EC 421

Final Topics from “New” Lectures

Spring 2020

Note$_1$: The final exam will focus on the following topics. I will also assume an understanding of the material from the midterm.

Note$_2$: As with the midterm, you do not need to memorize proofs. Understand the steps/reasoning. Intuition is paramount. I might ask how you get from one step to the next. I won’t ask you to write down a full proof.

Slide Set 7: Time Series

- Notation
- Assumptions
- Static models
- Dynamic models
  - With lagged explanatory variables
  - Autoregressive, distributed lag (ADL) models
  - ADL(p,q)
  - Long-run vs. short-run effects
- Contemporaenous exogeneity

Slide Set 8: Autocorrelation

- Definition of autocorrelation
- Negative and positive autocorrelation
- Equation/formula for AR(p) processes
- OLS implications for static models and dynamic models with lagged explanatory variables
- OLS implications/bias for dynamic models with lagged dependent variables
- Breusch-Godfrey test
  - Hypotheses
  - Interpretation of results
  - Conclusion
- Misspecification
- FGLS: General idea

Slide Set 9: Non-Stationary Time Series

- Definition/requirements of nonstationarity
  - Mean
  - Variance
  - Covariance
- Random walks
- Spurious correlations
- Differencing

Slide Set 10: Causality

- Prediction vs. causal inference/estimation
- Correlation vs. causation
- Experiments/RCTs
- The "ideal experiment" (ideal dataset)
- Treatment effects:
    - Individual effects
    - Average treatment effects
    - Constant treatment effects
- Selection bias

Slide Set 11: Instrumental Variables

- Exogeneity and endogeneity
- Requirements for a valid instrument
    - Relevant
    - Exogenous
- Probability limit
- Venn diagrams
- First stage and reduced form
- Two-stage least squares
    - Motivation
    - First stage
    - Second stage
- Interpretation