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Sarah Cohodes

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Sarah Cohodes

On average, charter schools perform at about the same level as traditional public schools. But an overall estimate disguises considerable variation in charter school impacts. Urban charter schools and those serving low-income and minority students, a number of which share a *no excuses* philosophy, tend to produce the largest gains. Expanding these highly effective charters and their practices may be a way to close achievement gaps. Research shows that charters can expand successfully and that traditional public schools that adopt charter practices (or are taken over by charter operators) can also make large academic gains. But to have a meaningful impact on nationwide achievement gaps, charter school approaches would need to be adopted beyond the charter sector itself. Any interventions that are built around using charter schools to close achievement gaps should focus not on the type of school but on the practices that work in the most effective charter schools.

Charter Schools in the United States

Charter schools are public schools that operate with autonomy from traditional school districts. They are given flexibility in curriculum, structure of the school day and year, and budget management, and are not required to participate in collective bargaining. In exchange for this flexibility, charters are held accountable by their authorizers (state education agencies or organizations like colleges, special boards, or even school districts, depending on the state), who can revoke these schools' charters if they don't meet state standards. Charter schools are free and open to the public. If more students wish to attend a charter school than there are seats available, admission is by lottery.

The first charter schools were created in Minnesota in 1993. Forty-three states and Washington, DC, now have laws that permit the operation of charter schools, and around 7,000 charter schools now serve more than 5 percent of students in the United States.¹ They've grown steadily over the past 10 years, adding about 300 or 400 schools each year. To put this in perspective, about 10 percent of US students attend a private school, and 3 percent are homeschooled. Despite the relatively small size of the charter school sector, charter schools and their effects on students have been a large part of the education policy conversation in the past two decades. Though charter schools were originally envisioned as laboratories for testing educational practices, their proponents

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currently value them as an outlet for students and families who are dissatisfied with traditional public schools.² Additionally, advocates claim that increasing competition by allowing students to vote with their feet may improve systemwide performance.

The Impact of Attending a Charter School

Researchers who wish to assess how attending a charter school affects student achievement face a common problem in social science research: selection bias. You could simply compare the test scores of students in charter schools with those in traditional public schools, but that would be misleading. Charter school students have chosen this alternative, and thus they may be different from their peers in traditional public schools. If you saw differences in test scores between charters and traditional public schools, you couldn't say whether they were caused by differences in schooling or by differences in the type of students who attend charters. It's not hard to imagine that students who choose to attend charter schools are different from those who don't. For example, their families were motivated to seek an educational opportunity for their children outside the norm. Consequently, if charter students had higher test scores, it may simply reflect the fact that they're the type of students who attend a charter school, rather than saying anything about the school itself.

Happily, many charter schools have a built-in mechanism to overcome the selection-bias problem. Because charter schools are required by law to admit students by a random lottery if they're oversubscribed, charter school admissions are analogous to an experiment in which participants are randomly assigned to a treatment group or a control group (a randomized controlled trial). After accounting for important details that arise from operating a lottery in the real world versus doing so purely for research purposes, such as sibling preferences and late applicants, a random lottery assigns the seats for charter schools that are oversubscribed. This allows researchers to compare the outcomes of a treatment group of students who were offered a seat in the lottery to a control group of those who were not. To estimate the effect of attending a charter school (as opposed to applying to a charter school), researchers divide the treatment-control test score difference by the difference in attendance rates. The benefit of this approach is that the random lottery ensures that the two groups have similar observed and unobservable

characteristics, and therefore any differences in outcomes can be attributed to attending a charter school rather than to unobserved differences among the students. In short, this type of study is considered the best way to generate causal estimates of program effects. Wherever possible, this review focuses on evidence generated by lottery-based studies.

The lottery approach has a major downside, however. It is possible to estimate a lottery effect only when a school is oversubscribed and has student records available. Thus, findings based on lottery results may not generalize to the entire population of charter schools. And it's reasonable to believe that oversubscribed schools are more successful than other charter schools. Indeed, evidence from Boston supports this hypothesis.³ To estimate the effect of attending a charter school that isn't oversubscribed or doesn't have sufficient or accessible lottery records, researchers typically attempt to control for differences between charter and noncharter students with some form of statistical matching, in what is often referred to as an *observational study*.

Matching studies find pairs or groups of students who differ only by charter school attendance and then compare outcomes between charter and noncharter students within these pairs or groups. So, for example, a matching study might find two girls in fourth grade in the same school who are both Latina English-language learners who don't receive special education services and have similar test scores. In sixth grade, one attends a charter school and the other doesn't. The difference in their sixth-grade scores would contribute to the overall estimate of a charter school effect, which would be averaged over all such pairs. This observational approach can give estimates for a much larger group of charter schools, but it may not entirely purge those estimates of selection bias because the students who make up the matched groups may differ in unobservable ways. In this review, I will turn to observational evidence when lottery estimates don't exist, which is the case for most research that includes charter schools in an entire state or several states.

Another concern with lottery studies of charter school effects is that the students who apply to charter schools are not representative of students in the district. Selectivity in applicants doesn't undermine the validity of the charter school effectiveness

Table 1. Advantages and Disadvantages of Methods for Estimating Charter School Effectiveness

	Lottery Studies	Observational Studies
Definition	<ul style="list-style-type: none">• Compare students offered a seat with those not offered a seat in a random charter school lottery	<ul style="list-style-type: none">• Compare students attending charter schools to students in traditional public schools with similar observable characteristics
Advantages	<ul style="list-style-type: none">• Charter effect estimates are free from selection bias, have confidence that they reflect the effect of charter school attendance rather than student characteristics	<ul style="list-style-type: none">• Can include all charter schools whether or not they have a lottery
Disadvantages	<ul style="list-style-type: none">• Charter effect estimates are for charter applicants and may not generalize to all students• Only possible to conduct when there is oversubscription and good record keeping	<ul style="list-style-type: none">• Charter effect estimates may still include selection bias, do not have complete confidence that the effects found are caused by the charter school rather than student characteristics

estimates generated by lotteries, since all applicants are subject to the random lottery. But it may mean that lottery-based findings can't be generalized to the population at large. It's possible that the effects found for charter schools can be accomplished only with the type of student already applying to charter schools, and that we can't assume that we'll see similar effects if charter schools are expanded. I discuss this generalizability problem in detail later in this article.

Table 1 summarizes the advantages and disadvantages of the two main approaches for estimating charter school impacts on student test scores. Because lottery-based estimates are the most credible in terms of generating an effect purged of selection bias, I use lottery-based evidence whenever possible. But most lottery studies are of single cities or single schools. To consider charter school effects nationwide, I also include observational studies in this review.

Overall Charter School Effects

The best estimates find that attending a charter school has no impact compared to attending a traditional public school. That might surprise you if you were expecting negative or positive impacts based on the political debate around charter schools. But using both lottery-based and observational estimates of charter school effectiveness in samples that include a diverse group of charter schools, the evidence shows, on average, no difference between students who attend a charter and those who attend a traditional public school.

However, much of the same research also finds that a subset of charter schools has significant positive impacts on student outcomes. These are typically urban charter schools serving minority and low-income students that use a *no excuses* curriculum. When estimates for these highly effective schools aren't separated from the broader group of charter schools, mostly those in suburbs and rural areas, differences between charter and traditional public schools average out to zero.

Lottery-Based Evidence

It's difficult to collect charter school lotteries in one location, let alone across the country, yet three studies have done so. The first is a study of charter middle schools, the second of charters run by management organizations, and the third an aggregation of lottery results from many sites across the nation. All three studies find that attending a charter school has no or small positive effects.

A national study sponsored by the federal Institute of Education Sciences (IES) included lottery estimates of 36 charter middle schools in 15 states.⁴ The project tracked more than 2,000 students who applied to charter schools in the 2004–05 and 2005–06 school years, and found no statistically significant differences in student achievement between lottery losers and lottery winners. But the results varied substantially. Some charter schools had statistically significant positive effects and others statistically significant negative ones. In general, the most successful schools served low-income and low-achieving students, typically in urban areas. This

study is the closest research we have to a nationally representative lottery study of charter schools.

Another national study, though not representative of charters as a whole, looked at charter schools run by charter management organizations (CMOs) (seven CMOs with 12 schools).⁵ CMOs are charter school operators that run multiple schools. They may be nonprofit or for-profit organizations, and they are increasingly prevalent across the nation. Again, a lottery study showed no statistically significant effect of attending a charter.

Box 1. What Are Standard Deviations?

Throughout this article and in the research on charter schools, the impact of attending a charter school on math and reading test scores is typically described in standard deviation units. Standard deviations are a convenient way to convert results from different tests and subjects into a universal scale that can be compared across studies. Impacts from evaluations measured in standard deviation units are called effect sizes. However, standard deviations and effect sizes can be difficult to interpret out of context.

The black-white achievement gap in the United States can serve as a benchmark for comparing the effect sizes reported here. In the 2013 National Assessment of Educational Progress (NAEP), the black-white achievement gap on the fourth-grade mathematics exam is about three-quarters of a standard deviation (the reading gap is about 60 percent of a standard deviation). Thus when a study of charter school effects reports a gain of one-quarter of a standard deviation in math per year of attendance, that amounts to about one-third of the black-white achievement gap.

A recent study combines school-level charter lottery impacts from eight studies/sites, including the two studies discussed above, Massachusetts, New York City, several studies of KIPP (Knowledge Is Power Program) schools, and some evaluations of individual schools, including some in which the school-level results aren't publicly available.⁶ Aggregating the school-level lottery estimates showed an average effect on math achievement of a little less than 10 percent of a standard deviation and an average reading effect about half that size (see box 1). It's not surprising that the charter effect in this study

was more positive than in the IES and CMO studies, because the sample of schools was designed as those with available lottery results, not a representative group of middle schools or CMOs. Thus, the sample includes some charters with very large effects, and many of the schools in this aggregation were in urban, low-income, and high-minority areas.

Observational Evidence

It's difficult to draw conclusions about the charter sector as a whole from the limited large-scale lottery evidence. Perhaps the null findings can be attributed to the makeup of the samples. For evidence that includes a large number of charter schools, the best option is to turn to studies that use observational methods, typically some form of statistical matching. These studies collect administrative data from entire states and then compare students who attend charters with very similar students who attend traditional public schools. This approach can include all the charter schools in a state, regardless of whether a lottery occurred or whether it's possible to collect data from lotteries that did. However, estimates from observational studies may not be entirely free from selection bias, because they don't take into account unobservable student characteristics like motivation and interest in school choice. Nonetheless, the observational evidence I review below comes to the same conclusion as the few available lottery studies: on average, there is no difference in test score outcomes between children who attend charters and those who attend traditional public schools, though some urban charter schools do increase test scores.

The broadest assessment of charter school effects comes from the Center for Research on Educational Outcomes (CREDO) at Stanford University. An initial report in 2009 examined charter schools in 16 states, a follow-up in 2013 included 27 states, and a 2015 report covered urban charters in 22 states.⁷ The large samples of charter schools in these studies precluded using lotteries to estimate effects. Instead, the researchers used statistical matching to estimate charter impacts. The initial findings indicated that charter schools overall had essentially no impacts on student learning in math and reading. That overall finding masked some variability: 46 percent of charters performed no differently than traditional public schools, 17 percent outperformed traditional schools, and 37 percent underperformed. In the 2013 report,

there was no difference in performance between charters and traditional schools. Again, schools varied considerably. Given the large samples sizes included in the analysis, the CREDO reports found statistically significant effects, but the magnitudes were so small that in essence they showed no difference between charter and traditional public schools. Perhaps the most important finding from the CREDO analyses is the considerable range of charter school effects, which is also highlighted by the 2015 analyses of urban schools. Though schools varied somewhat across regions, overall, students attending urban charter schools showed small gains in math and reading.

The study of CMOs discussed above also used matching to compare charter and noncharter students in a much larger sample than the one available for lottery analysis. The larger sample included 22 CMOs, with 68 total schools serving almost 19,000 students (and many more students serving as controls). Again, although the researchers found that attending a charter made no difference overall when compared to attending traditional public schools, they saw substantial variability, primarily between CMOs rather than within them. A more recent report on CMOs using a larger sample and matching methods generally found very small but statistically significant test-score gains from attending a CMO school.⁸

One study of charter schools in seven states took a different approach to statistical matching.⁹ Instead of finding statistically similar students for comparison, it used a *fixed effects* approach, comparing a student to herself when she switches between a charter school and a traditional public school. This approach has the benefit of controlling for individual characteristics that don't vary by time, but the disadvantage of relying on students who change school types during tested grades—perhaps not a representative sample. For example, this approach might use a student who switched from a district school in fifth grade to a charter school in sixth grade and compare her sixth-grade score to her fifth-grade score, attributing any variation from standard grade-to-grade growth to charter school attendance. The findings were mixed. In math, three locations showed no difference between charter schools and traditional public schools, two showed positive effects, and two showed negative effects.

For reading, four sites showed no difference, and the other three showed small negative impacts for attending a charter.

As with lottery-based studies of diverse groups of charter schools, observational studies that estimate charter school effectiveness for entire states also find few differences between students who attend charters and those in traditional public schools. Though the research methods used to make these assessments may not fully control for selection bias, they do include most of the charter schools in the nation. And the fact that observational estimates coincide with the lottery estimates gives credence to the idea that although they have flaws, the large-scale studies can still give us useful information. Together, both types of studies find that charter schools as a whole have little impact on test scores, with urban charters a possible exception.

Longer-Term Outcomes: Attainment and Earnings

We have scant evidence for broad samples of students on longer-term outcomes beyond test scores. Two studies are exceptions, using data from Florida and Texas to examine longer-term charter school impacts on outcomes like college and earnings.¹⁰ The Florida study restricted its sample of charter students to those who attended a charter in eighth grade and then used statistical matching; the Texas study used matching and controls to generate estimates of charter school effects. Again, estimates generated by these methods aren't as credible as those produced by lottery-based analyses, but they include many more charter schools. In the Florida study, charters had beneficial effects on aspects of educational attainment, including high school graduation (six percentage points), college-going (eight percentage points), and college persistence (12 percentage points). Examining earnings up to three years after college graduation (assuming on-time progression), attending a charter was associated with an increase of more than \$2,300 in annual earnings, and was concentrated in students who attended college.

In Texas, attending a charter school for one year was associated with an increase in high school graduation (1.2 percentage points) and two-year college attendance (1.5 percentage points), but a decrease in average annual earnings from age 24 to age 26 of about \$100–\$200, depending on the specification. The Texas study attempted to distinguish between no

excuses charter schools and regular charter schools (a difference I will discuss shortly), and found that the negative earnings effects were concentrated in regular charters.

Without more evidence about longer-term outcomes of attending charter schools across the country, it's hard to say whether the differences between the two studies can be attributed to methodology or to different samples or time periods. But the evidence on longer-term outcomes so far is consistent with the picture for test scores: no differences overall, but potentially substantial benefits for students at a subset of charter schools.

No excuses schools emphasize high expectations for both academics and behavior, longer school days and years, and frequent observations of teachers to give feedback, tutoring, and data-driven instruction that uses assessment to frequently update teachers.

High-Quality Urban Charter Schools

Although charter schools tend to be no different from traditional public schools on average, recent research shows that one group of charter schools has substantial beneficial effects for students. These are typically urban schools that serve low-income and minority children and often adhere to a no excuses philosophy. No excuses schools emphasize high expectations for both academics and behavior, longer school days and years, and frequent observations of teachers to give feedback, tutoring, and data-driven instruction that uses assessment to frequently update teachers.

In some cases, these charter schools have quite large effects, such that attending one for three years produces test-score gains that are equivalent

to the size of the US black-white achievement gap. In Boston and New York, where there are enough historical lottery data to track students for longer periods, such charter schools increase enrollment in four-year colleges and reduce teen pregnancy and incarceration. In this section, I summarize the evidence from individual cities and schools, focusing on lottery results. The positive effects of attending an urban no excuses charter school are consistent with the results from broader evaluations summarized above that show no overall benefit of attending a charter school, but gains in urban areas or for low-performing or low-income children.

Boston

Charter schools in Boston are some of the most studied.¹¹ Research has consistently found that attending a charter school in Boston has large positive effects on math and reading test scores. The most recent estimates, which include about 95 percent of the city's charter school enrollment, found test-score gains of about one-third of a standard deviation per year of attendance in math and 20 percent of a standard deviation for reading at the middle school level. Estimates for Boston charter high schools are even larger. A report that includes the entire state of Massachusetts mirrors national studies: charters in urban areas have the most beneficial impacts, and charters in suburban or rural areas have no or in some cases negative impacts on test scores.

With lottery records in Boston dating back to the mid-2000s, it's possible to connect charter school students to their outcomes many years later. Those outcomes include AP test-taking and scores, SAT test-taking and scores, and college entrance. Just as Boston's charter schools had beneficial effects on standardized state exams, they also boosted AP test-taking and AP and SAT scores. Charter students were slightly more likely to go to college and, if they did, significantly more likely to attend a four-year rather than a two-year institution. A strong correlation between test score effects and college-going suggests that the schools that do the best job of preparing students for exams also do the best job of preparing them to go to college.

New York City

Two broad evaluations showed gains for students who attended New York City charter schools.¹² A 2009 study covering 43 charter schools found that

for each year of attendance, students gained of about one-tenth of a standard deviation in math and half that in reading test scores. A 2013 study of 29 schools found similar effects. These impacts are not as large as those found in Boston, but they are still substantial, especially when aggregated over several years of attendance. Here, it's important to note that the large charter sector in New York includes a diverse set of schools with diverse practices. As I'll discuss in detail, New York charter schools with a no excuses culture tend to have quite large impacts. Take, for example, the Promise Academy in the Harlem Children's Zone.¹³ Research found that it had annual impacts of about one-quarter of a standard deviation in math and small but still positive effects on reading. A group of no excuses charters in New York City, Success Academy Charter Schools, also produced large positive statistically significant effects on math scores, with smaller but still positive impacts on reading.¹⁴ As in Boston, the benefits of attending a high-quality charter may go beyond test scores—attending the Promise Academy increased on-time high school graduation and college enrollment and decreased teen pregnancy for young women and incarceration for young men. However, results for longer-term outcomes aren't available for other New York City charter schools.

Additional Lottery Evidence on Urban Charter Schools

Beyond New York and Boston, lottery-based evaluations of KIPP charter schools and of charter schools in Denver and Chicago also show gains for charter students. KIPP schools, most of which are in urban areas, are some of the best-known charter schools in the country. Their college preparatory approach rests on five pillars, which they define as high expectations, choice and commitment, more time, power to lead, and focus on results. Mathematica Policy Research, a large, nonpartisan research organization, has evaluated KIPP schools nationwide over the past decade using statistical matching techniques and, when lottery data were available, experimental methods.¹⁵ Looking at scores on both high- and low-stakes exams, the researchers have consistently found that attending a KIPP middle school produces statistically significant positive test score effects. Their most recent report added KIPP elementary and high schools to the analysis; it found

beneficial effects for elementary students and new entrants to KIPP high schools, though not for students continuing from KIPP middle schools to KIPP high schools.

Denver uses the same process to assign students to all schools, including charter schools. Students and their families submit a ranked list of their choices, and a computer algorithm assigns students to schools based on a random lottery number. Researchers used this systemwide lottery data to estimate the effects of charter school attendance. Again, they found large statistically significant positive effects on test scores.¹⁶ Specifically, attending a Denver charter school produced standardized test score increases of about one-half of a standard deviation in math, one-third of a standard deviation in writing, and 20 percent of a standard deviation in reading. These are some of the largest charter school impacts that have been observed anywhere; they imply that attending a Denver charter school for two years is enough not just to close but also to surpass the black-white achievement gap in mathematics. That finding is particularly notable because to apply to a charter school, Denver families need not take any steps beyond those required of everyone. Thus charter school application is accessible to more students.

In Chicago, as in Boston and New York, recent lottery-based evidence from the Noble Network of high school charters shows college-going gains for charter students.¹⁷ Attending a Noble high school increased college enrollment by 13 percentage points, with most of the increase coming at four-year, relatively selective institutions. Persistence in college also increased, with a 12 percentage point increase in attending four or more semesters of higher education.

In general, then, lottery-based studies of urban charter schools find large, statistically significant impacts on test scores, in contrast to the evidence on overall charter school effectiveness. Where it's possible to look at longer-term outcomes, the same schools that have beneficial impacts on test scores also boost college preparation and college-going outcomes. The students in these studies are still too young for studies to look at important outcomes like college graduation and earnings, but the evidence

as a whole suggests that urban no excuses charter schools can improve young people’s academic trajectories.

Characteristics of High-Quality Charter Schools

If urban charter schools are effective, in contrast with charter schools as a whole, what is it that makes it possible for them to generate impressive test-score gains? A small body of research looks for correlations between charter schools’ effects and school practices. To do so, researchers examine school-level charter school impacts in concert with school-level measures of practices to see which practices are associated with positive test scores. Though this method isn’t as reliable as the lottery-based experimental methods used to estimate the school effects, consistent patterns have emerged across studies. They indicate that the largest charter school effects occur in schools serving urban, low-achieving students that use no excuses practices.

School Practices

Two studies, one of Massachusetts and one of New York charter schools, conducted similar exercises: they generated lottery-based school effectiveness measures for multiple schools, confirmed that the lottery results were similar to observational results, and correlated the lottery and observational school effects to school practices.¹⁸ Both studies found that a no excuses approach was related to charter school success.

The largest charter school effects occur in schools serving urban, low-achieving students that use no excuses practices.

In Massachusetts, school leaders were asked whether their school used the no excuses approach, and schools that did so tended to have better results. The study also drilled down to examine specific practices associated with no excuses. It found that a focus on discipline, uniforms, and student participation all predicted positive school impacts, with the important caveat that no excuses policies are often

implemented together, so that it’s difficult to separate the correlations for individual characteristics.

The New York City study aggregated school characteristics into *practice inputs* and *resource inputs*. The practice inputs followed no excuses tenets: intensive teacher observation and training, data-driven instruction, increased instructional time, intensive tutoring, and a culture of high expectations. The resource inputs were more traditional things like per-pupil-spending and student-teacher ratios. The study found that each of the five practice inputs, even when controlling for the others, positively correlated with better charter school effectiveness; the resource inputs did not.

Like the Massachusetts and NYC studies, the study of CMOs described above also correlated practices with effectiveness. It found that CMOs with comprehensive student behavior policies or with intensive teacher coaching tended to have larger student impacts.¹⁹ Again, these practices are part of the no excuses approach. Similarly, individual schools with documented lottery-based evidence of success are also no excuses schools. They include KIPP Lynn (a KIPP charter school in Massachusetts), the Promise Academy, and the SEED Academy (a charter boarding school in Washington, DC).²⁰

Student Population and Fallback Schools

Many of the studies with large samples of charter schools described above note that their overall finding that there’s no difference between charter and other schools often disguises considerable variation. Urban charters and those that serve minority, low-income, and low-achieving students tend to have positive test score impacts. In the Massachusetts study, the researchers examined this phenomenon more closely. They separated the difference between urban and nonurban charter school effects into differences due to the composition of the student population (based on demographics and prior test scores) and unexplained differences (which were assumed to be attributed to school practices). About half of the urban charters’ edge comes from serving high-needs populations. However, demographics and prior test scores can’t explain the other half, suggesting that school practices come into play.

Another study aggregated estimates of charter lottery effects to investigate the role of the student

population and, in particular, the role of the public school that students would have attended had they not won the charter lottery.²¹ It found that the worse the fallback school performed, the better the charter school outcomes. And when the researchers controlled for the scores of the fallback school, they found that no excuses practices were less important in explaining charter school outcomes (though some of those practices remained statistically significant predictors). Because many of the schools that subscribe to a no excuses philosophy are in areas with poorly performing fallback schools, it's hard to distinguish the explanatory factors. But the findings do suggest that new charters may be most effective in places where traditional public schools are performing poorly.

Replicating High-Quality Charter Schools

If we wished to use charter schools to reduce US achievement gaps, one obvious way to spread charter school success would be to replicate the most successful schools. As we've seen, both the KIPP network and Boston charter schools have documented success, and both have undergone major expansions in recent years. Thus, they can serve as case studies to examine the expansion of successful charter schools. KIPP received an infusion of funds for expansion, and Boston experienced a change in Massachusetts law that allowed successful charters to open new campuses. In both cases, the new charter schools also had positive, statistically significant impacts on student test score outcomes. In Boston, the impacts were just as large as those of the parent campuses, while KIPP expansion schools had smaller, though still beneficial, effects.

Expanding the KIPP Network

In 2010, the KIPP network received an Investing in Innovation (i3) grant from the US Department of Education that was explicitly designed to test replication of a successful model. Using the i3 funds, KIPP opened many new schools and expanded a leadership academy for principals. Under the grant, the KIPP network's student population grew from 27,000 to more than 55,000 in 2014–15. The i3 funding, as well as the network's expansion in previous years, provided an opportunity to study whether KIPP could successfully replicate its success.²² Over the past 10 years, KIPP middle schools have always had statistically significant positive test score impacts on children. However, KIPP's impacts were largest in the initial years of study, followed by a dip and

then a resurgence. One possible explanation for this pattern is that expansion was most effective when the network concentrated on its core operations, middle schools, which were a focus of the i3 grant.

Expanding Boston Charters

Research shows that Boston has one of the most successful charter sectors. Before 2010, charter school growth there was constrained by a cap on the percentage of district funding that could be allocated to charter schools. Then a change in law partially lifted the cap, emphasizing *proven providers* as charter operators. Today the financial cap is again in place in Boston. But between 2011 and 2015, the share of students in charters at the middle school level doubled, driven by replicating successful schools. If we view the change in law as an experiment to see whether successful charter schools can replicate, then the experiment was a success. New campuses were just as effective as their parent campuses, and they had large, statistically significant impacts on both math and reading scores.²³ Additionally, the state (the sole charter school authorizer in Massachusetts) was able to successfully identify the highest-performing campuses and to allow those operators to expand.

With the expansion, the percentage of middle school students attending charters in Boston nearly doubled, from 10 percent to 17 percent. Applications to charter schools also increased, from 15 percent to 35 percent, showing unmet demand. Charter schools were able to maintain their effectiveness at increasing student achievement, while serving a more representative population and expanding their operations. However, we don't know whether further expansion would produce the same kind of success.

Charter School Practices in District Schools

If large beneficial outcomes are associated with particular charter school practices, can these practices be transplanted to traditional public schools? Given the relatively small size of the charter sector, if charter-based interventions are to have large-scale impacts in the United States, we would likely have to intervene in traditional public schools. A few studies indicate that when district schools adopt charter policies, when charter organizations take over traditional public schools, or when traditional schools introduce specific practices of successful charters, we may see test-score gains as large as those produced by high-quality charter schools.

Given the relatively small size of the charter sector, if charter-based interventions are to have large-scale impacts in the United States, we would likely have to intervene in traditional public schools.

Adopting Charter School Practices

One recent experiment tested the proposition that successful charter school practices can be *injected* into traditional public schools. Using the five no excuses charter school practices that were identified in New York City as being correlated with the largest test-score gains—intensive teacher management, data-driven instruction, increased instructional time, intensive tutoring, and a culture of high expectations—Harvard’s Roland Fryer and colleagues worked with the Houston Independent School District (HISD) to turn around poorly performing district schools.²⁴ Sixteen of the lowest-performing elementary schools in HISD were randomized between treatment (receiving the charter school practices) and control (maintaining traditional district school practices). Three other elementary schools and nine secondary schools also received the treatment, though they didn’t participate in randomization. Using both random assignment and comparative research designs, the researchers found that at the elementary and the secondary levels, students in schools that adopted the charter practices had positive math test-score gains of about 15 percent of a standard deviation per year of attendance. Impacts on reading were positive but not statistically significant. Though the impacts weren’t quite as large as some of the gains found from attending a no excuses charter school, this experiment offers direct evidence that traditional public schools can successfully implement charter school practices and have beneficial impacts on student test scores.

In the past 15 years, federal and state accountability policies have required local school districts to turn failing schools around. One option for doing this has

been reconstituting the school as a charter, typically under an existing CMO. This turnaround method instills charter school management techniques and curricula into traditional public schools. At least initially, the schools serve the same students. Using nonlottery methods, an evaluation of this takeover strategy in Boston and New Orleans found large positive impacts for attending such a turnaround, similar in magnitude to those at no excuses charter schools.²⁵

Intensive Tutoring

A recent review of charter school lottery studies aggregated school-level charter impacts from two broad studies (Massachusetts and the IES national charter school study) and correlated them with charter school practices.²⁶ The authors also accounted for the performance of fallback schools. One charter school practice stood out: high-quality tutoring. Many high-quality charter schools require intensive tutoring as a means of remediation and learning, often incorporating one-on-one or small group tutoring into the school day rather than as an add-on or optional activity.

However, this evidence on high-quality tutoring in charters is correlational. Looking beyond the charter sector, experimental evidence exists to show that intensive tutoring can have large impacts on student test scores. A random assignment experiment in Chicago provided high-quality tutoring to almost 3,000 minority low-income boys in the ninth and tenth grades. It found large, statistically significant impacts on math test scores, math grades, and math course completion; the gains were of similar magnitude to the test-score gains found in high-quality charters.²⁷ The population that this intervention served was similar to those who attend urban charter schools, and the tutoring program was provided by an educational organization (Match Education) whose original purpose was to open and run charter schools. The tutoring program itself was similar to those used in no excuses charter schools. Tutoring was incorporated in the school day and conducted with very small groups of students at the same achievement level, and the tutors were recent college graduates who had received intensive training. This random assignment study was one of the most recent and largest-scale tutoring experiments, and the only one so far that has used a charter school organization as a provider. But several other studies on intensive tutoring have produced similar findings.²⁸ As a strategy to

close achievement gaps, adopting intensive tutoring beyond the charter sector may be less controversial than focusing explicitly on charter schools.

Interactions with District Schools

Charter schools are part of the education system, and expansion of charters typically means a shift away from traditional public schools. Which students apply to charters and how enrollment shifts as a result may have implications not only for how to interpret charter effects, but also for the students who remain in traditional public schools.

Cream Skimming and Generalizability

As I mentioned briefly above, one concern with the lottery approach is that applicants to charter schools are different from those who don't apply. Thus, results from the lottery studies can't be generalized to the larger student population. If charter schools practice *cream skimming*—that is, if they select higher-achieving or better-behaved students—then the makeup of their student populations may account for any positive impacts and undermine generalizability. Charter schools could practice cream skimming in two ways. The first is by manipulating the lottery. No lottery studies show evidence of this, and all the studies included here checked to make sure the lottery was implemented fairly by comparing the characteristics of students who were offered or not offered a seat. If researchers found that students with charter school offers consistently had higher test scores, it would imply some form of lottery manipulation. But again, there is no evidence of such manipulation. Thus cream skimming in the form of lottery manipulation can't explain charter school effects.

Another form of manipulation is to *push out* lower-performing or poorly behaving students, thus generating positive charter effects by excluding those with lower test scores and creating classrooms with relatively higher-achieving peers. Pushing out consists of practices that induce students not to enroll or to leave a school once enrolled. For example, before enrollment, charter schools can require families to attend open houses, purchase uniforms, and sign behavior contracts, all steps that prevent some children from enrolling. After enrollment, charter schools may encourage some students to switch schools. One study that looks directly at pushing out in a large urban school district found no evidence that it was occurring.²⁹ Another way to examine push-out is to look only at comparisons between those

who receive a charter school offer and those who do not, without adjusting for attendance at the charter. In most cases, these comparisons between lottery winners and lottery losers tell the same story as the more complicated estimates that adjust for charter attendance, giving credence to the idea that pushing out isn't driving charter school effects.

But there's a second way that the population charters serve is important. If the students who apply to charters tend to have higher test scores or other characteristics that promote learning than students who don't apply, the students in lottery-based studies will be different from other students in the area. That makes it hard to generalize the findings of a lottery study to students beyond the charter school applicants. To some extent, almost all charter school lottery studies face this problem, since students and their families must choose to apply to a charter school. Families that take this additional step may be very different from families that do not. (Notable exceptions are cities like Denver, CO, and Newark, NJ, which have incorporated charter schools into a school choice system in which all families participate.)

Families' selection into application doesn't compromise a lottery study itself—we can still be confident that the charter school effects are true causal estimates of the impact of attending among this group of students. However, differences between applicants and nonapplicants make it difficult to know whether charter schools would be as effective if they expanded beyond their current applicant pool. Lottery-based studies can use observable student characteristics to compare charter school applicants and other students in the same district. If applicants and nonapplicants are similar on observable measures like test scores and poverty, then the lottery results are more likely to generalize to nonapplicants.

At the beginning of the study period in Boston, for example, charter school applicants tended to have higher test scores than other district students. But in more recent years, many more students have been applying to charters, and applicants and nonapplicants now have very similar characteristics. Despite the change in applicant profiles, charter schools' effects on test scores were similar across the study period, implying that applicant characteristics weren't driving the results.³⁰ In New York City, applicants and nonapplicants have similar test scores, but charter applicants are more likely to be racial minorities.³¹

Even in Denver, where families can apply to charter schools without taking any extra steps, there are still some differences between charter applicants and nonapplicants. Though test scores of the two groups are similar, applicants are more likely to be students of color or English-language learners and to receive subsidized lunch, and they are less likely to receive special education services.³² In a broad examination of charter schools in 27 states, charter students and students in feeder schools had similar poverty levels, but the charter cohort was more likely to be students of color and less likely to be English-language learners or to receive special education services.³³ Charter applicants may not always differ from their peers who don't apply, but in some places, clearly, there are important differences.

The question, then, is whether these differences in applicant populations account for the effects we see and thus make it impossible to generalize charter results to the nonapplicant population. The evidence from Boston shows that charter school effects are largest for disadvantaged students, who, at least in the initial period of the study, were less likely to apply. This suggests that charter expansion may be most effective for the students who are least likely to apply—just the opposite of the fear that results won't generalize beyond applicants.³⁴ Denver charter schools have some of the largest documented test-score impacts, yet Denver is the only site studied where applicants need make no effort to apply beyond filling out an already required school choice form.³⁵ And students who were in district schools taken over by charter—that is, students who never actually applied to a charter—also had very large test-score gains.³⁶ Ultimately, the charter applicant population in each study should be assessed for how representative it is and thus, how generalizable the findings may be. But the evidence so far indicates that when urban charters expand to groups beyond the initial applicants, charter school effects remain similar.

Spillover Effects on Traditional Public Schools

Student achievement. The studies I've discussed in this review consider the effects and characteristics of charter schools on students without regard to potential effects on the traditional public schools nearby. If competition effects are present, charter schools might increase achievement at traditional public schools. On the other hand, charter schools

may have detrimental effects on nearby district schools via drops in funding and enrollment. With no lotteries to exploit, it's harder to assess how charters affect their district counterparts than it is to measure how charters affect students. But the evidence so far on the spillover effects of charters on student achievement in district schools generally points to either small benefits from competition or no differences.

Charter school competition studies generally use geographic proximity as a stand-in for competition and find some evidence that test scores rise among the district schools that are closest to charter schools.³⁷ A recent example from New York City examined what happens when charter schools open in new neighborhoods.³⁸ Student achievement increased at traditional public schools near charters, and the closer the charter school, the larger the effects. The impacts on district schools were largest when a new charter school was in the same building as the traditional school. That situation, which may be unique to New York City, offers a strong basis for comparing charter and district schools.

Though not as robust as lottery-based methods for estimating charter impacts directly, the methods used for competition studies are likely the best available to researchers for that purpose. As a whole, they suggest that charters have no negative achievement effects on district schools, and may even have some benefits for student achievement.

School finance. Even if competition from charters doesn't have large effects on student achievement, it may still exert a large influence on district schools through their finances (which, over time may, in turn, influence student achievement). In most states, funding formulas have dollars follow students to their schools, with some states allowing for transition payments to help districts adjust. Thus, if charter enrollment rises, funding for traditional public schools falls. With fewer students, districts can reduce some of their costs on a per-student basis, typically by hiring fewer teachers (though there is some time lag for this strategy). But districts have many fixed costs—such as building maintenance and pensions—that can't be reduced on a per-student basis. Few researchers have examined the financial effects of charter schools on district schools. But the research so far shows that financial stress increases at traditional public

schools. For example, a broad study of Michigan schools found that school districts with the largest charter enrollment expansions experienced the most financial difficulties.³⁹ Case studies of Albany and Buffalo, NY, show that although districts can reduce their expenditures after students enroll in charters, they face an overall net loss because they can't reduce their fixed costs and because they miss out on federal and state aid that's calculated by the number of students.⁴⁰ An examination of several school districts in North Carolina after an increase in charter schools shows similar financial strain in an urban school district, with smaller, but still meaningful, financial stress for suburban and rural schools.⁴¹

Eventually, the financial consequences of charter enrollment may mean that some traditional public schools have to close. Many cities, including New York, Chicago, and Washington, DC, have seen schools close recently, though not solely because of charter expansion but also because of population shifts. School closures are very disruptive to communities and have mixed effects on student test scores—students' achievement improves only if they are moved to schools that show a record of test-score gains.⁴²

Next Steps for Charter School Research

With strong interest in charter schools among policymakers and with school lotteries available to form the basis of high-quality research, charter schools are a relatively well-studied educational reform. Nonetheless, as the charter sector grows, some areas would benefit from additional or new research. For example, we could learn more by following lottery cohorts through college graduation and beyond, and where possible, by conducting more lottery analyses. In particular, we know little about how suburban and rural schools perform on longer-term outcomes. These schools appear to have no or even negative effects on students' test scores, but they may still have beneficial effects on college and employment. And because researchers haven't studied many urban schools that don't subscribe to the no excuses philosophy, it would be useful to gather school practice information on more schools, as in Massachusetts and New York City, to help disentangle the relationship between student population, fallback school options, and school practices.

Little research has been conducted on rural charter schools, which are often the only choice for rural

students other than traditional public schools. For some such students, the only option is an online or *virtual* charter school; these are also understudied.⁴³ In general, we need more research on the competition effects and financial consequences of charter schools, which may be particularly relevant in sparsely populated areas where losing just a few students can be a large hit to a small budget. And though it's hard to conduct research as rigorous as lottery studies on whether charter schools improve systemwide performance, as charters expand their market share it will be important to understand how they influence the education system generally.

Since charter school lotteries are already in place across the nation, it's not hard to generate basic, lottery-based estimates of charter school effects. State education agencies could collect lottery and wait-list records from schools each year and systematically generate estimates of effects from oversubscribed charters. Beyond studying effects, that would also help us understand the extent of charter school demand, and it would serve as a check to make sure lottery rules are implemented as required by state law. These estimates could then help state agencies and other authorizers make decisions about charter school reauthorization and inform the public about charter schools' effectiveness.

Charter Schools as a Strategy to Reduce Achievement Gaps

Given that the overall distribution of charter school effects is very similar to that of traditional public schools, expanding charter schools without regard to their effectiveness at increasing test scores would do little to narrow achievement gaps in the United States. But expanding successful, urban, high-quality charter schools—or using some of their practices in traditional schools—may be a way to do so. Research findings that show successful charter school expansion, as well as benefits from adopting charter school practices in district schools, lend support to the idea that expanding highly effective charter schools and getting low-performing public schools to adopt their practices may be a way to ameliorate achievement gaps.

The charter sector is growing by 300 to 400 schools a year. Let's consider a thought experiment in which further expansion focuses on high-quality charters. What would happen to the achievement gap in the United States if all of those new charter schools were

opened in urban areas serving low-income children, had no excuses policies, and had large impacts on test scores like Boston, New York, Denver, and KIPP charters? Expanding charters in this way certainly could transform the educational trajectories of the students who attend. But if we consider the US achievement gap as a whole, it would have a negligible effect. Charter schools represent too small a proportion of overall enrollment for such an expansion to reduce nationwide achievement gaps.

What if charter school practices were expanded in the traditional public school sector? We've seen successful attempts to inject no excuses charter school strategies into traditional public schools and to take over failing schools. Given the relative size of the charter and traditional public school sectors, a policy intervention focused on charter school practices would need to encompass traditional public schools if it were to reach enough students to have a meaningful impact on the achievement gap. A policy tool that's already in place could make just such an intervention possible. The Every Student Succeeds Act, the current iteration of the Elementary and Secondary Education Act, requires states to identify the lowest-performing 5 percent of schools and other underperforming schools every three years for "comprehensive support and improvement." Districts determine their own support and improvement methods, and they must submit their plans to the state for approval. These schools could provide a starting point for adopting charter school practices in traditional public schools. If all these low-performing schools successfully injected the practices of highly effective charter schools, charter-based interventions would reach a much wider population and thus could drive a meaningful reduction in achievement gaps in the United States.

Conclusions

We have little evidence that charter schools nationwide offer substantial academic benefits compared to their

traditional public school counterparts. However, most broad studies of charter schools also suggest that charters serving urban and low-income student populations can boost test scores. Lottery-based studies across a number of sites confirm that urban charter schools have positive and sometimes quite large impacts on student outcomes. Those with the largest benefits tend to follow a no excuses philosophy. The evidence on test score outcomes is extensive, and evidence of effects on college and other longer-term outcomes is beginning to emerge.

Attending an urban, high-quality charter school can have transformative effects on individual students' lives. Three years attending one of these high-performing charter schools produces test-score gains about the size of the black-white test-score gap. The best evidence we have so far suggests that these test-score gains will translate into beneficial effects on outcomes like college-going, teen pregnancy, and incarceration.

Given the large and potentially longer-term effects, the most effective charter schools appear to hold promise as a way to reduce achievement gaps. Research shows that we can expand highly effective charters or instill their practices in traditional public schools while maintaining similar test score benefits, creating two potential paths for intervention. Given the current growth rate of charter schools, even if all new charters were established as highly effective urban charter schools, the charter sector isn't large enough to reduce nationwide achievement gaps in a meaningful way. That's why adopting the practices of successful charter schools in traditional public schools, or turning around struggling traditional public schools with charter organizations, may be a farther-reaching way to improve student achievement in poorly performing traditional public schools and narrow the achievement gap.

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