayr. "Estimating Regional Trade Agreement Effects on FDI in an Interdependent World," with Peter Egger and Michael Pfaffermayr, *Journal of Econometrics*, Vol. 145 (July, 2008), pp. 194-208.

3. Baltagi, B. H. and B. Rokicki, "The Spatial Polish Wage Curve with Gender Effects: Evidence from the Polish Labor Survey," *Regional Science and Urban Economics*, Vol. 49 (November 2014), 36–47.

4. Baltagi, B. H. and Georges Bresson, "Maximum Likelihood Estimation and Lagrange Multiplier Tests for Panel Seemingly Unrelated Regressions with Spatial Lag and Spatial Errors: An Application to Hedonic Housing Prices in Paris," *Journal of Urban Economics*, Vol. 69 (January, 2011), 24–42.

5. Baltagi, B. H., Georges Bresson and Jean-Michel Etienne, "Hedonic Housing Prices in Paris: An Unbalanced Spatial Lag Pseudo-Panel Model with Nested Random Effects," *Journal of Applied Econometrics*, Volume 30, Issue 3 (April/May 2015), 353–528. (wileyonlinelibrary.com) DOI: 10.1002/jae.2377

6. Baltagi, B.H., B. Fingleton and A. Pirotte, 2012, "Estimating and forecasting with a dynamic spatial panel data model," *Oxford Bulletin of Economics and Statistics*, Volume 76, Issue 1 (February, 2014), 112-138.

7. Baltagi, B. H., Peter Egger and Michaela Kesina, "Firm-level Productivity Spillovers in China's Chemical Industry: A Spatial Hausman-Taylor Approach," with Peter H. Egger and Michaela Kesina, *Journal of Applied Econometrics*, Vol. 31, Issue 1, (January/February, 2016), 214-248. DOI: 10.1002/jae.2460.

Additional Class notes:

"At Syracuse University, academic integrity is expected of every community member in all endeavors. Academic integrity includes a commitment to the values of honesty, trustworthiness, fairness, and respect. These values are essential to the overall success of an academic society. In addition, each member of the university community has a right to expect the highest standards of academic integrity from all other community members. An individual's academic dishonesty threatens and undermines the central mission of the University. It is unfair to other community members who do not cheat, because it devalues efforts to learn, to teach, and to conduct research. Academic dishonesty interferes with moral and intellectual development, and poisons the atmosphere of open and trusting intellectual discourse. Syracuse University's academic integrity policy and procedures are administered by the Academic Integrity Office in the Division of Academic Affairs, and all schools and colleges." (SU Academic Integrity Office) <http://academicintegrity.syr.edu/>

Academic Integrity

http://coursecatalog.syr.edu/2014/rules/3383_academic_integrity

"Students who may need academic accommodations due to a disability are encouraged to discuss their needs with the instructor at the beginning of the semester. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter for the instructor. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance."

For more information about services and policy: <http://disabilityservices.syr.edu>