

POL 606 Time Series Analysis
Spring 2008
SBS-N702
Mondays and Wednesdays 10:30am-12:00pm

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I. Overview:

This course introduces students to time series methods and to the applications of these methods in political science. The focus of the class will be on applications and the use of political data measured over time. We will briefly study the calculus of finite differences before moving on to study stationary ARMA models. We will learn how to construct univariate and multivariate models and how to use them in political analyses and forecasting. We will study regression techniques using time series data as well as Box-Jenkins methods. We will also study some more recent advances in time series analysis including cointegration, error correction models, ARCH, GARCH, and ARFIMA methods. We will also spend some time learning about emerging methods for studying time varying relationships such as repeated cross-sectional analysis and dynamic conditional correlations. We will end the class with 2 weeks on pooled cross-sectional analysis.

II. Computer Work

We will make extensive use of the computer program RATS (Regression Analysis and Time Series). RATS has its own programming language that we will learn much of over the course of the semester. I advise students to share programs with each other (and with me) to help learn the syntax needed to invoke routines. RATS is available in the computer lab on the 7th floor of SBS. The manuals are available in PDF format and will come in handy. We will spend quite a bit of class time going over RATS programs and output. RATS can be a frustrating program to work with but is vastly superior to all other alternatives for most of what we'll do. We will use Stata for some of the PCTS material and also for forecasting.

I will put relevant materials, such as data sets and readings, on Blackboard. Please ensure that Blackboard has your correct email address so that I can email the class from there.

You can access class information on-line at: <http://blackboard.sunysb.edu> If you used Blackboard during the Fall semester, your login information (Username and Password) has not changed. If you have never used Stony Brook's Blackboard system, your initial password is your SOLAR ID# and your username is the same as your Stony Brook (sparky) username, which is generally your first initial and the first 7 letters of your last name. For help or more information see:

<http://www.sinc.sunysb.edu/helpdesk/docs/blackboard/bbstudent.php>

For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site , you can also call: 631-632-9602 or e-mail: helpme@ic.sunysb.edu

I will also post materials, including lecture notes, on my website. The notes from the 2006 version of this class are already posted there along with many other course materials. These shouldn't change very much this time around, especially in the first half of the course.

III. Required and Recommended Texts

Students should purchase the following 2 books at the campus bookstore:

Enders, Walter. *Applied Econometric Time Series, 2nd Edition*. New York: John Wiley and Sons. 2004. ISBN 0-471-23065-0.

Enders, Walter. *RATS Handbook for Econometric Time Series*. New York: John Wiley and Sons. 1996. ISBN: 0-471-14894-6.

Also, as a very basic primer, find yourself a copy of:

Sayrs, Lois W. *Pooled Time Series Analysis*. Sage Publication #70. ISBN 0-8039-3160-3.

Recommended texts:

The following are available from me for photocopying. I advise purchasing a copy of Hamilton. It is expensive but is probably the most complete time series book available.

Hamilton, J.D. *Time Series Analysis*. Princeton, NJ: Princeton University Press. 1994. ISBN 0-691-04289-6.

Box, George E.P., Gwilym M. Jenkins, and Gregory C. Reinsel. *Time Series Analysis: Forecasting and Control 3rd Edition*. 1994. Prentice Hall. ISBN 0-130-60774-6.

Hendry, David F. *Dynamic Econometrics*. Oxford, UK: Oxford University Press. 1995. ISBN: 0-19-828316-4.

Pindyck, Robert. S. & Daniel L. Rubinfeld. *Econometric Models and Economic Forecasts, 2nd Edition* (or later). New York: McGraw-Hill. 1981. ISBN: 0-07-050096-7.

Gujarati, Damodar N. *Basic Econometrics, 3rd Edition*. New York: McGraw-Hill. 1995. ISBN: 0-07-25214-9.

McCleary and Hay. 1980. *Applied Time Series Analysis for the Social Sciences. An out-of-print classic. See me for photocopies.*

These books are in the library and you might find them useful:

Mills, Terence C. *Time Series Techniques for Economists*. Cambridge, UK: Cambridge University Press. 1990. ISBN 0-521-34339-9.

A fairly simple explanation of some of the methods we cover in the first few weeks.

Engle, R.F. and C.W.J. Granger, Eds. *Long-run Relationships: Readings in Cointegration*. Oxford, UK: Oxford University Press. 1991. ISBN: 0-19-828338-5.

A classic book by the guys who won the Nobel Prize in large part for developing this methodology.

Chatfield, C. *The Analysis of Time Series: Theory and Practice*. London: Chapman and Hall. 1975. ISBN 0-412-14180-9.

Old, but a good basic treatment of the materials.

Goldberg, Samuel. *Introduction to Difference Equations*. New York: John Wiley & Sons. 1958. ISBN: 0-471-31051-4.

In case you find the first week's class especially fascinating.

IV. Course Requirements

Students are expected to do all the assigned reading and to attend all classes.

Course evaluation will be based on:

3 graded homework assignments: 5% each.

1 article critique and discussion: 5%.

Three short papers: 20% each.

Paper 1: Use the methods of weeks 1-6 below. **Due March 12.**

Paper 2: Use the methods of weeks 7-9 below. **Due April 11.**

Paper 3: Use the methods of weeks 10-14. **Due May 9.**

For Paper 1, you should use the methods from the later weeks, some intervention and transfer-function analysis. You should find your own data for this assignment or come up with an original idea using some of the data from class.

For Paper 2, you should use some, but not necessarily all of the methods of the weeks concerned. You may use the same data as from the first paper.

For paper 3, you will choose one of the methods or perhaps try comparing models and hypotheses using multiple methods. Again, you will need to collect your own data.

Final Exam: 20%. **IN CLASS MAY 12th.**

V. Disability Policy

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with

you what accommodations are necessary and appropriate. All information and documentation is confidential.

VI. Class Schedule and Readings

(note: some tweaking of this will be done during the semester)

Reading assignments should be completed before the class for which they are assigned.

The following is a guideline for the weekly topics of the course.

Week 1 January 28th and 30th

Topic: Introduction and Linear Difference Equations.

Reading:

Sprague, H. 1981. "One Party Dominance in Legislatures" *Legislative Studies Quarterly* 6(2):259-285.

Enders Chapter 1 (skip 1.5-1.8 and appendices)

Enders Handbook Chapter 1.

Recommended:

Hamilton Chapter 1, 2, 5.

Goldberg, Chapters 1-2.

Week 2 February 4th and 6th

Topic: Univariate ARMA and ARIMA Models I.

Reading:

Enders Chapter 2.

Enders Handbook Chapter 2.

Pindyck and Rubinfeld, Chapters 16 & 17.

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

Recommended:

Haynie, S. 1992. "Leadership and Consensus on the U.S. Supreme Court." *Journal of Politics* 54(4):1158-69.

McCleary and Hay, chapters 2&6.

Chatfield 2,3,4.

Mills, Ch. 5,6,8.

Hamilton 3.

Week 3 February 11th and 13th

Topic: Univariate ARMA and ARIMA Models II + Beginning Transfer Functions

Reading:

Enders Chapter 4.

Enders Handbook Chapter 4.

Pindyck and Rubinfeld, Chapter 18.

Li, R.P. "A Dynamic Comparative Analysis of Presidential and House Elections." *American Journal of Political Science* 20(4), 1976: 670-691.

Recommended:

Hamilton Chapter 4.

Mills, Chapter 11.

Chatfield, Chapter 5.

Li, R.P. and W.R. Thompson, "The Stochastic Process of Alliance Formation Behavior" *American Political Science Review* 72(4), 1978:1288-1303.

Week 4 February 18th and 20th

Topic: Transfer Function Models I.

Reading:

Enders Chapter 5 Sections 1-4.

Mills Chapter 12,13.

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

Hibbs, D. 1977. "Political Parties and Macroeconomic Performance" *American Political Science Review* 71: 1467-1479.

Recommended

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

Suzuki, Motoshi and Henry W. Chappell Jr. 1996. "The Rationality of Economic Voting Revisited." *Journal of Politics* 58(1):224-236.

Week 5 February 25nd and 27th

Topic: Transfer Function Models II + Election Forecasting

Reading:

Yantek, T. 1988., "Polity and Economy Under Extreme Economic Conditions: A Comparative Study of the Reagan and Thatcher Experiences" *American Journal of Political Science* 32:196-216.

Alt, J. 1986. "Political Parties, World Demand, and Unemployment" *American Political Science Review* 79(4):1016-1040.

Forecasting:

Greene, J.P., "Forewarned Before Forecast: Presidential Election Forecasting Models and the 1992 Election." *PS: Political Science and Politics* 26, 1993:17-21.

Campbell, J., "Weather Forecasters Should be so Accurate: A Response to 'Forewarned Before Forecast'" *PS*, 1993:165-66.

+ Others to be announced.

Recommended:

Rasler, K. and W. Thompson. 1985. "War and Economic Growth of the Major Powers." *American Journal of Political Science* 29:513-538.

Week 6 March 3rd and 5th

Topic: Time Series Regression Models.

Reading:

Gujarati 17.

Hamilton 8-9.

Beck, Nathaniel. 1991. "Comparing Dynamic Specification: The Case of Presidential Approval." *Political Analysis* Vol. 3, J. Stimson, Ed. 51-88.

Grier, K.B. 1989. "On the Existence of a Political Monetary Cycle" *American Journal of Political Science* 33(2):376-389.

Recommended:

Pindyk and Rubinfeld, Sections 6.2 and 9.1.

Hendry. 6-7.

Krause, George. 2000. "Testing for the Strong Form of Rational Expectations with Heterogeneously Informed Agents." *Political Analysis* 8(3):285-305.

Week 7 March 10th and 12th

Paper 1 due in class March 12th.

Topic: Unit Roots, Cointegration, and Error Correction Models.

Reading:

Enders Chapters 4.1-4.7, Chapter 6.

Enders' Handbook Chapters 4 & 6.

Murray, Michel P. 1994. "A Drunk and Her Dog: An Illustration of Cointegration and Error Correction." *The American Statistician* 48:37-9.

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):1104-23.

Clarke, Harold D., Marianne C. Stewart and Paul Whiteley. 1997. "Tory Trends: Party Identification and the Dynamics of Conservative Support Since 1992." *British Journal of Political Science* 27:299-331.

Recommended:

Political Analysis 4. Several Articles.

Hamilton 15-20.

Durr, R. 1993. "What Moves Policy Sentiments." *American Political Science Review* 87(1):158-172.

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

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

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

Week 8 March 24th and 26th

Topic: Near Integration, Fractional Integration, and Fractional Cointegration.

Reading:

Enders. Chapter 4.

Box-Steffensmeier, Janet M. and Renee M. Smith. 1996. "The Dynamics of Aggregate Partisanship." *American Political Science Review* 90(3):567-80.

Clarke, Harold D. and Matthew J. Lebo. 2003. "Fractional (Co)integration and Governing Party Support in Britain." *British Journal of Political Science* 33:283-301.

Dickinson, Matthew and Matthew Lebo. 2007. "Reexamining the Institutional Presidency, 1940-2000." *Journal of Politics* 69:206-19.

Skim:

Pesaran, M. Hashem, Yongcheol Shin, and Richard J. Smith. "Bounds Testing Approaches to the Analysis of Level Relationships." *Journal of Applied Econometrics* 16:289-326.

DeBoef, Suzanna and Jim Granato. 1997. "Near-Integrated Data and the Analysis of Political relationships." *American Journal of Political Science*, 41(2):619-40.

Recommended:

DeBoef, Suzanna. 2000. "Modeling Equilibrium Relationships: Error Correction Models with Strongly Autoregressive Data." *Political Analysis* 9(1):78-94.

Lebo, Matthew J., Robert Walker and Harold Clarke. 2000. "You Must Remember This: Dealing with Long Memory in Political Analyses." *Electoral Studies* 19:31-48.

Baillie and Bollerslev, "Cointegration, Fractional Cointegration and Exchange Rate Dynamics." Manuscript.

Barkoulas, Baum and Oguz, "Fractional Dynamics in a System of Long-Term International Interest Rates." Manuscript.

Lebo, Matthew J. and Will H. Moore. 2003. "Dynamic Foreign Policy Behavior." *Journal of Conflict Resolution* 47:13-32.

Week 9 March 31st and April 2nd (MPSA week)

Topic: Granger Causality, Vector Autoregression, and Seemingly Unrelated Regressions

Reading:

Enders, ch. 5.4-5.10.

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

Freeman, John, J. Williams, and T. Lin. 1989. "Vector Autoregression and the Study of Politics." *American Journal of Political Science*: 842:77.

Lebo, Matthew, and Daniel Cassino. 2007. "The Aggregated Consequences of Motivated Reasoning." *Political Psychology* 28:6.

Recommended:

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

Freeman, J. and J. Alt. 1994. "The Politics of Public and Private Investment I Britain." *The Comparative Politics of the Welfare State*: 136-168.

Clarke, Harold, Marianne Stewart, Michael Ault, and Euel Elliott. 2005. "Men, Women and the Political Economy of Presidential Approval." *British Journal of Political Science*, 35:31-51.

Week 10 April 7th and 9th

Paper 2 Due April 11th.

Topic: ARCH and GARCH Models.

Reading:

Enders Chapter 3.

Enders' Handbook Ch. 3.

Caldeira, Greg and Christopher Zorn. 1998. "Of Time and Consensual Norms in the Supreme Court." *American Journal of Political Science* 42:874-902.

Paul Gronke and John Brehm. 2002. "History, Heterogeneity, and Presidential Approval: A Modified ARCH Approach." *Electoral Studies*.

Maestas, Cheries and Robert R. Preuhs. 2000. "Modeling Volatility in Political Time Series." *Electoral Studies* 19:95-110.

Engle, Robert F. 1982. "Autoregressive Conditional Heteroskedasticity with Estimates of Variance of United Kingdom Inflation." *Econometrica* 50(4):987-1008.

Recommended:

Gujarati, Chapter 12.

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

Leblang, David & Bumba Mukherjee. 2005. "Presidential Elections and the Stock Market: Comparing Markov-Switching and (FI)GARCH Models of Stock Volatility." *American Journal of Political Science*.

Week 11 April 14th and 16th

Topic: Dynamic Conditional Correlation and Rolling Cross-Sectional Models.

Reading:

Johnston, Richard and Henry E. Brady. 2002. "The Rolling Cross-Section Design." *Electoral Studies* 21:283-295.

Johnston, Richard and Michael Hagen. 2003. "Priming and Learning: Evidence from the 2000 Annenberg Study." Presented at APSA 2003 Annual Meeting and available at PROceedings.

Lebo, Matthew and Janet Box-Steffensmeier. *Dynamic Conditional Correlations and Political Science*. Manuscript on my website.

Engle, Robert F. 2002. "Dynamic Conditional Correlation – A Simple Class of Multivariate GARCH." *Journal of Business and Economics Statistics* 17:425-46.

Recommended:

Carey, Sean and Matthew Lebo. 2006. "Election Cycles and the Economic Voter." *Political Research Quarterly* 59:4.

Bauwens, Luc, et al. 2006. "Multivariate GARCH Models: A Survey" *Journal of Applied Econometrics* 21:79-109.

Gidengil, Elisabeth and Agnieszka Dobrzynska. 2003. "Using a Rolling Cross Section Design to Model Media Effects: The Case of Leader Evaluations in the 1997 Canadian Election." Presented at APSA 2003 Annual Meeting and available at PROceedings.

Week 12 April 21st and 23rd

Topic: Pooled Cross-Sectional Time Series I.

Reading:

Sayrs, Lois. 1989. *Pooled Times Series Analysis*. Sage, pp. 7-32.

Stimson, J. 1985. Regression in Space and Time: A Statistical Essay. *American Journal of Political Science* 29: 914-947.

Beck, N. and J. Katz. 1995. What to Do (and not to do) with Time-Series Cross-Section Data. *American Political Science Review* 89: 634-647.

Recommended:

Burkhardt, R. and M.Lewis-Beck. 1994. "Comparing Democracy: The Economic Development Thesis." *American Political Science Review* 88:903-910.

Blais, Andre, Donald Blake, and Stephanie Dion. 1996. "Do Parties Make a Difference: A Reappraisal." *American Journal of Political Science* 40:514-20.

Week 13 April 28th and 30th

Topic: Pooled Cross-Sectional Time Series II.

Reading:

Jackson, J. 1991. Estimation of Models with Variable Coefficients. *Political Analysis* 3: 27-49.

Beck, N. and J. Katz. 2001. Random Coefficient Models for Time-Series Cross-Section Data: The 2001 version. Available at the Political Methodology web site [<http://polmeth.wustl.edu/>].

Wood, D. 2000. Weak Theories and Parameter Instability. *American Journal of Political Science* 44: 603-618.

Beck, N., J. Katz, and R. Tucker. 1998. Taking Time Seriously: Time-Series Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42: 1260-1288.

Carson, Jamie, Greg Koger, and Matthew Lebo. 2008. "The Electoral Consequences of Party Unity in Congress." Working paper on my website.

Recommended:

Finkel, S. and E. Muller. 1998. Rational Choice and the Dynamics of Political Action: Evaluating Alternative Models with Panel Data. *American Political Science Review* 92: 37-50.

Hicks A. and D. Swank. 1992. "Politics, Institutions and Welfare Spending in Industrialized Democracies." *American Political Science Review* 86(3):658-674.

Week 14 May 7th

NOTE: CLASS IS CANCELLED ON MAY 5th

Paper 3 due May 9th.

Pooled Cross-Sectional Time Series continued.

Week 15 May 12th

FINAL EXAM IN CLASS

VII. Academic Integrity:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report and suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

VIII. Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.