Review of Hoxby, How Teachers’ Unions Affect Education Productivity

1. Briefly summarize the central question this paper addresses, and what economic theory predicts.

*Do unions affect the level of educational inputs and the effectiveness of those inputs?*

Theory (1): Teachers maximize the same objective functions as parents (student achievement), but information/market imperfections lead teachers to demand different input levels. Under this theory, unions increase input effectiveness. Theory (2): Teachers maximize a different objective function—e.g., own salaries—and student achievement has less weight. This would lead to less effectiveness of inputs.

*Both theories suggest unions might change the budget level and allocation of the budget across inputs, but differ in terms of the effect of that on student outcomes.*

2. Hoxby states at the bottom of pg 673 that the “fourth and most serious obstacle [to a study of the effect of teachers’ unions on education production] is the identification problem.” Carefully explain what she means by this.

*It is difficult to differentiate between the characteristics of a school that make a union more likely to exist and the effect of unions on schools—e.g., incompetent administrators.*

3. Hoxby uses several different methods to try to resolve this identification problem. List these.

   (1) Reduce omitted variable bias by including detailed demographic information;
   (2) use first differences to eliminate school district characteristics that remain constant over time;
   (3) use what she terms differences in differences (really a second difference over time, not a treatment-control comparison)—subtract last period’s change from this period’s change. This will eliminate any unobservables with a constant time trend. Most unobservables are likely to trend slowly/constantly.
   (4) IV estimation. The union effect from the 2nd difference will be identified by differences in the timing of unionization—a discrete jump from crossing the threshold to 50% support for the union. This would lead to a new time trend for inputs/expenditures. She wants to focus on this discrete event. The timing differences are then instrumented by state laws that facilitate unionization. The only part of the discrete event of unionization that remains is the part correlated with law changes.

4. Explain what Hoxby means by her differences-in-differences estimator. Note that this is not exactly the same as the double difference estimator we discuss in class. What empirical problems does Hoxby hope to resolve using her approach? What types of unobserved effects has she controlled for? Give examples of some specific potential unobserved effects that would be controlled for using this approach.
See above.

5. Explain Figures III and IV.

She calculates a residual from the cross sectional regression of per-pupil spending on all variables EXCEPT unionization. She then combines these residuals to make a weighted average for (1) districts unionizing before 1972, (2) districts unionizing between 1972-1982, (3) districts unionizing 1982-92, and (4) districts never unionizing.

Figure 4 is the same except those this by law status.

Note that these figures are a GREAT way to look at the effect of a key variable when you want to control for everything else to illustrate the effect of that variable alone.

6. Why does Hoxby also use state laws as instruments?

See above. After the second differences, there may still be potential correlations between shocks to unobserved characteristics (e.g., a brand new bad superintendent) and the discrete change in unionization. The instruments need to be uncorrelated with these shock and also to cause unionization to change discretely when the laws change discretely.

7. Write out Hoxby’s estimation equations (13) – (16). Carefully explain the structure of the error terms.

See discussion on 687.

8. Hoxby states on page 687 that doing a time differences-in-differences is equivalent to estimating the equations with district fixed effects, time fixed effects, and district-specific time trends. For one of her equations, write out this alternative specification. Explain why it is equivalent to her approach.

Answers will vary here.

9. On page 288, Hoxby states that the IV first differences may or may not be better than OLS. Explain why there is this ambiguity.

The IV estimates reduce the measurement error problems that get exacerbated by first differences. However, the timing of the law change has to be arbitrary to solve the first difference identification problem.

10. Hoxby finds that the size of the unionization coefficient increases as she moves from the cross section to the IV results in Tables IV and V. Why is this the case?

She argues that the measurement error or omitted variable problems are being eliminated.
11. What does Hoxby ultimately conclude about the effects of unions? Are you convinced by her conclusions?

Answers vary. One thing to note is how much less attention she pays to instrument validity in this paper than was in the AJR paper—the first stage results are thrown in an appendix and the overid test is only discussed briefly. This follows the trajectory of how this literature has gone—today you need to do a lot more work to convince a reader that your IV is valid if it fundamental to your results.