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Summer 2002
263 WJB

Time Series Analysis
POS 5698

Course Description

This course is an introduction to methods of time series analysis. Students are assumed to understand basics of statistical inference, regression analysis, scalar and matrix algebra, and generalized least squares (you should have taken POS 5737, POS 5746, and POS 5747 or equivalent courses). Some topics that will be covered include ARIMA models, regression analysis of time series, cointegration, error correction models, exogeneity tests, encompassing, vector autoregression, pooled time series, and time varying parameter models.

Course Requirements

Each student is expected to attend all class meetings and to have completed all required readings prior to each class.

1) Homework Assignments (50%)
   You should select at least one time series data set that you are interested in that contains 40 or more data points (more than 80 is best). I will hand out two brief assignments during the semester. Some aspects of these assignments will involve the analysis of time series data using a computer program. Ideally you will analyze time series data for the homework assignments that will be used in your research paper (you will save yourself time by integrating the assignments and research paper). However, I would not recommend using pooled time series for these assignments, although you may use such data in your research paper. Assignment #1 is due on Wednesday, May 29th and Assignment #2 is due on Friday, June 14th.

2) Research Paper (50%)
   Choose a research question in your area of interest that involves some type of time series data. You will write a research paper that takes the form of a conference paper or journal article, and is written in the professional style of the American Political Science Association. The paper should contain a review of the relevant literature and identify one or more hypotheses/propositions to be tested. You are required to empirically test your hypotheses/propositions using some method of time series analysis used in this class. I will expect the following empirical components in your papers: a) descriptive analysis of your data (plotting the data, ACF, PACF, ARIMA models, tests for stationarity, etc), b) some type of multivariate analysis (regression, ECM, VAR, etc.), and c) diagnostic testing (check your model for violations of its basic assumptions such as normality and residual white noise). If you purchased the optional Wooldridge text, he has a nice chapter on conducting an empirical project (Chapter 19).

The paper will be due in two stages. Because the summer term is so short, I will be giving each student an incomplete after this six week session, which will be changed to a letter grade after the second summer session. This will give you 3 months to complete your research paper. The due dates are listed below.

June 7th (Friday): Research design, 5-7 pages (identifying your research question, a brief description of the literature relevant to your question, the descriptive analysis of your data (e.g. plots, ACF, PACF, ARIMA models), and a discussion of what type of multivariate time series analysis you intend to do. The research design is due in class on this date.

August 2nd (Friday): Final draft due at 5:00pm in my mailbox in 216 WJB.

Academic Honor Code

Students are expected to uphold the Academic Honor Code published in The Florida State University Bulletin and the Student Handbook. The Academic Honor System of The Florida State University is based on the premise that each student has the responsibility (1) to uphold the highest standards of academic integrity in the student's own work, (2) to refuse to tolerate violations of academic integrity in the university community, and (3) to foster a high sense of integrity and social responsibility on the part of the university community.

ADA Policy

Students with disabilities needing academic accommodation should (1) register with and provide documentation to the Student Disability Resource Center, and (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

Required Texts

Cromwell, Jeff B., Walter C. Labys, and Michel Terraza. 1994. *Univariate Tests for Time Series Models* (Sage University Paper series on Quantitative Applications in the Social Sciences, 07-099). Thousand Oaks, CA: Sage.

Enders, Walter. 1995. *Applied Econometric Time Series*. New York: Wiley.

Sayrs, Lois W. 1989. *Pooled Time Series Analysis*. Sage University Paper series on Quantitative Applications in the Social Sciences, series no. 07-070. Beverly Hills: Sage.

Wooldridge, Jeffrey. 2000. *Introductory Econometrics: A Modern Approach*. South-Western College Publishing (This book is not required but I strongly recommend purchasing it as a general reference on econometrics).

Recommended Texts

Chatfield, Christopher. 1996. *The Analysis of Time Series: An Introduction, Fifth Edition*. New York: Chapman and Hall.
Cromwell, Jeff B., Michael J. Hannan, Walter C. Labys, and Michel Terraza. 1994. *Multivariate Tests for Time Series Models* (Sage University Paper series on Quantitative Applications in the Social Sciences, 07-100). Thousand Oaks, CA: Sage.
Davidson, Russell, and James G. MacKinnon. 1993. *Estimation and Inference in Econometrics*. Oxford: Oxford University Press.
Doan, Thomas A. 2000. *RATS User's Manual, Version 5*. Evanston, IL: Estima.
Enders, Walter. 1996. *RATS Handbook for Econometric Time Series*. New York: Wiley.
Engle, Robert F. and C.W.J. Granger (eds.). 1991. *Long-Run Economic Relationships: Readings in Cointegration*. Oxford: Oxford University Press.
Goldberg, S. 1958. *Introduction to Difference Equations*. New York: Wiley.
Goldberger, Arthur S. 1992. *A Course in Econometrics*. Cambridge: Harvard University Press.
Gottman, R.E. 1981. *Time Series Analysis: A Comprehensive Guide for Social Scientists*.

Cambridge: Cambridge University Press.
Granger, C.W.J. 1990. *Modelling Economic Series*. Oxford: Oxford University Press. Note: this book is out of print.
Granger, C.W.J. and Paul Newbold. 1986. *Forecasting Economic Time Series (Second Edition)*. San Diego, CA: Academic Press.
Greene, William H. 2000. *Econometric Analysis (Fourth Edition)*. New York: Macmillan.
Gujarati, Damodar N. 1995. *Basic Econometrics (Third Edition)*. New York: McGraw Hill.
Hamilton, James D. 1994. *Time Series Analysis*. Princeton, New Jersey: Princeton University Press. (Available at the bookstores for this class)
Harvey, Andrew. 1989. *Forecasting, Structural Time Series Models and the Kalman Filter*. Cambridge: Cambridge University Press.
Harvey, Andrew. 1990. *The Econometric Analysis of Time Series (Second Edition)*. Cambridge: MIT Press.
Harvey, Andrew. 1993. *Time Series Models (Second Edition)*. Cambridge: MIT Press.
Hendry, David F. 1995. *Dynamic Econometrics*. Oxford: Oxford University Press.
Huckfeldt, R. Robert, C.W. Kohfeld, and T.W. Likens. 1982. *Dynamic Modeling: An Introduction*. Beverly Hills, CA: Sage.
Judge, George G., W.E. Griffiths, R. Carter Hill, Helmut Lutkepohl, and Tsoung-Chao Lee. 1985. *The Theory and Practice of Econometrics (Second Edition)*. New York: Wiley.
Leamer, Edward E. 1978. *Specification Searches: Ad Hoc Inference with Nonexperimental Data*. New York: Wiley.
Maddala, G.S. 1992. *Introduction to Econometrics (Second Edition)*. New York: Macmillan.
McCleary, Richard and Richard A. Hay, Jr. 1980. *Applied Time Series Analysis for the Social Sciences*. Beverly Hills: Sage. Note: this book is out of print.
McDowall, David, Richard McCleary, Errol E. Meidinger, and Richard A. Hay, Jr. 1980. *Interrupted Time Series Analysis*. Sage University Paper series on Quantitative Applications in the Social Sciences, series no. 07-021. Beverly Hills: Sage.
Mills, Terrence C. 1990. *Time Series Techniques for Economists*. Cambridge: Cambridge University Press.
Ostrom, Charles W. 1990. *Time Series Analysis: Regression Techniques*. Beverly Hills, CA: Sage.
Pindyck, R.S. and D.L. Rubenfeld. 1991. *Econometric Models and Economic Forecasts, Third Edition*. New York: McGraw-Hill.
Spanos, Aris. 1986. *Statistical Foundations of Econometric Modelling*. Cambridge: Cambridge University Press.

Class Schedule

Readings marked with an asterisk will be available in my office for copying. You can check them out with a student ID.

Wednesday, May 8th — Graphing and Summarizing Time Series, Difference Equations

Required Reading

*Mills (1990), Chapters 2-3 (pages 7-39)
Enders, Chapter 1 (pages 1-25)

Friday, May 10th — Difference Equations

Required Reading

Enders, Chapter 1 (pages 25-61)

Monday, May 13th Stationarity, Serial Correlation, and Normality

Required Reading

Cromwell, et al (Univariate), pages 1-49
*Gujarati (1995), pages 709-717
Enders, Chapter 2 (pages 63-77)
Also recommended: Wooldridge, Chapter 11 (pages 347-375)

Recommended Reading

Davidson and MacKinnon (1993), Chapter 10
Durbin, J. and G.S. Watson. 1950. "Testing for Serial Correlation in Least Squares Regression I." *Biometrika*, 37(3-4): 409-428.
Durbin, J. and G.S. Watson. 1951. "Testing for Serial Correlation in Least Squares Regression II." *Biometrika*, 38(1-2): 159-178.
Granger and Newbold (1986), Chapter 1
Gujarati (1995), Chapter 12
Hamilton (1994), pages 43-48
Jarque, Carlos M. and Anil K. Bera. 1980. "Efficient Tests for Normality, Homoscedasticity, and Serial Independence of Regression Residuals." *Economic Letters*, 6(3): 255-259.
McCleary and Hay (1980)
Ostrom (1990)

Wednesday, May 15th Differencing and Lag Operators

Required Reading

*Gujarati (1995), pages 718-725
Enders, Chapter 4 (pages 211-261)
Also recommended: Wooldridge, Chapter 11 (pages 347-375)

Recommended Reading

Granger and Newbold (1986), Chapter 1
Hamilton (1994), Chapters 1-2

Friday, May 17th Autoregressive Integrated Moving Average (ARIMA) Models

Required Reading

Enders, Chapter 2 (pages 78-119)

Recommended Reading

Granger and Newbold (1986), Chapter 5
Harvey (1990)
Hamilton (1994), Chapter 3
McCleary and Hay (1980)
Mills (1990), Chapter 7

Monday, May 20th ARIMA

Required Reading

*Gujarati, Chapter 22
*DeBoef, Suzanna and Jim Granato. 1997. "Near-Integrated Data and the Analysis of Political Relationships." *American Journal of Political Science*, 41(2): 619-640.
*Davidson and MacKinnon, pages 700-715

Recommended Reading

McDowall, et al (1980), pages 1-54

Mills (1990), Chapters 8 & 10

Phillips, P.C.B. 1987. "Time Series with a Unit Root." *Econometrica*, 55: 277-301.

Phillips, P.C.B. and P. Perron. 1988. "Testing for a Unit Root in Time Series Regression." *Biometrika*, 75: 335-346.

Sims, Christopher and Harald Uhlig. 1992. "Bayesian Skepticism on Unit Root Econometrics." *Econometrica*, 59: 1591-1599.

Wednesday, May 22nd Intervention/Transfer Function Analysis

Required Reading

Enders, Chapter 5 (pages 269-294)

*Norpoth, Helmut. 1986. "Transfer Function Analysis," pages 241-273 in William D. Berry and Michael S. Lewis-Beck (eds.), *New Tools for Social Scientists*. Beverly Hills: Sage.

*McDowall, et al (1980), pages 64-85

*MacKuen, Michael B., Robert S. Erikson, and James A. Stimson. 1989. "Macropartisanship." *American Political Science Review*, 83(4): 1125-1142.

*Green, Donald, Bradley Palmquist, and Eric Schickler. 1998. "Macropartisanship: A Replication and Critique." *American Political Science Review*, 92(4): 883-899.

Recommended Reading

Box, G.E.P. and G.C. Tiao. 1975. "Intervention Analysis with Applications to Economic and Environmental Problems." *Journal of the American Statistical Association*, 70(1): 70-79.

Carmines, Edward G. and James A. Stimson. 1986. “On the Structure and Sequence of Issue Evolution.” *American Political Science Review*, 80(3): 901-920.

Erikson, Robert S., Michael B. MacKuen, and James A. Stimson. 1998. "What Moves Macropartisanship? A Response to Green, Palmquist, and Schickler." *American Political Science Review*, 92(4): 901-912.

Hibbs, Douglas A. Jr. 1977. "Political Parties and Macroeconomic Policy." *American Political Science Review*, 71: 1467-1479.

Hibbs, Douglas A. Jr. 1977. "On Analyzing the Effects of Policy Interventions: Box-Jenkins and Box-Tiao vs. Structural Equation Models." *Sociological Methodology*.

Moe, Terry M. 1982. “Regulatory Performance and Presidential Administration. *American Journal of Political Science*, 26:197-224.

Oppenheimer, Bruce I., James A. Stimson, and Richard W. Waterman. 1986. “Interpreting U.S. Congressional Elections: The Exposure Thesis.” *Legislative Studies Quarterly*, 11:227-247.

Rasler, Karen. 1986. "War, Accommodation, and Violence in the United States, 1890-1970." *American Political Science Review*, 80: 921-945.

Ringquist, Evan J. 1995. "Political Control and Policy Impact in EPA's Office of Water Quality." *American Journal of Political Science,* 39(2): 336-363.

Wood, B. Dan. 1988. "Principals, Bureaucrats, and Responsiveness in Clean Air Enforcements." *American Political Science Review*, 82(1): 213-234.

Friday, May 24th More on ARIMA/Unit Roots

Required Reading

*Box-Steffensmeier, Janet M and Renee M Smith. 1998. "Investigating Political Dynamics Using Fractional Integration Methods." *American Journal of Political Science*, 42(2): 661-689.

*Rasler, Karen A. and William R. Thompson. 1985. "War Making and State Making: Governmental Expenditures, Tax Revenues, and Global Wars." *American Political Science Review*, 79(2): 491-507.

Monday, May 27th No Class, Memorial Day

Wednesday, May 29th Distributed Lag Models

Required Reading

*Beck, Nathaniel. 1991. "Comparing Dynamic Specifications: The Case of Presidential Approval." *Political Analysis*, Volume 3, 51-87. Ann Arbor: University of Michigan Press.

*Wood, B. Dan and Richard W. Waterman. 1993. "The Dynamics of Political -Bureaucratic Adaptation." *American Journal of Political Science*, 37(2): 497-528.

Recommended Reading

Box-Steffensmeier, Janet M. and Tse-min Lin. 1996. "A Dynamic Model of Campaign Spending in Congressional Elections." *Political Analysis*, Volume 6, 37-66. Ann Arbor: University of Michigan Press.

Monroe, Kristen R. 1981. “Presidential Popularity: An Almon Distributed Lag Model.” *Political Methodology*, 7(1): 43-69.

Friday, May 31st GLS and Interrupted Time Series Models

Required Reading

*Lewis-Beck, Michael S. and John R. Alford. 1980. "Can Government Regulate Safety? The Coal Mine Example." *American Political Science Review*, 74: 745-756.

*Ostrom, Charles W., Jr. and Robin F. Marra. 1986. "U.S. Defense Spending and the Soviet Estimate." *American Political Science Review*, 80(3): 819-842.

Also recommended, Wooldridge, Chapter 10 (pages 310-346) and Chapter 12 (pages 376-406)

Recommended Reading

Brophy-Baermann, Bryan and John A.C. Conybeare. 1994. "Retaliating Against Terrorism: Rational Expectations and the Optimality of Rules versus Discretion." *American Journal of Political Science*, 38(1): 196-210.

Lewis-Beck, Michael S. 1986. “Interrupted Time Series” pages 209-240 in William D. Berry and Michael S. Lewis-Beck (eds.), *New Tools for Social Scientists: Advances and Applications in Research Methods*. Beverly Hills: Sage.

Monday, June 3rd Three Econometric Methodologies, EBA, and Encompassing

Required Reading

*Granger (1990), Chapters 6-8 (Pagan, Hendry and Mizon, Sims)

*Granato, Jim. 1991. "An Agenda for Econometric Model Building." *Political Analysis*, Volume 3, 123-154. Ann Arbor: University of Michigan Press.

*Granato, Jim, Ronald Inglehart and David Leblang. 1996. "The Effect of Cultural Values on Economic Development: Theory, Hypotheses, and Some Empirical

Tests." *American Journal of Political Science*, 40(3): 607-631.

*Clarke, Kevin A. 2001. "Testing Nonnested Models of International Relations: Reevaluating Realism." *American Journal of Political Science*, 45(3): 724-744.

<u>Recommended Reading</u>

Granger (1990), Chapter 9 (Fair), Chapters 13-15 (Gilbert, Hendry and Richard, Spanos), Chapter 17 (Chong and Hendry)

Hendry (1995)

Hendry, David F. and Jean-Francois Richard. 1982. "On the Formulation of Empirical Models in Dynamic Econometrics." *Journal of Econometrics*, 20(1): 3-33.

Hendry, David F. and Jean-Francois Richard. 1983. "The Econometric Analysis of Time Series." *International Statistical Review*, 51(2): 111-163.

Hendry, David F. and Jean-Francois Richard. 1988. "Recent Developments in the Theory of Encompassing." *Institute of Statistics and Decision Sciences, Duke University*, number 88-05.

Wednesday, June 5th Granger Causality and Exogeneity

<u>Required Reading</u>

*Freeman, John. 1983. "Granger Causality and the Time Series Analysis of Political Relationships." *American Journal of Political Analysis*, 27: 327-358.

*Thurman, Walter N. and Mark E. Fisher. 1988. "Chickens, Eggs, and Causality, or Which Came First?" *American Journal of Agricultural Economics*, 237-238.

*Engle, Robert F., David F. Hendry, and Jean-Francois Richard. 1983. "Exogeneity." *Econometrica*, 51(2): 277-304.

<u>Recommended Reading</u>

Cromwell, et al (Multivariate), pages 32-55

Geweke, John. 1984. "Inference and Causality in Economic Time Series Models," pages 1101-1144 in Griliches and Intrilligator (eds.), *Handbook of Econometrics, Volume 2*. Amsterdam: Elsevier.

Hoole, Francis and Chi Huang. 1989. "The Global Conflict Process." *Journal of Conflict Resolution*, 33: 142-163.

Mills, pages 281-305

Reuveny, Rafael and Heejoon Kang. 1996. "International Trade, Political Conflict/Cooperation and Granger Causality." *American Journal of Political Science*, 40(3): 943-970.

Sayrs, Lois W. 1993. "The Long Cycle in International Relations: A Markov Specification." *International Studies Quarterly*, 37(2): 215-237.

Friday, June 7th Cointegration, Partial Adjustment, and Error Correction Models

<u>Required Reading</u>

Enders, Chapter 6 (pages 355-405)

*Caldeira, Gregory A. and Christopher J.W. Zorn. 1998. "Of Time and Consensual Norms in the Supreme Court." *American Journal of Political Science*, 42(3): 874-902.

*Ostrom, Charles W, Jr. and Renee Smith. 1992. "Error Correction, Attitude Persistence, and Executive Rewards and Punishments: A Behavioral Theory of Presidential Approval." *Political Analysis*, Volume 4, 127-183.

<u>Recommended Reading</u>

Adam, Christopher. 1991. "Financial Innvoation and the Demand for ξM3 in the UK: 1975-1986." *Oxford Bulletin of Economics and Statistics*, 53(4): 401-424.

Beck, Nathaniel. 1993. "The Methodology of Cointegration." *Political Analysis*, Volume 4, 237-248. Ann Arbor: University of Michigan Press.

Clarke, Harold D. and Marianne C. Stewart. 1994. "Prospections, Retrospections, and Rationality: The "Bankers" Model of Presidential Approval Reconsidered." *American Journal of Political Science*, 38(4): 1104-1123.

Cromwell (Multivariate), pages 17-31, 68-70

Dickey, David A., Dennis W. Jansen, and Daniel L. Thorton. 1991. "A Primer on Cointegration with an Application to Money and Income." *Federal Reserve Bank of St. Louis Review*. 73(2): 58-78.

Durr, Robert. 1993. "An Essay on Cointegration and Error Correction Models." *Political Analysis*, Volume 4, 185-228. Ann Arbor: University of Michigan Press.

Engle, R.F. and C.W.J. Granger. 1987. "Cointegration and Error Correction: Representation, Estimation, and Testing." *Econometrica*, 55: 251-276.

Engle, Robert F. and C.W.J. Granger. 1987. "Co-Integration and Error Correction: Representation, Estimation, and Testing." *Econometrica*, 55(2): 251-276.

Engle, R.F. and C.W.J. Granger. 1991. Introduction. *Long Run Economic Relationships: Readings in Cointegration*. New York: Oxford University Press.

Hall, S.G. 1989. "Maximum Likelihood Estimation of Cointegration Vectors: An Example of the Johansen Procedure." *Oxford Bulletin of Economics and Statistics*, 51(2): 213-218.

Johansen, Soren. 1988. "Statistical Analysis of Cointegration Vectors." *Journal of Economic Dynamics and Control*, 12: 231-254.

Krause, George A. 1997. "Voters, Information Heterogeneity, and the Dynamics of Aggregate Economic Expectations." *American Journal of Political Science*, 41(4): 1170-1200.

Smith, Renee. 1993. "Error Correction, Attractors and Cointegration." *Political Analysis*, Volume 4, 249-254. Ann Arbor: University of Michigan Press.

Williams, John. 1992. "What Goes Around Comes Around: Unit Root Tests and Cointegration." *Political Analysis*, Volume 4, 229-236. Ann Arbor: University of Michigan Press.

Monday, June 10th — Vector Autoregression (VAR)

Required Reading

Enders, Chapter 5 (pages 294-343)

*McGinnis, Michael D. and John T. Williams. 1989. "Change and Stability in Superpower Rivalry." *American Political Science Review*, 83(4): 1101-1123.

Recommended Reading

Cromwell (Multivariate), pages 56-67

Freeman, John, Daniel Houser, Paul M. Kellstedt, and John T. Williams. 1998. "Long-Memoried Processes, Unit Roots, and Causal Inference in Political Science." *American Journal of Political Science*, 42(4): 1289-1327.

Freeman, John T., Tse-min Lin, and John Williams. 1989. "Vector Autoregression and the Study of Politics." *American Journal of Political Science*, 33: 842-877.

Granger (1990), Chapters 8, 10 (Sims, Todd)

Hendry, David F. and Jean-Francois Richard. 1982. "On the Formulation of Empirical Models in Dynamic Econometrics." *Journal of Econometrics*, 20(1): 3-33.

McGinnis, Michael D. and John T. Williams. 2001. *Compound Dilemmas: Democracy, Collective Action, and Superpower Rivalry*. Ann Arbor: University of Michigan

Press.
Stock, James H. and Mark W. Watson. 2001. “Vector Autoregressions.” *Journal of Economic Perspectives*, 15(4).
Williams, John T. 1990. "The Political Manipulation of Macroeconomic Policy." *American Political Science Review*, 84: 767-796.
Williams, John T. 1992. "Dynamic Change, Specification Uncertainty, and Bayesian Vector Autoregression Analysis." *Political Analysis*, Volume 4, 97-125. Ann Arbor: University of Michigan Press.
Williams, John T. and Brian K. Collins. 1997. "The Political Economy of Corporate Taxation." *American Journal of Political Science*, 41(1): 208-244.

Wednesday, June 12th ARCH, GARCH, and Time Varying Parameters

Required Reading

*Beck, Nathaniel. 1983. "Time-Varying Parameter Regression Models." *American Journal of Political Science*, 27: 557-600.
Cromwell, et al (Univariate), pages 53-57, 73-74
Enders, Chapter 3 (pages 135-196)
*Mitchell, Sara McLaughlin, Scott Gates and Håvard Hegre. 1999. “Evolution in Democracy-War Dynamics.” *Journal of Conflict Resolution*, 43(6): 771-792.

Recommended Reading

Beck, Nathaniel. 1989. "Estimating Dynamic Models Using Kalman Filtering." *Political Analysis*, Volume 1, 121-156. Ann Arbor: University of Michigan Press.
Box, George and Douglas Pierce. 1970. "Distribution of Residual Autocorrelations in Autoregressive-integrated Moving Average Time Series Models." *Journal of the American Statistical Association*, 65: 1509-1526.
Chow, Gregory. 1960. "Tests of Equality between Sets of Coefficients in Two Linear Regressions." *Econometrica*, 28(3): 591-605.
Cromwell (Multivariate), pages 70-71
Dufour, Jean-Marie. 1982. "Recursive Stability Analysis of Linear Regression Relationships." *Journal of Econometrics*, 19: 31-76.
Engle, Robert F. 1982. "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation." *Econometrica*, 50(4): 987-1007.
Engle, Robert F. 2001. “The Use of ARCH/GARCH Models in Applied Econometrics.” *Journal of Economic Perspectives*, 15(4).
Hansen, Bruce E. 2001. “The New Econometrics of Structural Change: Dating Breaks in U.S. Labor Productivity.” *Journal of Economic Perspectives*, 15(4).
Hansen, Bruce. 1992. "Testing for Parameter Instability in Linear Models." *Journal of Policy Modeling*, 14(4): 517-533.
Harvey (1989, 1993)
White, Halbert. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica*, 48(4): 817-838.
Wood, B. Dan. 2000. “Weak Theories and Parameter Instability: Using Flexible Least Squares to Take Time-Varying Relationships Seriously.” *American Journal of Political Science*, 44: 603-618.

Friday, June 14th Pooled Time Series

Required Reading

*Beck, Nathaniel and Jonathan N. Katz. 1995. "What to Do (and Not to Do) with Times-Series-Cross-Section Data." *American Political Science Review*, 89: 634-647.

*Stimson, James A. 1985. "Regression in Space and Time: A Statistical Essay." *American Journal of Political Science*, 29: 914-945.
Sayrs (1990)
Also recommended: Wooldridge, Chapter 14 (pages 441-460)

Recommended Reading

Beck, Nathaniel, Jonathan N .Katz and Richard Tucker. 1998. "Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable." *American Journal of Political Science*, 42(4): 1260-1288.
Beck, Nathaniel and Jonathan N. Katz. 1996. "Nuisance vs. Substance: Specifying and Estimating Time-Series-Cross-Section Models." *Political Analysis*, Volume 6, 1-36. Ann Arbor: University of Michigan Press.
Finkel, Steven. 1995. *Causal Analysis With Panel Data*. Beverly Hills: Sage.
Holbrook, Thomas M. 1991. "Presidential Elections in Space and Time." *American Journal of Political Science*, 35(1): 91-109.
Hsiao, Cheng. 1986. *Analysis of Panel Data*. Cambridge: Cambridge University Press.
Kerr, Brinck and Kenneth R. Mladenka. 1994. "Does Politics Matter? A Time-Series Analysis of Minority Employment Patterns." *American Journal of Political Science*, 38(4): 918-943.
Pollins, Brian. 1989. "Does Trade Still Follow the Flag?" *American Political Science Review*, 83: 465-480.