

Econ 300 Spring 2020 Final Study Guide*

Below is a study guide of the main concepts you need to know for the exam. You also need to review Quizzes, and Problem Sets.

*The aim of this study guide is to help you study for the midterm, anything said in class can be in the exam, even if not listed below.

Simple regressions

- Be able to interpret regression coefficients
- Be able to make decision using t-statistics and p-value
- Be able to make decisions using confidence intervals

Multiple regressions

- Be able to interpret regression coefficients (don't forget "holding other explanatory variables fixed" !)
- Understand what is omitted variable bias
- Need to know the conditions for omitted variable bias
- Understand how to determine the direction of omitted variable bias
- Know how to read STATA output
- Know how to construct and check null hypothesis

Regression extensions

- Know how to check for threats to internal validity (different types of biases) and external validity of multiple regression models
- Know the difference between R-square and adjusted R-square.
- Know the F-test and how to interpret the results of the F-test
- Know the dummy variable trap and how to fix it
- Understand when interaction terms are needed.
- Know how to interpret interaction terms
- Know how to test whether interaction terms are significant
- Understand when non-linear terms are needed
- Understand how to address non-linearity in the regression and how to test it

Randomized control trial

- Understand what randomized control trial is and why it eliminates selection bias
- How to read balance table and result table of RCT
- Be able to perform statistical inference for the balance table and result table
- Understand the attrition problem in RCT
- Understand limitations of randomized control trial

Regression Discontinuity

- Understand what RD is, why we need RD, and the identification assumption of RD
- Understand two types of RD (Sharp, Fuzzy)
- Be able to recognize the running variable and cutoff value
- For RD implementation, understand the following formula,

- $Y = \alpha + \delta Above + \gamma Score + \eta(Score * Above) + \varepsilon$
- Understand fuzzy RD
- Understand Why RD might fail and the 2 Ways to check validity of the RD
- Know why RD estimates a LATE

Difference in Difference

- Know what DID is and its identification assumption
- The regression for simple DID-know what each parameter means on a graph
- How to check validity of the research design in DID? In other words, what is pre-trends (parallel trends) assumption in the DID setting.
- Why DID can fail to give the true effect? 4 reasons mentioned in slides