Questions to answer in preparing for Week 6 class (*I won’t plan on asking about the questions in italics in class, but you should be really clear on your answers to them*)

1. **Chapters 10 and 11 of *Methods Matter***
2. What conditions must be satisfied in order to use a particular variable as a suitable instrument for an endogenous question predictor?
3. What are the properties of an IV estimate of a causal relationship such as the impact of a year of college education on later labor market earnings?
4. Is there any advantage to having more than one instrumental variable? Explain.
5. *Murnane and Willett present three alternative modeling strategies for obtaining an instrumental variables estimate? What are they and what might be reasons to choose one modeling strategy over another?*
6. *Describe common types of instrumental variables in educational research? What are the threats to the validity of each type of instrument?*
7. *In what ways did the distribution of the PACES scholarship in Colombia conform to the ideal of a true experiment? In what ways was it a natural or quasi-experiment*?
8. As we discussed in class and as MM points out, IV estimates rely only on the behavior of “compliers.” “Never-takers” and “always-takers” do not contribute to the estimates. Can you describe why this is the case conceptually (it is possible to do so mathematically as well [see Angrist, Imbens and Rubin (1996)] but requires a fair bit of expectation notation)?
9. Once you’ve read Murnane and Willett’s summary of Brian Jacob and Lars Lefgren’s study of test-based assignment to summer school in the Chicago Public Schools, you have now added to your toolkit the ability to estimate a “fuzzy” regression discontinuity.
   1. In what way is assignment to summer school “fuzzy”?
   2. Why would naïve OLS estimates that regress reading scores in year *t*+1 on summer school attendance be biased?
   3. How can instrumental variables estimates model the causal effects of summer school in this fuzzy regression discontinuity framework?
   4. Equation 11.3 represents the first stage estimates of Jacob and Lefgren’s 2SLS model. Can you write out the second stage?
10. **Sections III.A, IV.B and IV.C of the Angrist and Lavy “Maimonides’ Rule” paper**
11. *Angrist and Lavy estimate a “fuzzy” regression discontinuity model to estimate the effect of learning in a small class. Can you articulate what is “fuzzy” about their RD and what would instead by a “sharp” RD?*
12. What do the authors mean when they use the term “reduced form estimates” in reporting the results in Table III.
13. *How do you interpret the coefficient of 0.704 in the top left corner of Table III?*
14. *How do you interpret the coefficient on fsc  of -0.149 in column 4 of Table 3?*
15. *How do you interpret the coefficient on class size of -.260 in column 3 of Table IV?*
16. *Explain the different ways that the authors capture the relationship between grade level enrollment and student average test scores in their 2SLS models?*
17. **pg. 155-158 of the Dee and Penner (2017) paper**
    * + 1. Review Dee and Penner’s discussion of Table 11. With your newly-found understanding of “never takers,” “always takers,” and “compliers,” can you now interpret what this analysis intends to uncover about the Local Average Treatment Effect and how treatment effects may differ across these three groups?
        2. A clarifying point: the authors write that, “when treatment effects are not homogenous across these groups, and assuming monotonicity, estimates like ours are Local Average Treatment Effects” (pg. 156). In mathematics, monotonicity means that a function is either increasing or decreasing over its entire domain. Here, monotonicity means that moving from not getting the treatment to getting the treatment can only make you equally or more likely to take the treatment up. Aka, there are no defiers.
18. **The Dee (2004) paper**

A. Focus of the paper

1. What is the author’s research question?
2. What answer does Dee find?
3. What are the channels though which Dee hypothesizes education affects civic participation?

B. Data

1. *What data sets does Dee use?*
2. *What are the strengths and limitations of these data sets?*
3. *How does Dee define his sample?*
4. Identification strategy
5. What is Dee’s identification strategy? (How does the strategy differ for the different data sets that he uses?)
6. What instruments does he use in implementing this strategy?
7. What is the theoretical justification for these instruments (p. 1705) (try to describe in each case what are the obstacles to causal identification for the endogenous predictor, why the instrument is exogenous, and why the instrument might satisfy the exclusion restriction)?
8. *Why did Dee decide not to use distance to 4-year colleges as an instrument?*
9. Details of findings
10. *Describe Dee’s finding in quantitative terms.*
11. How do Dee’s findings using IV estimates compare with the OLS findings?
12. What explanations does Dee provide for the difference between the two findings?
13. Threats to validity
14. What are the threats to Dee’s identification strategy?
15. How does Dee defend his identification strategy?
16. **The Angrist, Cohodes, Dynarski, Pathak & Walters (2016) paper**
17. Focus of the paper
18. What are authors’ research questions (*there are lots of sub-questions here, again focus on the big question and then the specific ones*)?
19. *On what outcomes do they focus? In what ways are these different outcomes than ones previously studied in the specific context of Boston charter studies by many of the same authors in previous work described on pg. 278?*
20. What do they find?
21. Data and Sample
22. *What are the sources of data in the Angrist et al. paper?*
23. *What are observable similarities and differences between students in the Boston Public Schools and charter lottery applicants?*
24. *What are the observable similarities and differences between charter lottery applicant winners and losers?*
25. Identification
26. What is the source of exogenous variation in treatment which the authors leverage to claim a credibly causal effect of charter schools on medium-term outcomes?
27. *Why would a regression of an outcome of interest on an indicator of charter school attendance yield biased estimates?*
28. Would a regression of an outcome of interest on an indicator for whether a student won a lottery to attend a charter school yield a biased estimate? If yes, why? If no, why do the authors not conduct the analysis in this way?
29. What is the instrument in this study? Does you think it meets the three assumptions for a valid instrument introduced in Lecture 5?
30. Can you describe the authors’ 2SLS estimation strategy by describing the first stage equation identifying the exogenous portion of the treatment followed by the second stage estimating the effect of the exogenous portion of the treatment on a given outcome?
31. What are the “risk sets” (*dij*) in Equations 1 and 2? Why are they important for the authors to include?
32. Results
33. *What are the quantified effects of charter school attendance on MCAS, SAT and AP test scores, grade progression, HS graduation, and college enrollment/persistence?*
34. Without getting into the details of Eqs. 3 and 4 and the method of creating the kernel function, why is the resulting Figure 1 an important addition to the paper beyond just a visualization of the results in Table 3?
35. The authors’ findings on the effects of charter school attendance on college enrollment and persistence are complex. Describe these effects in a way that would be complete and make sense to a legislative policy director interested in understanding the results of this study.
36. Mechanisms and Discussion
37. The authors find that charter school attendance reduces on-time graduation by 14.5 percentage points. How does this square with the rest of the paper’s results and what might be some of the mechanisms by which the charter schools in this sample are achieving the observed results?
38. Is the authors’ identification of the causal effects of charter attendance affected by whether charter schools “push out” poor performers or disruptive students? Why or why not?
39. Is the policy implication of the authors’ findings on charter attendance affected by whether charter schools “push out” poor performers or disruptive students? Why or why not?
40. The authors find that while lottery winners attend school with stronger performing peers than lottery losers in the year immediately after winning the lottery, these differences evaporate over time? Why does this fadeout occur? What implications does this have for the conclusions of the study?