
ADVANCED STATISTICAL METHODS

Graduate seminar

University of Greifswald – Winter term 2017/18 – Thursday, 8–10 AM, SR Baderstr. 4/5

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Consultation hour: Wednesdays 1–2 PM (by appointment only)

I. Outline

This seminar focuses on acquiring profound knowledge in quantitative empirical research and advanced statistical methods. It focuses on procedures that are frequently used in comparative political science as well as international relations, such as linear and non-linear regression, survival analysis, and time-series-cross-section models. Additionally, the fundamental principles of estimation methods, interpretation of coefficients, evaluation of model fit, and empirical implications of regression models will be discussed in the seminar. The seminar's structure alternates sessions of theoretical principles and applications of statistical procedures. We will use Stata for model estimation throughout the seminar and will replicate contemporary studies using the methods discussed in the course. The aim of the seminar is to enable students to conduct quantitative empirical studies using advanced statistical methods and to facilitate a critical evaluation of empirical studies.

II. Literature on Stata

Hamilton, L. (2012). *Statistics with Stata: Version 12*. 8th edition, Cengage Learning.

Kohler, U., and Kreuter, F. (2017). *Datenanalyse mit Stata: Allgemeine Konzepte der Datenanalyse und ihre praktische Anwendung*. 5th edition, Oldenbourg Verlag. <https://www.degruyter.com/view/product/469128>

III. Seminar literature

Best, H., and Wolf, C. (Hrsg.) (2015). *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. [access via University library]

Wolf, C., and Best, H. (Hrsg.) (2010). *Handbuch der sozialwissenschaftlichen Datenanalyse*. 1st edition, VS Verlag für Sozialwissenschaften. Online access: doi:[10.1007/978-3-531-92038-2](https://doi.org/10.1007/978-3-531-92038-2). [free online alternative to the SAGE Handbook in german language]

Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach*. 5th edition, Cengage Learning. [access via University library]

IV. Course assessment

90 minutes written exam within the module *Methoden der Politikwissenschaft A*.

V. Syllabus

1. Introduction and organisation session (October 19th)

2. Logistic regression (October 26th)

Best, H., and Wolf, C. (2015). Logistic Regression. In: Best, H., and Wolf, C. (Hrsg.). *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. Part II, Chapter 8, pp. 153–172.

3. Replication I: Dichotomous dependent variables (November 2nd)

Collier, P., and Hoeffler, A. (2004). Greed and grievance in civil war. *Oxford economic papers*, 56(4), 563–595. doi:[10.1093/oep/gpf064](https://doi.org/10.1093/oep/gpf064)

Note: Replication material: <http://users.ox.ac.uk/~ball10144/research.htm>

4. Multinomial and ordinal-logistic regression (November 9th)

Long, J. S. (2015). Regression models for nominal and ordinal outcomes. In: Best, H., and Wolf, C. (Hrsg.). *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. Part II, Chapter 9, pp. 173–204.

5. Replication II: Polytomous dependent variables (November 16th)

Krain, M. (2005). International intervention and the severity of genocides and politicides. *International Studies Quarterly*, 49(3), 363–388. doi:[10.1111/j.1468-2478.2005.00369.x](https://doi.org/10.1111/j.1468-2478.2005.00369.x)

Note: Replication material: <http://discover.wooster.edu/mkrain/research/>

6. Interaction terms, polynomials, and splines (November 23rd)

Brambor, T., Clark, W. R., and Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political analysis*, 14(1), 63–82. doi:[10.1093/pan/mpi014](https://doi.org/10.1093/pan/mpi014)

Lohmann, H. (2015). Non-linear and non-additive effects in linear regression. In: Best, H., Wolf, C. (eds.). *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. Part II, Chapter 6, pp. 111–132.

Helmdag, J. (2017). INTERACTPLOT: Generate plots for interaction terms of multiplicative regressions. Install by typing `ssc install interactplot` in Stata command line.

7. Replication III: Interaction terms, polynomials, and graphical presentation (November 30th)

Clark, W. R., and Golder, M. (2006). Rehabilitating Duverger's theory testing the mechanical and strategic modifying effects of electoral laws. *Comparative Political Studies*, 39(6), 679–708. doi:[10.1177/0010414005278420](https://doi.org/10.1177/0010414005278420)

Note: Replication material: <https://dataverse.harvard.edu/dataset.xhtml?persistentId=hdl:1902.1/10477>

8. Survival analysis (December 7th)

Fisher, L. D., and Lin, D. Y. (1999). Time-dependent covariates in the Cox proportional-hazards regression model. *Annual review of public health*, 20(1), 145–157. doi:[10.1146/annurev.publhealth.20.1.145](https://doi.org/10.1146/annurev.publhealth.20.1.145)

Golub, J. (2008). Survival Analysis. In: Box-Steffensmeier, J. M., Brady, H. E., and Collier, D. (eds.). *The Oxford Handbook of Political Methodology*. Oxford University Press, Part VII, Chapter 23, pp. 530–546.

9. Replication IV: Survival analysis (December 14th)

DeRouen, K. R., and Sobek, D. (2004). The dynamics of civil war duration and outcome. *Journal of Peace Research*, 41(3), 303–320. doi:[10.1177/0022343304043771](https://doi.org/10.1177/0022343304043771)

Note: Replication material: <https://www.prio.org/JPR/Datasets/>

10. Time-series–cross-section (January 4th)

Brüderl J., and Ludwig, V. (2015). Fixed-effects panel regression *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. Part III, Chapter 15, pp. 327–357.

Fortin-Rittberger, J. (2015). Time-series cross-section. In: Best, H., and Wolf, C. (eds.). *The SAGE Handbook of Regression Analysis and Causal Inference*. 1st edition, Sage. Part III, Chapter 17, pp. 387–408.

Helmdag, J. (2016). PANELL: Display panel length for a given set of variables. Install by typing `ssc install panell` in Stata command line.

11. Replication V: Time-series–cross-section and structural breaks (January 11th)

Allan, J. P., and Scruggs, L. (2004). Political partisanship and welfare state reform in advanced industrial societies. *American Journal of Political Science*, 48(3), 496–512. doi:[10.1111/j.0092-5853.2004.00083.x](https://doi.org/10.1111/j.0092-5853.2004.00083.x)

Note: Replication material can be found on Moodle.

12. Error correction models (January 18th)

De Boef, S., and Keele, L. (2008). Taking time seriously. *American Journal of Political Science*, 52(1), 184–200. doi:[10.1111/j.1540-5907.2007.00307.x](https://doi.org/10.1111/j.1540-5907.2007.00307.x)

Podestà, F. (2006). Comparing time series cross-section model specifications: the case of welfare state development. *Quality, and Quantity*, 40(4), 539–559. doi:[10.1007/s11135-005-2076-3](https://doi.org/10.1007/s11135-005-2076-3)

Note: For a recent discussion ECMs, see the Time Series Symposium in *Political Analysis*, 24(1), 2016. <https://academic.oup.com/pan/issue/24/1#220121-2593568>

13. Replication VI: Error correction models (January 25th)

Helmdag, J., and Kuitto, K. (2017). Interdependent learning from policy success: Contextual diffusion of active labour market policies. In: Dunlop, Claire; Radaelli, Claudio, and Trein, Philipp (eds.). *Learning in Public Policy: Analysis, Modes and Outcomes*. Forthcoming.

Note: Paper and replication material can be found on Moodle.

14. Critical reflections and concluding discussion (February 1st)

Berrebi, C., and Ostwald, J. (2016). Terrorism and the Labor Force. Evidence of an Effect on Female Labor Force Participation and the Labor Gender Gap. *Journal of Conflict Resolution*, 60(1), 32–60. doi:[10.1177/0022002714535251](https://doi.org/10.1177/0022002714535251)

Ioannidis, J. P. A. (2005). Why most published research findings are false. *PLoS Med*, 2(8), e124, 0696–0701. doi:[10.1371/journal.pmed.0020124](https://doi.org/10.1371/journal.pmed.0020124)

Ioannidis, J. P. A., Stanley, T. D. and Doucouliagos, H. (2017). The Power of Bias in Economics Research. *Economic Journal*, 127: F236–F265. doi:[10.1111/eoj.12461](https://doi.org/10.1111/eoj.12461).

Schrodt, P. A. (2014). Seven deadly sins of contemporary quantitative political analysis. *Journal of Peace Research*, 51(2), 287–300. doi:[10.1177/0022343313499597](https://doi.org/10.1177/0022343313499597)

Silberzahn, R., and Uhlmann, E. L. (2015). Crowdsourced research: Many hands make tight work. *Nature*, 526(7572), 189–191. doi:[10.1038/526189a](https://doi.org/10.1038/526189a)

Supplementary: Links to p-hacking modules from [FiveThirtyEight](#) (macro data) and [ShinyApps](#) (micro data). Also, watch the segment on p-hacking from Last Week Tonight <https://youtu.be/0Rnq1NpHdmw>.