VVSSR WORKSHOPS ON SOCIAL SCIENCE RESEARCH

Concordia University — FACULTY OF ARTS AND SCIENCE

Modern Regression using OLS

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May 23-24, 2018
9:00am – 4:30pm

Summary

This workshop is designed to teach students who have taken *The Basics of Multivariate Analysis* (or who have an equivalent background) the tools that they need to begin to test their theories and produce presentations of their results for the top journals in Political Science, International Relations, Public Policy, and other related disciplines. Students are encouraged to bring their own data sets so that they can get hands-on experiences with applying the techniques covered in this workshop. Thus the emphasis is on making the transitions between theory, model specification, and result presentation as seamless as possible.

   This workshop focuses on issues that researchers typically encounter as they attempt to test their theories in a regression framework. These include such issues as autocorrelation, heteroscedasticity, influential observations, multicollinearity, interactive theories, and non-linear relationships. Depending on time and student interests, we will also provide introductions to important extensions of the ideas of the workshop to time series data, spatial models, and models of limited dependent variables.

   This is a hands-on workshop, meaning that a major goal is to have students learn about techniques by putting them to work with statistical software. To facilitate this, we will have lectures on each topic followed by lab sessions. In these lab sessions students will have the option of working with their own data or working with data provided by the instructors. The main statistical software program that we will use for the labs is Stata. Most of the programs will also be available in R.

Textbook: Kellstedt, Paul M., and Guy D. Whitten. *The fundamentals of political science research*, 2nd edition. Cambridge University Press, 2013. Available at Webster Course Reserve Room (3 hour loan)

Outline
Topic 1   Review of Multiple Regression
- All the differential calculus you need for right now
- Extending to multiple regression
- From two variable to multiple regression
- Introduction to matrix algebra
- OLS in matrix algebra
- F-distribution and F-tests
- Presenting model results
- Omitted variable bias

- OLS is "BLUE"
- Readings:
  Fair, Ray C. (1988) "The effect of economic events on votes for president: 1984 update" *Political Behavior*, 10:168-177. http://reserves.concordia.ca/ares/ares.dll/plink?14EF224C
  Kellstedt and Whitten Chapter 9 *Available at Webster Course Reserve Room (3 hour loan)*
  Jann, Ben (2014) "Plotting regression coefficients and other estimates" *Stata Journal*, 14:708-737. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-search.ebscohost.com.mercury.concordia.ca%2Flogin.aspx%3Fdirect%3Dtrue%26db%3Da9h%26AN%3D100294298%26site%3Dehost-live%26scope%3Dsite

Topic 2   Relaxing and Testing Regression Assumptions I

- Multicollinearity and Micronumerosity
- Introduction to Clarify
- Being smart with dummy variables
- Influential Cases in Multiple Regression
- Functional form adjustment
- To standardize or not
- Readings:
  Kellstedt and Whitten Chapter 10 *Available at Webster Course Reserve Room (3 hour loan)*
  King, Gary, Michael Tomz, and Jason Wittenberg (2000) "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science*, 44:347-61. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-dx.doi.org.mercury.concordia.ca%2F10.2307%2F2669316
  Tomz, Michael, Jason Wittenberg, and Gary King (2003) "Clarify: Software for Interpreting and Presenting Statistical Results." http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-dx.doi.org.mercury.concordia.ca%2F10.18637%2Fjss.v008.i01

Topic 3   Relaxing and Testing Regression Assumptions II

- Heteroscedasticity
- "Curing" Heteroscedasticity with FGLS
- Interactive models
- Readings:
  Chapter 2: Interactions In Social Science in Kam, Cindy and Robert Franzese (2009) *Modeling and Interpreting Interactive Hypotheses in Regression Analysis*. University of Michigan Press. 7-12 http://reserves.concordia.ca/ares/ares.dll/plink?14EF21E1
  Brambor, Thomas, William Clark and Matt Golder (2006) "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis*, 14:63-82. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-search.ebscohost.com.mercury.concordia.ca%2Flogin.aspx%3Fdirect%3Dtrue%26db%3Dpoh%26AN%3D20124917%26site%3Dehost-live%26scope%3Dsite
  Berry, William D., Matt Golder, and Daniel Milton (2012) "Improving tests of theories positing interaction." *Journal of Politics*, 74.3: 653-671. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-dx.doi.org.mercury.concordia.ca%2F10.1017%2FS0022381612000199

Topic 4   Time Series Analysis (Optional Topic)
- Introduction to time series data and notation
- Introduction to using Stata to analyze time series data
- Non-stationarity and unit roots
- Overview of the threats to inference in time series analysis
- Traditional treatments of autocorrelation in regression models
- Interpreting time series regression models
- To lag or not to lag
- Reading:

    Kellstedt and Whitten pp. 256-269. *Available at Webster Course Reserve Room (3 hour loan)*
    Beck, Nathaniel (1991) "Comparing Dynamic Specifications: The Case of Presidential Approval,"
    Political Analysis III. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-
    dx.doi.org.mercury.concordia.ca%2F10.1093%2Fpan%2F3.1.51
    Keele, Luke and Nathan Kelly (2006) "Dynamic Models for Dynamic Theories: The Ins and Outs of
    Lagged Dependent Variables." *Political Analysis*, 14:186-205.
    http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-
    dx.doi.org.mercury.concordia.ca%2F10.1093%2Fpan%2Fmpj006
    De Boef, Suzanna and Luke Keele (2008) "Taking Time Seriously." *American Journal of Political Science*,
    52:184-200. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-
    dx.doi.org.mercury.concordia.ca%2F10.1111%2Fj.1540-5907.2007.00307.x

Topic 5   Qualitative Response Models (Optional Topic)
- Readings:

    Kellstedt and Whitten pp. 247-255. *Available at Webster Course Reserve Room (3 hour loan)*
    Whitten, Guy D. and Harvey D. Palmer (1996) "Heightening Comparativists' Concern for Model
    Choice: Voting Behavior in Great Britain and the Netherlands." *American Journal of Political Science*,
    40:231-60. http://reserves.concordia.ca/ares/ares.dll/plink?u-http%3A%2F%2F0-
    dx.doi.org.mercury.concordia.ca%2F10.2307%2F2111701

*If you are registered for non-credit and are unable to access these readings, please send us an email at
wssr@concordia.ca and we will do our best to assist you.