UP&PD 652: Times Series and Panel Data Techniques in Planning and Public Policy

Prerequisites: Regression Analysis, Discrete Choice, Analysis, and/or Advanced Quantitative Methods

Michael L. Lahr
Civic Square Bldg. Room 484
848-932-2372, lahr@rutgers.edu
http://policy.rutgers.edu/faculty/lahr/

Spring 2012 Class: Wednesday 9:00-11:40 AM, Room 170 **Office Hours:** by appointment

The main aim of the course is to give class participants a fundamental understanding of how to cope with statistical problems can arise when working with panel data in planning and public policy settings. Thus, the course will survey methods used to measure current and future events/trends via political and economic models—both simple and complex. The course emphasizes investigations into issues that especially crop up in time-series and related data: In particular, concepts of heteroskedasticity, serial correlation, autocorrelation, and dependent stationarity will be emphasized. Inasmuch as class time permits, we may also cover topics in spatial econometrics and/or computable general equilibrium modeling.

The class will focus on instilling participants with confidence in their use of standard software packages for the sake of future research efforts. In this vein, they will not be expected to learn the mathematics that underlie the various approaches, although they shall be covered at least briefly in class. In class we will also discuss assigned readings that focus on applications of the techniques described earlier in the class session. After the first two class sessions, the applied readings will be tailored to the interests of class participants.

On average, half of each class session will be held in the computer lab of the Civic Square Building. In this vein, a goal of the class will be to familiarize students with some core data sets used by publishing academics in the fields of planning and policy analysis.

Software

Student versions of software should be sufficient for this course. Presently I prefer Stata for panel data, and Eviews for regular time-series. Stata is available in the EJB school's computer lab.

Stata <http://www.stata.com/order/new/edu/gradplans/gp-direct.html>

Eviews <http://eviews.com/general/qmsprod.html>

Core texts

Kennedy, Peter. (2008) *A Guide to Econometrics*, 6th edition. Cambridge, Massachusetts: MIT Press.

Wooldridge, Jeffrey M. (2009) *Introductory Econometrics: A Modern Approach*, 4th ed. South-Western: Mason, OH. [Copies of key chapters from the 3rd edition available on Sakai.]

BASIS FOR GRADES

40%: Computer exercises

50%: A 20-page paper on a topic of your choosing in which you undertake some original regional economic analysis.

10%: Class participation

Please make sure to obey Rutgers-wide rules during the course. For the rules see...
Rutgers University's Policy on Academic Integrity for Graduate Students

READING LIST (***** indicates required reading)

1. **Overview of Econometrics (1-2 weeks)**

*****Geweke, John F., Joel L. Horowitz, and M. Hashem Pesaren. (2008) "Econometrics: A Bird's Eye View," In Steven N. Durlauf and Lawrence E. Blume (eds), *The New Palgrave Dictionary of Economics and Law*, 2nd ed. Palgrave Macmillan: NY. (Note half of this article is its reference list.) http://www.dictionaryofeconomics.com/article?id=pde2008_E000007

Granger, Clive W. J. and P. Newbold. (1974) "Spurious Regressions in Econometrics," *Journal of Econometrics*, 2, 111-120.

*****Kennedy, Chapters 1-2, 5, & 22.

Leamer, Edward E. (1983) "Let's Take the Con Out of Econometrics," *American Economic Review*, 73, 31-43.

Temple, Jonathan. (2000) "Growth Regressions and What the Textbooks Don't Tell You," *Bulletin of Economic Research*, 52(3), 181-205.

Zellner, Arnold. (1979) "Causality and Econometrics," *Carnegie-Rochester Conference Series on Public Policy*, 10, 9-54.

2. **Forecasting & Times Series Econometrics (4 weeks)**

***** Kennedy, Chapter 19-20.

***** Wooldridge**,** Sections 10.1-10.4, 11.1, 18.3**.**

a. Univariate Time Series (ARIMA): Seasonality, Trending, & Distributed Lags

* Weisang, Guillaume and Yukika Awazu. (2008) "Vagaries of the Euro: An Introduction to ARIMA Modeling," http://legacy.bentley.edu/csbigs/documents/weisang.pdf

* Wooldridge, Sections 10.5 & 18.1.

b. Detecting Serial Correlation & Unit Roots / Vector Autoregression (VAR)

* Stock, James H. and Mark W. Watson. (1994) "Vector Autoregressions," *Journal of Economic Perspectives*, 15(4), 101-115.

Ivanov, Ventzislav and Lutz Kilian. (2005) "A Practitioner Guide to Lag Order Selection for VAR Impulse Response Analysis," *Studies in Non-linear Dynamics & Econometrics*, 9(1), Article 2.

* Robertson, John C. and Ellis W. Tallman. (1999) "Vector Autoregressions: Forecasting and Reality," *Federal Reserve Bank of Atlanta Economic Review*, first quarter, pp. 4-18.

* Wooldridge, Sections 11.2, 18.2, & 18.5.

c. Serial Correlation and Heteroskedasticity: Cointegration, FGLS, ARCH, & GARCH

* Engle, Robert. (2001) "GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics," *Journal of Economic Perspectives*, pp. 157-168.

* Engle, Robert. (2003) Risk and Volatility: Econometric Models and Financial Practice, Nobel lecture, December 8, 2003, downloadable from http://nobelprize.org/nobel_prizes/economics/laureates/2003/engle-lecture.pdf

* Granger, Clive W.J. (2003) Time Series, Cointegration and Applications, Nobel lecture, December 8, 2003, downloadable from http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1019&context=ucsdecon

* The Royal Swedish Academy of Sciences (2003): Time Series Econometrics: Cointegration and Autoregressive Conditional Heteroscedasticity, downloadable from http://www-stat.wharton.upenn.edu/~steele/HoldingPen/NobelPrizeInfo.pdf

Shoesmith, Gary. (2006) "Co-integration, Error Correction and Improved Medium-term Regional VAR Forecasting," *Journal of Forecasting*, 11, 91-109.

Hsing, Yu. (2005) "Economic Growth and Income Inequality: The Case of the US," *International Journal of Social Economics*, 32, 639-647.

* Wooldridge, Chapter 12 & Section 18.4.

3. **Hierarchic Regression, Pooling Cross-sections Over Time, & Panel Data (5 weeks)**

***** Kennedy, Chapter 18.

***** Wooldridge, Chapter 13.

a. Hierarchic (Multilevel) Regression

* DiPrete, Thomas A. and Jerry D. Forristal. (1994) "Multilevel Models: Methods and Substance," *Annual Review of Sociology*, 20, 331-357.

b. Fixed & Random Effects and Heterogeneous Panels

Beck, Nathaniel. (2004) "Panel Data," unpublished memo http://weber.ucsd.edu/~tkousser/Beck%20Notes/panels.pdf

Beck, Nathaniel. (2004) "Longitudinal (Panel and Time Series Cross-Section) Data," (Part I) unpublished memo http://weber.ucsd.edu/~tkousser/Beck%20Notes/longitude20041short.pdf

***** Wooldridge, Chapter 14.

c. Dynamic Panel Models: SUR, GMM, and Minimum Distance Estimation

* Greene, William H. (2007) Minimum Distance Estimation and the Generalized Method of Moments," Chapter 15 in *Econometric Analysis*, 6th ed. Prentice Hall.

***** Kennedy, Chapter 11.

d. Limited Dependent Variables and Panel Data

Beck, Nathaniel. (2004) "Longitudinal (Panel and Time Series Cross-Section) Data," Part II, unpublished memo http://weber.ucsd.edu/~tkousser/Beck%20Notes/longitude20042short.pdf.

***** Box-Steffensmeier, Janet M. and Bradford S. Jones. (1997) "Time is of the Essence: Event History Models in Political Science," *American Journal of Political Science*, 41, 1336-1383.

Van den Berg, Gerard J. (2002) "Duration Models: Specification, Identification and Multiple Durations," Chapter 55 in James J. Heckman and Edward Leamer (eds), *Handbook of Econometrics*. New York: Elsevier, pp. 3381-3460.

***** Baltagi, Badi H. "Count Panel Data" and "Limited Dependent Variables and Panel Data," in *Econometric Analysis of Panel Data*, 4th ed. New York: Wiley.

4. **Quantile Regression (1 week)**

***** Koenker, Roger and Kevin F. Hallock. (2001) "Quantile Regression," *Journal of Economic Perspectives*, 15(4), 143-156.

Hao, Lingxin and Daniel Q. Naiman. (2007) *Quantile Regression*. Thousand Oaks, CA: Sage.