



Political Science 8125 & 7788

**Dynamic Analysis (Time Series Modeling in Politics)**

Electronic Classrooms

Spring Semester 2018

11:00-1:00 CST/12:00-2:00 EST, Fridays

Office hours, skype, google circles, etc by appoinment.

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This course studies statistical techniques used to analyze social processes occurring through time. The course introduces students to time series methods and to the applications of these methods in political science. We begin by discussing social problems that are inherently dynamic in nature and also how time series are measured. We then review the calculus of finite differences. We move next to the study stationary ARMA models. In the following section of the course, we examine a number of important topics in time series analysis including "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression also is discussed. We learn not only how to construct these models but also how to use time series models in social scientific analyses.

We expect students to have a firm grounding in probability and regression analysis and to bring to the course some interesting questions about the dynamics of political processes. The emphasis throughout the course is on application, rather than on statistical theory. However, the focus of most lectures will be statistical theory. Homework focuses as much as possible on the time series you are interested in understanding. To that end, students must gather time serial data for their analyses. It is strongly recommended that this task be

completed in the first or second week of class (these data need not be used throughout the term, though that would make your life easier). The length of the series should be at least 40 time points; longer series are better than shorter ones.

This is a 12-week seminar team-taught by the 3 J's: Jan, John, and Jon.

### Schedule

We expect to cover the following topics on the dates indicated, though we may adjust the schedule slightly as the course progresses. The professor indicated for each topic will take the lead on the respective day. She or he also will prioritize the reading (one week ahead of her or his session)

- Topic 1: Motivation, Measurement & Intro to Difference Equations – Freeman lead, Jan. 22
- Topic 2: The Calculus of Finite Differences – Freeman lead, Jan. 29
- Topic 3: ARIMA Models – Box-Steffensmeier lead, Feb. 5
- Topic 4: Unit Roots, Near Integration and Fractional Integration – Pevehouse lead, Feb. 12
- Topic 5: Intervention Analysis & Changes in Regimes – Pevehouse lead, Feb. 19
- Topic 6: ARCH, GARCH, FIGARCH Models – Box-Steffensmeier lead, Feb.26
- Topic 7: Forecasting, DCC Models, Time Series Count Models - Box-Steffensmeier lead, March 4
- Topic 8: Time Series Regression Analysis – Pevehouse lead, March 11
- Topic 9: VAR/Reduced Form Methods – Freeman lead, April 1
- Topic 10: Cointegration & ECMs – Box-Steffensmeier lead, April 15
- Topic 11: Cointegration & ECMs continued – Pevehouse lead April 22
- Topic 12: Bayesian Time Series Analysis & Sendoff – Freeman lead April 29

### Required Text

Box-Steffensmeier, Janet M. John R. Freeman, Matthew P. Hitt, and Jon C. W. Pevehouse. 2015. *Time Series Analysis for the Social Sciences*. Cambridge: Cambridge University Press. **We denote the book by TSASS.**

### Recommended Text

We will reference the following book a fair amount during the course. Students may find it helpful to own this book as well. Alternatively, copies of assigned chapters can be found on the class website.

Enders, Walter. 2009. *Applied Econometric Time Series*. 3<sup>rd</sup> ed. N.Y.: Wiley.<sup>1</sup>

### Other Recommended Texts:

Other books that serve as excellent references include:

Cryer, Jonathan and Kung-Sik Chan. 2010. *Time Series Analysis: With Applications in R*. Springer.

Goldberg, S. 2010. *Introduction to Difference Equations*. New York: Dover Publications.

Gujarati, Damodar, and Dawn Porter. 2008. *Basic Econometrics*, 5th. New York: McGraw-Hill

Hamilton, J.D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press.

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<sup>1</sup> Students may use the Fourth Edition of Enders book. However this syllabus uses page numbers in Enders' Third Edition.

Huckfeldt, R. Robert, C.W. Kohfeld, and T.W. Likens. 1982. *Dynamic Modeling: An Introduction* Beverly Hills, CA.: Sage.

McCleary, R. and R.A. Hay, Jr. 1980. *Applied Time Series Analysis for the Social Sciences* Beverly Hills, CA.: Sage. A Classic!

Maddala, G.S., and In-Moo Kim. 2000. *Unit Roots, Cointegration, and Structural Change*. Cambridge, MA: Cambridge University Press.

Mills, Terence C. 1991. *Time Series Techniques for Economists*. New York: Cambridge University Press.

Prado, R. and M. West 2010. *Time Series: Modeling, Computation and Inference* CRC Press.

Shumway, Robert H. 2013. *Time Series Analysis and Its Applications: With R Examples*. Springer.

### Software

STATA is the primary statistical package we will use. The STATA website is: <http://www.stata.com/>  
You are welcome to use RATS, R, or other software as well, but please inform the instructors first.

### Course Assignments

Students will complete four written assignments and give a short (approximately 15 minutes) oral presentation/critique. The assignments will be worth a total of 200 points. See the Assignment links on the website for more details.

1) The presentation should be on one of the articles on the syllabus or another application chosen in consultation with the instructor. Many of the articles on the syllabus are applications. These applications are essential to rounding out the class understanding of the methods. The applications also serve as catalysts for discussion. No more than 5 minutes of your presentation should be a summary of the article. Most of your 15 minutes should be devoted to critique and to leading class discussion. There will typically be 2 students presenting any one article and usually from different universities. Another option for presentations is camtasia (or alternative video recording program). If you choose this option, your presentation will be posted on the class website and you will facilitate and encourage online discussion. Jon Pevehouse will be coordinating the presentations so please email him your preferences about which article you want to present. The presentation is worth 35 points.

2) Problem set. A problem set on the calculus of finite differences must be completed. The problem set is worth 25 points.

3) Short paper. Students have two options for the short paper. The first is a critique of any application article on the syllabus. The second option is a critical evaluation of the Sprague article from the assigned readings in week II (Topic 2). The short paper is worth 25 points. It should be about 5 pages in length.

4) The next assignment is considerably larger in scope. Students will estimate and interpret an ARIMA model of their data. Again, the data set for this assignment must be composed of at least 40 time points. The data set need not be the same one students use for the next assignment, however, we recommend it. [Students are welcome to use their own, original data, data from the

website for TASS (<https://sites.google.com/site/timeseriesanalysisocsci/home>), or another existing data set. There is a limit of 8 pages (not including computer output). The ARIMA assignment is worth 55 points.

5) Finally, an additional (approximately 8 pages, not including computer output) paper analyzing a substantive problem using time series data and techniques is required. Vector Autoregression, Error Correction, or other advanced techniques should be used. Emphasis should be on explaining the methods and interpretation of the results. The assignment is worth 60 points.

## COURSE OUTLINE

The required readings are available on the course website which is located on the OSU Carmen system.

**Topic 1 [January 22]:** *Motivation, Measurement, and an Introduction to Time Series & Difference Equations - Freeman*

### REQUIRED

“Modeling Social Dynamics” Chapter 1 in TSASS

### Recommended (Motivation)

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.

Brunner, R.D. and K. Liepelt. 1972. “Data Analysis, Process Analysis and System Change” *Midwest (American) Journal of Political Science [AJPS]* 17(1): 538-569.

Cortes, et. al. 1974. *Systems Analysis for Social Scientists*. NY: Wiley: Chap. 1

Hamilton, J. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press: Chaps. 1

### Recommended (Time Series Measurement)

Freeman, John R. 1990. “Systematic Sampling, Temporal Aggregation and the Time Series Analysis of Political Relationships.” *Political Analysis* vol. 1. J. Stimson Editor.

Garratt, Anthony and Shaun P. Vahey. 2006. “U.K. Real Time Macro Data Characteristics.” *The Economic Journal* 116(February) F119-F135.

Georgoutsos, D.A., G.P. Kouretas, D.E. Tserkezos. 1998. “Temporal Aggregation in Structural VAR Models.” *Applied Stochastic Models and Data Analysis* 14: 19-34.

Granger, Clive W.J. 1990. “Aggregation of Time-Series Variables: A Survey.” *Disaggregation in Econometric Modeling*: 17-34.

Granger, Clive W.J. and P.R. Sikklos. 1995. “Systematic Sampling, Temporal Aggregation, Seasonal Adjustment, and Cointegration: Theory and Evidence.” *Journal of Econometrics* 66: 357-369.

Robertson, John C. and Ellis W. Tallman. "Data Vintages and Measuring Forecast Model Performance." *Economic Review* Atlanta, GA: Federal Reserve Bank of Atlanta, Fourth Quarter, 1998: 4-20.

Tiao, G.C. and W. Wei. 1976. "Effect of Temporal Aggregation on the Dynamic Relationship of Two Time Series Variables." *Biometrika* 63(3): 513-523.

Zellner, A. and C. Montemarquette. 1971 "A Study of Some Aspects of Temporal Aggregation" *Review of Economics and Statistics* 53: 335-342.

**Topic 2 [January 29] The Calculus of Finite Differences; Difference Equations-Freeman**

Required

"Time Series Models as Difference Equations" Appendix in TASS.

Enders. Third Edition, Chapter 1.

Przeworski, Adam and John Sprague. 1986. *Paper Stones: A History of Electoral Socialism* University of Chicago Press. Pps. 1-11, 57-99 and 187-201.

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

Recommended

Freeman, J. and D. Snidal. 1982. "Diffusion, Development and Democratization in Western Europe." *Canadian Journal of Political Science* 15 (2): 299-329.

Huckfeldt et. al., 1982 *Dynamic Modeling: An Introduction* Sage Publications.

Richards, D. 1993. "A Chaotic Model of Power Concentration in the International System." *International Studies Quarterly* 37: 55-72.

Zinnes, D.A. and R.G. Muncaster. 1984. "The Dynamics of Hostile Activity and the Prediction of War." *Journal of Conflict Resolution* 28 (2): 187-229.

**Topic 3 [February 5]: ARIMA Models – Box-Steffensmeier**

REQUIRED

"Univariate Time Series Models" Chapter 2 in TSASS.

Enders, Third Edition, Chapter 2.

Recommended

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

Hamilton, Chapters 2, 3.

Haynie, S. 1992. "Leadership and Consensus on the U.S. Supreme Court." *Journal of Politics [JOP]* 54(4): 1158-1169.

Li, R. P. 1976. "A Dynamic Comparative Analysis of Presidential and House Elections." *AJPS* 20: 670-691.

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

MacKuen, M., R. Erickson, and J. Stimson. 1989. "Macropartisanship." *American Political Science Review* 83(December): 1125-42.

McCleary and Hay. 1980. *Applied Time Series Analysis for the Social Sciences* Beverley Hills, CA,: Chps 2, 6.

O'Connor, Brendan, Ramnath Balasubramanyan, Bryan R. Routledg, and Noah A. Smith. 2010. "From Tweets to Polls: Linking Text Sentiment to Public Opinion Time Series." *Proceedings of the international AAAI Conference on Weblogs and Social Media*.

Quinn, D. P. and R. Jacobson. 1989 "Industrial Policy Through Restrictions on Capital Flows" *American Journal of Political Science [AJPS]* 33(3): 700-736.

**Topic 4 [February 12]:** *Unit Roots, Near Integration, and Fractional Integration – Pevehouse*

REQUIRED

"Univariate, Non-Stationary Processes: Tests and Modeling" Chapter 5 in TSASS.

"Selections on Time Series Analysis" Chapter 7 in TSASS, specifically 7.1 Fractional Integration

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

Enders, Third Edition, Sections 4.1-4.10

Lebo, Matthew, Robert W. Walker, and Harold D. Clarke. 2000. "You Must Remember This: Dealing with Long Memory in Political Analyses." *Electoral Studies*, Vol. 19, No. 2. (March): 31-48.

Recommended

Box-Steffensmeier, Janet M., and Renee M. Smith. 1998. "Investigating Political Dynamics Using Fractional Integration Methods." *American Journal of Political Science* 42(2): 661-89.

Brooks, Chris, Melvin J. Hinich, and Robert E. Molyneux. 1999. "Episodic Nonlinear Event Detection: Political Epochs in Exchange Rates." in *Political Complexity*, ed., Diana Richards. University of Michigan Press.

Chambers, Marcus J. 1998. "Long Memory and Aggregation in Macroeconomic Time Series." *International Economic Review* 39 (4): 1053-1072.

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

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

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*, Vol. 42, No. 4. (Oct.): 1289-1327.

Hamilton, J.D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press: Chapters 15-20.

Lebo, Matthew, and Harold D. Clarke. 2000. "Modelling Memory and Volatility: Recent Advances in the Analysis of Political Time Series." *Electoral Studies*, Vol. 19, No. 2. (March): 1-7.

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

Maddala, G.S., and In-Moo Kim. 2000. *Unit Roots, Cointegration, and Structural Change*. Cambridge: Cambridge University Press: Chapters 4, 6, 9.

Rossana, Robert J. and John Seater. 1992. "Aggregation, Unit Roots, and the Time Series Structure of Manufacturing Real Wages." *International Economic Review* 33 (1): 159-179.

#### **Topic 5 [February 19]: Intervention Models and Changes in Regime – Pevehouse**

##### REQUIRED

"Univariate Time Series Models" Chapter 2 in TSASS (previously assigned).

Enders, Third edition: Sections 4.8 (reread) and 5.1 (pps. 273-280)

Enders' video presentation – see website.

Hibbs, D. 1977. "Political Parties and Macroeconomic Performance." *American Political Science Review* 71(4): 1467-1479.

##### Recommended

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

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.

Corporale, Tony and Kevin Greier 2005 How Smart Is My Dummy? Time Series Tests for the Influence of Politics. *Political Analysis* 13:77-94.

Flemming, R., J. Bohte, B. D. Wood. 1997. "One Voice Among Many: The Supreme Court's Influence on Attentiveness to Issues in the US, 1947-92." *AJPS* 41(4): 1224-50.

McCleary and Hay, Chapter 3,4.

Rasler, K. and W. Thompson, 1985. "War and the Economic Growth of the Major Powers." *American Journal of Political Science* 29(3): 513-538.

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

Roberts, Brian. 1990. "A Dead Senator Tells No Lies: Seniority and the Distribution of Federal Benefits." *American Journal of Political Science*. Vol. 34, no. 1, 31-58.

Wood, B. Dan. 1988. "Principals, Bureaucrats, and Responsiveness in Clean Air Enforcements." *American Political Science Review* 82(1): pp. 213-236.

Wood, B. Dan and R. W. Waterman. 1991. "The Dynamics of Control of Bureaucracy" *American Political Science Review* 85(3): 801-828.

Yantek, T. 1988. "Polity and Economy Under Extreme Economic Conditions: A Comparative Study of The Reagan and Thatcher Experiences." *AJPS* 32(1): 196-216.

**Topic 6 [February 26]: ARCH, GARCH, FIGARCH, and Changes in Regime – Box-Steffensmeier**

REQUIRED

"Selections on Time Series Analysis" Chapter 7 in TSASS, specifically 7.2 and 7.4.

Brehm, John and Paul Gronke. 2002. "History, Heterogeneity, and Presidential Approval: A Modified ARCH Approach." *Electoral Studies* 21 (3): 425-452.

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

Enders, Third Edition, Sections 3.1-3.9 and Section 4.8 (reread)

Freeman, John, Jude C. Hays, Helmut Stix. 2000. "Democracy and Markets: The Case of Exchange Rates." *American Journal of Political Science*, (July): 449-468.

Recommended

Bauwens, L., S. Laurent, and J.V.K.Rombouts 2006. "Multivariate GARCH Models: A Survey" *Journal of Applied Econometrics* 21: 79-109.

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.

Hays, Jude, J.R. Freeman and H. Nesseth. 2003. "Exchange Rate Volatility and Democratization in Emerging Market Countries." *International Studies Quarterly* 47: 203-288.

Maddala, G.S., and In-Moo Kim. 2000. *Unit Roots, Cointegration, and Structural Change*. Cambridge: Cambridge University Press: Chapter.

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

Park, Jong Hee. 2011. "Changepoint Models for Binary and Ordinal Probit Models: An Application to Bank Rate Policy in the Interwar Period." *Political Analysis* 19(2): 188-204.

Park, Jong Hee. 2010. "Structural Change in the U.S. Presidents' Use of Force Abroad." *American Journal of Political Science* 54(3).

There is a new body of work in econometrics which aims to detect financial crises. An example is:

Phillips, P.C. B. and J. Yu (2011) "Dating the Timeline of Financial Bubbles During the Subprime Crisis," *Quantitative Economics* 2: 455-491.

**Topic 7 [March 4]:** *Forecasting, DCC Models, Time Series Count Models – Box-Steffensmeier*

REQUIRED for Forecasting

"Selections on Time Series Analysis" Chapter 7 in TSASS, particularly 7.3 Forecasting.

Clements, Michael P. and David F. Hendry "An Introduction to Forecasting" Chapter 1 in *Forecasting Economic Time Series* NY Cambridge University Press, 1998: 1-32.

Pindyck, Robert and Daniel L. Rubinfeld, "Estimating and Forecasting with Time Series Models" Chapter 18 in *Economic Models and Econometric Forecasting* Fourth Edition NY McGraw Hill, 1998: 549-579..

Kou, S. G. and Michael E. Sobel (2004) "Forecasting the Vote: A Comparison Of Election Market and Public Opinion Polls" *Political Analysis* 12(3), 2004: 277-295.

REQUIRED for DCC & Time Series Count Models

"Selections on Time Series Analysis" Chapter 7 in TSASS, particularly 7.2 Incorporating Heterogeneity

Brandt, Patrick, John Williams, Benjamin Fordham, and Brian Pollins. 2000 "Dynamic Modeling for Persistent Event Count Time Series" *AJPS* October: 823-843.

Lebo, Matthew, and Janet M. Box-Steffensmeier. 2008. "Dynamic Conditional Correlations in Political Science." *American Journal of Political Science*. 52(3): 688-704.

Mitchell, Sara McLaughlin, Scott Gates and Håvard Hegre. 1999. "Evolution in Democracy-War Dynamics." *Journal of Conflict Resolution* 43(6): 771-792.

Recommended for Forecasting

Brandt, Patrick, John R. Freeman, and Philip A. Schrodt. 2014. "Evaluating Forecasts of Political Conflict Dynamics." *International Journal of Forecasting*. 30(4): 944-962

Brandt, Patrick, John R. Freeman, and Philip A. Schrodt. 2011. "Real Time, Ex Ante Time Series Forecasting of Inter- and Intra-state Political Conflict." *Conflict Management And Peace Science*, 28(1): 41-64.

Clements and Hendry, "Evaluating Forecast Accuracy" Chapter Three in *Forecasting Economic Time Series* pps. 52-78.

Montgomery, Jacob, Florian M. Hollenbach and Michael D. Ward (2012) "Improving Predictions Using Bayesian Ensemble Model Averaging" *Political Analysis* 20(3): 271-291.

"Political Forecasting" A Special Issue of *International Journal of Forecasting* 1999. L. Sigelman, R. Batchelor and H. Steklar eds. [Articles on forecasting U.S, British, and French election outcomes as well as Dutch partisanship.]

Symposia and articles on forecasting particular elections in the U.S. and the American States by year of election:

2008, *PS: Political Science & Politics* 61(4) 2008

2004, *PS: Political Science & Politics* 38(1), 2005: 23-40

*PS: Political Science & Politics* 37(4), 2004: 733-768, 813-821

1996, Wlezien and Erikson, "Temporal Horizons and Presidential Election Forecasts" *American Politics Quarterly (now APR)* 1996

1992, *The Political Methodologist* 5(2): 1994: 2-23

*PS: Political Science & Politics* 26, 1993: 17-23

Campbell, J. and T Mann, "Forecasting the 1992 Presidential Election: A User's Guide to the Models" *The Brookings Review* Fall, 1992: 22-27.

#### Recommended for DCC & Time Series Count Models

Almqvist, Zach and Carter T. Butts (2013) "Dynamic Network Logistic Regression: A Logit Choice Analysis of Inter and Intra-Group Blog Citation Dynamics in the 2004 U.S. Presidential Election" *Political Analysis* 21(4): 430-448.

Dickinson, Matthew J., and Matthew J. Lebo. 2007. "Reexamining the Growth of the Institutional Presidency." *Journal of Politics*. 69(1).

Franzese, Robert Jr., Jude Hays, and Aya Kachi (2012) "Modeling History Dependence In Network-Behavior Coevolution" *Political Analysis* 20(2): 175-190.

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.

Video presentation by Matt Lebo – see website.

**Topic 8 [March 11]: *Time Series Regression Principles – Pevehouse***

REQUIRED

“Dynamic Regression Models” – Chapter 3 in TSASS

Keele, Luke J. and Suzanna DeBoef. (2008). "Taking Time Seriously" *AJPS* 52 (1): 184-200.

Keele, Luke J. and Nathan J. Kelly (2006). "Dynamic Models for Dynamic Theories: The Ins and Outs of Lagged Dependent Variables." *Political Analysis*.

Recommended

Beck, N. 1985. “Estimating Dynamic Models is not Merely a Matter of Technique.” *Political Methodology* 11 (1-2): 71-90.

Beck, Nathaniel. 1991. “Comparing Dynamic Specifications: The Case of Presidential Approval.” *Political Analysis* 3: 51-88.

Box-Steffensmeier, Janet M. and Tse-Min Lin. 1995. “A Dynamic Model of Campaign Spending in Congressional Campaigns.” *Political Analysis* 6

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

Gujarati, Damodar. 1995. *Basic Econometrics, 3<sup>rd</sup> Edition*. New York: McGraw-Hill: Chapter 17.

Jackson, John and Kenneth Kollman (2012) “Modeling, Measuring, and Distinguishing Path Dependence and Outcome Dependence,” *Political Analysis* 20(2): 157-175.

Hamilton, J.D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press: Chapter 8.

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

Mitchell, S. M. and W. Moore. 2002. “Presidential Uses of Force During the Cold War: Aggregation, Truncation, and Temporal Dynamics.” *American Journal of Political Science* 46 (2): 438-453.

**Topic 9 [April 1]: *VAR/“Reduced Form” Methods - Freeman***

REQUIRED

“Modeling the Dynamics of Social Systems” – Chapter 4 in TSASS

Enders, Edition, Sections 5.4-5.9.

Freeman, J. Williams, and T. Lin. 1989. “Vector Autoregression and the Study of Politics.” *American Journal of Political Science*: 842-877.

## Recommended

Box-Steffensmeier, Janet M., David Darmofal, and Christian A. Farrell. 2009. "The Aggregate Dynamics of Campaigns." *Journal of Politics* 71(1): 309-323.

Brandt, Patrick T. and John R. Freeman. 2009. "Modeling Macro-Political Dynamics." *Political Analysis* 17(2): 113-142.

Brandt, Patrick, and John T. Williams 2007. *Multiple Time Series Models*. Sage.

Du, Yingxin and Ju, Jiandong and Ramirez, Carlos D. and Yao, Xi, Bilateral Trade and Shocks in Political Relations: Evidence from China and Some of its Major Trading Partners, 1990–2012 (December 16, 2014). GMU Working Paper in Economics No. 14-50. Available at SSRN: <http://ssrn.com/abstract=2539384> or <http://dx.doi.org/10.2139/ssrn.2539384>

Dufor, Jean-Marie and David Tessier, 1993. "On the Relationship between Impulse Response Analysis, Innovation Accounting and Granger Causality." *Economic Letters* 42: 327-333.

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

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

Goldstein, J. S., J. Pevehouse, D. Gerner, and S. Telhami. 2001. "Dynamics of Middle East Conflict and U.S. Influence, 1979-1997." *Journal of Conflict Resolution* 45 (5): 594-620.

Goldstein, J. and J. Pevehouse. 1997. "Reciprocity, Bullying, and International Cooperation: Time-series Analysis of the Bosnian Conflict." *American Political Science Review* 91 (3): 515-529.

Goldstein, J. and J. Freeman. 1990. *Three Way Street: Strategic Reciprocity in World Politics* Chicago: University of Chicago Press.

Gujarati, Damodar. 1995. *Basic Econometrics, 3<sup>rd</sup> Edition*. New York: McGraw-Hill: 746-53.

Hamilton, J.D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press: Chapters 10-11.

Schneider, G., Margit Bussmann, Constantin Ruhe. 2012. "The Dynamics of Mass Killings: Testing Time-Series Models of One-Sided Violence in the Bosnian Civil War." *International Interactions* 38 (4).

Williams, J. 1990. "The Political Manipulation of the Macroeconomic Policy." *American Political Science Review* 84(3): 767-795.

Zeitsoff, Thomas. 2011. "Using Social Media to Model Conflict Dynamics: An Application to the 2008-2009 Gaza Conflict." *Journal of Conflict Resolution*.

**April 8 – No Class, Meet at MPSA Conference Friday Night Pizza Dinner**

**Topic 10 [April 15] – Cointegration and Error Correction ( Part One) – Box-Steffensemeir**

REQUIRED (Part One)

“Cointegration and Error Correction Models” Chapter 6 in TSASS.

Murray, Michael P. 1994 “A Drunk and Her Dog: An Illustration of Cointegration and Error Correction” *The American Statistician* 48: 37-39.

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.

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

Recommended

See Recommended Readings at Topic 11

**Topic 11[April 22] Cointegration and Error Correction Continued--Pevehouse**

Required

Enders, Third Edition, Chapter 6

A new symposium on this topic is forthcoming in *Political Analysis*, Winter 2016. Read the articles by Box-Steffensmeier and Helgason, Keele et al. and Grant and Lebo. The other pieces are recommended.

\*Box-Steffensmeier, J. and A. Helgason, “Introduction to Symposium on Time Series Error Correction Models in Political Science”

\*Grant, T. and M. Lebo, “Error Correction Methods with Political Time Series”

“Keele, L. , S. Linn, and C. Webb, “Taking Time with All Due Seriousness”

Esarey, J. “Fractionally Integrated Data and the Auto Distributed Lag Model: Results From a Simulation Study”

Freeman, J. Progress in the Study of Nonstationary Political Time Series?

Helgason, A. “Fractional Integration Methods and Short Time Series: Evidence From A Simulation Study.”

Lebo, M. and T Grant. “Equation Balance and Dynamic Political Modeling.”

### Additional Recommended Reading on Cointegration and Error Correction

- Beck, Nathaniel. 1993. "The Methodology of Cointegration." *Political Analysis* 4: 237-248.
- Box-Steffensmeier, Janet M., and Andrew R. Tomlinson. 2000. "Fractional Integration Methods in Political Science." *Electoral Studies* 19 (1, March): 63-76.
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- Engle, R.F. and Clive W.J. Granger. 1987. "Cointegration and Error Correction: Representation, Estimation, and Testing." *Econometrica* 55:251-276.
- Engle, R.F. and Clive W.J. Granger. 1991. *Long Run Economic Relationships: Readings in Cointegration*. New York: Oxford University Press.
- Greene, William H. 1993. *Econometric Analysis, 2<sup>nd</sup> Edition*: Sections 19.3 - 19.6.
- Haber, Stephen and Victor Menaldo. 2011. "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse." *American Political Science Review* 105(1): 1-16.
- Kono, D. 2008 "Democracy and Trade Discrimination" *Journal of Politics* 70: 94-955.
- Krause, George A. 1997. "Voters, Information Heterogeneity, and the Dynamics of Aggregate Economic Expectations." *American Journal of Political Science* 41 (4 Oct.): 1170-1200.
- Ostrom, C. W and R. M. Smith 1993. "Error Correction, Attitude Persistence and Executive Rewards and Punishments: A Behavioral Theory of Presidential Approval" *Political Analysis* Volume 4, J. Freeman Editor.
- Ramirez, M. 2009. "The Dynamics of Partisan Conflict on Congressional Approval. *AJPS* 53 (3): 681-694.
- Smith, Robert. 1993. "Error Correction, Attractions, and Cointegration." *Political Analysis* 4: 249-254.
- Williams, John. 1993. "What Goes Around, Comes Around: Unit Root Tests and Cointegration." *Political Analysis* 4: 229-236.

### **Topic 11 [April 29]: Bayesian Time Series & Sendoff – Freeman** **REQUIRED**

- 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." *Policy Analysis* 14(1): 1-36.
- Brandt, Patrick T., Michael Colaresi, and John R. Freeman 2008 "The Dynamics of Reciprocity, Accountability, and Credibility." *Journal Conflict Resolution* 52(3): 343-379

Kadane, J. B., N.H.Chan, and L.J. Wolfson 1996 “Priors for Unit Root Models” *Journal Of Econometrics* 75: 99-111.

### Recommended

Bauwens, L., M. Lubrano, and J.-F. Richard 1999. *Bayesian Inference in Dynamic Econometric Models*. Oxford University Press.

Brandt, Patrick and John R. Freeman. 2009. “Modeling Macropolitical Dynamics.” *Political Analysis* 17(2): 113-142.

Brandt, Patrick, John R. Freeman, Tse min Lin, and Philip Schrodtt (2014) “A Bayesian Time Series Approach to the Comparison of Conflict Dynamics.” See recommended reading Topic 7.

Brandt, Patrick and Todd Sandler (2012) “A Bayesian Poisson Vector Autogressive Model” *Political Analysis* 29(3): 292-315

Brandt, Patrick et al. See recommended reading Topic 7.

Montgomery et al. See recommended readings Topic 7.

Sattler, Thomas, John R. Freeman, and Patrick Brandt. 2008 “Political Accountability And the Room to Maneuver: A Search for a Causal Chain.” *Comparative Political Studies*. 41(9): 1212-1239 [Corrigendum, 42(1): 125-131.]

Sattler, Thomas, Patrick Brandt, and John R. Freeman. 2010. “Democratic Accountability in Economies.” *Quarterly Journal of Political Science* 5:71-91.

Sims, C.A. and T. Zha 1998. “Bayesian Methods for Dynamic Multivariate Models” *International Economic Review*

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