

Quiz 5 (Answer Key)
ECNS 432
Fall 2018

Name _____

1.) In 2009, Georgia's Peach County School District switched from a traditional school week to a shortened, four-day school week in order to save on overhead and transportation costs. A Peach County school administrator has asked you to evaluate the effects of this change on the academic performance of elementary school students.

To evaluate the four-day week via a difference-in-differences methodology, you must first select an appropriate control group (i.e. a school district that did not switch its schedule). Consider the following characteristics of the Peach County School District and the county school districts that border Peach County that did not switch their schedule:

	<u>Peach County</u>	<u>Macon County</u>	<u>Crawford County</u>	<u>Bibb County</u>
Average school size (i.e. average student population)	300	250	190	320
Average teacher experience (in years)	8.5	12	8	6
Percentage of students receiving free or reduced price lunch	25%	15%	20%	25%
County-level unemployment rate	10%	8%	8%	11%
Percentage of county population that is white	70%	60%	50%	75%

a.) (5 points) Assuming you can only choose one, which of the three bordering counties (Macon, Crawford, and Bibb) would you choose as your control county? WHY did you choose this county?

I would probably choose Bibb county. Bibb is of a similar size, has the same % receiving free or reduced price lunch, has a similar unemployment rate, and a similar % of population that is white.

b.) (5 points) To evaluate student academic achievement, you have data on average student GPAs for Peach County School District and the school district you chose as your control group (which we will just refer to as School District X):

	Peach County		School District X	
	<u>2008</u>	<u>2010</u>	<u>2008</u>	<u>2010</u>
Average student GPA	2.8	3.0	2.7	2.8

If you were to only use within-Peach County variation in GPA, how much of a change in GPA would you attribute to switching to a four-day week? Using a difference-in-difference method, how much of a change in GPA would you attribute to switching to a four-day week? Which method is preferred and WHY?

If only using within-Peach county variation in GPA, we would attribute a change in average GPA of .2 to the schedule change.

If we used a DD method, we would only attribute a change in average GPA of .1 to the schedule change.

We prefer the DD method as it helps to control for unobserved factors that would have influenced GPA in the absence of treatment.

c.) (5 points) Now let's assume you have more pre-treatment data on average student GPA for Peach County and School District X:

	Peach County					School District X				
	<u>2002</u>	<u>2004</u>	<u>2006</u>	<u>2008</u>	<u>2010</u>	<u>2002</u>	<u>2004</u>	<u>2006</u>	<u>2008</u>	<u>2010</u>
Ave. GPA	2.8	2.8	2.8	2.8	3.0	2.4	2.5	2.6	2.7	2.8

Given this new information, how does your inference from part b.) change? That is, without the consideration of pre-existing trends in GPA, is your diff-in-diff estimate from part b.) biased? If so, does your part b.) estimate overstate or understate the true impact of the four-day week on student academic achievement? You do not necessarily have to do any calculations here, I am mainly looking for the correct intuition.

Given this new information, we would conclude that our DD estimate from part b.) is biased. In particular, because GPA was trending smoothly upward in our control county, but not in Peach county, we would conclude that the DD estimate in part b.) is too small.