3rd term workshop 2018-2019

Event history analysis

Event history analysis I: Introduction (10 credits)
Event history analysis II: Extensions (10 credits)

Organised by Juho Härkönen

Dates & Rooms:
14/5/2019 14:30-18:30, Emeroteca
20/5/2019 10:00 – 15:00, Seminar Room 3
22/5/2019 10:00 – 15:00, Seminar Room 4
24/5/2019 10:00 – 15:00, Seminar Room 3
29/5/2019 14:00 – 17:00 Seminar Room 2

Registrations online

Contact: Monika Rzemieniecka

Summary
Event history analysis (also known as survival analysis, hazard regression, duration analysis, etc.) is used to analyze the rate of events such as death, divorce, job change, revolutions, and legislative change. The other way of asking these questions is long it takes that an event happens, and can be used to answer question such as: How does migration background affect the chances of finding a job? How long do dictatorships survive? How does affect affect mortality? What the affects the rate of violent protest?

This set of two 10-credit courses introduces to the basics of event history analysis (I) and its extensions (II). Stata will be used in teaching but attending students are free to use the software of their choice.

Organization
The course is given in two blocks (Introduction, and Extensions). There will be flexibility within the blocks so that one topic will not perfectly overlap with one time slot. The goal is to cover the important topics with scope for flexibility.

The course's Sharepoint files will include the slides, example data, do-files, and some of readings.

Feel free to use your own data, otherwise we will use data from the European Social Survey and NLSY79. You can write a term paper based on the course.

Readings
Textbooks, which are often (but not totally) overlapping, useful for the course are

Allison, Paul (PA). 2014. Event history and survival analysis. Sage https://methods-sagepub-com.ezproxy.eui.eu/book/event-history-analysis-2e

Blossfeld, HP, Golsch, K, & Rohwer, G. (BGR) 2007. *Event History Analysis With Stata*. Erlbaum. (Also, this older version has the basic stats: Blossfeld, HP & Rohwer, G. 1995. Techniques of event history modeling : new approaches to causal analysis).

Cleves, M, Gould, WW, Gutierrez, RG, & Marchenko, YV. (CGGM) *Introduction to Survival Analysis Using Stata* (various editions). Stata Press.

The latter two are on hold in the course book shelf in the library.

Another book useful book, though focusing mainly on multilevel analysis and maybe more technical, is

Rabe-Hesketh, S & Skrondal, A. (RHS) 2012. *Multilevel and Longitudinal Modeling Using Stata, Volume II: Categorical Responses, Counts, and Survival*. Stata Press.

Other useful books include

Kleinbaum, David G./Klein, Mitchel (2005): *Survival Analysis: A Self-Learning Text*. 2nd Edition. New York: Springer.
Box-Steffensmeier, JM, & Jones, BS. 2004. *Event history modeling. A guide for social scientists*. Cambridge University Press.
Mills, M. 2010. *Introducing survival and event history analysis*. Sage.
Royston, P & Lambert, PC. 2011. *Flexible Parametric Survival Analysis Using Stata: Beyond the Cox Model*. Stata Press.

Event history analysis I: Introduction

1. Event history questions and data

This introductory class discusses the types of questions event history analysis can be used to answer and the data for doing so. Fundamental concepts and measures (risk population, risk time, hazard, survival, censoring, truncation) are introduced.

Readings: PA, Ch 1; BGR, Chs. 1-2; CGGM, Chs. 1-2, 4; (RHS, pp. 743-748, 799-805).

2. Descriptive methods

We continue with the fundamentals and turn to descriptive event history analysis in practice, using life tables and Kaplan-Meier estimators.

Readings: BGR, Chs. 3; CGGM, Ch. 8

3. Piecewise constant exponential model I

4. Piecewise constant exponential model II
5. Piecewise constant exponential model III

The piecewise constant exponential model is a common and flexible tool for event history analysis in a regression framework. These three classes introduce the piecewise constant model, its use in Stata, the use time-varying covariates, and the use of interactions for separating timing vs probability effects.

Readings for PCEM: BGR, Chs. 4-6.; RHS, pp. 805-815; (PA, Ch. 3)

Event history analysis II: Extensions

6. Parametric and Cox models

Parametric event history models assume a specific functional form for the hazard (such as exponentially growing (mortality) or growing and then decreasing (divorce)). Parametric models enable efficient analysis of such events. The Cox model is commonly used in event history analysis applications.

Readings: PA, Chs. 3-4; BGS, Chs. 7 & 9; CGGM, Ch. 9-14

7. Count models

Event history data can be analyzed using count models, such as Poisson regression. These models also allow for analysis of event data where the timing of the events is not well recorded but where the number of events is known.

RHS, Ch. 13; pp. 819-22.

Royston, P & Lambert, PC. 2011. *Flexible Parametric Survival Analysis Using Stata: Beyond the Cox Model*. Stata Press., Ch. 4.

8. Discrete-time analysis

Discrete-time analysis is useful when events can occur only at pre-determined time points (e.g., graduation from school) or when time is measured imperfectly (e.g., in years). We also introduce the discrete-time fixed-effects model for non-repeated data.

Readings: PA, Ch. 2.; RHS, Ch. 14

Also: Yamaguchi, K. 1991. *Event History Analysis*. Sage; Allison, P & Christakis, N. 2006. Fixed-effects methods for the analysis of non-repeated events. *Sociological Methodology* 36: 155-72;

9. Competing-risks analysis

The event of interest is not always a binary outcome (event happens vs does not happen), but involves multiple alternatives (e.g., finding a job or dropping out of the labor market for the unemployed). Competing-risks analysis allows for analyzing such data.

Readings: PA, Ch. 5; CGGM, Ch. 17; RHS, Ch. 14.2.5

Also: Coviello, V & Boggess, M (2004) Cumulative incidence estimation in the presence of competing risks. Stata Journal, 4(2) https://doi.org/10.1177/1536867X0400400201; Clayton, P. (2017). STCOMLIST: Stata module to list cumulative function in presence of competing risks.

10. Repeated-events analysis

Some events—such as becoming unemployed, divorce, and revolutions—can happen multiple times. This requires adaptations to the analysis. At the same time, it allows controlling for unobserved heterogeneity.

Readings: PA, Ch. 6; BGGM, Ch. 15; RHS, Chs. 14.7-14.8, 15.9-15.12.