**Econ 300 Spring Final Exam Name:**

**5/5/2020 3:30-5:30pm**

**Total points: 100.**

**Part I – Multiple Choice Questions [30 pts]**

1. Which one of the following is **NOT** the reason why DID fails?

a. Policy endogeneity

b. The cutoff value is used for other policies

c. Contamination

d. Common trend assumption fails

2. Suppose some high schools started to offer AP economics in 2005 and some other schools never offered AP economics. We can use DID identification strategy in this case. What is the identification assumption needed to make DID valid?

a. Schools that started to offer AP and schools that never offered AP had the same graduation rates before 2005

b. Schools that started to offer AP and schools that never offered AP would have the same trends in graduation rates after 2005 if there were no policy change

c. All schools have the same graduation rates

d. None of the above

3. Which one of the following is **FALSE**?

a. R-square shows how much of the variation in Y can be explained by the model

b. With statistical inference, the bigger t gets, better the chances of rejecting the null hypothesis

c. In a regression, the unexplained variation is always small compared with the part of variation in Y that can be explained by X

d. In Y=X+, if X is a dummy variable,  can be interpreted as the difference in means between two groups X=1 and X=0.

4. To implement Sharp RD, you run a linear regression:

, where S is the running variable minus the cutoff value; Above=1 if S 0, and Above=0 if S<0. Y is the outcome. Which parameter gives the causal impact in RD?

a. 

b. 

c. 

d. 

5. You are studying the impact of class size on earnings. You know that the rule determining class size is 1) If there are 30 students in a grade, the class size is 30; 2) if there are 31 students in a grade, students will be split into 15, and 16. In this example, what is the running variable?

a. Class size

b. Earning

c. Number of students in a grade

d. Number of grade in a school

6. Which one of the following is **FALSE** about RD?

a. When implementing RD, linear model always gives us the best fit

b. Fuzzy RD is a type of RD

c. Sharp RD is a type of RD

d. The idea of RD is to mimic randomization around the cutoff

7. Suppose you are studying the impact of smoking on health. You know on 9/1/2009 there is an increase in Tabaco tax in California but not in other states. Which identification strategy is best fit for this analysis?

a. Differences-in-differences

b. Regression discontinuity

c. Randomized control trial

d. Simple OLS

8. Which interpretation about RD estimate is **FALSE**?

a. RD has great tests to explicitly check its identification assumption

b. RD’s identification assumption will fail if there is perfect manipulation

c. RD estimate is a LATE because it estimates the average treatment effect only for people around the cutoff value

d. RD estimate is a LATE because sometimes it estimates the average treatment effect for people who come late to class.

9. Which of the following is **FALSE** about the Randomized Control Trials?

a. Randomized control trials can be costly.

b. There can be ethical concerns with running randomized control trials.

c. They have great external validity but poor internal validity.

d. They have great internal validity but external validity.

10. Which is **NOT** a test for the identification assumption?

a. Pre-trend test

b. Covariate smoothness test

c. Balance table

d. T-test

**Part II – Short Questions [20 pts]**

1. Does a regression discontinuity (RD) design estimate a Local average treatment effect (LATE)? Why or why not? Justify your answer.
2. Explain why the naïve comparison is not misleading in the case of a randomized control trial?
3. Suppose you are interested in the research question: does raising minimum wage lead to lower employment. You know there is a minimum wage increase for the state of New York in 2012 but not for other states.
   1. Can you compare the employment rate before and after this policy change in NY to get the causal effect of the minimum wage increase on employment? Explain. (5pts)
   2. Can you design a research to get the causal effect? Explain your research design. (Don’t have to write the regression) (5pts)

**Part III – Difference-in-differences [30 pts]**

**Opioid Drugs – Difference-in-Difference** In an effort to reduce opioid prescription abuse in 2012 North Carolina implemented a monitoring program that limited the number of opioid prescriptions a doctor could subscribe. South Carolina did not implement any program. Use a difference-difference identification strategy to measure the impact of the program on number of prescriptions written.

1. Which state acts as the treatment group and which group acts as control group?
2. What is the post/after period?
3. Write down the standard difference-in-difference regression model for this context.
4. Using the data to calculate the impact of the policy on the number of prescriptions written.

A screenshot of a cell phone

Description automatically generated

1. Based on the graph, which other state besides South Carolina do you think would a good control state? Justify why?



1. What is the key assumption of a difference-in-difference research design?

**Part IV Quiet Study Areas- Regression Discontinuity [30 pts]**

In a one-time trial at a large urban university the school is offering a dedicated quiet study space for all individuals that live further than 15 miles from campus. If an individual lives 16 miles from campus they receive access to a study room in the library. If an individual lives 14 miles away from campus they do not have access to the study room. A regression discontinuity design can be used to measure the impact of having a study room on student’s GPA.

1. What is the running variable? Which individuals are treated? What is the cutoff for treatment?

The RD regression estimates for a model with a window of within 5 miles of the cutoff is

1. What is the average GPA of non-treated people just near the cutoff?
2. What is the average GPA of non-treated people just near the cutoff?
3. What is the impact of being assigned a study room on GPA?
4. What is the assumption of a regression discontinuity design in this context?
5. What is a way we can check if the assumptions of RD are likely to hold in this context?