Analysis of PyCitySchools Data

Felix Hernandez, MD, MMM

Notable Trends.

1. Performance differences by school type.

In looking at the tables generated in the Pandas-Challenge-PyCitySchools, the thing that struck me first was the differences in percent passing scores for math, reading, and overall between the Charter schools and the District schools as displayed in the “By School Type” analysis. Checking back to the “Top Five Performing Schools” (extending that list to include all 15 schools), one sees that every Charter school performed better than all the District schools in terms of percent passing scores for math, reading, and overall.

Particularly striking is the “% Overall Passing” score for the District schools was just under 54% indicating that 46% of students in the District schools did not achieve a passing score on the standardized tests in both math and reading. It is tempting conclude that since a higher percentage of students at Charter schools achieve passing scores for math, reading, and overall, it would be better for a student to attend a charter high school if possible.

1. Performance by School Size.

In looking at the “Scores by School Size” table a similar difference is seen with the schools in the “Large (2000 – 5000)” bin demonstrating lower percent passing scores for math, reading, and overall when compared to the “Small (<1000)” and “Medium (1000 – 2000)” bins. It is also tempting to conclude that it would be better for a student to attend a small or medium size high school than a large one. However, school size is a proxy for school type.

|  |  |  |
| --- | --- | --- |
| **Size** | **Charter Schools** | **District Schools** |
| Small (<1000) | Holden, Pena | none |
| Medium (1000 – 2000) | Cabrera, Griffin, Shelton, Thomas, Wright | none |
| Large (2000 – 5000) | All District High Schools | Wilson |

The “Performance by School Size” table does not contribute additional information. We cannot draw any inferences on whether it would be desirable for the school district to build more schools to be able to limit each school to 2000 students since Size is a proxy for school type and not an independent variable.

1. Performance by School Spending.

As Per Student Budget (PSB) increases, we see a progressive lowering of the average math and reading scores resulting in a progressive lowering of the percent passing scores for math, reading, and overall. Again, it would be tempting to conclude that schools with high PSBs are not using the additional dollars effectively in terms of standardized test scores. Once again however, PSB is a proxy for school type.

|  |  |  |
| --- | --- | --- |
| **Per Student Spending** | **Charter Schools** | **District Schools** |
| < $600 | Cabrera, Holden, Wilson, Wright | none |
| $600 - $630 | Shelton, Pena, Griffin | Bailey |
| $630 - $645 | Thomas | Rodriguez, Figueroa, Ford |
| > $645 | none | Johnson, Hernandez, Huang |

The “Performance by School Spending” table also does not contribute additional information. Here also, we cannot draw inferences regarding the most effective use of budget dollars since PSB is a proxy for school type and not an independent variable.

Limitations to the Data

The data provided is presumably complete in giving us testing scores for all high school students in the district for one year. We are looking at these scores as a measure of academic success. We know that academic success is determined by several factors including, economic status, family characteristics, race/ethnicity, attendance/ engagement with the school, and school performance in earlier grades (Ritter, 2013). We have no data regarding the students in any of these areas.

Economic status is a particularly important factor as students in the lowest quintile of family income are 5 times more likely to drop out of high school than students in the highest quintile of family income (Rumberger, 2013). It is also well documented that student that drop out of high school frequently end up in minimum-wage jobs, living in poverty and suffer several poor health outcomes (Ritter, 2013).

Students who are the children of single, unemployed mothers, or who have experienced high family stresses (frequent moving, homelessness, domestic violence) are much less likely to succeed academically (Chapman, 2011 & McCallumore, 2010). Low parental education levels are also associated with lower academic achievement (Ritter, 2013). We do not have information regarding economic status, family characteristics, race/ethnicity, attendance/school engagement, or academic performance in earlier grades for the students.

We do have information about Charter schools relative to District schools.

The National Alliance of Public Charter Schools states.

“Charter schools are always public schools. They never charge tuition, and they accept any student who wants to attend. Charter laws require that students be admitted by a random lottery drawing in case too many students want to enroll in a single charter school. Charter schools must also meet the state and federal academic requirements that apply to all public schools. “(Strauss, 2016).

A story in Reuters by Stephanie Simon in 2016 reported her finding when she investigated admission practices at many charter schools (Simon, 2016). She reports finding that “across the United States, charter schools aggressively screen applicants” with “Lengthy application forms, often printed only in English, that require student and parent essays, report cards, test scores, disciplinary records, teacher recommendations and medical records.” (Simon, 2016). This is done either before submitting remaining applicants to a random lottery or entirely in place of a random lottery.

The analysis of the PyCitySchools data raises the question: have similar selection criteria been applied to the enrollment of students into the Charter schools in the district? One could argue that a random selection of students would have produced standardized test scores for the Charter schools more like those seen in the District schools. Or, are the superior standardized test scores a result of better academic programs at the Charter schools?

Without the additional data regarding economic status, family characteristics, race/ethnicity, attendance/ engagement with the school, and school performance in earlier grades, we are unable to deduce whether the two groups of students (Charter v District) are comparable with respect to known key factors.

References

1. Ritter, B. (2015). Factors influencing high school graduation. Washington Student Achievement Council.
2. Reardon, S. F. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. Whither opportunity, 1(1), 91-116.
3. Rumberger, R. W. (2013). Poverty and high school dropouts: The impact of family and community poverty on high school dropouts. The SES Indicator, 6(2).
4. McCallumore, K. M., & Sparapani, E. F. (2010). The Importance of the Ninth Grade on High School Graduation Rates and Student Success in High School. Education, 130(3).
5. Chapman, C., Laird, J., Ifill, N., & KewalRamani, A. (2011). Trends in High School Dropout and Completion Rates in the United States: 1972-2009. Compendium Report. NCES 2012-006. National Center for Education Statistics.
6. Simon, S. (2013). Special Report: Class Struggle - How charter schools get students they want. Reuters. Retrieved from <https://www.reuters.com/article/idUSBRE91E0HF20130215?irpc=932>
7. Strauss, V. (2013). How charter schools choose desirable students. The Washington Post. Retrieved from <https://www.washingtonpost.com/news/answer-sheet/wp/2013/02/16/how-charter-schools-choose-desirable-students/?outputType=amp>
8. U.S. Department of Education, NCES, 2015 -066: “Early High School Dropouts: What Are Their Characteristics?” Retrieved from http://nces.ed.gov/surveys/hsls09