Political Science 787: Multivariate Analysis

Fall 2013
Monday 4–6 (5564 Haven)
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Office hours: Wed 2–4 or other times by appointment.
Course web page: in CTools; syllabus also at `http://www.umich.edu/ wmebane/ps787.html`

Assignment Due Dates

due date	description	weight
TBA	four data analysis problem sets	70%
Dec 20	final paper	20%
—	participation	10%

See `fpaper.pdf` posted on the CTools site for more information about the final paper. The presentation described there will be rated as part of the participation grade.

Reading Availability

Much of the course will refer to journal articles. I plan to follow or refer to a few chapters in the following books (others also appear below).

Cameron, A. Colin, and Pravin K. Trivedi. 2005. *Microeconometrics: Methods and Applications.* Cambridge UP.

Kenneth E. Train. 2003. *Discrete Choice Methods with Simulation.* Cambridge UP.

In the following listing, required reading is preceded by a bullet. Other items are recommended.

Class meeting and reading schedule

1. computing (Sep 9)

   - John Chambers. 1999. Computing with Data: Concepts and Challenges. *The American Statistician* 53: (1, Feb.): 73–84.
   - Bierlaire, M. 2003. BIOGEME: A free package for the estimation of discrete choice models, Proceedings of the 3rd Swiss Transportation Research Conference, Ascona, Switzerland. `http://biogeme.epfl.ch/`
   - OpenBUGS. `http://www.openbugs.info/w/`
   - The BUGS Project. `http://www.mrc-bsu.cam.ac.uk/bugs/`

   Crawley, Michael R. 2007. *The R Book.* Wiley.

   Spector, Phil. 2008. *Data manipulation with R.* Springer.

   Albert, Jim. 2007. *Bayesian Computation with R.* Springer.

   Chambers, John M. 2008. *Software for Data Analysis.* Springer.

   Braun, W. John, and Duncan J. Murdoch. 2007. *A First Course in Statistical Programming with R.* Cambridge.

Plummer, Martyn. 2003. "JAGS: A Program for Analysis of Bayesian Graphical Models Using Gibbs Sampling," Proceedings of the 3rd International Workshop on Distributed Statistical Computing (DSC 2003), March 20–22, Vienna, Austria. ISSN 1609-395X. `http://www.ci.tuwien.ac.at/Conferences/DSC-2003/Proceedings/Plummer.pdf`

JAGS. `http://mcmc-jags.sourceforge.net/`

2. asymptotics, bootstrap and refinements (Sep 16)

    - Bradley Efron. 1987. "Better Bootstrap Confidence Intervals (and discussion)" *Journal of the American Statistical Association* 82 (397): 171–200.
    - Gary W. Oehlert. 1992. A Note on the Delta Method. *The American Statistician* 46 (1, Feb.): 27–29.
    - Thomas R. Fears, Jacques Benichou, Mitchell H. Gail. 1996. A Reminder of the Fallibility of the Wald Statistic. *The American Statistician* 50 (3, Aug.): 226–227.
    - Yudi Pawitan. 2000. A Reminder of the Fallibility of the Wald Statistic: Likelihood Explanation. *The American Statistician* 54 (1, Feb.): 54–56.
    - J. Scott Long and Laurie H. Ervin. 2000. Using Heteroscedasticity Consistent Standard Errors in the Linear Regression Model. *The American Statistician* 54 (3, Aug.): 217–224.
    - Dennis D. Boos and Jacqueline M. Hughes–Oliver. 2000. How Large Does n Have to be for Z and t Intervals? *The American Statistician* 54 (2, May): 121–128.

    Bradley Efron. 1979. "Bootstrap Methods: Another Look at the Jackknife," *Annals of Statistics* 7 (1): 1–26.

    Barndorff-Nielsen, O. E., and D. R. Cox. 1984. "Bartlett Adjustments to the Likelihood Ratio Statistic and the Distribution of the Maximum Likelihood Estimator," *Journal of the Royal Statistical Society. Series B (Methodological)* 46 (3): 483–495.

    A.C. Davison and D.V. Hinkley. 1997. *Bootstrap Methods and their Applications.* Cambridge.

    Cameron and Trivedi. Chapters 5, 11 and Appendix A.

    Jeffrey M. Wooldridge. 2002. *Econometric Analysis of Cross Section and Panel Data.* MIT Press. Chapters 3, 12–14.

    Russell Davidson and James G. MacKinnon. 1993. *Estimation and Inference in Econometrics.* Oxford UP. Chapters 4, 8–9.

3. choice models (Sep 23, 30, Oct 7)

    - Daniel McFadden and Kenneth Train. 2000. Mixed MNL Models for Discrete Response. *Journal of Applied Econometrics* 15 (5, Sep–Oct): 447–470.
    - Kenneth E. Train. 2009. *Discrete Choice Methods with Simulation.* 2d ed. Cambridge UP. `http://elsa.berkeley.edu/books/choice2.html`
    - John E. Jackson, Bogdan W. Mach and Radoslaw Markowski. 2010. "Party Strategies and Electoral Competition in Post-Communist Countries: Evidence from Poland." *Electoral Studies* 29 (2): 199–209. (in file `jackson.mach.markowski.elecstud2010.pdf`)

- John E. Jackson, Bogdan W. Mach and Radoslaw Markowski. 2010. "Party Strategies and Electoral Competition in Post-Communist Countries: Evidence from Poland. Appendix A: Methodological Appendix." (in file `jelsmethapp.docx`)
- Walter R. Mebane, Jr. 2013. "A mixed logit model with 1997 Polish survey data from John Jackson." Working paper (in file `notes27sep2013.pdf`).
- Garrett Glasgow. 2001. Mixed Logit Models for Multiparty Elections. *Political Analysis* 9 (1): 116–136.

Hensher, David A., and William H. Greene. 2003. The mixed logit model: the state of practice. *Transportation* 30 (2): 133–176.

McFadden, Daniel. 1974. "Conditional logit analysis of qualitative choice behavior." In P Zarembka, ed., *Frontiers of Econometrics*, New York: Acadmic Press. pages 105–142.
`http://emlab.berkeley.edu/reprints/mcfadden/zarembka.pdf`

McFadden, Danel. 1981. "Structural Discrete Probability Models Derived from Theories of Choice." In Charles F. Manski and Daniel L. McFadden, eds, *Structural Analysis of Discrete Data and Econometric Applications*, Cambidge, MA: MIT Press, chapter 5, pp. 198–272.
`http://emlab.berkeley.edu/discrete/ch5.pdf`

4. hierarchical models, MCMC (Oct 21, 28)

- Simon Jackman. 2009. *Bayesian Analysis for the Social Sciences.* Wiley. Chapter 7.
- Andrew Gelman, John B. Carlin, Hal S. Stern and Donald B. Rubin. 2004. *Bayesian Data Analysis*, 2d ed. Chapman & Hall. Chapter 5. (Chapters 1–4 are probably necessary preparation.)
- Andrew Gelman and Jennifer Hill. 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models.* Cambridge. Pages 109–117 251–265, 345–359, 366–371, 419–421.
- Brooks, S. P. 1998. Markov chain Monte Carlo method and its application. *The Statistician* 47: 69–100.
- Brooks, S. P. and A. Gelman. 1998. Alternative methods for monitoring convergence of iterative simulations. *Journal of Computational and Graphical Statistics* 7: 434–455.
- Spiegelhalter, D. J., N. G. Best, B. P. Carlin and A. van der Linde. 2002. Bayesian measures of model complexity and fit (with discussion). *J. Roy. Statist. Soc. B* 64: 583–640.

George Casella and Edward I. George. 1992. Explaining the Gibbs Sampler *The American Statistician* 46 (3, Aug.): 167–174.

Siddhartha Chib and Edward Greenberg. 1995. Understanding the Metropolis–Hastings Algorithm *The American Statistician* 49 (4, Nov.): 327–335.

Jeff Gill. 2002. *Bayesian Methods: A Social and Behavioral Approach.* Chapman & Hall.

5. latent variable models (Nov 4)

- Simon Jackman and Shawn Treier. 2008. Democracy as a Latent Variable. *American Journal of Political Science* 52 (1): 201–217.

- Joshua Clinton, Simon Jackman and Douglas Rivers. 2004. The Statistical Analysis of Roll Call Data. *American Political Science Review* 98 (2, May): 355–370.
- Jian-Qing Shi and Sik-Yum Lee. 2000. Latent Variable Models with Mixed Continuous and Polytomous Data. *Journal of the Royal Statistical Society. Series B (Statistical Methodology)* 62 (1): 77–87.
- Vincent Arel-Bundock and Walter R. Mebane, Jr. 2011. "Measurement Error, Missing Values and Latent Structure in Governance Indicators". Paper presented at the 2011 Annual Meeting of the American Political Science Association, Seattle, WA, September 1–4.

Michael A. Bailey. 2007. Comparable Preference Estimates across Time and Institutions for the Court, Congress, and Presidency. *American Journal of Political Science* 51 (3, Jul.): 433–448.

Sik-Yum Lee. 2007. *Structural Equation Modelling: A Bayesian Approach.* Wiley.

Sik-Yum Lee, Xin-Yuan Song, John C. K. Lee. 2003. Maximum Likelihood Estimation of Nonlinear Structural Equation Models with Ignorable Missing Data. *Journal of Educational and Behavioral Statistics* 28 (Summer): 111–134.

Sik-Yum Lee and Xin-Yuan Song. 2004. Maximum Likelihood Analysis of a General Latent Variable Model with Hierarchically Mixed Data. *Biometrics* 60 (Sep.): 624–636.

Sophia Rabe-Hesketh, Anders Skrondal and Andrew Pickles. 2004. *Generalized Latent Variable Modelling: Multilevel, Longitudinal and Structural Equation Models.* Chapman & Hall.

6. hypothesis tests, M-estimators and QMLE (Nov 11)

- Cameron and Trivedi. Chapter 7.
- Benjamini, Yoav and Yosef Hochberg. 1995. Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society, Series B* 57 (1): 289–300.
- Benjamini, Yoav and Daniel Yekutieli. 2005. False Discovery Rate-Adjusted Multiple Confidence Intervals for Selected Parameters. *Journal of the American Statistical Association* 100 (Mar.): 71–81.
- Vuong, Quang H. 1989. "Likelihood-ratio Tests for Model Selection and Non-nested Hypotheses." *Econometrica* 57 (2): 307–333.
- Leonard A. Stefanski and Dennis D. Boos, 2002. The Calculus of M-Estimation. *The American Statistician* 56 (1, Feb.): 29–38.
- White, Halbert. 1982. Maximum Likelihood Estimation of Misspecified Models. *Econometrica* 50 (1): 1–25.
- D. A. Freedman. 2006. On the so-called "Huber Sandwich Estimator" and "robust" standard errors. *The American Statistician* 60: 299–302.

Peter McCullagh and John A. Nelder. 1989. *Generalized Linear Models.* 2d ed. Chapman and Hall.

McCullagh, Peter. 1983. Quasi-likelihood Functions. *Annals of Statistics* 11 (Mar.): 59–67.

7. partial identification and identification with missing covariates (Nov 18)

    - Joel L. Horowitz and Charles F. Manski. 2000. Nonparametric Analysis of Randomized Experiments with Missing Covariate and Outcome Data. *Journal of the American Statistical Association* 95 (449, Mar): 77–84.
    - Charles F. Manski and Elie Tamer. 2002. Inference on Regressions with Interval Data on a Regressor or Outcome. *Econometrica* 70 (2, Mar): 519–546.
    - Rosa L. Matzkin. 2007. Nonparametric Survey Response Errors. *International Economic Review* 48 (4): 1411–1427.
    - Charles F. Manski. 1990. Nonparametric Bounds on Treatment Effects. *American Economic Review* 80 (2, Papers and Proceedings): 319–323.
    - Francesca Molinari. 2010. Missing Treatments. *Journal of Business and Economic Statistics* 28 (1): 82–95.
    - Walter R. Mebane, Jr. and Paul Poast. 2013. "Causal Inference without Ignorability: Identification with Nonrandom Assignment and Missing Treatment Data." *Political Analysis* 21 (2): 233–251.

    Charles F. Manski. 1995. *Identification in the Social Sciences*. Harvard UP.

    Charles F. Manski. 2003. *Partial Identification of Probability Distributions*. Springer.

    Rosa L. Matzkin. 2007. Nonparametric Identification. In James J. Heckman and Edward E. Leamer, eds., *Handbook of Econometrics* volume 6B. North-Holland. Pp. 5307–5368.

8. causal identification norms (or dogmas), DAGs and selectivity (Nov 25)

    - Thomas J. Rothenberg. 1971. Identification in Parametric Models. *Econometrica* 39 (May): 577–591.
    - Judea Pearl. 1995. Causal Diagrams for Empirical Research. *Biometrika* 82 (4, Dec.): 669–688. (plus discussion, 688–710).
    - Holland, Paul. 1986, Statistics and Causal Inference. *Journal of the American Statistical Association* 81: 945–961.
    - Heckman, J. J. 1978. Dummy endogenous variables in a simultaneous equation system. *Econometrica* 46: 931–959.
    - Heckman, J. J. 1979. Sample selection bias as a specification error. *Econometrica* 47: 153–161.

    Roger Bowden. 1973. The Theory of Parametric Identification. *Econometrica* 41 (Nov): 1069–1074.

    Franklin Fisher. 1976. *The Identification Problem in Econometrics*. Krieger.

    Roger Bowden and Darrell Turlington. 1984. *Instrumental Variables*. Cambridge UP.

    Judea Pearl. 2009. *Causality: Models, Reasoning and Inference*, 2d ed. Cambridge UP. Chapters 1–5.

    James M. Robins. 1999. Association, Causation, and Marginal Structural Models. *Synthese* 121: 151–179.

    David A. Freedman and Jasjeet S. Sekhon. 2010. Endogeneity in Probit Response Models. *Political Analysis* 18 (2): 138–150.

James J. Heckman and Edward Vytlacil. 2005. Structural Equations, Treatment Effects, and Econometric Policy Evaluation. *Econometrica* 73 (3, May): 669–738.

9. bounded influence estimation (Nov 25)

- Stefanski, Leonard A., Raymond J. Carroll, David Ruppert. 1986. Optimally Bounded Score Functions for Generalized Linear Models with Applications to Logistic Regression. *Biometrika* 73 (Aug): 413–424.
- Western, Bruce. 1995. Concepts and Suggestions for Robust Regression Analysis. *American Journal of Political Science* 39 (3): 786–817.
- Mebane, Walter R., Jr., and Jasjeet S. Sekhon. 2004. Robust Estimation and Outlier Detection for Overdispersed Multinomial Models of Count Data. *American Journal of Political Science* 48 (April): 392–411.
- Mebane, Walter R., Jr. 2010. Fraud in the 2009 Presidential Election in Iran? *Chance* 23 (Mar.): 6–15.

Hampel, Frank R. and Peter J. Rousseeuw and Elvezio Ronchetti. 1981. The Change-of-Variance Curve and Optimal Redescending M-Estimators. *Journal of the American Statistical Association* 76 (Sep): 643–648.

Croux, Christophe and Peter J. Rousseeuw and Ola Hossjer. 1994. Generalized S-Estimators. *Journal of the American Statistical Association* 89 (Dec): 1271–1281.

10. paper presentations (Dec 2, 9)