

Appendix

Our model is similar to Devaraj, Faulk and Hicks (2018)ⁱ, where we investigate the relationship between student performance outcomes and district size. We examine performance measures for high-school students' college-readiness. To control for factors that affect student performance, we included the share of low-income students in a district and the general state aid per student. The data come from the Illinois State Board of Education. To control for the importance of geographical differences, we included dummy variables from the United States Department of Agriculture (2013)ⁱⁱ along the rural-urban gradation. Table 1 contains descriptive statistics for all used variables.

We estimate the following regression takes the form:

$$Q_{it} = \delta(\ln(Z_{it})) + BX + \mu_t + \alpha_i + \epsilon_{it}$$

Where Q_{it} is the outcome variable, ACT Composite Test scores, of school district i , in year t , is a function of the natural log of enrollment, Z , the matrix of control variables, X , year fixed effects, μ district effects and an error term. Control variables, X , contains the districts share of low-income students, the share of black students, share of Hispanic students, and the state-aid per pupil that each district received. We also include all 9 of the USDA's rural-urban continuum dummy codes. We omit Chicago Public Schools from our model, as it serves as an extreme outlier with approximately 400,000 students. We also only include districts that serve high-school aged populations since high school students take the ACT. Year fixed effects are included to account for yearly changes in local economic growth, population growth and differences in school cohort populations that vary over time for all districts and may affect test scores.

Data from the Illinois State Board of Education from 2012-2014^{iii, iv} was used in our analysis of student performance measures. Most importantly we control for variables outside of a district's control that may affect student performance. First, we control for socioeconomic differences by controlling for the three largest factors that generate student outcomes, share of individuals who are low-income, race and the rurality of the county a district resides in. Second, we control for the amount of aid per pupil a district receives from general state funding.

We report results from five separate regressions. One for the entire sample and four for the remaining subsets; school districts with fewer than 1,000 enrolled students, fewer than 2,000 enrolled students, fewer than 3,000 enrolled students and fewer than 5,000 enrolled students.

Results

Average Composite ACT Regressions

Average composite ACT score	School district enrollment				
	Total	<1,000	<2,000	<3,000	<5,000
Variables	Coefficient				
Log enrollment	0.49 *** (0.0496)	0.59 *** (0.1414)	0.50 *** (0.0884)	0.50 *** (0.068)	0.59 *** (0.0659)
Log state aid	-0.56 *** (0.087)	-0.15 (0.0765)	-0.24 *** (0.0798)	-0.22 *** (0.0778)	-0.48 *** (0.0913)
Low-income student population	-0.038 *** (0.004)	-0.04 *** (0.0042)	-0.05 *** (0.0039)	-0.05 *** (0.0035)	-0.04 *** (0.0043)
Hispanic student population	-0.031 *** (0.005)	-0.01 (0.01)	-0.01 ** (0.005)	-0.02 *** (0.0046)	-0.03 *** (0.0054)
Black student population	-0.029 *** (0.004)	-0.02 *** (0.0046)	-0.01 *** (0.005)	-0.01 *** (0.0046)	-0.02 *** (0.0048)
Constant	23.28 *** (0.739)	19.56 *** (0.9975)	20.89 *** (0.7883)	20.72 *** (0.7205)	21.99 *** (0.7571)
Pseudo R-squared	0.67	0.85	0.76	0.73	0.70
Number of districts	474	232	341	382	421
Number of observations	1415	678	1015	1140	1253
Notes: all regressions include year fixed effects and geographic dummy variables					
*** and ** indicate significance at the 1 and 5 % levels respectively					
Robust standard errors are presented in parentheses.					

ⁱ Devaraj, Srikant, Dagney Faulk, and Michael Hicks, "School District Size and Student Performance," *Journal of Regional Analysis & Policy* 48.4 (2018): 25-37.

ⁱⁱ United States Department of Agriculture, "Rural-Urban Continuum Codes," 2013.

ⁱⁱⁱ Illinois State Board of Education, "2012-2013 Report Card Data"

^{iv} Illinois State Board of Education, "2013-2014 Report Card Data"