

Teaching Proposal: Advanced Topics in Bayesian Econometrics

Instructor: Prof. Dr. Ferdinand M. Vieider, Ghent University

Coordination: Maura Mezzetti

Course Duration: 6 Hours

Materials: Bayesian Statistics Materials (<https://fvieider.quarto.pub/bstats/>)

Introduction

This course is designed as a continuation of Maura Mezzetti's Bayesian Econometrics course, focusing on advanced topics and practical applications using Stan. The goal is to provide participants with a deeper understanding of Bayesian econometric methods, equipping them with the skills to apply these techniques to real-world data.

Objectives

- To reinforce the foundational concepts of Bayesian econometrics
- To explore advanced topics in Bayesian econometrics.
- To provide hands-on experience with Bayesian modeling in Stan.
- To discuss practical applications and case studies.

Course Outline

Hour 1: Review and Introduction to Advanced Topics

- Brief review of foundational Bayesian concepts
 - Bayesian inference
 - Priors, likelihood, and posterior distributions
- Introduction to Bayesian econometrics in Stan
 - How to write a simple model in Stan
 - Tips and tricks of Stan programming
- Introduction to advanced topics
 - Hierarchical models
 - Bayesian model comparison

Hours 2&3: Hierarchical Bayesian Models

- Detailed exploration of hierarchical models
 - Theory and applications
 - Benefits and challenges
- Hands-on example using provided materials
 - Building and interpreting hierarchical models
 - Practical implementation in R/Stan

Hour 4–6: Practical Applications and Case Studies

- Application of Bayesian methods to real-world data
 - Case studies from economics and finance
- Group discussion and Q&A
 - Sharing experiences and discussing challenges
 - Addressing specific questions from participants

Materials and Resources

Participants will use materials available at Bayesian Statistics Materials (<https://fvieider.quarto.pub/bstats/>), which include:

- Lecture notes and slides
- Sample datasets
- Code examples in R and Stan
- Additional reading materials

Teaching Methods

- Lectures and Discussions: Each topic will be introduced through a lecture, followed by a discussion to clarify concepts and address questions.
- Hands-on Exercises: Practical examples and exercises will allow participants to apply the concepts discussed.
- Case Studies: Real-world examples will help illustrate the practical applications of Bayesian econometrics.

Conclusion

This advanced course in Bayesian econometrics, coordinated with Maura Mezzetti's prior instruction, aims to deepen participants' understanding and application of Bayesian methods. By the end of the course, participants will be well-equipped to utilize Bayesian econometrics in their research.