

Econometric Methods I - Part I, WS 2022/23

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Lectures: Fridays 10:00-14:00, Room 3.3.002C at DIW Berlin starting on 21 October 2022

TA sessions: Mondays 10:00-12:00, Room 3.3.002C at DIW Berlin starting on 24 October 2022

1. The Classical Linear Regression Model

- a) Ordinary Least Squares (OLS) Estimation
- b) Maximum Likelihood (ML) Estimation
- c) Hypothesis Testing
- d) Generalized Least Squares (GLS) Estimation

References: Hayashi (2000, Ch. 1), Judge et al. (1988, Ch. 5,6,8), Greene (2019, Ch. 2,3,4,5,9,14)

2. Asymptotic Theory

- a) Stochastic Convergence Concepts
- b) Laws of Large Numbers (LLN) and Central Limit Theorems (CLT)
- c) Asymptotic Properties of OLS
- d) Asymptotic Properties of ML
- e) Asymptotic Properties of GLS

References: Hayashi (2000, Ch. 2), Judge et al. (1985, Ch. 5), Hamilton (1994, Ch. 7), Greene (2019, Ch. 4,5,9,14)

3. Single Equation Generalized Method of Moments (GMM)

- a) Instrumental Variables (IV) Estimation
- b) Method of Moments (MM) Estimation
- c) GMM Estimation
- d) Asymptotic Properties of GMM
- e) Related Tests

References: Hayashi (2000, Ch. 3), Hamilton (1994, Ch. 14), Judge et al. (1988, Ch. 13), Greene (2019, Ch. 8, 13)

4. Multiple Equation Generalized Method of Moments (GMM)

- a) Simultaneous Equations
- b) GMM Estimation
- c) Uses of Multiple Equation GMM

References: Hayashi (2000, Ch. 4), Hamilton (1994, Ch. 14), Judge et al. (1988, Ch. 11,14,15), Greene (2019, Ch. 10, 13)

5. Panel Data

- a) Random Effects
- b) Fixed Effects

References: Judge et al. (1988, Ch. 11), Greene (2019, Ch. 11), Hayashi (2000, Ch. 5),

6. Bayesian Estimation and State-Space Models

- a) Bayesian Estimation of the Classical Linear Regression Model
- b) Time-Varying-Parameter, Unobserved Components, Dynamic Factor and Common Stochastic Trend Models
- c) The Kalman Filter

References: Kim & Nelson (1999, Ch. 3, 7), Hamilton (1994, Ch. 13), Judge et al. (1985, Appendix C), Greene (2019, Ch. 16)

References

Greene, W. H. (2019). *Econometric Analysis* (8 ed.). Pearson.

Hamilton, J. D. (1994). *Time Series Analysis*. Princeton university press.

Hayashi, F. (2000). *Econometrics*. Princeton University Press.

Judge, G. G., Hill, R. C., Griffiths, W., Lütkepohl, H., & Lee, T.-C. (1985). *The Theory and Practice of Econometrics*.

Judge, G. G., Hill, R. C., Griffiths, W., Lütkepohl, H., & Lee, T.-C. (1988). *Introduction to the Theory and Practice of Econometrics*. New York New York John Wiley and Sons.

Kim, C.-J. & Nelson, C. R. (1999). *State-space models with regime switching: classical and Gibbs-sampling approaches with applications*. The MIT press.

Course Requirements

The grading is based on the assignments (20%) and an exam (80%) at the end of the each part. Each part of the course is given a 50% weight of the total grade.