

TIME SERIES ANALYSIS
030:306, FALL 2011
T 2:00 – 4:50 PM, 177 SH

INSTRUCTOR:

Sara McLaughlin Mitchell
307 SH

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Office Hours: Monday 10:30am-12:00pm, Thursday, 1:00-2:30pm, or by appointment

COURSE DESCRIPTION:

This course is an introduction to methods of time series analysis. Students are assumed to understand basics of statistical inference, regression analysis, and scalar and matrix algebra. Some topics that will be covered include ARIMA models, intervention analysis, regression analysis of time series, cointegration, error correction models, 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 (30%)

You will complete four homework assignments throughout the semester using STATA 12.0. You can also do most of the assignments in STATA 11.0.

2) Final Exam (30%)

The final exam will be administered during finals week on Tuesday, December 13th from 12:00-2:00pm in 177 SH. The exam will be comprehensive and includes multiple choice, short answer, and essay questions.

3) Poster (30%): December 9th, 1:30-3:30pm in 302 SH hall

Choose a research question in your area of interest that involves some type of time series data. You will present your research in poster format at the end of the semester. The poster should identify your research question, identify one or more hypotheses to be tested (along with a causal story linking your variables), describe your research design, and present your empirical results. I expect the following empirical components in your poster: a) descriptive analysis of your data (plotting the data, ACF, PACF, ARIMA models, tests for stationarity, etc.) and b) some type of multivariate time series analysis (regression, ECM, VAR, ARFIMA, etc.). The poster will be judged both for its substantive content and its aesthetic qualities. You must submit a copy of your poster materials to the instructor by 5pm on Monday, December 5th. More detailed instructions will be distributed later this semester.

4) Applications (10%)

Early in the semester, each student will sign up to discuss 3 articles that utilize the time series methods we are learning in class. For each application paper, the student will type a 2-3 page paper summarizing the method, describing how it is applied, and discussing any potential problems with the particular application of the method.

REQUIRED TEXTS (Order Online):

Enders, Walter. 2010. *Applied Econometric Time Series, 3rd Edition*. New York, NY: Wiley.
Patrick T. Brandt and John T. Williams. 2007. *Multiple Time Series Models*. Beverly Hills, CA: Sage.

Assigned articles (marked with *) will be available on ICON.

OTHER USEFUL TEXTS:

- Banerjee, Anindya, Juan Dolado, J.W. Galbraith, and David F. Hendry. 1993. *Co-integration, Error Correction, and the Econometric Analysis of Non-Stationary Data*. Oxford: Oxford University Press.
- Box, George E.P., Gwilym M. Jenkins, and Gregory C. Reinsel. 2008. *Time Series Analysis: Forecasting and Control*. Wiley.
- Chatfield, Christopher. 2003. *The Analysis of Time Series: An Introduction, Sixth 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.
- Cryer, Jonathan D. and Kung-Sik Chan. 2010. *Time Series Analysis with Applications in R*. Springer.
- Davidson, Russell, and James G. MacKinnon. 1993. *Estimation and Inference in Econometrics*. Oxford: Oxford University Press.
- Engle, Robert F. and C.W.J. Granger (eds.). 1992. *Long-Run Economic Relationships: Readings in Cointegration*. Oxford: Oxford University Press.
- Granger, C.W.J. 1991. *Modelling Economic Series*. Oxford: Oxford University Press.
- Granger, C.W.J. and Paul Newbold. 1986. *Forecasting Economic Time Series (Second Edition)*. San Diego, CA: Academic Press.
- Gujarati, Damodar N. 2008. *Basic Econometrics, 5th Edition*. New York: McGraw-Hill.
- Hamilton, James D. 1994. *Time Series Analysis*. Princeton, New Jersey: Princeton University Press.
- Harvey, Andrew. 1989. *Forecasting, Structural Time Series Models and the Kalman Filter*. Cambridge: Cambridge University 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.
- Leamer, Edward E. 1978. *Specification Searches: Ad Hoc Inference with Nonexperimental Data*. New York: Wiley.
- Lütkepohl, Helmut. 2010. *New Introduction to Multiple Time Series Analysis*. Springer.
- McCleary, Richard and Richard A. Hay, Jr. 1980. *Applied Time Series Analysis for the Social Sciences*. Beverly Hills: Sage.
- 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. and Raphael N. Markellos. 2008. *The Econometric Modelling of Financial Times Series, 3rd edition*. Cambridge: Cambridge University Press.

- Ostrom, Charles W. 1990. *Time Series Analysis: Regression Techniques*. Beverly Hills, CA: Sage.
- Pindyck, R.S. and D.L. Rubinfeld. 1991. *Econometric Models and Economic Forecasts, Third Edition*. New York: McGraw-Hill.
- Sayrs, Lois W. 1989. *Pooled Time Series Analysis*. Sage University Paper series on Quantitative Applications in the Social Sciences, series no. 07-070. Sage.
- Tsay, Ruey S. 2010. *Analysis of Financial Time Series*. New York: Wiley.
- Wooldridge, Jeffrey. 2009. *Introductory Econometrics: A Modern Approach, 4th Edition*. South-Western College Publishing.

CLASS SCHEDULE:

August 23 Introduction to Time Series & Graphing/Summarizing Time Series

Required Reading

Enders, Chapter 1

*Beck, Nathaniel and Jonathan M. Katz. 2011. "Modeling Dynamics in Time-Series-Cross-Section Political Economy Data." *Annual Review of Political Science* 14: 331-352.

Recommended Reading

Mills, Terrence C. 1990. *Time Series Techniques for Economists*. Cambridge: Cambridge University Press.

Mills, Terrence C. and Raphael N. Markellos. 2008. *The Econometric Modelling of Financial Times Series, 3rd edition*. Cambridge: Cambridge University Press.

Sayrs, Lois W. 1989. *Pooled Time Series Analysis*. Beverly Hills, CA: Sage.

August 30 No Class, APSA Conference

September 6 Stationarity and Normality, Introduction to ARIMA

Required Reading

Enders, Chapter 2, pp. 49-78

Enders, Chapter 4, pp. 181-215

*Cromwell, Jeff B., Walter C. Labys, and Michel Terraza. 1994. *Univariate Tests for Time Series Models*. Beverly Hills, CA: Sage, pp. 1-36.

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

Hamilton (1994), Chapters 1-2

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.

September 13 Autoregressive Integrated Moving Average (ARIMA) Models

Required Reading

Enders, Chapter 2, pp. 79-103

Brandt and Williams, Chapter 1

*Li, R.P. 1976. "A Dynamic Comparative Analysis of Presidential and House Elections."
American Journal of Political Science 20(4): 671-691.

Recommended Reading

Granger and Newbold (1986), Chapter 5

Hamilton (1994), Chapter 3

McCleary and Hay (1980)

Mills (1990), Chapter 7, 8, 10

McDowall et al (1980), pages 1-54

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.

September 20 Panel Unit Root Tests and Near/Fractional Integration

Required Reading

Enders, Chapter 4, pp. 215-247

*DeBoef, Suzanna and Jim Granato. 1997. "Near-Integrated Data and the Analysis of Political
Relationships." *American Journal of Political Science* 41(2): 619-640.

*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.

*Banerjee, Anindya. 1999. "Panel Data Unit Roots and Cointegration: An Overview." *Oxford
Bulletin of Economics and Statistics* 61(S1): 607-629.

Recommended Reading

Box-Steffensmeier, Janet M. and Andrew R. Tomlinson. 2000. "Fractional Integration Methods
in Political Science." *Electoral Studies* 19(1): 63-76.

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

Lee, Chien Chiang and Jun-De Lee. 2009. "Income and CO₂ Emissions: Evidence from Panel
Unit Root and Cointegration Tests." *Energy Policy* 37: 413-423.

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(May): 1-24.

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(2): 335-346.

September 27 Intervention/Transfer Function Analysis

Required 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.

*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.

Enders, Chapter 5, pages 272-294

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

Recommended Reading

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.
- Green, Donald, Bradley Palmquist, and Eric Schickler. 1998. “Macropartisanship: A Replication and Critique.” *American Political Science Review* 92(4): 883-899.
- Hibbs, Douglas A. Jr. 1977. “Political Parties and Macroeconomic Policy.” *American Political Science Review* 71(4): 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* 8: 137-179.
- Moe, Terry M. 1982. “Regulatory Performance and Presidential Administration.” *American Journal of Political Science* 26(2): 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(2): 227-247.
- Rasler, Karen. 1986. “War, Accommodation, and Violence in the United States, 1890-1970.” *American Political Science Review* 80(3): 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.

October 4 Interrupted Time Series Analysis & Distributed Lag/OLS Models

Required Reading

- *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.
- *Ravines, Romy R., Alexandra M. Schmidt, and Helio S. Migon. 2006. “Revisiting Distributed Lag Models Through a Bayesian Perspective.” *Applied Stochastic Models in Business and Industry* 22:193-210.
- *Wood, B. Dan and Richard W. Waterman. 1993. “The Dynamics of Political-Bureaucratic Adaptation.” *American Journal of Political Science* 37(2): 497-528.
- *Box-Steffensmeier, Janet M, Suzanna de Boef, and Tse-min Lin. 2004. “The Dynamics of the Partisan Gender Gap.” *American Political Science Review* 98(3): 515-528.

Recommended Reading

- Box-Steffensmeier, Janet M. and Tse-min Lin. 1996. “A Dynamic Model of Campaign Spending in Congressional Elections.” *Political Analysis* 6(1): 37-66.
- 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.
- Burkhart, Ross E. and Michael S. Lewis-Beck. 1994. “Comparative Democracy: The Economic Development Thesis.” *American Political Science Review* 88(4): 903-910.
- Lewis-Beck, Michael S. and John R. Alford. 1980. “Can Government Regulate Safety? The Coal Mine Example.” *American Political Science Review* 74(3): 745-756.
- Monroe, Kristen R. 1981. “Presidential Popularity: An Almon Distributed Lag Model.” *Political Methodology* 7(1): 43-69.

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.

October 11 Cointegration and Error Correction Models, Part I

Required Reading

Enders, Chapter 6

*De Boef, Suzanna and Luke Keele. 2008. "Taking Time Seriously." *American Journal of Political Science* 52(1): 184-200.

*Breitung, Jörg and M. Hashem Pesaran. "Unit Roots and Cointegration in Panels." Chapter 9 in Laszlo Matyas and Patrick Sevestre, eds., *The Econometrics of Panel Data*. Springer.

Recommended Reading

Granger (1990)

Westerlund, Woakim. 2007. "Testing for Error Correction in Panel Data." *Oxford Bulletin of Economics and Statistics* 69(6): 709-748.

October 18 Cointegration and Error Correction Models, Part II

Required Reading

*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* 4(1): 127-183.

*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.

*Lebo, Matthew J. and Will H. Moore. 2003. "Dynamic Foreign Policy Behavior." *Journal of Conflict Resolution* 47(1): 13-32.

*Hansford, Thomas. 2011. "The Dynamics of Interest Representation at the U.S. Supreme Court." *Political Research Quarterly* XX(X): 1-16.

*Haber, Stephen and Victor Menaldo. 2011. "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse." *American Political Science Review* 105(1): 1-26.

Recommended Reading

Adam, Christopher. 1991. "Financial Innovation and the Demand for £M3 in the UK: 1975-1986." *Oxford Bulletin of Economics and Statistics* 53(4): 401-424.

Beck, Nathaniel. 1993. "The Methodology of Cointegration." *Political Analysis* 4(1): 237-248.

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 et al (1994), pages 17-31, 68-70

DeBoef, Suzanna. 2001. "Modeling Equilibrium Relationships: Error Correction Models with Strongly Autoregressive Data." *Political Analysis* 9(1): 78-94.

Dickey, David A., Dennis W. Jansen, and Daniel L. Thornton. 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* 4(1): 185-228.

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

- Engle, R.F. and C.W.J. Granger. 1991. *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(2-3): 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* 4(1): 249-254.
- Williams, John. 1992. "What Goes Around Comes Around: Unit Root Tests and Cointegration." *Political Analysis* 4(1): 229-236.

October 25 Vector Autoregression (VAR) and Granger Causality

Required Reading

- Enders, Chapter 5 (pages 297-329)
- Brandt and Williams, Chapter 2
- *Freeman, John. 1983. "Granger Causality and the Time Series Analysis of Political Relationships." *American Journal of Political Science* 27(2): 327-358.
- *Thurman, Walter N. and Mark E. Fisher. 1988. "Chickens, Eggs, and Causality, or Which Came First?" *American Journal of Agricultural Economics* 70(2): 237-238.
- *Hood, M.V. III, Quentin Kidd, and Irwin L. Morris. 2008. "Two Sides of the Same Coin? Employing Granger Causality Tests in a Time Series Cross-Section Framework." *Political Analysis* 16(3): 324-344.

Recommended Reading

- Brandt, Patrick T. and John R. Freeman. 2009. "Modeling Macro-Political Dynamics." *Political Analysis* 17(2): 113-142.
- Cromwell et al (1994), pages 32-67
- Engle, Robert F., David F. Hendry, and Jean-Francois Richard. 1983. "Exogeneity." *Econometrica* 51(2): 277-304.
- Freeman, John, Daniel Houser, Paul M. Kellstedt, and John T. Williams. 1998. "Long-Memored 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(4): 842-877.
- 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.
- Granger (1991), Chapters 8, 10 (Sims, Todd)
- 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* 88-05.

- Hoole, Francis and Chi Huang. 1989. "The Global Conflict Process." *Journal of Conflict Resolution*, 33(1): 142-163.
- Mills (1990), pp. 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.
- Stock, James H. and Mark W. Watson. 2001. "Vector Autoregressions." *Journal of Economic Perspectives* 15(4): 101-115.
- Williams, John T. 1992. "Dynamic Change, Specification Uncertainty, and Bayesian Vector Autoregression Analysis." *Political Analysis* 4(1): 97-125.
- Williams, John T. and Brian K. Collins. 1997. "The Political Economy of Corporate Taxation." *American Journal of Political Science* 41(1): 208-244.

November 1 VAR Applications

Required Reading

Brandt and Williams, Chapter 3

- *Brandt, Patrick T., Michael Colaresi, and John R. Freeman. 2008. "The Dynamics of Reciprocity, Accountability, and Credibility." *Journal of Conflict Resolution* 52(3): 343-374.
- *Box-Steffensmeier, Janet M., David Darmofal, and Christian A. Farrell. 2009. "The Aggregate Dynamics of Campaigns." *Journal of Politics* 71(1): 309-323.
- *Wood, B. Dan. 2009. "Presidential Saber Rattling and the Economy." *American Journal of Political Science* 53(3): 695-709.

Recommended Reading

- Bauwens, Luc, Michel Lubrano, and Jean-Francois Richard. 1999. *Bayesian Inference in Dynamic Econometric Models*. Oxford: Oxford University Press.
- Brandt, Patrick T. and John R. Freeman. 2006. "Advances in Bayesian Time Series Modeling and the Study of Politics: Theory Testing, Forecasting, and Policy Analysis." *Political Analysis* 14(1): 1-36.
- Goldstein, Joshua S. and John R. Freeman. 1990. *Three Way Street: Strategic Reciprocity in World Politics*. Chicago, IL: University of Chicago Press.
- Goldstein, Joshua S. and Jon Pevehouse. 1997. "Reciprocity, Bullying, and International Cooperation: Time-series Analysis of the Bosnian Conflict." *American Political Science Review* 91(3): 515-529.
- Kadane, Joseph B., Ngai Hang Chan and Lara J. Wolfson. 1996. "Priors for Unit Root Models." *Journal of Econometrics* 75(1): 99-111.
- Litterman, Robert B. 1986. "Forecasting with Bayesian Vector Autoregressions: Five Years of Experience." *Journal of Business and Economic Statistics* 4(1): 25-38.
- McGinnis, Michael D. and John T. Williams. 1989. "Change and Stability in Superpower Rivalry." *American Political Science Review* 83(4): 1101-1123.
- McGinnis, Michael D. and John T. Williams. 2001. *Compound Dilemmas: Democracy, Collective Action, and Superpower Rivalry*. Ann Arbor, MI: University of Michigan Press.
- Sims, Christopher A. and Tao Zha. 1998. "Bayesian Methods for Dynamic Multivariate Models." *International Economic Review* 39(4): 949-968.

- Williams, John T. 1990. "The Political Manipulation of Macroeconomic Policy." *American Political Science Review* 84(3): 767-796.
- Zeitoff, Thomas. 2011. "Using Social Media to Model Conflict Dynamics: An Application to the 2008-2009 Gaza Conflict." *Journal of Conflict Resolution*, Forthcoming.

November 8 ARCH Models

Required Reading

Enders, Chapter 3

- *Leblang, David and Bumba Mukherjee. 2004. "Presidential Elections and the Stock Market: Comparing Markov-Switching and Fractionally Integrated GARCH Models of Volatility." *Political Analysis* 12(3): 296-322.
- *Jensen, Nathan M. and Scott Schmith. 2005. "Market Responses to Politics: The Rise of Lula and the Decline of the Brazilian Stock Market." *Comparative Political Studies* 38(10): 1245-1270.

Recommended Reading

- 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(332): 1509-1526.
- Brehm, John and Paul Gronke. 2002. "History, Heterogeneity, and Presidential Approval: A Modified ARCH Approach." *Electoral Studies* 21(3): 425-452.
- Chow, Gregory. 1960. "Tests of Equality between Sets of Coefficients in Two Linear Regressions." *Econometrica* 28(3): 591-605.
- Dufour, Jean-Marie. 1982. "Recursive Stability Analysis of Linear Regression Relationships." *Journal of Econometrics* 19(1): 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): 157-168.
- Hansen, Bruce E. 2001. "The New Econometrics of Structural Change: Dating Breaks in U.S. Labor Productivity." *Journal of Economic Perspectives* 15(4): 117-128.
- Harvey (1989, 1993)
- Hays, Judith C., John R. Freeman, and Hans Nesseth. 2003. "Exchange Rate Volatility and Democratization in Emerging Market Countries." *International Studies Quarterly* 47(2): 203-288.
- Maddala, G.S. and In-Moo Kim. 2000. *Unit Roots, Cointegration, and Structural Change*. New York: Cambridge University Press.
- Maestas, Cherie and Robert R. Preuhs. 2000. "Modeling Volatility in Political Time Series." *Electoral Studies* 19(1): 95-110.
- Western, Bruce and Meredith Kleykamp. 2004. "A Bayesian Change Point Model for Historical Time Series Analysis." *Political Analysis* 12(4): 354-374.
- White, Halbert. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48(4): 817-838.

November 15 Dynamic Approaches to Time Series Modeling and Time Varying Parameters

Required Reading

Enders, Chapter 2, pp. 103-110.

- *Beck, Nathaniel. 1983. "Time-Varying Parameter Regression Models." *American Journal of Political Science* 27(3): 557-600.
- *Mitchell, Sara McLaughlin, Scott Gates and Håvard Hegre. 1999. "Evolution in Democracy-War Dynamics." *Journal of Conflict Resolution* 43(6): 771-792.
- *Lebo, Matthew J. and Janet M. Box-Steffensmeier. 2008. "Dynamic Conditional Correlations in Political Science." *American Journal of Political Science* 52(3): 688-704.
- *Keele, Luke and Nathan J. Kelly. 2006. "Dynamic Models for Dynamic Theories: the Ins and Outs of Lagged Dependent Variables." *Political Analysis* 14(2): 186-205.

Recommended Reading

- Beck, Nathaniel. 1989. "Estimating Dynamic Models Using Kalman Filtering." *Political Analysis* 1(1): 121-156.
- Beck, Nathaniel. 1991. "Comparing Dynamic Specifications: The Case of Presidential Approval." *Political Analysis* 3(1): 51-87.
- Hansen, Bruce E. 1992. "Testing for Parameter Instability in Linear Models." *Journal of Policy Modeling* 14(4): 517-533.
- 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(3): 603-618.

November 22 No Class, Thanksgiving Break

November 29 Pooled Time Series Models

Required Reading

- *Stimson, James A. 1985. "Regression in Space and Time: A Statistical Essay." *American Journal of Political Science* 29(4): 914-945.
- *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(3): 634-647.
- *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.
- *Carter, David B. and Curtis S. Signorino. 2010. "Back to the Future: Modeling Time Dependence in Binary Data." *Political Analysis* 18(3): 271-292.

Recommended Reading

- Special Issue of *Political Analysis*, "From Statistical Nuisances to Serious Modeling: Changing How We Think About the Analysis of Time-Series-Cross-Section Data." 2007, Volume 15, Number 2.
- Beck, Nathaniel. 2008. "Time-Series—Cross-Section Methods." In *Oxford Handbook of Political Methodology*. Janet Box-Steffensmeier, Henry Brady and David Collier (eds.). New York: Oxford University Press. (pp. 475-93)
- Beck, Nathaniel. 2001. "Time-Series-Cross-Section Data: What Have We Learned in the Past Few Years?" *Annual Review of Political Science* 4: 271-293.
- Beck, Nathaniel and Jonathan N. Katz. 1996. "Nuisance vs. Substance: Specifying and

- Estimating Time-Series-Cross-Section Models.” *Political Analysis* 6(1): 1-36.
- Beck, Nathaniel and Jonathan N. Katz. 2001. “Throwing Out the Baby With the Bath Water: A Comment on Green, Kim, and Yoon.” *International Organization* 55(2): 487-495.
- Finkel, Steven. 1995. *Causal Analysis With Panel Data*. Beverly Hills: Sage.
- Fording, Richard C. 1997. “The Conditional Effect of Violence as a Political Tactic: Mass Insurgency, Welfare Generosity, and Electoral Context in the American States.” *American Journal of Political Science* 41(1): 1-29.
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December 6 Modeling Dynamics in Event Count Data & Temporal Aggregation

Required Reading

- *Brandt, Patrick T., John T. Williams, Benjamin O. Fordham and Brian Pollins. 2001. “Dynamic Modeling for Persistent Event-Count Time Series.” *American Journal of Political Science* 44(4): 823-843.
- *Brandt, Patrick T. and John T. Williams. 2001. “A Linear Poisson Autoregressive Model: The Poisson AR(p) Model.” *Political Analysis* 9(2): 164-184.
- *Mitchell, Sara McLaughlin and Will H. Moore. 2002. “Presidential Uses of Force during the Cold War: Aggregation, Truncation, and Temporal Dynamics.” *American Journal of Political Science* 46(2): 438-452.
- *Shellman, Stephen M. 2004. “Time Series Intervals and Statistical Inference: The Effects of Temporal Aggregation on Event Data Analysis.” *Political Analysis* 12(1): 97-104.

Teaching Policies & Procedures

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS [Student Academic Handbook](#).

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (*Operations Manual*, [III.15.2](#). Scroll down to k.11.)

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty

The College of Liberal Arts and Sciences expects all students to do their own work, as stated in the [CLAS Code of Academic Honesty](#). Instructors fail any assignment that shows evidence of plagiarism or other forms of cheating, also reporting the student's name to the College. A student reported to the College for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

CLAS Final Examination Policies

Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS [Student Academic Handbook](#).

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI [Comprehensive Guide on Sexual Harassment](#) for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the

classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety [web site](#).

Student Resources: The Writing Center www.uiowa.edu/~writingc/ and the Campus Information Center's Tutor Referral Services <http://imu.uiowa.edu/cic/> at the IMU.

*These CLAS policy and procedural statements have been summarized from the web pages of the [College of Liberal Arts and Sciences](#) and The University of Iowa [Operations Manual](#).