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Chapter 4 The Effect of Attending Charter Schools on Achievement, Educational Attainment and Behavioral Outcomes: A Review

by Julian R. Betts

Introduction

This chapter reviews the research on whether charter schools affect student outcomes. Understandably, in this era of accountability and state testing, the bulk of research to date has focused foursquare on student test scores. However, as economists often point out, test scores are related only weakly to adult outcomes such as earnings and whether students graduate from high school or attend college. The prior chapter by Laura Hamilton and Brian Stecher provides a rich framework for thinking about the diverse goals of public education, listing many outcomes beyond test scores that researchers might want to study. Researchers are just now beginning to look at the effect of attending a charter school on some of these other outcomes. The final section of the paper will review work on these alternative outcomes, which so far have focused mainly on variants of educational attainment, such as high school graduation.¹

¹ I thank Jon Christensen for his insights on the literature.

An Update on the Literature on Charter Schools and Achievement

Betts and Tang (2008a,b) provide an overview and a more detailed description, respectively, of a meta-analysis of all work on charter schools and achievement that they could find published as of mid to late 2008. They made the decision to focus on studies that had used either lottery data or value-added models that take into account students' past test scores, based on evidence in Chapter 2 and as outlined by the Charter School Achievement Consensus Panel (2006) that these methods are more likely than weaker methods to produce unbiased estimates of the causal effect of attending a charter school on student achievement. Remarkably, of roughly 70 studies they considered, only 13 studies conformed to these two approaches – 3 lottery-based studies, and 10 value-added studies.

Betts and Tang found evidence that in some grades and locations charters outperformed traditional public schools, and in other grades and locations they underperformed. Overall, when weighting studies by the number of charters in each study, they found more evidence of positive achievement effects of charter schools than negative, but again the results varied by grade and subject.

One can summarize the literature by examining the percentage of studies that found significant negative or positive results. Alternatively one can calculate the overall distribution of

effect sizes. (Effect sizes in this context refer to the predicted number of standard deviations by which test scores would change in one school year if a student switched to a charter school.)

Betts and Tang found that the majority of estimated effects of charter schools are positive. This imbalance is sometimes mild, but in some cases, such as for reading scores in elementary schools, and for math scores in middle schools, the literature strongly suggests that charter schools are outperforming traditional public schools. There are important exceptions. Charter high schools appear to underperform significantly in math. In several cases of specific grade spans and test subjects Betts and Tang find considerable evidence of both positive and negative effects of charter schools, with variations by geographic location.

Betts and Tang (2008b) provide cautions about the dangers of drawing nationwide conclusions from the studies they examined, because of the relatively narrow geographic coverage of the studies they included. The states studied included Texas, Florida, North Carolina, Delaware and Idaho. Other studies included four districts in California, charter schools in New York City and three charter schools in Chicago. They report that their pessimistic results for high school math derive from Texas, Idaho, Delaware and a small number of large urban districts in California.

Another way to look at the data is to study the effect sizes rather than the signs of the estimated effects. Table 4.1, reproduced from Betts and Tang (2008b), shows the median effect

sizes for math and reading, by grade span studied. The three columns show results when we weight each study equally, when we weight each study by the number of charter schools in the study samples, and when we weight by the product of the number of charter schools and the number of years of data included in the study. A weakness of the first (unweighted) approach is that it gives equal importance to a study of one charter as it gives to a statewide study of 1000 charter schools. The two weighting schemes gives a more representative picture of what happened at the “typical” charter school or in the typical charter school year.

[Insert Table 4.1 around here]

The first pattern apparent in the table is that regardless of the weighting scheme, in most cases the median effect is positive. This supports the vote counting analysis referred to above: there are far more positive findings than negative findings. The only exception is at the high school level, in which the median effect is negative for math scores regardless of weighting, and negative for one of the cases of reading. Again, this closely matches the patterns of significance discussed earlier.

While generally positive, the median effect sizes tend to be small. In all cases but two, the absolute value of the median effect size is less than 0.10, or less than 1/10 of a standard deviation of a test score. This is true for all of the unweighted median effects, as well as the

weighted effects when the number of schools times the number of years serves as weight. Again, the only exception is at the high school level, and only under one of the weighting schemes.

It is important to put these effect sizes into context. Betts and Tang (2008b) point out that the effect size for both math and reading in elementary schools is 0.08, or 8% of a standard deviation. They calculate that a student with median test scores -- ranking 50th out of 100 students -- would be predicted to move up to about the 47th rank out of 100 students after one year at a charter school. Over several years of such gains, a student could move up markedly. For comparison purposes, Clotfelter, Ladd and Vigdor (2007) estimate that in North Carolina reducing class size by 5 students is associated with gains in achievement of 1.0% -1.5% of a standard deviation.

Several new studies have appeared since the review of the literature conducted in 2008 by Betts and Tang. Zimmer, Gill, Booker, Lavertu, Sass and Witte (2009) report on value-added modeling of math and reading achievement in Texas, Ohio, Chicago, Denver, Milwaukee, Philadelphia and San Diego. In the cases of Texas and San Diego, this work updates work done by some of these authors and other researchers, and in the other locations this report produces the first value-added knowledge of which I am aware.

The authors emphasize their middle and high school results, because they have relatively few elementary school students who switch between charter schools and traditional public

schools. In these “non-primary” models, in five of seven cases there was no statistically significant difference between reading and math gains in charters versus traditional public schools. But charter schools in Chicago underperformed in reading and in the Texas sample charter schools underperformed in both math and reading. In each of these negative cases the effect size was in the range of -0.08 to -0.09.²

One other recent study, which in this case uses the ideal method of comparing lottery winners and losers, examines charter schools in Boston. Abdulkadiroglu, Angrist, Cohodes, Dynarski, Fullerton, Kane, and Pathak (2009) found that the estimated effect of attending a charter school for one year was positive and quite large. For example they estimated effect sizes of 0.17 and 0.16 for English Language Arts in middle and high school, and effect sizes of 0.54 and 0.19 for math in middle and high school. All effects were significant the 5% or lower levels. As the authors point out a gain of 0.54 standard deviations in a single year is very large.

Overall, the new results fit quite well with the earlier literature as reviewed by Betts and Tang (2008a,b) – there is a mix of results, with the earlier non-lottery results being slightly more negative than the earlier work and the Boston study being among the most positive results found to date.

² In the sample that included primary schools for Ohio, the overall charter effect was negative for both reading and math. This result appeared to derive from some “virtual” charter schools that educate students at a distance, typically through the Internet.

Evidence on Outcomes Other than Test Scores

Several papers have started to look at student outcomes other than academic achievement as proxied by test scores. This literature is just in its infancy but already the results strongly hint that test scores do not fully capture all of the effects of attending a charter school on individual student outcomes. The bulk of this work has focused on various measures of educational attainment, that is, measures of how much education each person obtains.

Emerging Evidence on Educational Attainment

A central problem in analyzing years of education, whether a student graduates from high school, or enters college, is that we observe a person's (final) level of education only once. With test scores, which we observe repeatedly, we can compare student performance before and after he or she enters a charter school, using a student-fixed-effect value added model. Even if we do not have the minimum of three test scores needed for this model, we could use just two test scores to measure how much students improve in different school environments. We cannot use these "value-added" models for outcomes such as high school graduation. The closest we can come, is to model, for instance, whether a person graduates while controlling for observable

student characteristics at some earlier point in time. The chances that unobserved differences across students are driving the results rises exponentially.

For precisely this reason, the value of lottery data that compares outcomes between lottery winners and losers is particularly useful in the context of “once-only” variables such as high school or college graduation. If the only thing that separates lottery winners and losers is the luck of the draw, then on average we expect students in these two groups to have the same probability of reaching a given level of education. If statistically significant differences emerge, we can be quite confident that winning or losing the lottery has caused these differences in educational attainment.

Unfortunately, there has been only one lottery-based study of the effects of charter schools on educational attainment, and that study examines only one California charter school. McClure, Strick, Jacob-Almeida and Reicher (2005) utilize admission lotteries at the Preuss School at UCSD to examine the effect of winning a lottery on student achievement and educational attainment. They did not find big differences in test scores between lottery winners and losers, but they did observe large differences in a variety of measures of educational attainment. First, they studied how many college preparatory courses the students completed, and found large differences emerging as early as grade 10, in favor of lottery winners.

The authors also surveyed lottery losers in the graduating class of 2005 (who had enrolled in traditional public schools in San Diego) when they reached grade 12. Part of the survey asked about the students' plans for college. The survey found a striking gap in planned college attendance. Among the Preuss school attendees (the lottery winners), 90.3% were set to enroll in a four-year college in fall, and 9.7% were planning to enroll in community college. Only 66.7% of respondents from the group of lottery losers planned to attend a four-year college in the fall, a gap of about 23%.

An issue with this comparison is that just under two-thirds of students in the group that did not win the lottery replied to the survey. By assuming either that none of the non-respondents or alternatively that all of these non-respondents were intending to enroll in college, we obtain a range of 42.1% to 78.9% as the maximum range for the actual 4-year college enrollment in this comparison group. Regardless, then, the lottery winners were more likely to enroll in college than the lottery losers at this school.

The remaining studies of educational attainment do not use lottery data and so potentially suffer from bias caused by omitted variables. For instance, if students who attend charter schools are more motivated than are students who attend traditional public schools, then greater educational attainment among charter students could simply reflect variations in unmeasured motivation.

Zimmer, Gill, Booker, Lavertu, Sass and Witte (2009) examine the association between educational attainment and charter school attendance in a variety of locations. One of the approaches they take to reduce the self-selection among charter students is to focus on students who attend a charter school in grade 8, then comparing educational attainment within this subsample between students who later attend high school charter schools and those who attend traditional public high schools. Because of onerous data requirements, this analysis is limited to Chicago and Florida.

In Chicago, the authors estimate that attending a charter high school is associated with a 7% increase in the probability of graduating from high school and a 10% increase in the probability of attending a community college or four-year college. The corresponding figures for Florida are 12-15% and 8%. The limitations of this method are that we cannot be sure that limiting to the analysis to students who attended charter schools in grade 8 removes unobserved variations among students who after all come to different decisions about whether to attend charter public high schools.

Another perhaps more convincing approach implemented by these same authors uses instrumental variables to take into account students' endogenous choice of whether to attend a charter school. The central idea is to replace the variable indicating actual charter school attendance with a predicted charter attendance variable, which is created by using various

measures of the proximity of other local charter schools. These models produced even bigger estimates. For instance, the probability of graduating from high school is predicted to rise when attending a charter high school by about 15% in Florida and about 32% in Chicago. The estimated changes in probability of attending a two- or four-year college are 18% and 14% in Florida and Chicago respectively. On the surface these estimates seem high. On the other hand, the Preuss School results, which use the more convincing lottery method, suggest a 24% boost in the probability of attending a four-year college.

These are all strong results, but are limited to one school in San Diego, and charters in Chicago and Florida. In principle, it would be simple to extend these sorts of analyses to other states and cities, at least for high school graduation.

Evidence on Attendance and Behavior

Imberman (2007) studies two outcomes that are more closely related to student behavior than student achievement: attendance and suspensions from school (combined with more serious disciplinary actions). He studies an un-named large urban school district. He finds significant reductions in student disciplinary infractions among those who attend charter high schools. A natural concern, of course, is that charter high schools may suspend or otherwise discipline

students less often for a given behavior, perhaps because of lower disciplinary standards or a lower probability of catching students violating the behavior code. Still the differences are quite large. For instance the baseline model suggests a change of -0.36 infractions per student, which is large compared to the average number of infractions per student in traditional public schools of 0.42 infractions.

Imberman also models the percentage attendance rate. The baseline model shows no relation between charter school attendance and attendance rates. However, in models that also control for lagged charter school attendance a small positive relation between attending a charter two periods ago and attendance in the current period arises.

Conclusion

The rapidly growing literature on charter schools and achievement still contains a surprisingly small number of studies that use convincing value-added or experimental (lottery) methods, but this subsample of studies is growing steadily.

The achievement results neither confirm the worst fears of charter critics nor fulfill the greatest hopes of charter supporters. There is ample evidence that some charter schools outperform traditional public schools and that others underperform. Overall, the evidence to date

supports the notion that positive effects are somewhat more common than negative effects. High school math scores are a weak point for charter schools, while charter schools most typically outperform traditional public schools in elementary school reading tests and middle school math tests. But even with some excellent recent additions to the literature, we are still surveying a literature that completely ignores the majority of U.S. states. In many states, policymakers have to choose between rigorous evidence from other states or districts and less rigorous or even no evidence on the influence of charter schools in their own location.

Researchers are just beginning to examine outcomes other than test scores. Studies in three different locations suggest that attending a charter high school is associated with significantly higher educational attainment. A study in an un-named urban district suggests that disciplinary infractions fall when students switch to charter schools. There is also weak evidence that those who switch to charter schools eventually exhibit slightly higher attendance rates.

None of these models of non-achievement outcomes has been estimated in a sufficiently wide range of school districts to know whether the results generalize, but the results are certainly very promising. They suggest that the call by Hamilton and Stecher in the previous chapter for researchers to investigate a broader set of student outcomes could prove prescient.

Table 4.1 Median Effect Sizes on Math and Reading Scores from Attending a Charter School Based on Studies Examined by Betts and Tang (2008b)

		(1)	(2)	(3)
		Unweighted	Weighted by # of schools	Weighted by # of schools * # of years
All studies	Math	0.0305 (19)	0.00519 (1,277)	0.00519 (6,044)
	Reading	0.0197 (16)	0.0175 (1,243)	0.0220 (5,976)
Elementary	Math	0.0863 (6)	0.0807 (300)	0.0807 (1,854)
	Reading	0.039 (5)	0.086 (288)	0.086 (1,830)
Elementary And Combined Elementary/Middle	Math	0.0807 (7)	0.0807 (367)	0.0807 (2,256)
	Reading	0.0363 (6)	0.086 (355)	0.086 (2,232)

Middle	Math	.00519 (5)	.00519 (226)	.00519 (1,879)
	Reading	-.00460 (4)	.0220 (213)	.0220 (1,853)
Middle and Combined Middle/High	Math	0.00519 (5)	0.00519 (232)	0.00519 (1,927)
	Reading	0.00659 (4)	0.0220 (219)	0.0220 (1,901)
High	Math	-0.0206 (4)	-0.215 (190)	-0.0155 (369)
	Reading	0.0592 (3)	-0.163 (181)	0.0592 (351)

Source: Betts and Tang (2008b), Table 5. Number of studies, number of represented schools, or

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