

A Graphical Description of the Impact

The attached graphs are intended to accompany the report, *Informing the Debate: Comparing Boston's Charter, Pilot and Traditional Schools*, released by the Boston Foundation in January 2009. To put the magnitude of the estimated impacts in context, we portray the mean test scores of students in the Boston Public Schools and the Brookline Public Schools in 4th grade and 6th through 8th grade. The graph also portrays the mean scores of applicants in the charter school lotteries. The graph contrasts the scores of all lottery “winners” and all lottery “losers”, including those in either group who may have attended charter schools or traditional public schools. The difference between the two lines represents the impact of being *offered a slot* in one of the charters that was subject to the lottery. As discussed in the report, we estimated the *impact per year* of attendance in a charter by essentially dividing the difference in scores for winners and losers by the difference in the number of years that the two groups had spent in charters as of 6th, 7th and 8th grade respectively. (Such estimates depend on the assumption that the only way being offered a slot in a charter has an impact on student performance is through the number of years spent in a charter.)

As is evident in the graph, lottery winners and losers had similar scores in 4th grade, before entering middle school. This is what we would expect if the middle school lotteries were truly randomized. Both groups had 4th grade scores somewhat higher than the mean for the Boston Public Schools (.2 standard deviations higher in math and .3 in English Language Arts). In other words, the applicants were a select group (somewhat higher performing than the Boston Public school students, but not dramatically so). Between 4th grade and 8th grade, the lottery losers remained somewhat higher scoring than the average BPS student. However, the lottery winners substantially improved their performance and closed the gap with the students in Brookline. Indeed, by 8th grade, the lottery winners as a group were scoring only about 2 tenths of a standard deviation below the mean student in Brookline in math. In ELA, the results were less dramatic, with the mean for lottery winners still about half of a standard deviation below the Brookline mean in 8th grade.

As of 6th grade, the lottery winners had spent about half of a year more in charter schools than the lottery losers. The differences in 7th and 8th grade are roughly 1 and 1.5 years respectively. Dividing the difference between lottery winners and losers by the difference in years attending a charter, the estimated impact per year averages .5 standard deviations per year in math and .2 in ELA. The implied impact of spending 3 years in a charter school is therefore roughly .6 standard deviations in ELA and 1.5 standard deviations in math. Both are sizeable effects, but the math effects are unusually large for an educational intervention of any kind. The ELA effects may therefore be a better guide to future impacts.

Description of Sample and Methods for Middle School Graph:

Brookline (dark blue)

Mean test score of students enrolled in Brookline Public Schools that have baseline demographic information in 4th grade. To be analogous to the lottery cohorts, 4th grade test scores are from 2002-2005, 6th grade test scores are from 2004-2007, 7th grade test scores are from 2005-2007, and 8th grade test scores are from 2006-2007.

BPS (blue)

Mean test score of students enrolled in Boston Public Schools that have baseline demographic information in 4th grade. To be analogous to the lottery cohorts, 4th grade test scores are from 2002- 2005, 6th grade test scores are from 2004-2007, 7th grade test scores are from 2005-2007, and 8th grade test scores are from 2006-2007.

Lottery Winners (dark red)

Mean test scores of students who won the charter lottery, regression-adjusted for demographic characteristics, program participation, baseline test score, year, year of birth, and charter school risk set, calculated grade by grade.

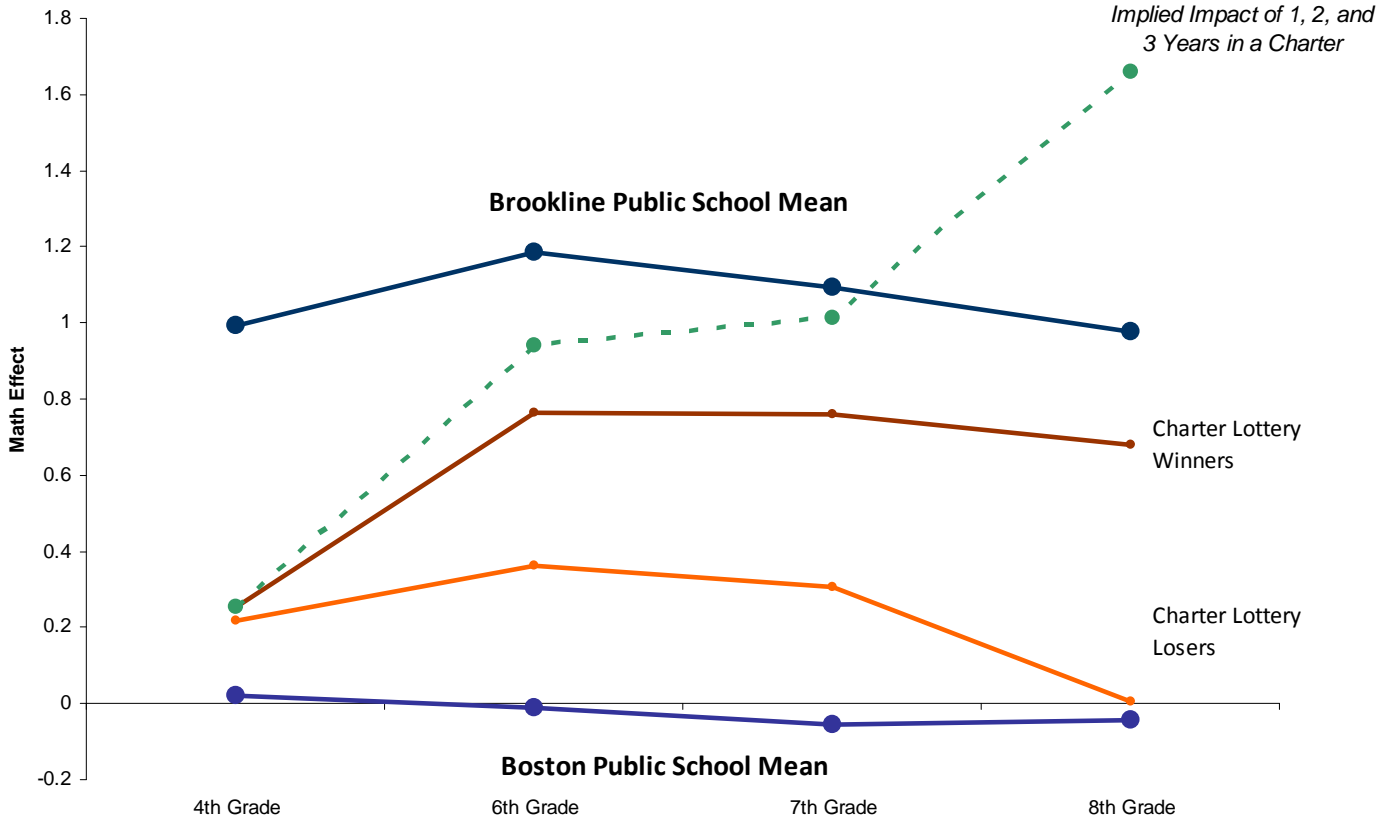
Lottery Losers (orange)

Mean test scores of students who lost the lotteries, regression-adjusted for demographic characteristics, program participation, baseline test score, year, year of birth, and charter school risk set, calculated grade by grade.

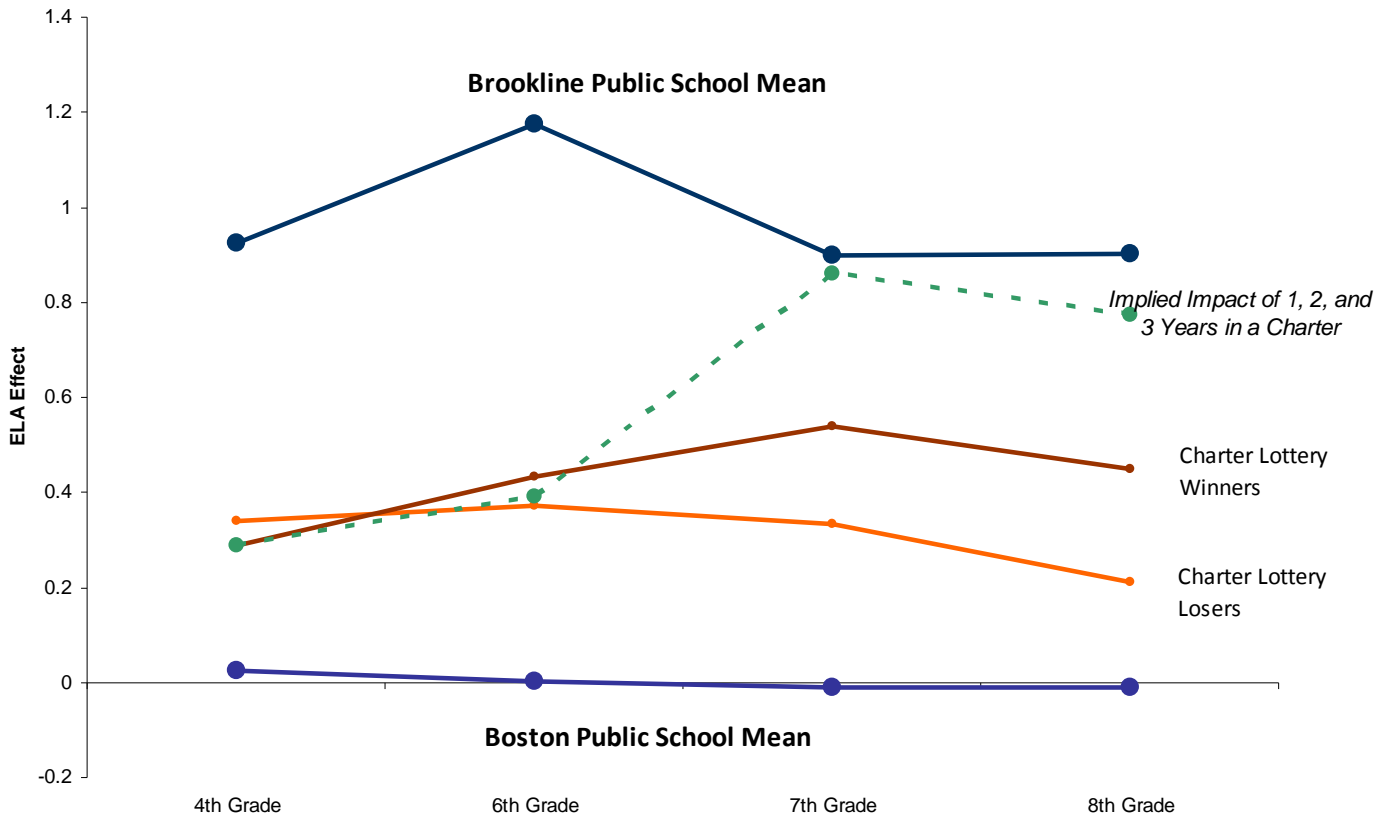
Implied Impact of 1, 2, and 3 Years in a Charter (dotted green)

Grade by grade two stage least squares (2SLS) estimates of the impact of years in a lotteried charter school on test scores. The 6th grade impact is the 2SLS estimate multiplied by 1 (for 1 year in a charter), the 7th grade impact is the 2SLS estimate multiplied by 2 (for 2 years in a charter), and the 8th grade impact is the 2SLS multiplied by 3 (for 3 years in a charter). Note that these estimates capture the hypothetical impact of *continuous* charter enrollment whereas the simple difference between lottery winners and losers is diluted by the fact that many winners leave charters before they finish middle school while some losers enter after 6th grade..

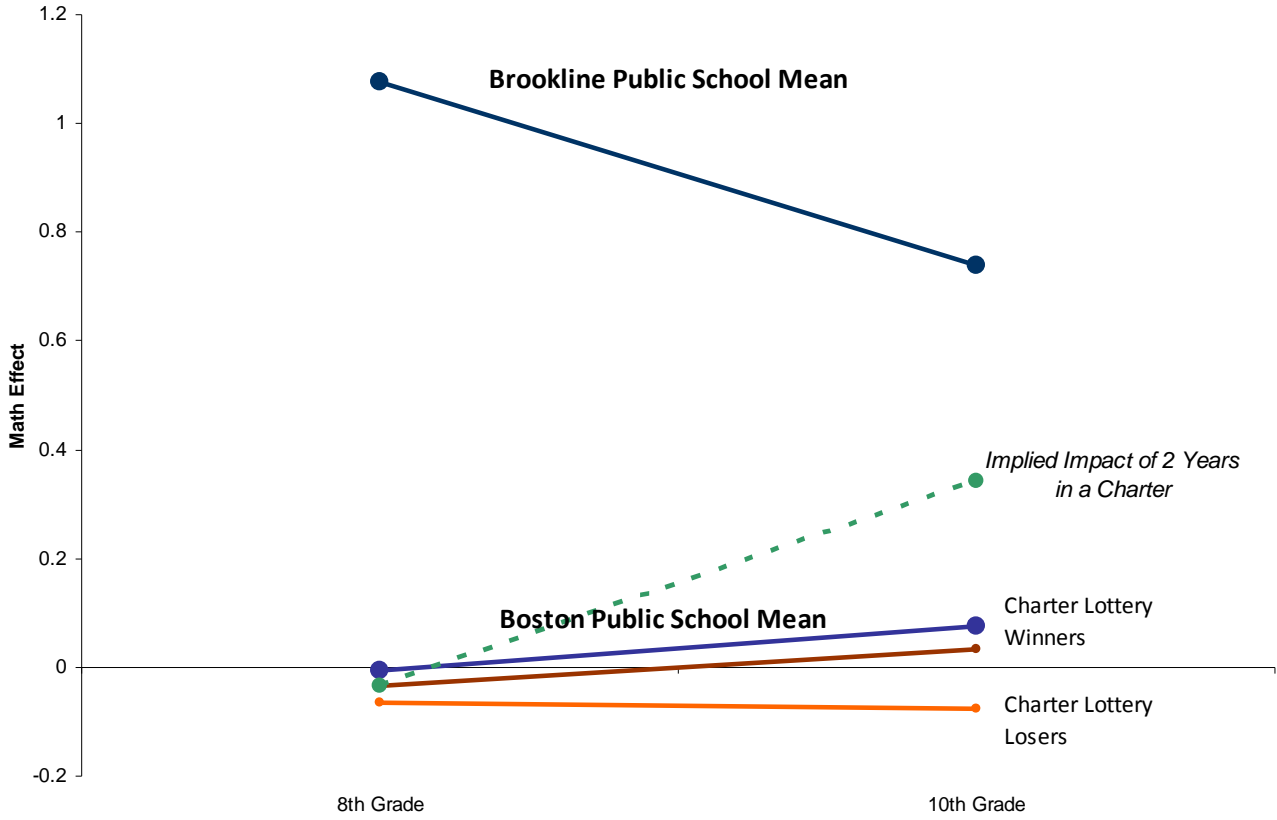
Middle School Math



Middle School English/Language Arts



High School Math



High School English/Language Arts

