Econometrics I (part 2)
Lecture notes coverage of sections in Hansen (2021)

Markus Jäntti
markus.jantti@sofi.su.se

March 6, 2024

The lectures in part 2 cover sections in Hansen (2021) – the version that is available on Athena – as follows (with the materials for the last substantive lecture on time series to be added early next week):

7 Hypothesis testing:

- 9.1 Hypotheses
- 9.2 Acceptance and Rejection
- 9.3 Type I Error
- 9.4 t tests
- 9.5 Type II Error and Power
- 9.6 Statistical Significance
- 9.7 P-Values
- 9.8 t-ratios and the Abuse of Testing
- 9.9 Wald Tests
- 9.11 Criterion-Based Tests
- 9.15 Hausman Tests
- 9.17 Problems with Tests of Nonlinear Hypotheses
- 9.20 Multiple Tests and Bonferroni Corrections
- 9.21 Power and Test Consistency
- 9.22 Asymptotic Local Power
- 9.23 Asymptotic Local Power, Vector Case

8 Resampling

- 10.1 Introduction
- 10.2 Example
- 10.3 Jackknife Estimation of Variance
- 10.6 The Bootstrap Algorithm
- 10.7 Bootstrap Variance and Standard Errors

- 10.8 Percentile Interval
- 10.9 The Bootstrap Distribution
- 10.16 Consistency of the Percentile Interval
- 10.17 Bias-Corrected Percentile Interval
- 10.21 Bootstrap Hypothesis Tests
- 10.22 Wald-Type Bootstrap Tests
- 10.23 Criterion-Based Bootstrap Tests
- 10.27 Bootstrap Regression
- 10.28 Bootstrap Regression Asymptotic Theory
- 10.29 Wild Bootstrap

9A Asymptotic theory for least squares

- 7.1 Introduction
- 7.2 Consistency of Least Squares Estimator
- 7.3 Asymptotic Normality
- 7.5 Consistency of Error Variance Estimators
- 7.7 Heteroskedastic Covariance Matrix Estimation
- 7.10 Functions of Parameters

9B Regression extensions

- 11.1 Introduction
- 11.2 Regression Systems
- 11.3 Least Squares Estimator
- 11.4 Expectation and Variance of Systems Least Squares
- 11.5 Asymptotic Distribution
- 23.1 Introduction
- 23.2 Identification
- 23.3 Estimation
- 23.4 Asymptotic Distribution

10 Instrumental variables

- 12.1 Introduction
- 12.2 Overview
- 12.3 Examples
- 12.4 Endogenous Regressors
- 12.5 Instruments
- 12.6 Example: College Proximity
- 12.7 Reduced Form
- 12.8 Identification

- 12.9 Instrumental Variables Estimator
- 12.12 Two-Stage Least Squares
- 12.28 Control Function Regression
- 12.29 Endogeneity Tests
- 12.35 Identification Failure

11 Generalized method of moments

- 13.1 Introduction
- 13.2 Moment Equation Models
- 13.3 Method of Moments Estimators
- 13.4 Overidentified Moment Equations
- 13.5 Linear Moment Models
- 13.6 GMM Estimator
- 13.7 Distribution of GMM Estimator
- 13.8 Efficient GMM
- 13.9 Efficient GMM versus 2SLS
- 13.10 Estimation of the Efficient Weight Matrix
- 13.13 Clustered Dependence
- 13.19 Distance Test
- 13.21 OverIdentification Test
- 13.25 Nonlinear GMM

12 Time series

- 14.1 Introduction
- 14.2 Examples
- 14.3 Differences and Growth Rates
- 14.4 Stationarity
- 14.5 Transformations of Stationary Processes
- 14.6 Convergent Series
- 14.7 Ergodicity
- 14.8 Ergodic Theorem
- 14.9 Conditioning on Information Sets
- 14.10 Martingale Difference Sequences
- 14.11 CLT for Martingale Differences
- 14.17 Lag Operator
- 14.18 Autoregressive Wold Representation
- 14.19 Linear Models
- 14.20 Moving Average Processes

- 14.21 Infinite-Order Moving Average Process
- 14.22 First-Order Autoregressive Process
- 14.23 Unit Root and Explosive AR(1) Processes
- 14.24 Second-Order Autoregressive Process
- 14.25 AR(p) Processes
- 14.30 Estimation of Autoregressive Models
- 14.31 Asymptotic Distribution of Least Squares Estimator
- 14.32 Distribution Under Homoskedasticity

References

Hansen, Bruce E (Aug. 2021). *Econometrics*. Madison, WI: University of Wisconsin.