Economics 475: Econometrics
Homework #5

This homework is due on Monday, March 6th.

1. The data file WA BUILDING DATA has been placed on the class website. This is an unbalanced panel of all Washington State public K-12 schools between 2002 and 2011. It contains annual observations of building-level demographic data as well as some information required by the No Child Left Behind Act (NCLB). The NCLB required each building to have a certain fraction of their students pass a standardized math and reading tests. In this case, the percent of a building's students passing these exams are "math_pass" and "reading_pass."

One argument against the NCLB is that the percent of high performing students is a function of school demographics—students from disadvantaged backgrounds are unlikely to do well on standardized exams. To make matters worse, the NCLB actually removed resources from schools which had too few students achieving passing scores on these standardized tests. You will explore these claims in this homework.

a. Perform an OLS regression on the pooled data with your model being:

(1) $\text{math\_pass}_i = \beta_0 + \beta_1 \text{perwhite}_i + \beta_2 \text{perfreelunch}_i + \beta_3 \text{avgexp}_i + \beta_4 \text{studperteacher}_i + \varepsilon_i$

Comment on β_2. How do you interpret this coefficient?

b. Perform the following fixed effects regression:

(2) $\text{math\_pass}_{it} = \beta_0 + \beta_1 \text{perwhite}_{it} + \beta_2 \text{perfreelunch}_{it} + \beta_3 \text{avgexp}_{it} + \beta_4 \text{studperteacher}_{it} + \alpha_i + \varepsilon_{it}$

How did your estimate of β_2 change relative to your pooled OLS estimates of (1)? Provide an explanation for this change.

c. When I estimate (1) with fixed effects, I find rho = .736. What does this mean? Specifically, for schools attempting to raise the number of students passing the math exam, is a high rho or a low rho better?

d. Does including fixed effects explain a statistically significant amount of the variation in math_pass? Given your answer, what does this mean for schools attempting to increase the number of students passing the math exam?

e. When I examine the fixed effects from (1), I find that Cedar Wood Elementary School in the Everett School District has an alpha = 40.7 meaning that 40.7% more of this school's children pass the math exam than would be predicted by perwhite, perfreelunch, avgexp, and studperteacher. For a while, the State of Washington gave out awards to schools that had high alphas. Comment on this practice. Would you want to reward Cedar Wood Elementary?

f. Is the fixed effects approach appropriate in this case? Should random effects be used? Test this.