Advanced Demographic Methods 1:
An Introduction to Event-History Analysis

Last change: March16, 2017

7.5 ECTS credits, Spring 2017

Course code: SO7130

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Background

Course *Basic Demographic Methods* and/or statistical methods course on regression analysis.

Course description

This course is an introduction to event-history analysis (also known as survival analysis, hazard regression, intensity regression, or duration data analysis) and is given at the advanced (Masters / PhD level). Duration data is commonly used to address many research questions in demography, social sciences, and epidemiology. Examples of such questions are: Which factors influence how long people live, how long they stay unemployed, or when do they start a family? This course introduces the techniques for analyzing such questions and data and covers univariate and basic multivariate (regression) methods for analysis of duration (event-history) data. Students also learn data management skills that are specific to conducting event-history analysis in Stata.

Further topics of event-history analysis are covered in the follow-up course Advanced Demographic Methods 2. This follow-up course also provides students with the opportunity to carry out an event-history project with their own data.

Expected learning results

By the end of the course, students should be able to:

- Describe the basic concepts of event-history analysis
- Understand the link between event-history analysis, basic demographic methods and regression analysis
- Recognize the type of research questions for which event history analysis would be a suitable method
- Interpret studies that have used basic event-history methods

- Reflect on the assumptions, problems and limitations of event-history methods

Using *Stata*:

- Transform data into the basic data layout of event history analysis
- Analyze time-dependent univariate and multivariate relationships
- Specify appropriate regression models using time-constant and time-varying explanatory variables
- Interpret results obtained and communicate them to experts and non-experts alike

Teaching

The course is given half-time over a 9 week period. Coursework and examination consist of lectures, research output from demographic studies, and computer-based exercises. The exercises are done with the latest Stata statistical package using data from the European Social Survey (round 3). Students will receive feedback after each computer exercise.

Examination

Examination is based on active participation including a short study presentation, computer exercises, and a take-home exam. Students are graded according to **15** separate evaluations (specified below), and each is graded Fail (0 points), Pass (1 point), Good (2 points).

Participation (1. – 2.) is evaluated by the student's attendance in lectures and computer exercises, including discussion of the assigned readings (**1.**) and a brief oral presentation of a particular research question that can be addressed with event-history analysis (**2.**).

Each of the five computer exercises is evaluated (**3. – 7.**). The computer exercises should include proper solutions to the assigned problems and clear presentations of the Stata-syntax ("do-files") and the output.

The **take-home exam (8. – 15.)** consists of a small independent study using event-history analysis with data provided by the instructors. The following aspects are evaluated:

8. Argument for research question and choice of data and method
9. Data description, manipulation and variable construction)
10. Stata-syntax ("do-files") that are clear and easy to follow
11. Descriptive analyses
12. Appropriate model specification for multivariate analysis
13. Execution of multivariate analysis
14. Presentation of results
15. Interpretation of results (including limitations)

The maximum number of points a student can attain is 30. In addition, extraordinary performance in any of the aspects can be rewarded with up to 2 extra points that can compensate for any shortcomings.

The final course grade is based on the following criteria:

A (Excellent) = 28-30 points

B (Very good) = 25-27 points

C (Good) = 22-24 points

D (Satisfactory) = 19-21 points

E (Sufficient) = 15-18 points

Fx (Insufficient) = Fail for one or two of the aspects specified above

F (Fail) = Fail more than two

Literature

The course book and other suggested books are listed here, while all other readings for each session are listed in the course schedule below. Most readings can be accessed online from an SU computer. Readings that are not available online can be found in the course compendium (.pdf file available from Mondo).

Course book

Blossfeld, H-P, Golsch, K. & Rohwer, G. 2007. Event History Analysis Using Stata. Lawrence Erlbaum. (hereafter, BGR)

Other suggested books:

Cleves, M., Gutierrez, R.G., Gould, W. & Marchenko, Y.V. 2010. An Introduction to Survival Analysis Using Stata. Stata Press.

Kleinbaum, David G./Klein, Mitchel (2005): Survival Analysis: A Self-Learning Text. 2nd Edition. New York: Springer. (hereafter, KK).

Course schedule (and readings)

March 22 **1-4pm, F355**	**Introduction to event-history analysis: Concepts and Terminology (lecture)?**

Compulsory readings
- BGR, pages 1-12
- BGR, pages 38-57
- KK, pages 4-8 *(In Course Compendium)*
- Dykstra, Pearl and van Wissen, Leo (1999). Introduction: The life course approach as an interdisciplinary framework for population studies. In: van Wissen, L.J.G. and Dykstra, P.A. (eds.) *Population Issues: An Interdisciplinary Focus*. New York: Kluwer Academic/ Plenum Publishers, 1-14. *(In Course Compendium)*

March 27 **1-3pm, B389**	**Stata and data (computer exercise)**

March 30 **10-4pm, B389**	**Rates, duration, survival, hazard, and cumulative functions (lecture + computer exercise)**

Compulsory readings
- BGR, pages 31-37, 58-85

Additional readings
- Breslow N.E. and N. E. Day (1980). *Statistical Methods in Cancer Research, Volume 1 - The Analysis of Case-Control Studies*. Lyon: International Agency for Research on Cancer. Selected pages of Sections 2.1 through 2.7.
(In Course Compendium)
- Andersson, Gunnar and Philipov, Dimiter (2002). Life-table representations of family dynamics in Sweden, Hungary, and 14 other FFS countries. *Demographic Research* 7(4): 67-144.
Fulltext pdf: http://dx.doi.org/10.4054/DemRes.2002.7.4
- Kan, Maxim (2012). Ethnic-specific Reproductive Behavior in Independent Kazakhstan. *Stockholm Research Reports in Demography* 2012:15
Fulltext pdf: http://www.suda.su.se/SRRD/SRRD_2012_15.pdf

April 6
10-4pm, B397

Event-history models: Exponential and piecewise exponential (lecture + computer exercise)

Compulsory readings
- BGR, pages 87-101; 116-127

Additional readings
- Grunow, D. and Mayer, K.U. (2007). How Stable Are Working Lives? Occupational Stability and Mobility in West Germany 1940s-2000. *CIQLE Working Paper 2007-03*. New Haven (CT): Yale.
  Fulltext pdf:
  http://www.yale.edu/ciqle/CIQLEPAPERS/CIQLEWP2007-3.pdf
- Ramirez, F.O., Souzal, Y., & Shanahan, S. (1997). The changing logic of political citizenship: cross-national acquisition of women's suffrage rights, 1890 to 1990. *American Sociological Review*, 62(5), 735-745.
  Fulltext pdf: http://www.jstor.org/stable/2657357
- Li, Ma (2009). Social Policy and Childbearing Behavior in Japan since the 1960s: An Individual Level Perspective. *Stockholm Research Reports in Demography* 2009:10
  Fulltext pdf: http://www.suda.su.se/SRRD/SRRD_2009_10.pdf

April 11
10-12am, B800

Time-varying covariates (lecture)

Compulsory readings
- BGR, pages 128-152

Additional readings
- BGR, page 152-181

April 12
10-12am, B389

Time-varying covariates (computer exercise)

April 19
10-12am, B800

Interactions (lecture)

Compulsory readings
- Jaccard, J. (2001). Interactions in Logistic Regression, especially pages 1-2, 12-23
  (In Course Compendium)
  Fulltext also available from SU computers:
  http://srmo.sagepub.com/view/interaction-effects-in-logistic-regression/SAGE.xml?rskey=XPc5Xj&row=1
- Härkönen, Juho (2014) A note on interactions in event-history models
  (In Course Compendium)

Additional readings
- Härkönen, Juho (2005). Divorce risk factors across Finnish marriage cohorts, 1954-1989. *Yearbook of Population Research in Finland*, 41, 151-164

Fulltext pdf: http://www.yale.edu/ciqle/PUBLICATIONS/Harkonen-DivorceRiskFactors.pdf

- Andersson, Gunnar (1998). Trends in marriage formation in Sweden 1971-1993. *European Journal of Population* 14(2): 157-178.
Fulltext pdf:
http://www.springerlink.com/content/w5t26572k4750227

April 24
10-12am, B389

Interactions (computer exercise)

May 3
10-12am,
B800

Model specification, post-estimation, anticipatory analysis (lecture)

Compulsory readings
- BGR, pages 119-121
- Hoem, Jan M., Kreyenfeld, Michaela (2006). Anticipatory analysis and its alternatives in life-course research. Part 1: Education and first childbearing. *Demographic Research*, 15:16, 461-484
Fulltext pdf: http://dx.doi.org/10.4054/DemRes.2006.15.16
- Hosmer, David W., Lemeshow, Stanley (2008) Applied Survival Analysis: Regression Modeling of Time to Event Data, 2nd edition (Wiley Series in Probability and Statistics), pages 132 – 136
(In Course Compendium)

Additional readings
- Hoem, Jan M. (1996). The harmfulness or harmlessness of using an anticipatory regressor…, *Yearbook of Population Research in Finland* 33: 34-43.
(In Course Compendium)
- Hoem, Jan M. (2014). The dangers of conditioning on the time of occurrence of one demographic event in the analysis of another. *Population Studies*, 68(2): 151-159
Fulltext pdf: http://dx.doi.org/10.1080/00324728.2013.843019
- Härkönen, J. (2008). Labour force dynamics and the obesity gap in female unemployment in Finland. *Research on Finnish Society*, 1, 3-15.
Fulltext pdf:
http://finnresearch.fi/rfs2008_01_a1_3_15_haerkonen.pdf

May 4
10-4pm, B389

Flavors of event-history analysis: Parametric analysis and Cox regression
(lecture + computer exercise)

Compulsory readings
- BGR 182-246

Additional readings

- Drefahl, S. (2010) How Does the Age Gap Between Spouses Affect Their Survival? *Demography*, 47(2): p. 313-326.
  Fulltext pdf: http://dx.doi.org/10.1353/dem.0.0106

May 8
10-4pm, B389

Discrete-time analysis and competing risks
(lecture + computer exercise)

Compulsory readings
- BGR 101-115
- Allison, P. (1984) Event History Analysis. Sage, pages 14-22
  (In Course Compendium)
- Cleves, M., Gutierrez, R.G., Gould, W. & Marchenko, Y.V. 2010. *An Introduction to Survival Analysis Using Stata*. Stata Press, pages 365-391
  (In Course Compendium)
- Coviello, V. and Boggess, M. 2004. Cumulative incidence estimation in the presence of competing risks. *The Stata Journal* 4(2): 103-112.
  Fulltext pdf:
  http://ageconsearch.umn.edu/bitstream/116230/2/sjart_st0059.pdf

June 2

Deadline Submission Take-Home Exam