

SHOULD PUBLIC FUNDS BE USED FOR CHARTER SCHOOLS? DC AS A CASE STUDY

by Elizabeth Bersin & Katherine Kehres

ABSTRACT

The number of charter schools in the United States has been increasing rapidly since the first charter school was established in Minnesota in 1992. DC's first charter school was opened in 1995 and since then more parents, educators, and policy makers have argued that charter schools create a free market for education and improve student achievement. These publicly funded schools cannot accept every student, making it important to evaluate whether these claims are valid. Using DC public and charter school student achievement data from 2012-2014, the authors conducted an analysis on the performance of students on the Math and Reading DC-CAS assessment to study how the scores differ between public schools and charter schools. Initial results indicate that charter schools are associated with higher student achievement, however two major drawbacks are present in our design. Because of the drawbacks in our data source, our analysis is inconclusive as to whether or not charter schools represent a good investment.

INTRODUCTION

The presence of charter schools is one of the many changes that have occurred during the past 25 years in education policy. Charter schools have also been subject to numerous controversies and increased scrutiny by education leaders and the public alike.¹ Policy makers that support charter schools argue that in order to reform schools and districts there must be a competitive marketplace. Charter schools therefore provide a free market for education and choice.²

Between the 1991-1992 school year and the 2012-2013 school year, the percentage of public schools that were charters increased from 1.7% to 6.2%.^{3,4,5} In hard numbers, that was an increase from 1,500 to 6,100 schools.⁶ The key question being considered is whether or not charter schools offer a better education than traditional public schools. We plan to consider this question using student achievement outcomes at charter schools as compared to those at public schools. Since charter schools are publicly funded, it is important to consider the type of education they are providing. Do charter schools offer better programs that improve student achievement as compared to public schools by an amount significant enough to warrant public funding? Does attending a charter school actually decrease a student's performance? Does free market choice mean a better school system? To answer these questions, we will use data from the District of Columbia (DC) to analyze student performance on the Math and Reading DC-CAS assessment to study how the scores differ between public schools and charter schools.

HISTORY OF CHARTER SCHOOLS

Dr. Ray Budde of the University of Massachusetts first introduced the concept of the charter school in 1974 in a paper he published that described a system in which teachers could teach without having to answer to a district

1 "Charter Schools: Finding Out The Facts", accessed November 4, 2015, <http://www.centerforpubliceducation.org/Main-Menu/Organizing-a-school/Charter-schools-Finding-out-the-facts-At-a-glance/Charter-schools-Finding-out-the-facts.html>

2 Danny Weil, Charter school movement: History, politics, policies, economics and effectiveness (Grey House Pub, 2009)

3 "Fast Facts", accessed November 27, 2015, <https://nces.ed.gov/fastfacts/display.asp?id=30>

4 We are not under the impression that these are replacing traditional schools, though this was specifically clarified.

5 While we were not able to determine how the number of total students affected, charter schools with smaller enrollments (under 300 students) decreased from 77 to 54 percent, while charter schools with larger enrollment (500+ students) increase from 11 to 22 percent (Fast Facts).

6 "Fast Facts"

bureaucracy.⁷⁸ The idea gained traction through the 1980s as a response to calls for school reform and eventually captured the interest of the American Federation of Teachers and the Department of Education. In 1988, Budde's idea was referenced (and promoted) by then-president of the Federation, Albert Shanker, in his weekly New York Times column.⁹ In a speech later that year to the National Press Club, Shanker¹⁰ proposed a form of these "charter schools", a name taken from Budde's original work. His vision was a new school within a school that was teacher-formed, and gave parents and teachers the ability to "opt for" a different type of school. In 1992, the first charter school was opened in Minnesota just one year after it became the first state to pass charter school legislation.¹¹

The concept of charter schools was introduced in the District of Columbia in 1995. The DC School Reform Act of 1995 authorized¹² the creation of public charter schools under the control of the DC Board of Education (DC BoE), the only agency that could authorize charter schools in the District.¹³ A key aspect of the law requires identical operating funding for both DC Public Schools (DCPS) and public charter schools on a per student basis.¹⁴ The law also specifies an allowance of 20 charters every year and has no appeals process regarding charter authorizations. DC charter schools are also waived from state education regulations¹⁵ and laws and operate on 15-year contracts that are performance-based, requiring a review every five years at a minimum.¹⁶ In 1996, the Act was amended to add the Public Charter School Board as another independent agency that could authorize charter schools. That same year, the first charter school in the District opened to 160 students.¹⁷

In 2006, the DC BoE voted to give up their charter school responsibilities,

7 This paper was essentially an outline for a book he tentatively titled *Education by Charter: Key to a New Model of School District*. (Karanovich, 2009).

8 Frances Karanovich, "The Evolution Of Charter Schools: From Concept To Public Schools Of Choice", *Journal Of Philosophy And History Of Education* 59: 203-208

9 Karanovich, "The Evolution of Charter Schools"

10 Incidentally, Shanker and his colleagues withdrew their support for the charter school system a few years later. One of their concerns had to do with the use of vouchers (Karanovich, 2009).

11 Karanovich, "The Evolution of Charter Schools"

12 Congress passed this act.

13 "Charter Facts", accessed November 4, 2015, <http://www.focusdc.org/charter-facts>

14 "Charter Facts"

15 This does not include testing, but rather items such as school policies and programs, classroom sizes, and curriculum adjustments (National Alliance for Public Charter Schools).

16 Danny Weil, *Charter school movement: History, politics, policies, economics and effectiveness* (Grey House Pub, 2009)

17 "Charter Facts"

meaning that the Public Charter School Board (PCSB) would be the only agency to authorize charter schools for the District.¹⁸ The DC Council passed legislation the following year to give direct authority over DC Public Charter Schools (DCPCS) to the Office of the Mayor.¹⁹ According to the Friends of Choice in Urban Schools (FOCUS) nonprofit, DCPCS enrollment is almost 39,000 students at over 100 schools, making up about 44% of public school children in the District.^{20,21}

It is important to note that charter schools are not private schools, nor alternative schools – they are publicly accountable public schools that exist under a contract. Thus, charter schools are also held accountable to the same educational standards put in place by their state, district, and federal education statutes.²²

FINANCING CHARTER SCHOOLS

Similar to public schools, charter schools receive funding from both the district and the state according to enrollment (specifically, average daily attendance, or ADA).²³ Charter schools, also like public schools, are not allowed to charge students tuition.²⁴ The amount of funding charter schools receive varies by state and district. A school's funding is often negotiated and determined in their charter contract.²⁵ Nationwide, it is estimated on average that charter schools are funded at 64% of their public school counterparts.²⁶ Additional resources in the form of federal education grants are available for charter schools, and are either distributed by the U.S. Department of Education (using an application process) or are funneled through state agencies that are responsible for distributing funds.²⁷ Unlike public schools, a majority of charter schools are required to provide the capital to find and secure a location, and many charters schools have repurposed buildings (old schools, churches, etc.) to help defray those costs.²⁸

Funding in DC is based off the Uniform Per Student Funding Formula, which guarantees a base level of funding for both charter and public schools on

18 “Charter Facts”

19 “Charter Facts”

20 “Facts and Figures: Market Share”, accessed November 4, 2015, <http://www.dcpsb.org/facts-and-figures-market-share>

21 See figure 8 in Appendix 1 showing charter school market share, both over time and in recent years,

22 Weil, Charter School Movement

23 “Just the FAQs”, accessed November 4, 2015, <https://www.edreform.com/2012/03/just-the-faqs-charter-schools/>

24 Weil, Charter School Movement

25 “Just the FAQs”, November 4, 2015.

26 “Just the FAQs”

27 “Just the FAQs”

28 “Just the FAQs”

a per student basis.²⁹ This base was set at \$5,000 per student in 1998/1999 and is set to rise each year by either 4% or the local Consumer Price Index, whichever is lower.³⁰ ³¹ The base funding level assumes a student is in grades 4 or 5 and does not receive any extra services from the school – additional funding is provided for students in lower and higher grades, and those receiving special services.³²³³ The total local contribution for both public and charter schools is determined by multiplying the number of students in each category (taken from the fall enrollment count) by the Weighted Pupil Unit factor, and then again by the base level.³⁴ District public schools are also eligible for other funding that charter schools are not, including: intra-district funds, capital construction funds, and federally funded retirement programs.³⁵

The District of Columbia’s Office of Public Charter School Financing and Support (OPCSFS) was created in 2003 in order to manage several financing programs specifically for public charter schools.³⁶ This agency supports innovation and best practices for all public schools (charter and traditional), as well as improves the number of public charter school seats and quality of the schools.³⁷ OPCSFS manages the DC Charter Schools Program grant given by the US Department of Education, a grant specifically meant to fund the creation and implementation of new public charter schools.³⁸ DC is also one of the few states/municipalities to offer funding for facilities to charter schools, though it is still less than public schools receive.³⁹

One issue that can arise with financing public charter schools and which has been especially present in the DC system is the funding cycle. Charter schools initially receive money based on projected enrollment taken from attendance records in April and are given the public rate until enrollment audits are completed. These, however, are not usually complete until January or February, giving dishonest operators plenty of room for fraudulent practices and causing

29 Larry Maloney, “Charter School Funding: Inequity Persists”, Washington, DC: Ball State University 2015

30 Maloney, “Charter School Funding”

31 The base level for FY 2006-2007 was \$8,002 (Maloney).

32 Maloney, “Charter School Funding”

33 This includes services such as special education, Title I, and free or reduced lunches, among others.

34 Maloney, “Charter School Funding”

35 Maloney, “Charter School Funding”

36 Maloney, “Charter School Funding”

37 “Funding Opportunities For The DC Public Charter Schools”, accessed November 4, <http://osse.dc.gov/service/funding-opportunities-dc-public-charter-schools>

38 “Funding Opportunities”

39 Maloney, “Charter School Funding”

many problems.^{40 41}

SPECTRUMS OF RESEARCH

Eric Bettinger examined the effect of charter schools on charter students and public schools using school-level data from Michigan's standardized testing results.⁴² He used a difference-in-differences estimator to compare (successive) groups of fourth grade classes and used a lagged dependent variable specification to check this and ensure entering students with low scores do not cause an overstatement of the effect. This estimator compares the fourth grade charter school students with public school fourth graders who have similar "pre-charter" test scores.⁴³ Using this analysis method, Bettinger found no evidence that charter schools improve test scores more quickly than public schools with similar "pre-charter" test scores. His estimates even suggest that charter school fourth graders may actually score lower on reading and math exams than public school fourth graders.⁴⁴ He suggests that a long-term study in the future would be useful to further examine the data and results⁴⁵ (However, these results may not be generalizable to major urban areas).

Marcus Winters examined the effect of charter schools on public school student achievement specifically in New York City, which may provide a better comparison to DC. Winters used student-level data on Math and English Language Arts scores from the New York City Department of Education.⁴⁶ These tests are administered to students in grades 3 through 8, and the author used data from 2006 through 2009. His results indicated that students in public schools had a small, but positive gain in achievement due to the competition from charter schools. Hispanic students were found to have a significant gain in achievement in Math, as compared to white students, due to this competition.⁴⁷ His research suggests that even if charter school achievement is not higher than public schools, the free market choice helps improve public schools in urban areas.

These two studies show how wide and varied the spectrum of previous research regarding student achievement in charter schools can be. Each study finds different rates of success or failure, more or less significance, and concludes

40 It is unclear what happens to this money due to a highly unregulated system (regardless of laws)

41 Weil, Charter School Movement

42 Eric P. Bettinger, "The effect of charter schools on charter students and public schools." *Economics of Education Review* 24, no. 2 (2005)

43 Bettinger, "The effect of charter schools," 133-147

44 Bettinger, "The effect of charter schools," 133-147

45 Bettinger, "The effect of charter schools," 133-147

46 Marcus A. Winters, "Measuring the effect of charter schools on public school student achievement in an urban environment: Evidence from New York City," *Economics of Education review* 31, no. 2 (2012): 293-301

47 Winters, "Measuring the effect of charter schools"

with different recommendations. It seems that, based on these findings, studies must be done regarding the specific population that is intended to benefit from the inclusion (or exclusion) of charter schools.

DATA

We are interested in analyzing whether the public funds being given to charter schools are being put to good use based on student achievement. Though they receive less funding than public schools, this can, in part, be attributed to the populations they serve (i.e. fewer students with needs for special services). In order to study the impact of charter schools on test scores for students, we are using DC-CAS data from three school years, 2012, 2013, and 2014. The DC-CAS assessment is administered in the spring for students in grades 2-10.⁴⁸ These tests were aligned specifically with DC English/Language Arts, Math, Science, and Health Standards.⁴⁹ Students in grades 2-10 have been taking Math and English Language Arts tests since 2006 and tests for Science (grades 5-8) and Biology have been in place since 2007.⁵⁰ There is a composition component to the test that has been in place since 2008, but in 2012 this component was aligned with the Common Core standards.⁵¹ The Health and Physical Education Assessment began in 2012 for grades 5 and 8.⁵²

We only found data for Math and Reading. In 2014, the data that was available indicated the number of students who took the assessment per school, and the number of students who scored at each level of the test, below basic, basic, proficient, and advanced. In 2012 and 2013, the available data indicated the number of students who took the test at each school, and the number of students who scored at the proficient and the advanced level. For all school years, the authors created a percentage with the number of students who scored at the proficient and the advanced level over the number of students who took the test at each school. This was used as the outcome variable. The key explanatory variable in our analysis was a dummy variable indicating whether or not a school was a charter school. Charter schools and public schools were differentiated through the district number listed, as shown in the District column in the 2012 and 2013 data. While all DCPS schools are part of the same district, each charter school is considered its own district. The 2012 and 2013 data were matched to the 2014 data using the school code as a unique identifier for each school to determine the correct district. One school had to be looked up online by the authors to determine the type of school.

In D.C., there is a large difference in neighborhood schools. Children living in Ward 3 (a more wealthy area) will likely have a very different experience

48 “DC-CAS”, accessed November 20, 2015, <http://osse.dc.gov/service/dc-cas>

49 “DC-CAS”

50 “DC-CAS”

51 “DC-CAS”

52 “DC-CAS”

in DCPS schools than children living in Ward 8 (a poorer area with a large African American population). We included a vector of Ward fixed effects as additional controls. We only have school level data so we are unable to identify which Ward the students originate from, but we believe it is likely that students will attend a charter school closer to home (and likely in their Ward) because it is convenient and they are more likely to have other friends attending the school. For those who live close to the border of their Ward, this may not be the case. Figure 1 below presents a few key demographic characteristics for each Ward.⁵³

FIGURE 1⁵⁴

Key Demographic Characteristics for Each D.C. Ward			
Ward	Percent of Population that is Black ¹	Median Household Income	Percent of Families Below the Poverty Line ²
Ward 1	45.74%	\$36,902	19.7%
Ward 2	19.93%	\$44,742	11.6%
Ward 3	5.78%	\$71,875	2.7%
Ward 4	70.73%	\$46,408	7.9%
Ward 5	86.65%	\$34,433	14.3%
Ward 6	62.73%	\$41,554	19.1%
Ward 7	96.84%	\$30,533	21.6%
Ward 8	92.41%	\$25,017	33.1%

The Ward breakdowns were only available in the 2012 and 2013 data. Using the unique school code, the authors determined the correct Ward for the 2014 data. There were some schools that were in the 2014 data that were not in the 2012 or 2013 data. For those schools, the authors searched the Internet for the school to determine its address, and used the address to determine which Ward it was in. There were 18 records that needed to be looked up by the authors.

Figures 2, 3 and 4 below show the descriptive statistics for the percent of students who scored at or above the proficient or advanced level for math and reading. One key factor to point out is that there are many more observations for Wards 1, 4, 5, 6, 7 and 8 than there are for Wards 2 and 3 because there are fewer schools in those areas.⁵⁵ There are also major differences in the range of scores for each Ward as well as differences in the means.

FIGURE 2

Data Overview By Ward: Percent of Students Scoring at the Proficient or Advanced Level in Math					
Ward Number	Num. of Observations	Mean	Standard Deviation	Min	Max
Ward 1	53	52.68%	23.12%	5.17%	100%
Ward 2	26	69.27%	18.72%	23.38%	98.23%
Ward 3	30	82.26%	9.71%	59.52%	93.68%

53

This data is from 2002, and the demographic characteristics have likely changed somewhat in the 10 years between this information was gathered and the first year of the DC-CAS assessment data.

54 “DC Open Data”

55 See Appendix 2

Ward 4	90	52.93%	18.39%	0%	95%
Ward 5	85	47.57%	22.44%	7.5%	100%
Ward 6	74	47.66%	18.6%	6.72%	80.73%
Ward 7	95	41.85%	20.27%	4.84%	91.57%
Ward 8	103	37.96%	21.47%	8.33%	95.37%

FIGURE 3

Number of Observations for Schools per Ward					
Ward Number	Num. of Charter School Observations	Num. of DCPS School Observations	Total School Observations	Percent of Charter Schools	Percent of DCPS Schools
Ward 1	21	32	53	39.62%	60.38%
Ward 2	3	24	27	11.11%	88.89%
Ward 3	0	30	30	0%	100%
Ward 4	49	44	93	52.69%	47.31%
Ward 5	45	41	86	52.33%	47.67%
Ward 6	25	50	75	33.33%	66.67%
Ward 7	44	53	97	45.36%	54.64%
Ward 8	45	59	104	43.27%	56.73%

FIGURE 4

Data Overview by Ward: Percent of Students Scoring at the Proficient or Advanced Level in Reading					
Ward Number	Num. of Observations	Mean	Standard Deviation	Min	Max
Ward 1	53	47.76%	20.41%	3.33%	97.73%
Ward 2	26	68.78%	19.72%	24.68%	99.33%
Ward 3	30	82.09%	9.42%	60.32%	94.19%
Ward 4	90	52.24%	18.89%	0%	95.24%
Ward 5	85	47.45%	20.31%	11.25%	100%
Ward 6	74	45.64%	17.72%	5.22%	77.78%
Ward 7	95	37.74%	17.16%	10.14%	96.39%
Ward 8	103	33.49%	15.68%	8.33%	72.53%

Figure 3 presents the number of observations for Charter Schools per Ward. As this is over a three-year period, it does not reflect the number of schools exactly but will show approximately three observations per school. Ward 2 appears to just have one charter school and Ward 3 does not have any charter schools.

Figures 5 and 6 below show the difference in means for charter schools versus DCPS schools. Specifically in Wards 7 and 8, there is a major increase in students scoring at the proficient or advanced levels at the charter schools versus the DCPS schools. The percentage of students scoring at the proficient or advanced level in Ward 7 jumps from 32.15% at DCPS schools to 54.10% at charter schools. There is a similar increase for Ward 8 where only 25.88% of students at DCPS schools score at the proficient or advanced level but 54.17% of charter school students score in that range. These differences suggest that charter schools may have a significant impact at on test scores in areas with a high percentage of minorities and lower median incomes, thus in fact helping students in areas where it is most needed.

FIGURE 5

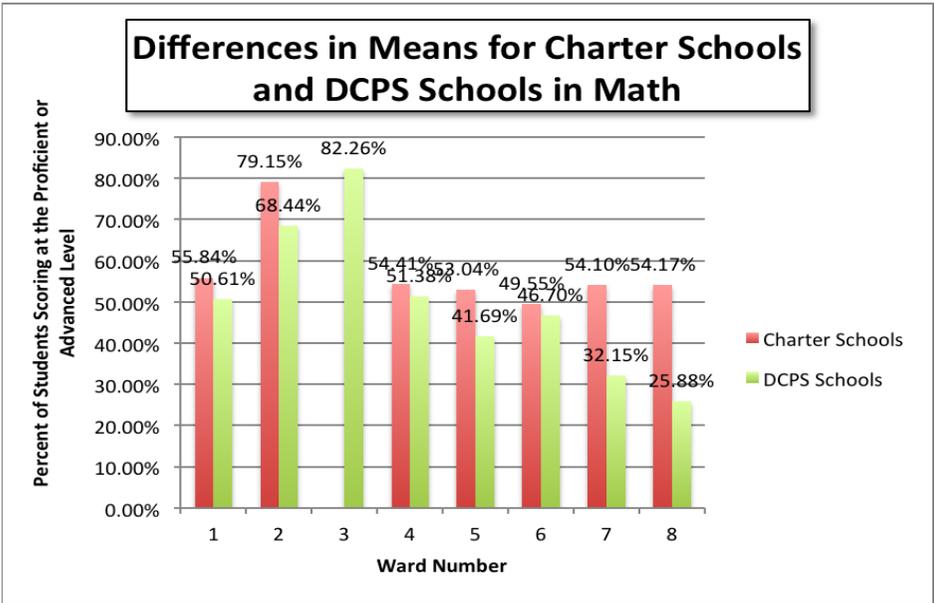
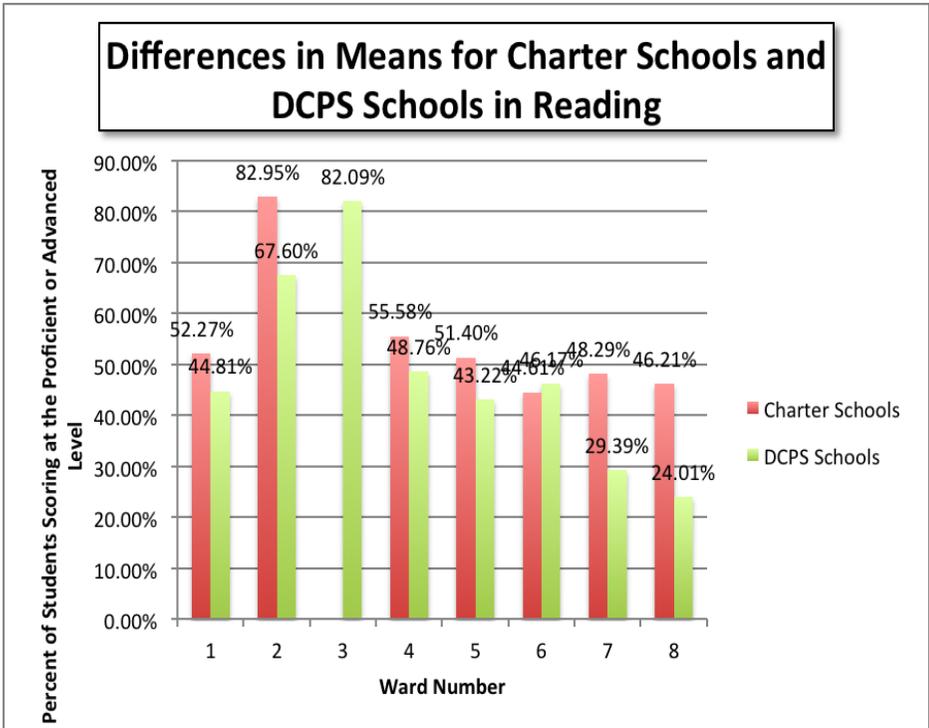


FIGURE 6



METHODOLOGY AND RESULTS

Our theoretical model for the relationship between whether or not a school is a charter school and the percent of students who scored at the proficient level in math and reading is as follows:

$$Y_{1i} = \alpha_1 + \beta_1 X_i + \delta_{11} Z_{i1} + \delta_{12} Z_{i2} + \delta_{13} Z_{i3} + \delta_{14} Z_{i4} + \delta_{15} Z_{i5} + \delta_{16} Z_{i6} + \delta_{17} Z_{i7} + \delta_{18} Z_{i8} + e$$

$$Y_{2i} = \alpha_1 + \beta_1 X_i + \delta_{11} Z_{i1} + \delta_{12} Z_{i2} + \delta_{13} Z_{i3} + \delta_{14} Z_{i4} + \delta_{15} Z_{i5} + \delta_{16} Z_{i6} + \delta_{17} Z_{i7} + \delta_{18} Z_{i8} + e$$

Where Y_{1i} is the percent of students in Math who scored at the proficient or advanced level, X_i is a dummy variable indicating that a school is a Charter school or not, each of the Z_i variables are Wards 1 – 8, and Y_{2i} is the percent of students in Reading who scored at the proficient or advanced level. We estimated our coefficients using OLS. We clustered on school and used robust standard errors.⁵⁶

FIGURE 7

Results for Charter Schools and Percent of Students Scoring at the Proficient or Advanced Level					
Math					
Variable	Coefficient	Standard Error	t value	Confidence Interval	
Charter School	.1353***	.0291	4.64	.0778	.1927
Ward 1	-.3493***	.0622	-5.61	-.4721	-.2266
Ward 2 ³	-.1403**	.0652	-2.15	-.2689	-.0117
Ward 3	Used as Base for Other Ward Number coefficients				
Ward 4	-.3624***	.0474	-7.64	-.456	-.2688
Ward 5	-.4169***	.053	-7.86	-.5214	-.3124
Ward 6	-.3916***	.0468	-8.37	-.4838	-.2994
Ward 7	-.4638***	.0397	-11.68	-.5421	-.3856
Ward 8	-.5007***	.0396	-12.65	-.5787	-.4227
Constant	.8226***	.0287	28.67	.7660	.8791
R ² = 0.3013 n = 556					
* = Significant at the .1 level ** = Significant at the .05 level *** = Significant at .01 level					
Variable	Coefficient	Standard Error	t value	Confidence Interval	
Charter School	.1156***	.0255	4.53	.0653	.1659
Ward 1	-.389***	.0562	-6.93	-.4998	-.2783
Ward 2 ⁴	-.142**	.0688	-2.06	-.2777	-.0063
Ward 3	Used as Base for Other Ward Number coefficients				
Ward 4	-.3575***	.0465	-7.68	-.4493	-.2658
Ward 5	-.4062***	.0501	-8.11	-.5049	-.3074
Ward 6	-.4035***	.0465	-8.69	-.4951	-.3119
Ward 7	-.4945***	.0371	-13.34	-.5676	-.4214
Ward 8	-.5353***	.0351	-15.26	-.6045	-.4662
Constant	.8209***	.0286	28.74	.7646	.8772
R ² = 0.3738 n = 556					
* = Significant at the .1 level ** = Significant at the .05 level *** = Significant at .01 level					

Our results indicate that attending a charter school is associated with a 13.5

⁵⁶ A specification without robust standard errors was used and the differences are fairly small.

percentage point increase in students who score at the proficient or advanced level in Math. For reading, attending a charter school is associated with an 11 percentage point increase in the percent of students who score at the proficient or advanced level. These coefficients are significant at the .01 level. These increases are practically significant as well as because it represents an increase in the pass rate of more than 1/10th of the students in the District. We also used a design where we did not include data from Wards 2 and 3 because there is not a good mix of charter schools and DCPS schools as compared to the other Wards, and our estimates did not change.⁵⁷

There are two major drawbacks to our data and our results. One issue is that in some cases (though not all), charter schools can select their students based on criteria such as test scores and are likely to choose students who have higher scores going in. Public schools must accept everyone. If the data was available, we could address this issue by only using Charter schools that accept students by lottery or by some other random method. The other main issue is that students who want to attend charter schools (and their parents) are likely different than students who attend public schools. This could be addressed with data at the student level that indicated scores for students who had attended a charter school versus students who were randomly excluded (like from a waiting list) from attending a charter school and had to attend a DCPS school.

CONCLUSION

Because of the drawbacks in our data source, our analysis is inconclusive in terms of indicating whether or not charter schools represent a good investment. Our results indicate that they do, but the fact that charter schools can choose students and that students who attend charter schools are different than those who attend DCPS schools means that it is likely omitted factors on ability, drive or others are impacting our results. Because these students are more likely to score higher on tests anyway, it is likely our coefficient has a positive bias that is inflating the influence of charter schools. A much better experiment would follow students that applied to a charter school and compared test scores on those that got in versus those that did not ideally when students were assigned by lottery.

Our results, were they to be more reliable, would imply that policy makers should encourage the expansion of the charter school system and work to provide more federal funding for charter schools. Expanding the charter school system would give children more equal access to charter schools, especially in low-income areas. This would include, but is not limited to, exploring the reason for lower rates of funding in charter schools as compared to public schools. If, however, this were to be taken on by policymakers, it would also be advisable that better regulations be put in place to avoid misuse of funds and to ensure that charter schools continue to provide an environment where students can become high achievers. These results would also potentially highlight that the curriculum,

57 See Appendix 3 for table of results.

teachers or another factor about charter schools are potentially more effective than public schools, so policymakers could encourage public schools to adopt techniques from charter schools and see if test scores improve. Ultimately, teasing out which of these impacts is causing the improvement on test scores would be extremely difficult, but further research would aim to do just that.

APPENDIX 1: CHARTER SCHOOL AND POVERTY GUIDELINE DATA

FIGURE 8: CHARTER SCHOOL MARKET SHARE GROWTH

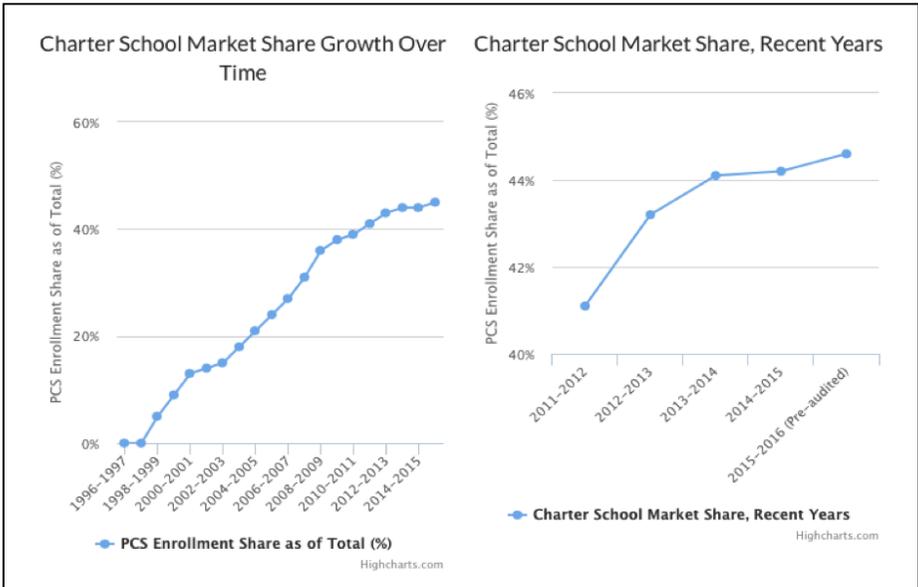


FIGURE 9: 2012 POVERTY GUIDELINES FOR U.S. CONTIGUOUS STATES AND D.C.

**2012 Poverty Guidelines for the
48 Contiguous States and the District of Columbia**

PERSONS IN FAMILY/HOUSEHOLD	POVERTY GUIDELINE
1	\$11,170
2	15,130
3	19,090
4	23,050
5	27,010
6	30,970
7	34,930
8	38,890

For families/households with more than 8 persons, add \$3,960 for each additional person.

FIGURE 10: 2013 POVERTY GUIDELINES FOR U.S. CONTIGUOUS STATES AND D.C

2013 POVERTY GUIDELINES FOR THE 48 CONTIGUOUS STATES AND THE DISTRICT OF COLUMBIA

PERSONS IN FAMILY/HOUSEHOLD	POVERTY GUIDELINE
1	\$11,490
2	15,510
3	19,530
4	23,550
5	27,570
6	31,590
7	35,610
8	39,630

For families/households with more than 8 persons, add \$4,020 for each additional person.

FIGURE 11: 2014 POVERTY GUIDELINES FOR U.S. CONTIGUOUS STATES AND D.C.

2014 POVERTY GUIDELINES FOR THE 48 CONTIGUOUS STATES AND THE DISTRICT OF COLUMBIA

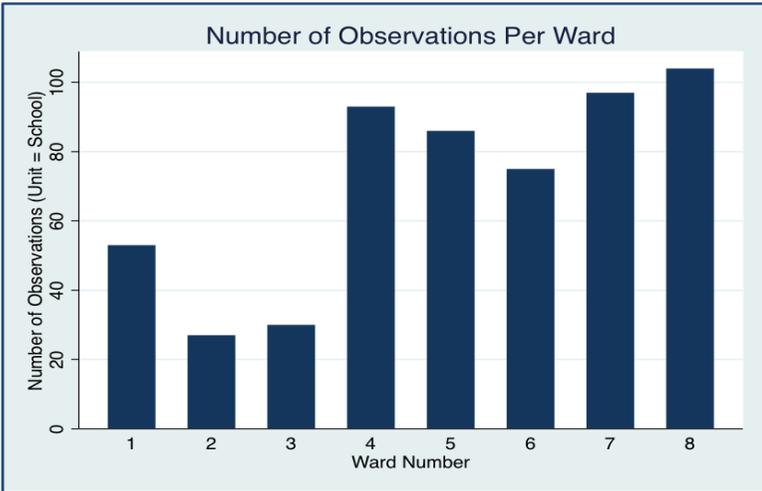
PERSONS IN FAMILY/HOUSEHOLD	POVERTY GUIDELINE
1	\$11,670
2	15,730
3	19,790
4	23,850
5	27,910
6	31,970
7	36,030
8	40,090

For families/households with more than 8 persons, add \$4,060 for each additional person.

There is a difference between poverty thresholds and poverty guidelines. The poverty threshold is used for statistical purposes such as the number of Americans in poverty every year. The poverty guidelines (included here) are a simplified version of the threshold used for administrative purposes, such as financial aid eligibility (Poverty Guidelines).

APPENDIX 2: OBSERVATIONS PER D.C. WARD

FIGURE 12: NUMBER OF OBSERVATIONS PER D.C. WARD



APPENDIX 3: BOX PLOTS FOR EACH WARD FOR MATH AND READING PERCENTAGES

FIGURE 13, BOX PLOT BY D.C. WARD FOR MATH SCORES

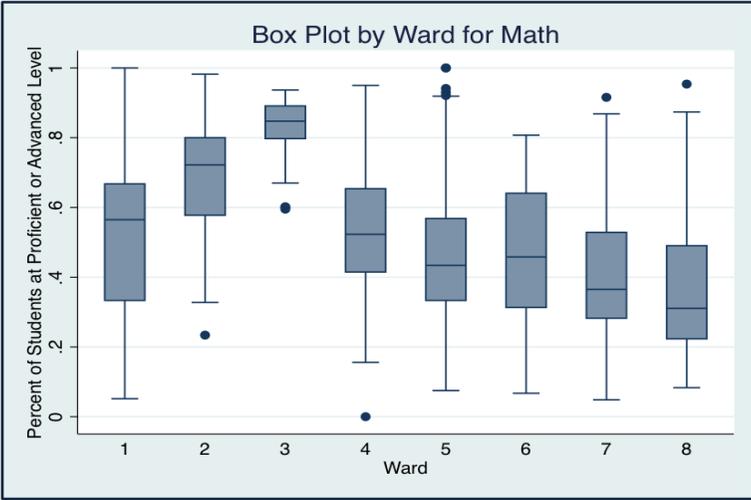
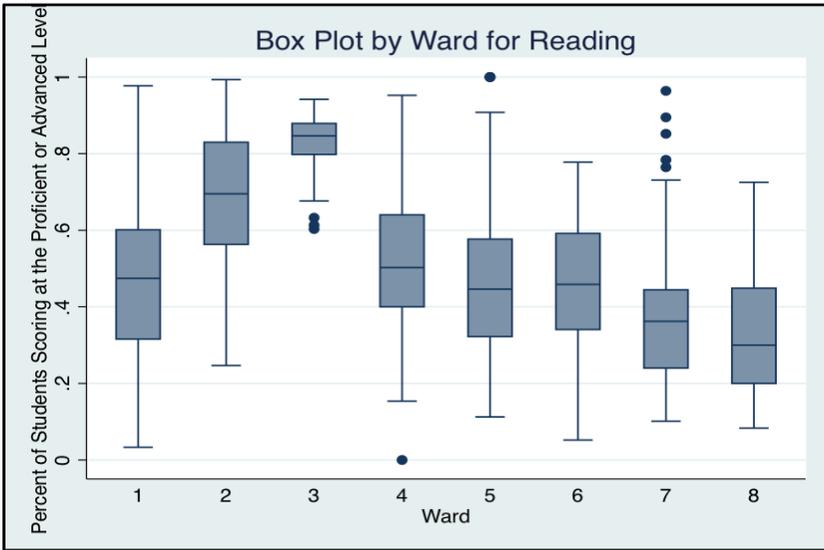


FIGURE 14, BOX PLOT BY D.C. WARD FOR READING SCORES



APPENDIX 4: TABLE OF RESULTS FOR SPECIFICATION THAT EXCLUDED WARDS 2 AND 3

FIGURE 15

Results for Charter Schools and Percent of Students Scoring at the Proficient or Advanced Level					
Math					
Variable	Coefficient	Standard Error	t value	Confidence Interval	
Charter School	.1357***	.0295	4.60	.0775	.1939
Ward 1	Used as Base for Other Ward Number coefficients				
Ward 4	-.0131	.0626	-0.21	-.1366	.1104
Ward 5	-.0676	.0666	-1.02	-.1990	.0638
Ward 6	-.0422	.0646	-0.65	-.1697	.0852
Ward 7	-.1145	.0595	-1.92	-.232	.0029
Ward 8	-.1514**	.06	-2.52	-.2697	-.0331
Constant	.4731***	.0552	8.56	.3641	.582
$R^2 = 0.1668$ n = 500					
* = Significant at the .1 level ** = Significant at the .05 level *** = Significant at .01 level					
Variable	Coefficient	Standard Error	t value	Confidence Interval	
Charter School	.115***	.0258	4.45	.064	.166
Ward 1	Used as Base for Other Ward Number coefficients				
Ward 4	.0316	.0564	0.56	-.0797	.1428
Ward 5	-.017	.0589	-0.29	-.1333	.0992
Ward 6	-.0145	.0585	-0.25	-.1299	.1009
Ward 7	-.1055**	.0517	-2.04	-.2075	-.0034
Ward 8	-.1463	.0498	-2.94	-.2445	-.048
Constant	.4321***	.0484	8.93	.3367	.5275
$R^2 = 0.3738$ n = 556					
* = Significant at the .1 level ** = Significant at the .05 level *** = Significant at .01 level					

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(Footnotes)

1 The authors calculated the percent of the population that is Black by dividing the population of Black individuals over the total population. The population data appears to be from 2000 and the income data may be from 2002.

2 This column in the data is POVFAM_. The authors assume that this is a percentage. Poverty guidelines for 2012-2014 are available in Appendix 1, figures 2-4. This also includes a note about the difference between poverty thresholds and poverty guidelines.

3 The coefficient on Ward 2 is significant, but this may not be a good estimate of the true value because of the small sample size for that Ward.

4 See above, footnote 12.