Preliminary Syllabus for Econometrics I (Ph.D.)

Course URL: https://basis.uni-bonn.de/

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Lectures: Mondays and Thursdays from 10:00 am – 12:00 p.m. in the Reinhard Selten Institute.

Course Description: This class is the first semester of the econometrics sequence for Ph.D. students. It lays the foundations for understanding how to model uncertainty in economics and for carrying out empirical research in economics.

We start with an introduction to probability theory and the most important statistical concepts, including random variables and their properties, modes of convergence, point estimation, hypothesis testing and confidence intervals. We then discuss the linear regression model in detail, including different interpretations, algebraic properties, as well as small sample and large sample results.

In the second semester (Econometrics II), we will cover more advanced topics, including instrumental variable estimation, panel data models and many nonlinear models, such as the probit and logit models for binary outcomes, the multinomial logit and nested logit models for discrete outcomes, and censored and truncated regression models. We will also discuss GMM and nonparametric methods.

Readings: We will use the following two main references:

- Casella, G. and R. Berger, Statistical Inference, Duxbury Resource Center, 2001.
- Hansen, B., Econometrics, https://www.ssc.wisc.edu/ bhansen/econometrics/.

We will cover parts of Casella and Berger in the first half of the semester. We will mainly focus on the material that is most important to understand econometrics related topics, and we will therefore skip many sections. In addition to the textbook, I will distribute handouts that summarize the most important results. I still recommend that you read the book. For the subsequent parts, we will use Hansen's textbook, which is a graduate level textbook and can be freely downloaded, as well as additional handouts.

Problem Sets: I will distribute bi-weekly problem sets (7 in total). By turning in the problem sets, you can earn bonus points for the final exam. For each problem set, you can earn either 0, 1, or 2 points. We will go through the solutions to some of the problems during the lectures.

Midterm Exam: There will be a midterm exam on Monday, December 2, which will be held in class. Make sure you are available that day. By taking to midterm exam, you can earn additional bonus points for the final exam.

Final Exam: TBA.