

Identifying Presence of Brain Drain Effects of Public Chartered Schools on Other Local Public Schools

I. Introduction

Public charter schools have been growing in the past decade from an enrollment of 1.6 million students in 2009 to 3.4 million students in 2019. Public charter schools are schools that are government funded, but do not necessarily have to follow local or state regulations. Instead, they create a charter with goals that is agreed upon with the state funding the school. If the school fails to meet the expectations outlined in the charter, the state can revoke funding. Additionally, this charter is approved for a specified amount of time (generally several years) (Annual Reports).

The inequalities in education in the United States are a long-standing and contentious topic. (Mullen and Bartlett). One of the major concerns is the quality of public schools versus public charter schools. Public charter schools are particularly controversial as they are sometimes seen as the cause of “brain drain” – or the relocation of highly gifted or academically talented students away from local public schools and state regulations. High performing students may leave due to curriculum better suited to them, preferred peer group composition, or other factors. The result of this is a potential for lower percentages of students performing proficiently on state examinations (Leonard).

Hillsborough county in New Hampshire is in the southmost portion of New Hampshire. With a population of 415,305 as of 2020, the county was the most populous in New Hampshire (United States Census Bureau). There are two cities: Manchester and Nashua, and 29 towns. The county also has a set of 14 public school districts with middle schools, some of which serve multiple towns at once. Additionally, the county contains one blue-ribbon school – The Academy of Science and Design (ASD) – a public chartered, STEM-focused, school currently located in Nashua, New Hampshire. Opened

Commented [PA1]: Good job introducing the topic and providing background information.

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in 2007-2008 for grades 7-12, the school quickly gained reputation in the state for high performance (National Blue Ribbon Schools Program). The school does not provide transportation and admits students using a lottery system with no location preference within New Hampshire (Merhalski). This paper will explore the effect of ASD on the percentage of proficient students at nearby schools. It is hypothesized that the growth of the number of ASD students will cause a drop in the percentage of proficient students nearby due to brain drain. This will be measured using regression to view the relationships between various independent variables and a dependent variable.

Commented [PA3]: Is a lottery the only criteria used for admissions? Do they require good behavior, high grades or test scores to get in? If lottery is the only criteria, please say so. If it is not, please add information on other criteria for selection.

II. Sample

The sample used for this study are school reports of distribution of student's skill levels from the New Hampshire Department of Education Bureau of Education Statistics for the 22 middle schools that have 8th grade students inside the Hillsborough County from the 2008-2009 school year to the 2014-2015 school year (Assessment Data). Only schools within Hillsborough County are considered to limit the schools being affected to the same region. The data available includes demographics (Enrollments - Demographic Categories) and percentage of students who are eligible for free/reduced lunch (Free and Reduced School Lunch Eligibility). The locations of each school are available through the school district's websites.

Commented [PA4]: Good job providing clear information on your data source.

Commented [PA5]: Good job explaining your sample.

III. Dependent Variable

Percentage of Proficient Students in Public Non-Chartered School

The dependent variable is the percentage of proficient students. Since there are three different exams: science, math, and ELA (English and Language Arts), the percentage of proficient students will be determined by averaging the percentage of proficient students in each of the categories. The percentage of proficient students in each school is an indicator of

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the skill level of students at these middle schools as the goal of the statewide exam is to

provide a measure of proficiency. While it is not a perfect system, it provides a comprehensive, analytical survey of each school's student population. The examinations used for the analysis may vary and the scoring scale is not consistent between each year (i.e., the actual score cannot be compared across years). However, since the New Hampshire Board of Education also categorizes every student in 4 categories based on these exam results, the categorical data can be used. For every subject, students have the following possible categories: 1 – Not Proficient, 2 – Approaching Proficiency, 3 – Proficient, 4 – Above Proficient. The categories 1 and 2 are considered not proficient, while the categories of 3 and 4 are both considered proficient. Sometimes, due to a school lacking any students in a category, there will be a <10 percentage in a group. In this case, if data is not available for a specific year, it will not be considered (this issue is only present in 2 middle schools) (Assessment Data).

IV. Independent Variables

Number of 8th Grade Students in ASD

The number of 8th grade students in ASD is used as a proxy variable to represent the amount of brain drain nearby schools are experiencing. The number of students is used because there is only data available for ASD one year prior to the forming of the school and would make it difficult to measure any jump. Additionally, the school began with a small population in a city so it may not have a drastic effect until it grew. Consequently, the number of students is used to account for the small initial size and rapid growth.

I expect that there will be a negative relationship between ASD's 8th grade population and other middle school's percentage of proficient students since the smartest students are picked up by ASD assuming brain drain. If the relationship between this variable and the

Commented [PA6]: This sentence is confusing. I had to look at the dataset to understand what you meant. Please rephrase this so it is less confusing. You could, for example, say the dataset assigns a <10 value for groups with less than 10%, making it impossible to know what the percentage for that category was in that year. If specific data are not available...

-0.5 points

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dependent variable are significant, this will indicate that there is a potential for ASD to cause brain drain from other local schools.

Distance to ASD

Schools that are further from ASD may experience a lower loss of academically gifted students. All public schools outside of ASD provide their own form of transportation, enabling students to go to their local district school. However, ASD does not provide transportation potentially making it difficult for further students to go to the school.

Commented [MP7]: Check sentence structure.

Additionally, if the schools are very far apart, parents may prefer to send their child to the school in their local district (so that their children are not far apart from them). Since schools serve their own local district and not students from outside the district, this variable can represent how far students at these schools are from ASD. This fails to account for students who live near the edge of district boundaries or far from the district middle school as they may be particularly further or closer to ASD. However, it does provide insight and an approximation into how far students will need to travel to go to ASD.

The distance used will be direct distance (in miles). This may be slightly inaccurate as the distances between schools is not a perfect representation of travel difficulty. The terrain in New England is hilly and there are not many grid-like road patterns but rather an archaic road pattern reminiscent of the original settler's plans¹.

ASD also moved from Merrimack, New Hampshire to Nashua, New Hampshire. While the change may cause a conflicting effect on this variable, it will not be considered here but with a different dummy variable. The original address and newest address are both available so the distance will change between two schools for different years.

¹ Roads are reminiscent of farms and planning from the 1700s when the towns and areas were originally settled. Roads were improved over time but some of the structure and planning remains the same. As a consequence, roads are not optimal for minimal time to travel but are present in an older style.

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The distance to ASD is expected to have a negative relationship with percentage proficient students. Schools and students that are closer to ASD will have easier access to ASD and will have a stronger brain drain effect.

Commented [MP8]: The way this is written is a little confusing. Please write it more clearly. For example, the larger the distance from ASD ..."

ASD Facility

This will be a dummy variable to represent whether ASD is in its older Merrimack, NH facility or newer Nashua, NH facility. 0 will represent Merrimack and 1 will represent Nashua. This variable represents the changing of ASD's facilities and the move from Merrimack to Nashua. The school gained additional land and facilities, becoming larger and more able to serve students. Due to the improved facilities, a more academically gifted group of students may decide to join the school (Lavy and Nixon). Consequently, I expect a negative relationship between this dummy variable and the Percentage of Proficient Students.

Commented [MP9]: Good job

Free/Reduced Lunch Eligibility Percentage

The percentage of students who are eligible for free/reduced lunch will also be considered. This variable will be used to identify students who have a lower economic status and consequently may not have as many tools available to improve their academic proficiency as their higher economic status peers (Jones). Because of having lower opportunities available to grow academically, I predict a negative relationship with the independent variable.

Commented [MP10]: This should say dependent, not independent.
-0.5 points

Percentage Asian/Black/Hispanic/Multi-race

Certain groups of people may place different levels of emphasis on education and standardized testing results, including minority groups. A majority of most of the schools being analyzed are predominantly white. However, there are different distributions of races at different schools (Quinn). To consider the differing beliefs/emphasis on education of differing racial/ethnic groups, a variable for each of the percentages above will be utilized. I have no prediction on the effect on the independent variable.

Commented [MP11]: Excellent work!

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Works Cited

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<https://nationalblueribbonschools.ed.gov/awardwinners/winning/17nh103pu_academy_for_science_and_design.html>.

Quinn, D. M., Cooc, N., McIntyre, J., & Gomez, C. J. "Seasonal Dynamics of Academic Achievement Inequality by Socioeconomic Status and Race/Ethnicity: Updating and Extending Past Research With New National Data ." *Educational Researcher* 45.8 (2016).

United States Census Bureau. 17 March 2022. 3 October 2022.

<<https://www.census.gov/data/developers/data-sets/acs-5year.html>>.

My comments.

1. Your paper and presentation were excellent. Good job! I particularly like how you are clear on your data sources, variable level, variable definitions and hypotheses.
2. Please address comments listed here (in navy blue) and throughout the paper (in red).
3. Please add page numbers
4. Your proposal is among the best I've received this term. You have an interesting and creative question, you are very clear on your data sources and hypotheses, and you provide citations to support your claims. Excellent work!
5. It would be useful to add a variable looking at parental education. It may not be available at the school level. If you can't find it, write a short paragraph explaining how that may be an important variable you are not able to measure.

Percent of proficient students in public school = number of 8th graders at ASD (same value per year for all schools), distance to ASD (each school has own value),

Classmate comments you should consider looking at. **The MP denotes my response to your classmates' comments. If there is no MP, that means you can decide whether or not to incorporate that comment.**

1. Are students coming in from other counties a concern? Where is ASD relative to other counties? MP: You said it is roughly in the middle so that is not a big concern. For the final paper, it may be useful to add a map with the county boundary and ASD's old and new location to the Appendix.

2. Since the counties are majority white, can you measure income variability? MP: You answered that use use free and reduce lunch to try an account for income. I agree.

3. Do these schools have after school programs? MP: You answered that there's a lot of these. I think there are so many private and public after school programs that it would be impossible to account for them.

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4. Look into teacher retention, years of teaching, or other teacher performance variables. MP: I think this is something you should add for your final paper. This source has data on teacher experience though I believe you may be able to find it in a better format here: <https://www.education.nh.gov/who-we-are/division-of-educator-and-analytic-resources/bureau-of-education-statistics/data-reports/district-staffing-reports>

Or here: <https://www.education.nh.gov/who-we-are/division-of-educator-and-analytic-resources/bureau-of-education-statistics/data-reports>

Source that has it per school but would be more time consuming to use:

<https://www.greatschools.org/new-hampshire/bartlett/22-Josiah-Bartlett-Elementary-School/>

5. If you are looking at the effect of a charter school you could also look at private schools. MP: I think this would be helpful but I am not sure it is easy to do in the time you have. You can try if you want to, up to you. You should, however, mention on your paper that a possible concern with your estimation would be a private school coming in at roughly the same time and taking good students too.

Good job! I look forward to reading your DA paper.

100-0.5-0.5 = 99. Excellent!