GOVT 6089: Time Series Analysis

Friday 10:10am - 1:10pm (Location Stimson Hall 206), Fall 2018

Instructor

Peter Enns (peterenns@cornell.edu)
Office Hours: Use `https://enns.youcanbook.me/` to schedule office hours or email to schedule and appointment.

Overview

This course considers statistical techniques to analyze time series data. We will pay particular attention to common time series methods, assumptions, and examples from political and social science. The course will offer a general introduction to the topic and will cover more advanced topics, such as cointegration, error correction models, vector autoregression, fractional integration, and time-series cross-sectional analysis.

This class has two prerequisites: GOVT 6019 and GOVT 6029 (or the equivalent).

Students are responsible for completing all of the assigned readings before class, completing all homework assignments, a class presentation, and writing a research paper or replication paper.

Texts

- Box-Steffensmeier, Janet M., John R. Freeman, Matthew P. Hitt, and Jon C. Pevehouse. 2015. *Time Series Analysis for the Social Sciences* New York: Cambridge University Press.

Evaluation

Your performance in this class will be assessed on the following:

Class Participation	20%
Homework Assignments	30%
Class Presentation	10%
Research Paper	40%

Note: Not all homework assignments are weighted the same.

Research paper: There are two options for the research paper. **Option one** is a research paper that is suitable for presentation at a professional conference and almost ready for submission to a top academic journal. The paper can be substantive or methodological, but it must use time series analysis. For this option, I encourage you to revise a paper you have previously written. If you are writing a research paper (or research proposal or literature review) for another class, this paper must overlap with that paper (see me if you think you need an exception). **Option two** is a replication study. This option could involve extending an existing article or chapter by incorporating new data (e.g., more observations or an additional variable) or evaluating whether existing findings are sensitive to modeling choices. Replication decisions should be based on theory and methods.[1]

Incomplete Policy

I adhere to Cornell's incomplete policy (`http://courses.cornell.edu/content.php?catoid=12&navoid=2089`): "An incomplete (INC) signifies that a course was not completed before the end of the semester for reasons beyond the students control and acceptable to the instructor. Students must have substantial (normally at least 50 percent) equity in the course, be able to complete the remaining work, and have a passing grade for the completed portion... When a final grade is determined, it is recorded on the official transcript with an asterisk and a footnote explaining that this grade was formerly an incomplete."

Student Accommodations

Please give me your Student Disability Services (SDS) accommodation letter early in the semester so that I have adequate time to arrange your approved academic modifications. Meeting with me in my office hours will help ensure confidentiality. If you need an immediate accommodation for equal access, please speak with me after class or send an email message to me and/or SDS at `sds_cu@cornell.edu`. If the need arises for additional accommodations during the semester, please contact SDS.

Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity (`http://cuinfo.cornell.edu/Academic/AIC.html`). Any work submitted by a student in this course for academic credit will be the student's own work.

Turnitin Notice

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

[1]For illustrative examples, see Giuliano, Paola. 2015. "Comment on Support for Redistribution in an Age of Rising Inequality"' and Enns, Peter K. 2015. "Comment on Support for Redistribution in an Age of Rising Inequality"' *Brookings Papers on Economic Activity*

Readings and Assignments

I have listed the assigned readings below. All readings that are not assigned texts are either available on blackboard, through the library's e-journals, or the links embedded in this syllabus. *Complete the day's reading before coming to class.* Review supplemental materials to articles when they are available. I may assign additional readings throughout the course.

Recommended Reading: For most weeks, I have listed several recommended readings. If you are conducting research that relates to the week's topics, you should become familiar with these readings. It is also worth emphasizing that this syllabus is not meant to be exhaustive. As with all courses, we *cannot* cover all topics or all relevant works and you should seek out additional sources and approaches as relevant to your research.

- **Week 1 (8/27): Course Intro**
- **9/3: No Class: Labor Day**
- **Week 2 (9/10): Univariate Time Series**
  - Box-Steffensmeier et al. Chs.1-2
  - Ch.2: Pickup, Mark. 2015. *Introduction to Time Series Analysis.* Sage Publications.
- **Week 3 (9/17): Diagnosing Series & Simulations**
  - Box-Steffensmeier et al. Ch.5
  - Box-Steffensmeier, Janet. and Renée M. Smith. 1996. "The Dynamics of Aggregate Partisanship." *American Political Science Review* 90(3): 567-580.
  - Watch William Reed's "Stata Tutorial: Monte Carlo Simulations Part 1" (`https://www.youtube.com/watch?v=mYtlKAmXmiI`)
    - *Recommended Reading:*
    - Watch William Reed's "Stata Tutorial: Monte Carlo Simulations Part 2" (`https://www.youtube.com/watch?v=rMcpeLQ1ppo`)
- **Week 4 (9/24): Dynamic Models**
  - **Homework 1 due**
  - Box-Steffensmeier et al. Ch.3 *and* Appendix
  - Bellemare, Marc F., Takaaki Masaki, and Thomas B. Pepinsky. 2017. "Lagged Explanatory Variables and the Estimation of Causal Effect." *Journal of Politics* 79(3): 949-963.
  - Campbell, James E. 2011. "The Economic Records of the Presidents: Party Differences in Inherited Economic Conditions." *The Forum* 9: 1-29. (Data available here: `http://www.acsu.buffalo.edu/~jcampbel/index.html`)

- Pages 42-43 in: Bartels, Larry M. 2016. *Unequal Democracy, 2nd Edition* New York: Russell Sage Foundation.
    - *Recommended Reading:*
    - Keele, Luke and Nathan J. Kelly. 2006. "Dynamic Models for Dynamic Theories: The Ins and Outs of Lagged Dependent Variables."
    - Boydstun, Amber E., Benjamin Highton, and Suzanna Linn. 2018. "Assessing the Relationship between Economic News Coverage and Mass Economic Attitudes." *Political Research Quarterly.*

- **Week 5 (10/1): Cointegration and Cointegration Tests**
  - **Homework 2 due (Paper Topic Proposal)**
  - Murray, Michael P. 1994. "A Drunk and Her Dog: An Illustration of Cointegration and Error Correction." *The American Statistician* 48(1): 37-39.
  - Box-Steffensmeier et al. Ch.6
  - Durr, Robert H. 1992. "An Essay on Cointegration and Error Correction Models." *Political Analysis* 4: 185-228.
  - Engle, Robert F. and C.W.J. Granger. 1987. "Co-integration and Error Correction: Representation, Estimation, and Testing." *Econometrica.* 55(2): 251-176.
  - Ch.6 in: Baumgartner, Frank R., Suzanna L. De Boef, and Amber E. Boydstun. 2008. *The Decline of the Death Penalty and the Discovery of Innocence.* New York: Cambridge University Press. (*Pay special attention to Table 6.1 and corresponding discussion.*)
    - *Recommended Reading:*
    - All articles in the 1992 (4) *Political Analysis* symposium on cointegration and error correction (`https://www.cambridge.org/core/journals/political-analysis/volume/10B7B6F5BB4A7C73F529E19D7409C887`).

- **10/8: No Class: Fall Break**

- **Week 6 (10/15): GECM**
  - **Homework 3 due**
  - De Boef, Suzanna and Luke Keele. 2008. "Taking Time Seriously." *American Journal of Political Science* 52(1): 184-200.
  - Grant, Taylor and Matthew J. Lebo. 2016. "Error Correction Methods with Political Time Series." *Political Analysis* 24: 3-30.
  - Enns, Peter K., Nathan J. Kelly, Takaaki Masaki, and Patrick C. Wohlfarth. 2016. "Don't Jettison the General Error Correction Model Just Yet: A Practical Guide to Avoiding Spurious Regression with the GECM." *Research and Politics* 3(2):1-16.

- Enns, Peter K., Nathan J. Kelly, Takaaki Masaki, and Patrick C. Wohlfarth. 2017. "Moving Forward with Time Series Analysis." *Research and Politics* 4(4):1-7.
- Epp, Derek A. 2017. "Policy Agendas and Economic Inequality." *Political Studies*. 1-18.
  - *Recommended Reading:*
  - Remaining articles in 2016 *Political Analysis* Time Series Symposium.
  - Enns, Peter K., Takaaki Masaki, and Nathan J. Kelly. 2014. "Time Series Analysis and Spurious Regression: An Error Correction."
  - Lebo, Matthew J. and Patrick W. Kraft. "The General Error Correction Model in Practice." *Research and Politics* 4(2):1-13.

- **Week 7 (10/22): ARDL Bounds Approach and Equation Balance**
  - **Homework 4 due (Paper data proposal)**
  - Giles, David. 2013. "ARDL Models - Part II - Bounds Tests" (`https://davegiles.blogspot.com/2013/06/ardl-models-part-ii-bounds-tests.html`)
  - Philips, Andrew Q. 2018. "Have Your Cake and Eat it Too? Cointegration and Dynamic Inference from Autoregressive Distributed Lag Models." *American Journal of Political Science* 62(1): 230-244.
  - Lebo, Matthew J. and Taylor Grant. 2016 "Equation Balance and Dynamic Political Modeling." *Political Analysis* 24(1): 69-82.
  - Enns, Peter K. and Christopher Wlezien. 2018. "Understanding Equation Balance in Time Series Regression." *The Political Methodologist*. 24(2): 2-12.
    - *Recommended Reading:*
    - Wlezien, Christopher. 2000. "An Essay on 'Combined' Time Series Process." *Electoral Studies* 19(1): 77-93.
    - Pesaran, M. Hashem and Yongcheol Shin. 1999. "An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis." in *Econometrics and Economic Theory in the 20th Century: the Ragnar Frisch Centennial Symposium*."

- **Week 8 (10/29): Near and Fractional Integration**
  - **Homework 5 due**
  - Steffensmeier at al. Pages 173-187.
  - De Boef, 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 Andrew R. Tomlinson. 2000. "Fractional integration methods in political science." *Electoral Studies* 19(1): 63-76.

- Box-Steffensmeier, Janet M. and Renée M. Smith. 1998. "Investigating Political Dynamics Using Fractional Integration Methods." *American Journal of Political Science* 42(2): 661-689.
- 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(1): 31-48.
  * *Recommended Reading:*
  * Keele, Luke, Suzanna Linn, and Clayton McLaughlin Webb. 2016. "Treating Time with All Due Seriousness." *Political Analysis* 24:3141.

- **Week 9 (11/5): TSCS Models 1**
  - **Homework 6 due (Bivariate figure)**
  - 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.
  - Harden, Jeffrey J. 2011. "A Bootstrap Method for Conducting Statistical Inference with Clustered Data." *State Politics & Policy Quarterly* 11(2): 223-246.
  - Pages 357-363 *and* Appendix D (Supplementary Materials) in: Franko, William W., Nathan J. Kelly, and Christopher Witko. 2016. "Class Bias in Voter Turnout, Representation, and Income Inequality." *Perspectives on Politics* 14(2): 351-368.
  - Wlezien, Christopher, Stuart Soroka, and Dominik Stecula. 2017. "A Cross-National Analysis on the Causes and Consequences of Economic News." *Social Science Quarterly* 98(3): 1010-1025.

- **Week 10 (11/12): TSCS Models 2**
  - **Homework 7 due**
  - Bartels, Brandon L. 2015. "Beyond 'Fixed versus Random Effects': A Framework for Improving Substantive and Statistical Analysis of Panel, TSCS, and Multilevel Data. In *Quantitative Research in Political Science*, ed. Robert J. Franzese. Sage.
  - Clark, Tom S. and Drew A. Linzer. 2015. "Should I use Fixed for Random Effects?" *Political Science Research Methods* 3(2): 399-408.
  - Mutz, Diana C. 2018. "Status threat, not economic hardship explains the 2016 presidential vote." *PNAS.*

- **Week 11 (11/19): Class Presentations**

- Each presentation must:
    - be a *maximum* of 8 minutes
    - contain 4 slides (title page, bivariate plot, results table, substantive effects)
    - Email me your slides by 9am before class.

- **Week 12 (11/26): VAR Models**
  - Box-Steffensmeier et al. ch. 4
  - Section 17.14 in: Gujarati, Damodar N. and Dawn C. Porter, *Basic Econometrics.*
  - Hopkins, Daniel J., Eunji Kim, and Soojong Kim. 2017. "Does Newspaper Coverage Influence of Reflect Public Perceptions of the Economy." *Research and Politics* 4(4):1-7.
    - *Recommended Reading:*
    - Freeman, John. 1983. "Granger Causality and the Time Series Analysis of Political Relationships." *American Journal of Political Science* 27(2): 327-358.
    - Granger, CWJ. 1969. "Investigating causal relationships by econometric models and cross spectral methods." *Econometrica* 37: 424-438.
    - Freeman, John R., John T. Williams, and Tse-min Lin. 1989. "Vector Autoregression and the Study of Politics." *American Journal of Political Science* 33(4): 842-877.

- **Week 13 (12/1): VECM Models**
  - **Homework 8 due**
  - Johansen, Søren. 1988. "Statistical Analysis of Cointegration Vectors." *Journal of Economic Dynamics and Control* 12(2-3): 231-254.
  - Jennings, Will. 2009. "The Public Thermostat, Political Responsiveness and Error-Correction: Border Control and Asylum in Britain, 1994-2007." *British Journal of Political Science* 39(4): 847-870.

- Monday, Dec. 10: **Research Paper Due**