Midterm II Review

EC 320: Introduction to Econometrics

Amna Javed
Winter 2020

Midterm Topics

Anything from the lectures, labs, or problem sets **is fair game!**

1. Simple Linear Regression: Estimation I & II
2. Classical Assumptions
3. Simple Linear Regression: Inference
4. Multiple Linear Regression: Estimation
5. Multiple Linear Regression: Inference
6. Interpret R output
7. Anything before Midterm I

1. Simple Linear Regression: Estimation

OLS mechanics

- How does OLS pick parameter estimates?
- What properties are a direct consequence of OLS?
- Residuals *v.s.* errors

Coefficient interpretation (literal)

1. Simple Linear Regression: Estimation (cont.)

Goodness of fit

- R^2 interpretation (literal)
- Understand R^2 derivation
- Use and misuse of R^2

OLS by hand

- Estimate coefficients and calculate R^2 .
- Don't have to calculate standard errors by hand.

2. Classical Assumptions

Six assumptions

1. Linearity
2. Sample variation/no perfect collinearity
3. Random sampling
4. Exogeneity
5. Homoskedasticity
6. Normality

What do they buy?

When are they satisfied? When are they violated?

2. Classical Assumptions (cont.)

So what?

- Coefficient interpretation (substantive)
- Hypothesis test validity.

3. Simple Linear Regression: Inference

Making inferences about population parameters

- Population *v.s.* sample
- What do we mean by "statistical significance?"

Hypothesis testing (*e.g.*, *t* tests)

- Null hypotheses *v.s.* alternative hypotheses
- Left-tailed, right-tailed, and two-tailed
- Type I *v.s.* Type II error

Confidence intervals

4. Multiple Linear Regression: Estimation

OLS mechanics and properties

Goodness of fit

- R^2 interpretation (literal)
- Know the behavior of R^2 as the number of explanatory variables increases.

Make predictions for certain values of the explanatory values (*e.g.*, hedonic modeling)

4. Multiple Linear Regression: Estimation (cont.)

Coefficient interpretation (literal and substantive)

Omitted-variable bias

- Know when omitting a variable causes bias.
- Sign the bias.
- Back out correlations between explanatory variables.

5. Multiple Linear Regression: Inference

Confidence intervals and *t* tests

- Other than degrees of freedom, same as before.

Multicollinearity

- Standard errors depend on the overlapping variation between the explanatory variable.
- More overlap $\implies$ bigger standard errors $\implies$ less likely to reject null hypothesis.

Irrelevant variables

No *F* tests on the midterm! Stay tuned for the final.

Midterm Structure

Multiple Choice Questions

Short Analytical Questions

More involved Analytical Questions

Midterm Protocol

Materials

- Writing utensil
- Basic or scientific calculator
- **Nothing else**

Procedure

- 80 minutes from *"you may begin"* to *"pencils down"*