

## Applied Econometrics: Limited Dependent Variables

Semester: Summer semester 2017  
Level: Masters  
Language: English  
Instructor: JProf Nathanael Vellekoop, PhD  
E-Mail: [vellekoop@safe.uni-frankfurt.de](mailto:vellekoop@safe.uni-frankfurt.de)  
Office hours: every Monday from 12:00-13:00 without appointment in HoF 4.10  
Format: Lectures with biweekly tutorials in the computer lab  
Final grade: 2 homework assignments (20%) and a 90 minute exam (80%)

### Contents

Many interesting economic outcomes are not continuous. Variables can be binary (e.g. to save or not to save), represent multiple choices (which retirement savings plan to choose), or are limited by nature or observation (in a typical cross-section, many households have zero savings). Ordinary least squares often is not the right method to analyze limited dependent variables. This course will provide a hands-on instruction of techniques, with empirical examples and learning by doing in the computer lab. The methods you will learn are used in marketing, labor economics, public economics, household finance and industrial organization among others. Many examples we will study in detail are in the field of household finance: for example portfolio decisions, stock market participation, mortgage choice, and retirement savings.

Every second week there will be a tutorial in the computer lab, where Stata will be instructed to apply the techniques learned in class. The homework will be Stata-exercises. Some basic knowledge of econometrics, statistical testing and Stata is needed to follow the course.

### Topics

1. Logit, probit, linear probability model; maximum likelihood estimation
2. Interpretation and presentation of results, model fit, specification tests
3. Multinomial logit, random utility model
4. Ordered probit
5. Count data
6. Truncation and censoring, Tobit models
7. Sample selection models
8. Panel data Logit
9. IV Probit

### Literature

Lecture notes. The following empirical papers will be used for the homework assignments. Papers and data will be made available on OLAT.

1. Bachmann, Rüdiger, Tim O. Berg, and Eric R. Sims. 2015. Inflation expectations and readiness to spend: Cross-sectional evidence. *American Economic Journal: Economic Policy*, 7(1): 1-35. [Link to paper](#)
2. Bertaut, C.C., 1998. Stockholding behavior of US households: Evidence from the 1983–1989 survey of consumer finances. *Review of Economics and Statistics*, 80(2): 263-275. [Link to paper](#)

The following books can be used as background reading, but are not mandatory.

- Baum, C. (2006). An Introduction to Modern Econometrics Using Stata, Stata Press.
- Franes, Ph. and R. Paap (2001). Quantitative Models in Marketing Research
- Greene, W. and D.A. Hensher (2010). Modeling Ordered Choices: A Primer
- Verbeek, M. (2012). A Guide to Modern Econometrics, John Wiley and Sons.
- Wooldridge, J.M. (2009). Introductory Econometrics: A Modern Approach, 4<sup>th</sup> edition.

| Lectures                                                    |                                                                                                                   | Tutorial                        |                                                                  |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------|
| 24 April                                                    | Intro limited dependent variables<br>LDV as right hand side variable<br>Interpretation coefficients<br>Review OLS | 25 April Vellekoop              | Introduction Stata (1)<br>Do-files<br>Summary statistics         |
| 08 May<br><b>HoF 1.26</b>                                   | Linear probability model<br>Maximum Likelihood<br>Logit and Probit<br>SCF Example: stock market participation     | 09 May Dutt<br><b>12:-14:00</b> | Introduction Stata (2)<br>LPM, Logit and Probit<br>Handout HW #1 |
| 15 May                                                      | Marginal effects<br>Model fit<br>Hypothesis testing<br>SCF example: stock market participation (2)                |                                 |                                                                  |
| 22 May                                                      | Random utility model<br>Ordered probit<br>SCF example: searching for credit                                       | 23 May Dutt<br><b>12:-14:00</b> | Introduction Stata (3)                                           |
| 29 May                                                      | Multinomial logit<br>SCF Example: portfolio diversification                                                       |                                 |                                                                  |
|                                                             |                                                                                                                   | 06 June Vellekoop               | <b>Deadline HW #1</b><br>Discuss assignment                      |
| <b>Wed 14 June</b><br><b>12:15-13:45</b><br><b>SH 3.108</b> | Count data<br>Fractional responses<br>SCF example: number of children                                             |                                 |                                                                  |
| 19 June                                                     | Tobit models<br>SCF example: artificial topcoding                                                                 | 20 June Dutt<br><b>12-14:00</b> | Introduction Stata (4)<br>Handout HW #2                          |
| 26 June                                                     | Bivariate probit<br>SCF example: food purchases<br>Example: Boersch-Supan, Reil-Held and Schunk (2008)            |                                 |                                                                  |
| 03 July                                                     | Panel data Logit<br>Example: TBF                                                                                  | 04 July Dutt<br><b>12-14:00</b> | Introduction Stata (5)                                           |
| 10 July                                                     | Heckman selection<br>Example: Van Santen, Alessie and Kalwij (2012)                                               |                                 |                                                                  |
| 17 July                                                     | IV Probit and control functions                                                                                   | 18 July Vellekoop               | <b>Deadline HW #2</b><br>Discuss assignment                      |