# Rising Tide:

## Charter School Market Share and Student Achievement

By David Griffith


THOMAS B. FORDHAM INSTITUTE
ADVANCING EDUCATIONAL EXCELLENCE

**September 2019**

Foreword and Executive Summary by
Michael J. Petrilli and Amber M. Northern

## ABOUT THE FORDHAM INSTITUTE

The Thomas B. Fordham Institute promotes educational excellence for every child in America via quality research, analysis, and commentary, as well as advocacy and exemplary charter school authorizing in Ohio. It is affiliated with the Thomas B. Fordham Foundation, and this publication is a joint project of the Foundation and the Institute. For further information, please visit our website at www.fordhaminstitute.org. The Institute is neither connected with nor sponsored by Fordham University.

## SUGGESTED CITATION FOR THIS REPORT

Griffith, David. *Rising Tide: Charter School Market Share and Student Achievement*. Washington, DC: Thomas B. Fordham Institute (September 26, 2019). https://fordhaminstitute.org/national/research/rising-tide-charter-market-share.

## ACKNOWLEDGMENTS

This report was made possible through the generous support of the Walton Family Foundation, the William E. Simon Foundation, and our sister organization, the Thomas B. Fordham Foundation. A hearty thank you to Martin West, professor of education at the Harvard Graduate School of Education, who responded to multiple drafts and provided sage advice on the methodology. Likewise, Matthew Larsen, of Lafayette College, provided feedback on early drafts of the report.

At Fordham, we extend our gratitude to author David Griffith, who approached this research with the commitment and seriousness that it merited. We also thank Adam Tyner for his astute feedback throughout the project; Chester E. Finn, Jr. for reviewing drafts; Olivia Piontek for handling funder communications; Brandon Wright for copyediting; and Jonathan Lutton for developing the report's layout and design. Fordham research interns Pedro Enamorado and Tran Le provided assistance at various stages in the process. And communications expert Lisa Cohen lent a hand with media dissemination.

# Contents

# FOREWORD

**By Michael J. Petrilli and Amber M. Northern**

Those of us at Fordham have strived over the course of our organization's two-decade existence to stay open to new evidence and to be willing to change our minds. For example, we shifted from the "let a thousand flowers bloom" camp within the charter movement to the "some weeding is necessary" team after multiple studies showed just how poor the achievement of some charters was turning out to be, and just how hard it was to actually shut such failing charter schools down. And there have been other smaller shifts over the years too, on funding, teacher diversity, and more.

Of course, we are fortunate to be an independent think tank, with our own endowment and a mission to follow the evidence wherever it leads. It's not so easy to keep an open mind when you're an interest group, like a teachers union, which is charged with protecting its members' concerns. The unions are never going to say, "You know, we've changed our minds based on the evidence, and we've decided we *really* like these non-unionized charter schools." So for them the game is about finding evidence that supports their position and ignoring, if not discrediting, the rest.

We see that on our side of the reform fence too, as when some of our friends decided that test scores weren't valid measures of student success after multiple rigorous studies showed negative test score impacts of private school choice programs. Thus the energetic effort to discredit test scores as predictors of long term outcomes.

But back to reform opponents. There used to be a fierce debate about whether kids in charter schools were learning more than kids in traditional public schools. The American Federation of Teachers, for example, famously leaked a study to the *New York Times* that relied on NAEP scores to make this tendentious point. But now that dozens of studies have found that kids of color in urban charter schools learn significantly more on average than their district peers, the unions and other opponents have had to find other arguments to make their case, while working to discredit the impact evaluations.

So they now have a two-part argument.

First, they argue that the charter school advantage is due entirely to "creaming." For example, in a recent *Wall Street Journal article*, the co-chairman of United Teachers Los Angeles attributed the success of charter schools to "having classes filled with motivated, high-performing students." It's apparently not enough to claim that *some* of the advantage comes from selection—the likelihood that families who choose charters are different in important ways from those who don't. But all of it?

Second, they argue that, regardless of how good or bad charters might be for the kids they serve, their growth is hurting traditional public schools and the kids who are left behind there. This argument has the benefit of polling extremely well, and has been used to great—or terrible—effect in the current California charter school wars.

With that long context in mind, we are pleased to present the following *highly significant* analysis by Fordham's senior research and policy associate, David Griffith, which examines the relationship between charter school market share and student achievement—not just for the kids in charters or the kids in district schools but for everybody.

It sounds straightforward, but to our knowledge this is the first time anyone has conducted such a study.

We have the CREDO evaluations and other studies looking at the performance of students in charter versus district schools. And there have been many studies of "competitive" or "spillover" effects of charter schools on district schools, most of which find that competition from charter schools does not harm achievement in nearby district schools, and sometimes boosts it.

This study doesn't look at the differences between charter and district kids. In fact, we can't distinguish between them because our data source, the Stanford Education Data Archive (SEDA), includes the academic progress that *all* students in a given geographic community made compared to students in other geographic communities nationwide. In other words, the academic performance of charter schools is included in what SEDA refers to as the "geographic school district," regardless of whether the charter schools operate independently of the district in which they are located (although we do know what percentage of students attended charters).

Griffith spent an entire year getting acquainted with the dataset and searching for the best way to model "charter market share." For example, because we're really interested in the achievement of specific racial subgroups, it makes more sense to consider the effects of "charter market share" within those subgroups than across them. So his findings focus on the relationship between the percentage of black, white, or Hispanic students who enrolled in charters and the average achievement of all black, white, or Hispanic students in a geographic school district, including those in traditional public schools.

In the end, what we learned was quite simple: For large urban districts, the more black and Hispanic students are enrolled in charter schools, the greater achievement is for black and Hispanic students.

This has huge implications for the two arguments that charter opponents are making.

First, it provides new evidence that creaming can't explain the entirety of the charter school advantage in urban districts. Because if charter schools' success was truly an "illusion," as the *Wall Street Journal* author charges, we'd see no gains for communities with greater charter market share. Higher test scores in charters would be canceled out by lower test scores in district schools, driven by the transfer of higher-achieving students from district to charter schools. It would be a zero-sum game.

Instead, we find achievement gains in districts with more charters. What that implies is that the additional learning that's happening in charter schools is not coming at the expense of less learning in district schools. It's additive. And that implies that kids in charters really are learning more—not because of who the kids are, but because of what the schools are doing.

The findings also have implications for opponents' argument that charter schools are hurting traditional public schools. We suspected that wasn't the case, based on existing evidence, at least for the district schools located closest to new charter schools, at least when it comes to test scores. But maybe the performance of other students in the district was being harmed in some way. We don't see any evidence of that in this study.

Of course, this one analysis won't end the charter school wars, or even change them in a significant way. Perhaps some scholars or bystanders who mildly opposed charter schools will change their minds, now that there's even more evidence that they really are doing something to help black and Hispanic kids learn more, and that they aren't hurting the outcomes of students in district schools. Yet we suspect that most critics will continue to oppose charter schools because their opposition has always been based on bread and butter interests, like the bargaining power of teachers unions, rather than evidence or reason.

But, charter supporters, stand proud. These schools really are getting better results for children of color, and not just because they are attracting the most motivated families.

That's good news with which to kick off the new school year.

# EXECUTIVE SUMMARY

Although numerous studies have examined the relative performance of charter and traditional public schools, as well as the competitive effects that charters may have on their district neighbors, to our knowledge, no prior study has addressed whether overall achievement increases as the "market share" of charter schools rises.

Accordingly, this report uses data from a new source, which allows researchers to compare English language arts (ELA) and math scores from thousands of school districts and dozens of different tests, to address two questions:

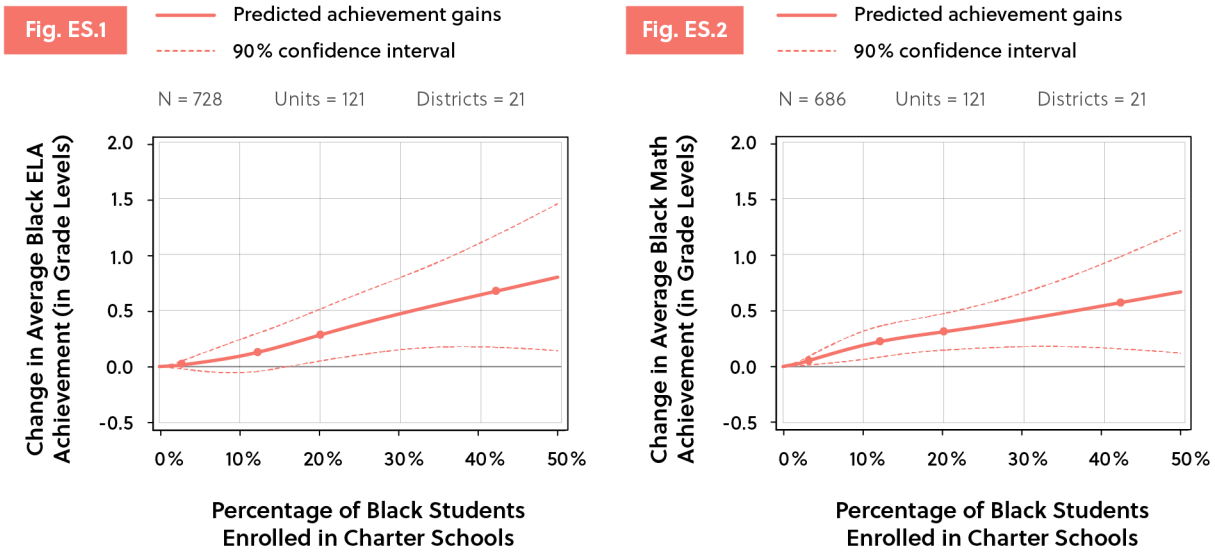
1. *Is higher charter market share associated with achievement gains for all students—including those enrolled in traditional (i.e., district-operated) public schools?*
2. *How does the relationship between charter market share and achievement differ by district and student characteristics?*

Unlike previous studies, this one neither compares nor distinguishes between the achievement of students in charter and traditional public schools. Rather, it focuses on the overall performance of "geographic school districts," which include both traditional public schools and local charters (even if they are legally and functionally independent). Furthermore, the effects of higher "charter market share" are examined *within* racial subgroups rather than *across* them. In other words, the findings focus on the relationship between the percentage of black, white, or Hispanic students who enrolled in charters and the average achievement of *all* black, white, or Hispanic students in a geographic school district, including those in traditional public schools.

## FINDING 1: In urban areas, higher charter market share is associated with significant achievement gains for black and Hispanic students.

In major urban areas, higher charter market share among black and Hispanic students is associated with significant achievement gains in both ELA and math. For example, in the twenty-one urban districts with the most black students, moving from 0 to 50 percent "black charter market share" is associated with a 0.8 grade level increase in average ELA achievement and a 0.7 grade level increase in average math achievement for all black students—including those in traditional public schools (Figures ES.1–ES.2).

### Figures ES.1–ES.2. In the largest urban districts, higher "black charter market share" is associated with significant achievement gains for black students.




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >2500 between 2009 and 2015.

Similarly, in the twenty-seven urban districts that enroll the most Hispanic students, moving from 0 to 35 percent "Hispanic charter market share" is associated with a 0.7 grade level increase in average ELA and math achievement among Hispanic students—though because Hispanic charter market share didn't exceed 35 percent in any of these districts, we can't estimate the achievement gains beyond this point (Figures ES.3–ES.4).

**Figures ES.3–ES.4. In the largest urban districts, higher "Hispanic charter market share" is associated with significant achievement gains for Hispanic students.**

Fig. ES.3

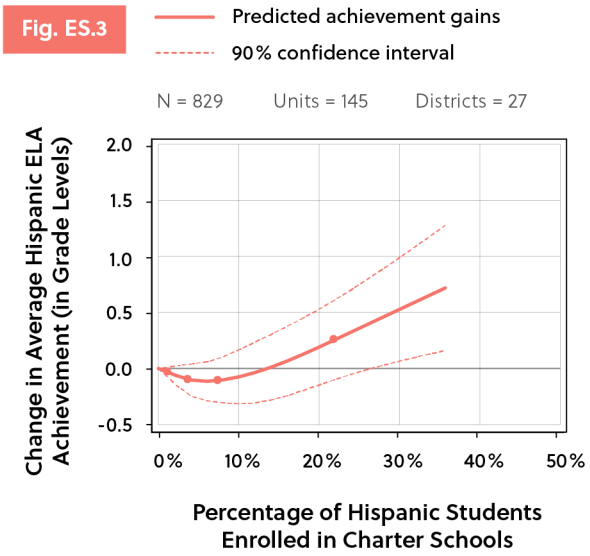
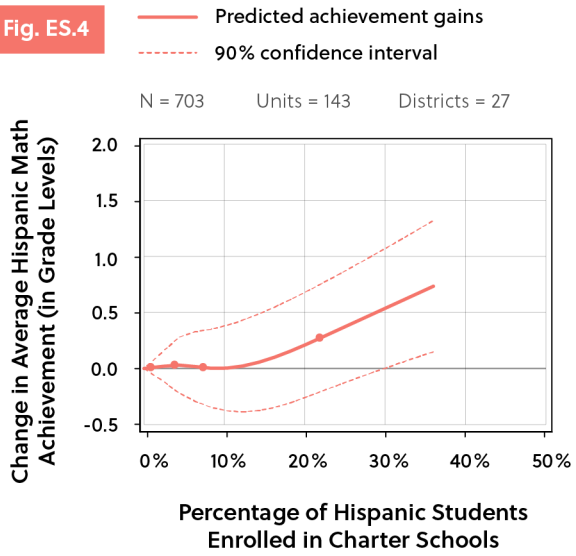



Fig. ES.4




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 35 percent Hispanic charter market share and average Hispanic enrollment >2500 between 2009 and 2015.

## **FINDING 2:** In suburban and rural areas, higher charter market share is associated with significant achievement gains for Hispanic students, and black students in rural districts also see gains.

For example, in suburban districts with at least 500 Hispanic students per grade level, moving from 0 to 50 percent Hispanic charter market share is associated with a gain of 0.5 grade levels in ELA for Hispanic students—although there is no evidence that Hispanic students in suburban areas see gains in math (Figures ES.5–ES.6).

### Figures ES.5–ES.6. In large suburban districts, higher "Hispanic charter market share" is associated with significant ELA gains for Hispanic students.

Fig. ES.5

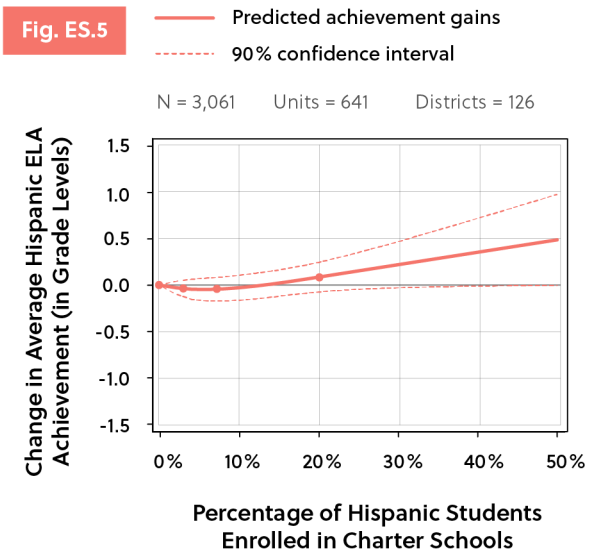
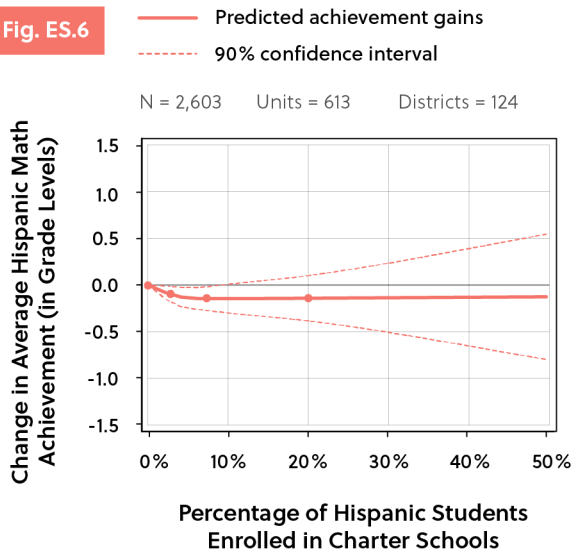



Fig. ES.6




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all suburban units with 0 to 50 percent Hispanic charter market share and average Hispanic enrollment >500 between 2009 and 2015.

Similarly, higher black charter market share in rural districts is associated with significant ELA gains for black students in these communities (Figures ES.7–ES.8). However, there is no evidence that higher black charter market share in suburban districts benefits black students (not shown).

## Figures ES.7–ES.8. In rural districts, higher "black charter market share" is associated with significant gains in ELA achievement for black students.

Fig. ES.7

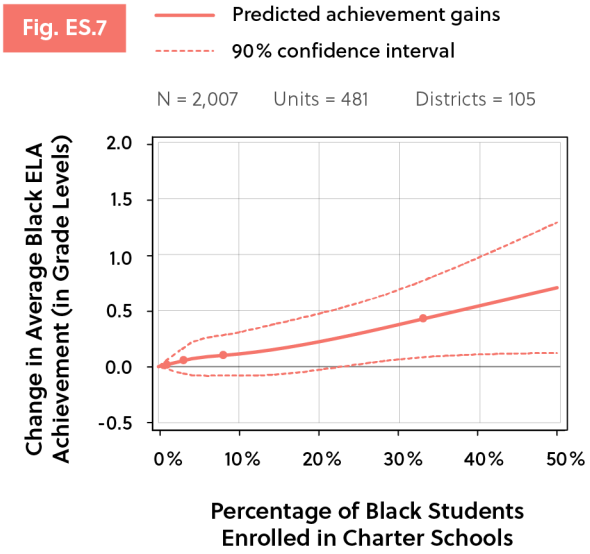
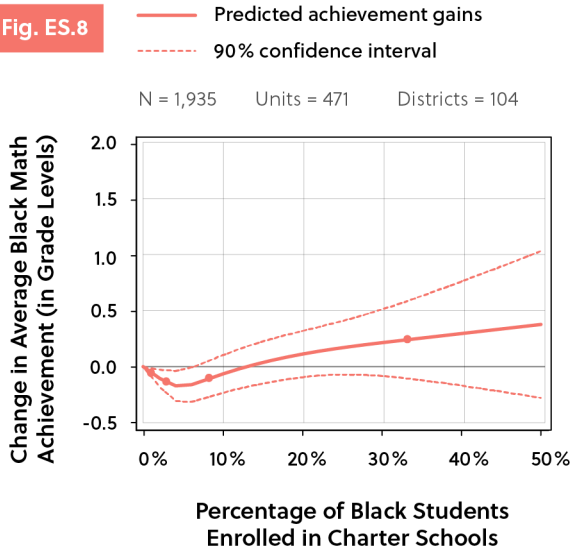



Fig. ES.8




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all rural units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

## FINDING 3: There is no evidence that higher charter market share is associated with achievement gains for white students.

For example, there is no evidence that higher "white charter market share" boosts the ELA or math achievement of white students in larger urban districts (Figures ES.9–ES.10).

### Figures ES.9–ES.10. In large urban districts, there is no significant relationship between "white charter market share" and white students' ELA and math achievement.

Fig. ES.9

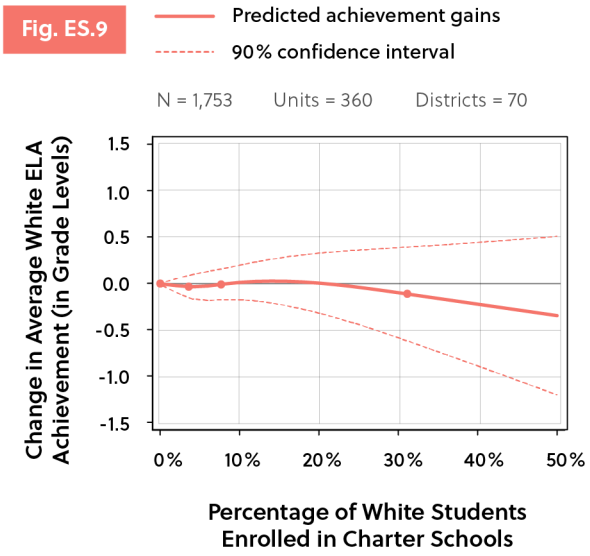
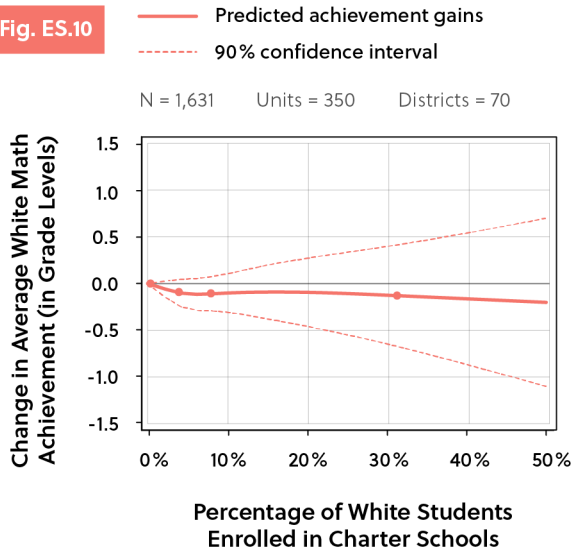


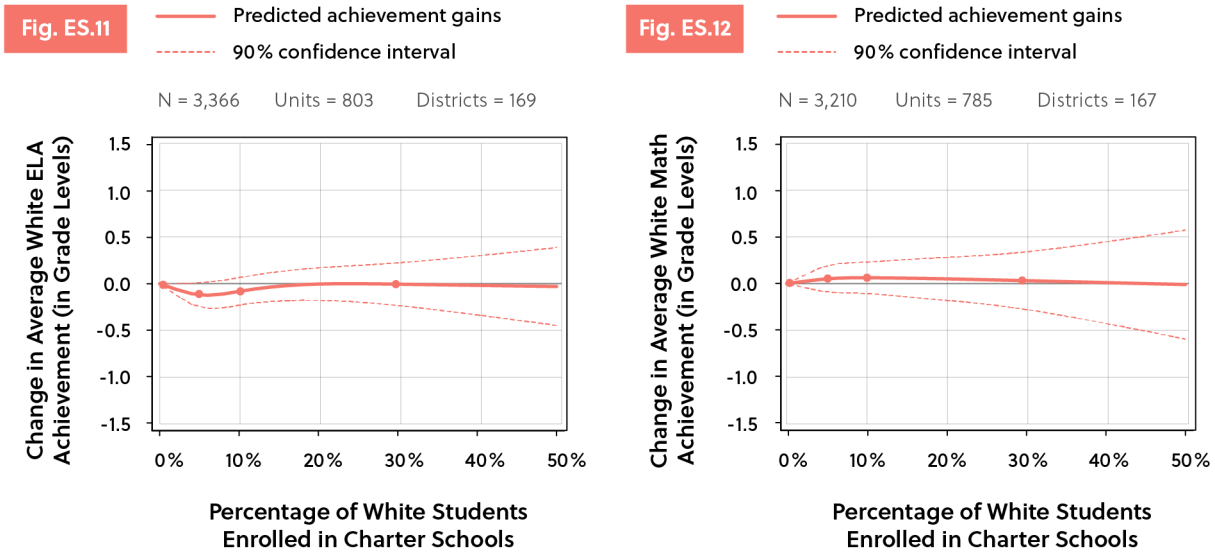

Fig. ES.10




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 white students in charter and traditional public schools as district-by-grade-level charter market share increases among white students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent white charter market share and average white enrollment >1000 between 2009 and 2015.

Similarly, there is no evidence that white higher charter market share boosts the academic achievement of white students in suburban districts (not shown) or in rural areas—although it doesn't seem to do much harm in these places either (Figures ES.11–ES.12).

**Figures ES.11–ES.12. In rural districts, there is no significant relationship between "white charter market share" and white students' ELA and math achievement.**




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 white students in charter and traditional public schools as district-by-grade-level charter market share increases among white students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all rural units with 0 to 50 percent white charter market share and average white enrollment >250 between 2009 and 2015.

In short, when it comes to white charter market share, there simply isn't much to talk about.

In contrast, the academic gains associated with higher black and Hispanic charter market share are substantial and highly consistent with the large, overwhelmingly positive literature on the performance of charters that serve these groups, as well as the smaller, but still positive, literature on charters' competitive effects.

Obviously, the logical implication of these results is that increasing the percentage of black and Hispanic students who enroll in charters—especially in the largest urban districts, which educate millions of minority students per year—would significantly reduce the longstanding racial achievement gaps that are ostensibly of concern to policymakers.

# I. INTRODUCTION

For education reformers, it's a trillion-dollar question: *Does a rising tide of charter schools lift all education boats?*

In other words, are charters really boosting the overall performance of our K–12 education system—at least in most places, and especially for low-income students and students of color—as research suggests? Or are the mischievous education seas once again playing tricks on unsuspecting reformers? For example, might charters' apparent success actually be coming at the expense of traditional public schools—perhaps via the "creaming" of their best students or perhaps through some other mechanism—leading to the illusion of overall progress where in fact none has occurred?

From the helm of a sinking vessel, even a trough can look like a swell. But that doesn't mean the ocean is rising. Similarly, no matter what statistical wizardry researchers employ, comparisons *between* charter and traditional public schools *within* education markets can never fully capture the former's *overall* effect on academic achievement—as sophisticated critics of the charter movement are quick to note.

Making any headway on that analytic front requires comparisons between and across education markets—or at least between and across reasonably large school districts—with varying levels of charter penetration. Yet, even in larger states, there aren't that many big school districts with consequential numbers of charters in their midst. And a federal system that allows states to design their own English language arts (ELA) and math assessments makes it tough to compare the performance of districts across state lines.

Tough, but not impossible—thanks to the Stanford Education Data Archive (SEDA), a new data source that uses states' performance on the National Assessment of Education Progress (NAEP) to make comparable ELA and math scores from dozens of different state tests and thousands of school districts.

Accordingly, this report seeks answers to two fundamental but inherently difficult questions:

1. *Is higher charter market share associated with achievement gains for all students—including those enrolled in traditional (i.e., district-operated) public schools?*
2. *How does the relationship between charter market share and achievement differ by district and student characteristics?*

Although there are no randomized controlled trials when it comes to higher "charter market share," the answers to these questions are vitally important—and, as demonstrated by the findings, definitive enough to point state and local policymakers in the right direction.

Obviously, there would be cause for concern if communities with a growing charter presence were experiencing declining performance—even if the reasons for such decline weren't clear. So what is the appropriate reaction or course of action if the opposite is true—that is, if all seaworthy vessels, regardless of their flag, seem to be rising along with the charter tide?

# II. BACKGROUND

Although the subject of "charter market share" intersects with many lines of research, two literatures are particularly relevant to the present study.

First, there have been numerous attempts to gauge the *relative* performance of charter and traditional public schools in ELA and math. For example, many early studies used the admissions lotteries conducted by oversubscribed charters to compare the performance of students who were and were not admitted to these schools, with many (though by no means all)[1] finding positive effects,[2] especially for students of color.[3] However, since such lotteries are only held by relatively popular (and presumptively higher-performing) charters, concerns were raised about the generalizability of these studies.

Accordingly, for the past decade, Stanford's Center for Research on Education Outcomes (CREDO) has collected student-level data from dozens of states in an effort to summarize the relative performance of the charter sector. For example, a 2009 study found that students in charter schools made less progress in ELA and math, on average, than otherwise similar students in traditional public schools.[4] However, by 2013, CREDO's estimates suggested that charters had edged past their district counterparts in ELA, while essentially pulling even in math.[5] And a subsequent analysis of charter performance in major urban areas found large positive effects in both subjects—especially for low-income students and (once again) for students of color.[6]

Less numerous (but no less important) than the studies of charters' relative performance are the dozen or so empirically rigorous studies that have examined their impact on traditional public schools, most of which have found neutral or slightly positive effects.[7] For example, a 2013 study of charter competition in North Carolina found positive effects on ELA and math achievement in traditional public schools, which were concentrated in "overlapping" grade levels.[8] Similarly, a 2014 study found that traditional public schools in the District of Columbia improved in response to competition from higher-quality charters—but not in response to higher market share (defined as the percentage of students who transferred to neighboring charters).[9] Finally, a 2016 study found that charters in New York City had positive "spillover effects" on district schools, which increased with their physical proximity.[10]

In combination, the literature on charters' performance *relative* to traditional public schools and the literature on charters' competitive effects suggest that the "equilibrium effects" of higher charter market share (that is, its *overall* effects on the academic achievement of *all* students in community) are positive—at least in most locations (and for most students). However, to our knowledge, no prior study has directly addressed this trillion-dollar question.

# III. DATA

Our primary data source for this project is the Stanford Education Data Archive (SEDA), which includes estimates of average ELA and math achievement for more than 13,000 geographic school districts and more than 80,000 district-by-grade-level units (e.g., fourth graders in the Los Angeles Unified School District). Collectively, these data span six grade levels (grades 3–8) and seven years (2009 through 2015). However, because many states changed tests at some point during the study period, many districts and district-by-grade-level units are missing data for at least one year (resulting in an unbalanced panel).[11]

In addition to estimates of average district-by-grade-level achievement, SEDA also includes data on a host of district and/or district-by-grade-level covariates (e.g., the percentage of students who are English language learners). Although most of these data were originally assembled from other sources, because some smaller school districts didn't always report their enrollment data to the National Center for Education Statistics (NCES), some of the covariate data in SEDA have been imputed.

Importantly, because SEDA assigns individual charter campuses to "geographic school districts" based on their physical addresses, the academic performance of local charters is *included* in SEDA's estimates of average district-by-grade-level achievement, *even when the charters in question are legally and functionally independent from the surrounding district*. In other words, the dependent variable—average district-by-grade-level achievement—reflects the performance of both students in traditional public schools and students in charter schools.

Similarly, the variable of interest—district-by-grade-level "charter market share"—includes both students who attended district-authorized charters (where such exist) and students who attended other local charters within the boundaries of the relevant district. However, although we relied on SEDA for data on achievement and covariates, because the current version of SEDA doesn't include district-by-grade-level data on charter enrollment, our "charter market share" variables were constructed by downloading the relevant school-by-grade-level enrollment data from the National Center for Education Statistics (NCES) and merging them with the SEDA data.[12]

Although the ultimate goal is to characterize the effects of higher charter market share at the district level, for several reasons, it makes more sense to analyze these effects at the "district-by-grade" level: First, insofar as the effects of higher charter market share are attributable to charters themselves, it makes no sense to estimate the effect of higher market share in grades 6–8 on the ELA and math achievement of students in grades 3–5. Second, prior research suggests that any competitive effects that charters have on traditional public schools are strongest in "overlapping" grade levels (i.e., within district-by-grade-level units). Finally, looking at each district-by-grade-level unit separately gives us a useful source of variation that is plausibly independent of district-level trends (see *Appendix A*).

# IV. SAMPLE

Because our analysis focuses on the changes in charter market share that district-by-grade-level units experienced over time, we restricted the sample to those units with at least some charter market share during the study period—and in the case of our subgroup estimates (which are the basis for our findings), at least some black, white, or Hispanic charter market share. Similarly, because very few large districts had charter market share that exceeded 50 percent—either overall or for the three biggest racial subgroups—we decided to exclude districts that exceeded this threshold, rather than present estimates for the 50 to 100 percent range that would necessarily depend on an inappropriate level of extrapolation.[13]

In addition to these cuts, we also excluded any district-by-grade-level units with fewer than 100 students in the relevant subgroup—that is, with fewer than 100 black, white, or Hispanic students.[14] Although these thresholds are arbitrary, limiting the sample in this manner is helpful insofar as it reduces the influence of *very* small districts and districts with *very* few students in the subgroup of interest, as well as the potentially confounding effect of unobserved interdistrict choice (see *Limitations*).

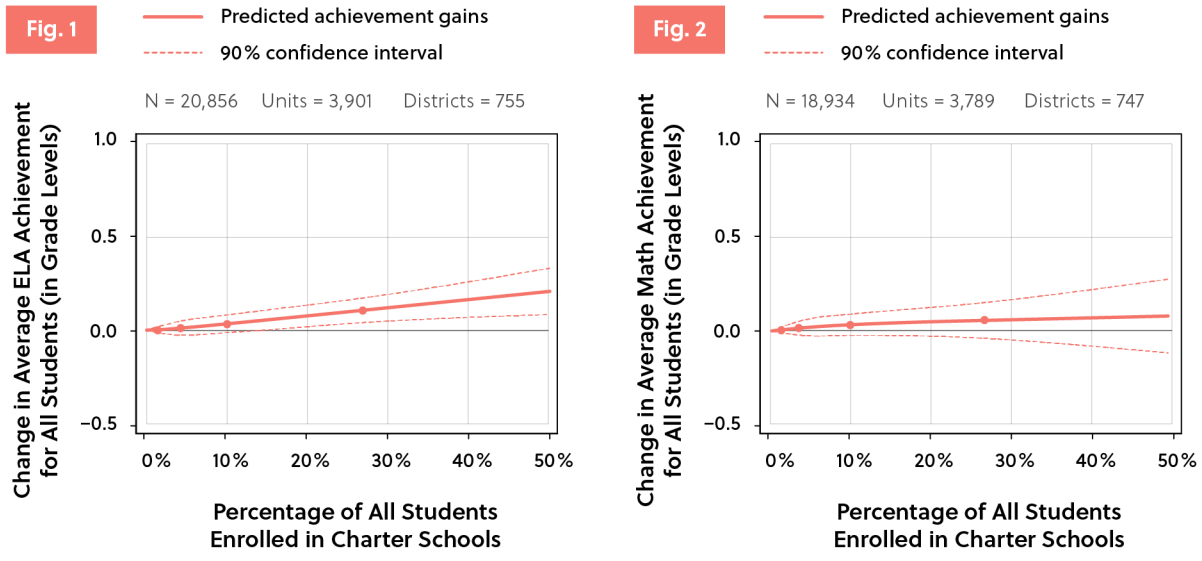
In practice, district-by-grade units with at least 100 students in the relevant subgroup—essentially districts with at least 100 students in these groups per grade level—enrolled more than 95 percent of students in units with non-zero charter market share. In other words, if our ultimate goal is to characterize the overall effects of higher charter market share for the average *student*, as opposed to the average district, we lose very little by restricting the sample in the manner described—especially in urban districts (which are larger on average) and for black and Hispanic students (for whom charter attendance is particularly concentrated in urban areas).

# V. METHODS

To isolate the relationship between district-by-grade-level charter market share and average district-by-grade-level achievement in ELA and math, we rely on a combination of demographic controls, district-by-grade-level and year fixed-effects, and district-specific time-trends (see *Appendix A* for more). In a nutshell, our model asks whether students in grade levels where charter market share increased during the study period saw a larger or smaller increase in average ELA and math achievement than one would expect given the broader (i.e., district-level) achievement trends in those subjects and the observable changes in student demographics. However, because the effect of "higher charter market share" is actually the product of many different effects—from the transition costs associated with changing schools, to the short-term costs of closing a low-performing school—we can't assume that its relationship to academic achievement is strictly linear, or that the returns to higher market share increase or decrease consistently. Accordingly, rather than assuming linearity, we decided to "let the data speak" via a series of cubic "splines" that allow the slope and curve of the function to change at the 5th, 35th, 65th, and 95th percentiles of charter market share.[15]

For example, Figures 1–2 show the relationship between *total* charter market share in district-by-grade-level units with at least 500 students and the average achievement of *all* students—including those in traditional public schools.

**Figures 1–2. Higher charter market share among "all students" is associated with a significant increase in ELA achievement.**




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 students in charter and traditional public schools as district-by-grade-level charter market share increases among all students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all units with 0 to 50 percent charter market share and average enrollment >500 between 2009 and 2015.

Per the figures, each spline is accompanied by a 90 percent confidence interval, allowing the reader to gauge statistical significance. For example, Figure 1 implies that moving from 0 to 50 percent charter market share is associated with a statistically significant increase in overall ELA achievement, which is roughly equivalent to 0.2 grade levels.[16] However, per Figure 2, there is no statistically significant relationship between total charter market share and average math achievement—consistent with contemporary estimates of charters' relative performance.[17]

Similarly, there is evidence of a positive relationship between *total* charter market share and the average ELA achievement of black, white, and Hispanic students, including those in traditional public schools. For example, in districts with at least 500 students and at least 100 black, white, or Hispanic students, moving from 0 to 50 percent charter market share (among *all* students) is associated with a gain of 0.3 grade levels for black students, as well as (suggestive) gains of 0.2 grade levels for Hispanic students and 0.1 grade levels for white students (Figures 3–5). However, although it may seem intuitive, this is probably *not* the best way to think about charter market share. For example, total charter market share and average white achievement are positively correlated in the District of Columbia (where charters' growth has coincided with rapid gentrification). Yet it seems unlikely that charters in D.C. have had a significant impact on white students given how few of them enroll. (And for similar reasons, the fact that higher *overall* charter market share was associated with achievement gains for *all* District of Columbia students isn't as illuminating as it might be.)

As that example suggests, if we're really interested in the impact of "charter market share" on the achievement of specific racial subgroups, it makes more sense to consider the effects of "charter market share" *within* those subgroups than *across* them. Accordingly, the findings that follow focus on the relationships between higher charter market share *within* black, white, and Hispanic communities—that is, the percentage of black, or white, or Hispanic students that enrolled in charters—and the overall achievement of students in those groups—that is, the average achievement of *all* black, white, or Hispanic students in a geographic school district, including those in traditional public schools.

## Figures 3–5. Higher charter market share among "all students" is associated with a significant increase in black students' ELA achievement (and there is suggestive evidence of ELA gains for Hispanic students).

Fig. 3

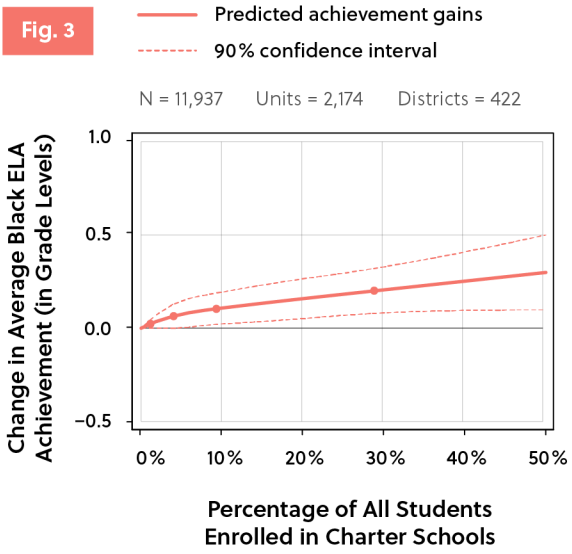



Fig. 4

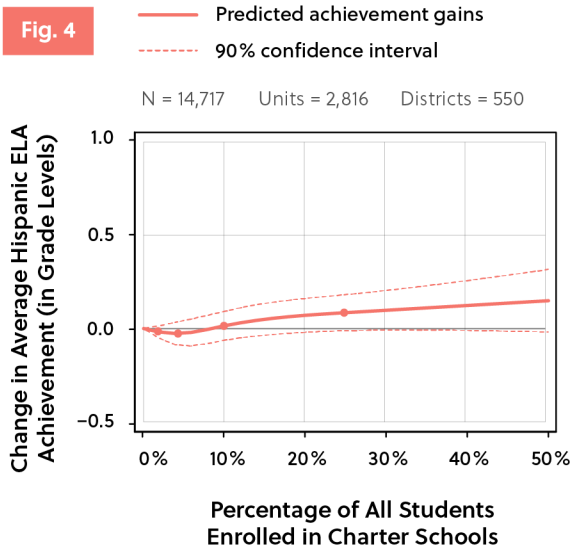
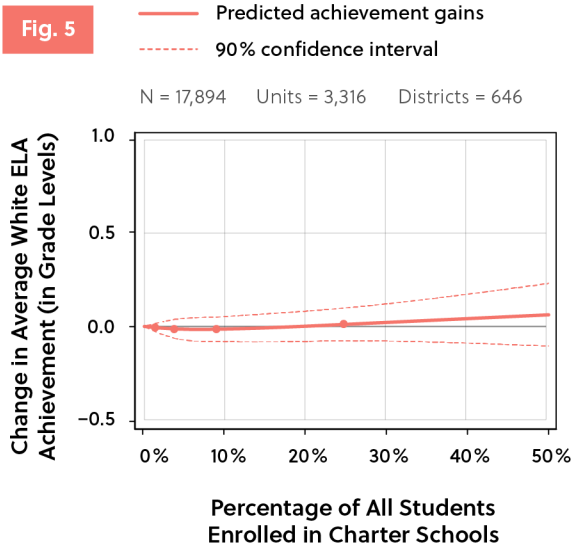



Fig. 5




Note: Figures show the predicted changes in the average ELA achievement of black, Hispanic, and white 3–8 students in charter and traditional public schools as district-by-grade-level charter market share increases among all students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all units with 0 to 50 percent total charter market share, average enrollment >500, and average black, white, or Hispanic enrollment >100 between 2009 and 2015.

Per Table 1, roughly three-quarters of black students and three-fifths of Hispanic students who enrolled in a charter school between 2009 and 2015 were in districts that NCES classifies as "urban," as were at least three-fifths of *all* black and Hispanic students in districts and grades with non-zero black and Hispanic market share—that is, in the markets and communities that were affected by the schools in question (Table 2). Consequently, we begin with a discussion of the relationship between higher black and Hispanic charter market share and the average achievement of students in these groups in major urban locations.

**Table 1. Distribution of black, Hispanic, and white charter school enrollment by district type (i.e., urban, suburban, and rural).**

| | Black | Hispanic | White | All Students |
|---|---|---|---|---|
| Urban | 74% | 62% | 38% | 56% |
| Suburban | 22% | 30% | 40% | 33% |
| Rural | 4% | 7% | 22% | 10% |
| All Districts | 100% | 100% | 100% | 100% |

Note: Rural districts include those classified as "Town" by the National Center for Education Statistics. Due to the volume of missing and/or imputed data, percentages are approximate.

**Table 2. Distribution of black, Hispanic, and white students whose communities are affected by charter schools by district type (i.e., urban, suburban, and rural).**

| | Black | Hispanic | White | All Students |
|---|---|---|---|---|
| Urban | 63% | 61% | 37% | 52% |
| Suburban | 32% | 34% | 47% | 39% |
| Rural | 5% | 5% | 16% | 9% |
| All Districts | 100% | 100% | 100% | 100% |

Note: Rural districts include those classified as "Town" by the National Center for Education Statistics. Due to the volume of missing and/or imputed data, percentages are approximate.

# VI. FINDINGS

## FINDING 1: In urban areas, higher charter market share is associated with significant achievement gains for black and Hispanic students.

In urban areas, higher charter market share among black students is associated with significant achievement gains for black students. For example, in urban districts with at least 100 black students per grade level, our estimates imply that moving from 0 to 50 percent "black charter market share" is associated with a gain of 0.3 grade levels in ELA and 0.4 grade levels in math—for all black students, including those in traditional public schools (Figures 6–7).[18]

### Figures 6–7. In smaller urban districts, higher "black charter market share" is associated with significant achievement gains for black students.

Fig. 6

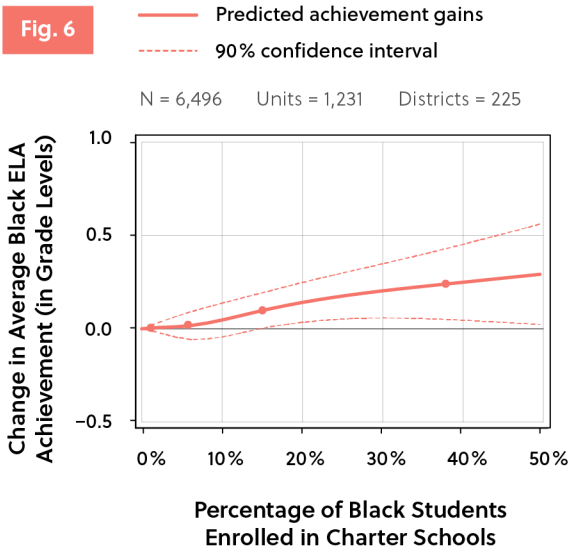
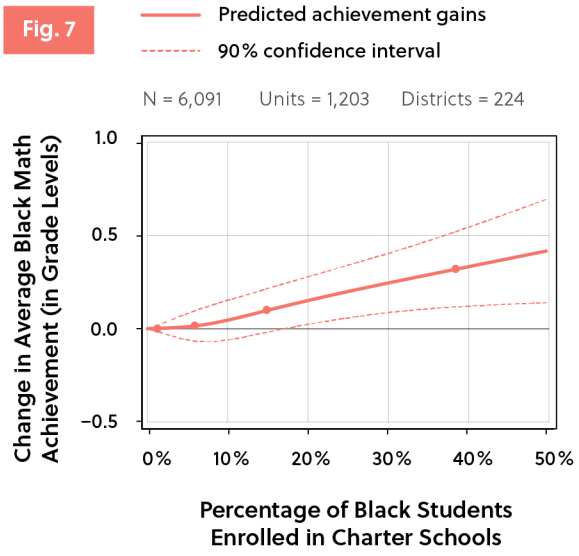


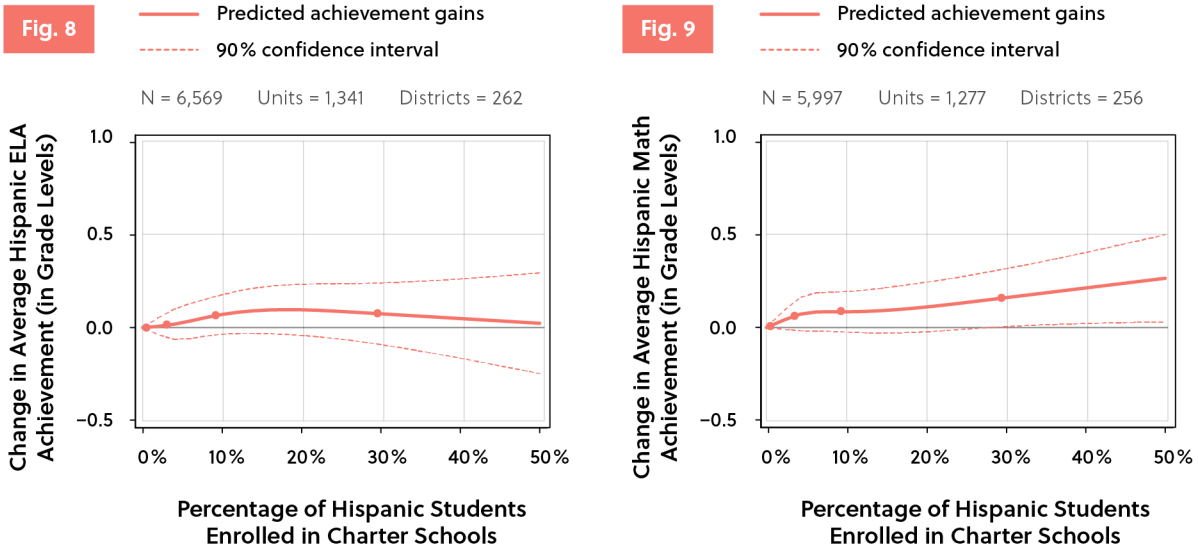

Fig. 7




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

Similarly, among urban districts with at least 100 Hispanic students per grade level, moving from 0 to 50 percent "Hispanic charter market share" is associated with a gain of 0.3 grade levels in math—for all Hispanic students, including those in traditional public schools—although there is no evidence that Hispanic students see gains in ELA (Figures 8–9).

**Figures 8–9. In smaller urban districts, higher "Hispanic charter market share" is associated with a significant increase in math achievement for Hispanic students.**




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent Hispanic charter market share and average Hispanic enrollment >100 between 2009 and 2015.

In general, these estimates of the effects of higher black and Hispanic charter market share on *overall* black and Hispanic achievement in urban districts are consistent with prior estimates of the *relative* performance of urban charters (see *Appendix B*). However, because the size of urban districts varies so dramatically, they may actually understate the gains for the average black or Hispanic student in these places.

For example, if we restrict the sample to the twenty-one urban districts with at least 2,500 black students per grade level (see *Appendix C*, Table C.1), our estimates imply that moving from 0 to 50 percent black charter market share is associated with gains of 0.8 grade levels in ELA and 0.7 grade levels in math for black students (Figures 10–11). In other words, the relationship between "black charter market share" and black students' ELA and math achievement is even *more* positive for these very large districts, which collectively accounted for over half of black enrollment in urban districts where at least one black student enrolled in a charter.

**Figures 10–11. In the largest urban districts, higher "black charter market share" is associated with significant achievement gains for black students.**

Fig. 10

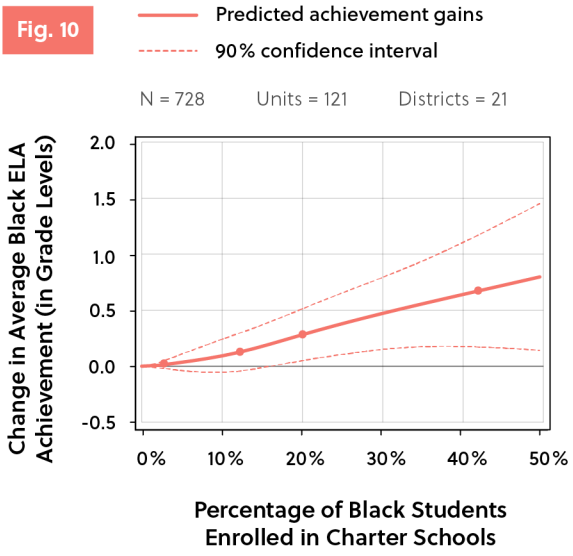
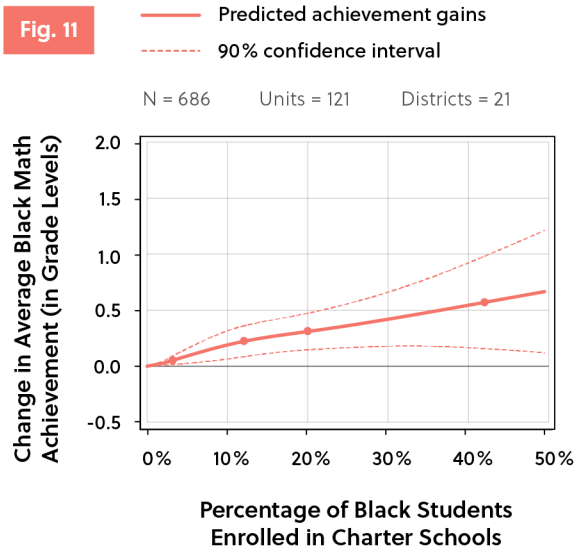


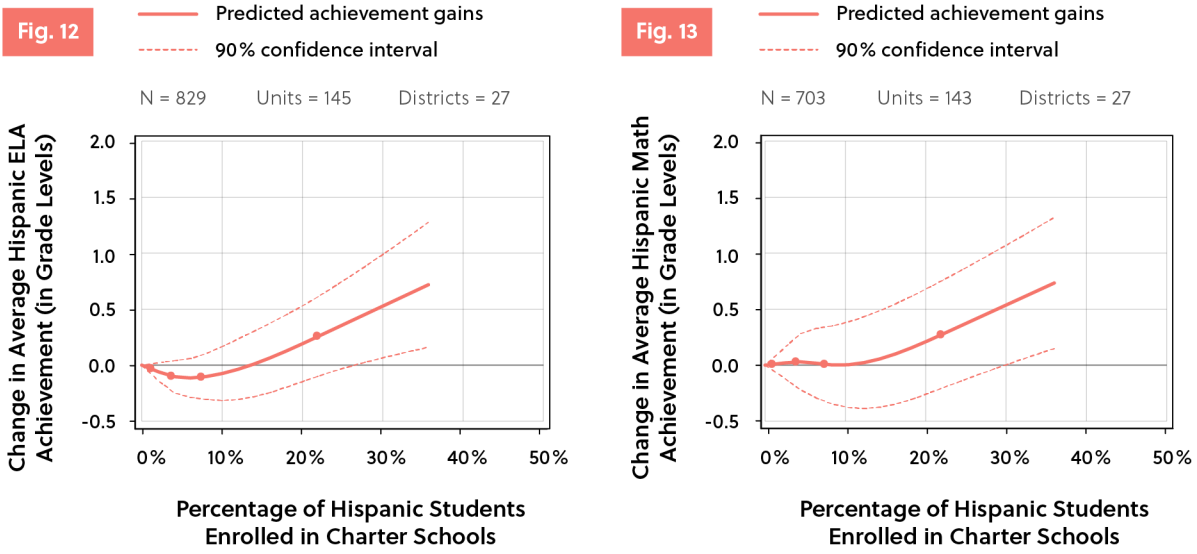

Fig. 11




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >2500 between 2009 and 2015.

Similarly, in the twenty-seven urban districts with at least 2,500 Hispanic students per grade level (see *Appendix C*, Table C.2), our estimates imply that moving from 0 to 35 percent Hispanic charter market share is associated with a 0.7 grade level increase in average ELA and math achievement among Hispanic students (Figures 12–13). Unfortunately, because Hispanic charter market share didn't exceed 35 percent in any of these districts during the study period, we can't be sure that moving beyond this point yields additional gains, although this seems extremely likely based on the shapes of our graphs.

**Figures 12–13. In the largest urban districts, higher "Hispanic charter market share" is associated with significant achievement gains for Hispanic students.**

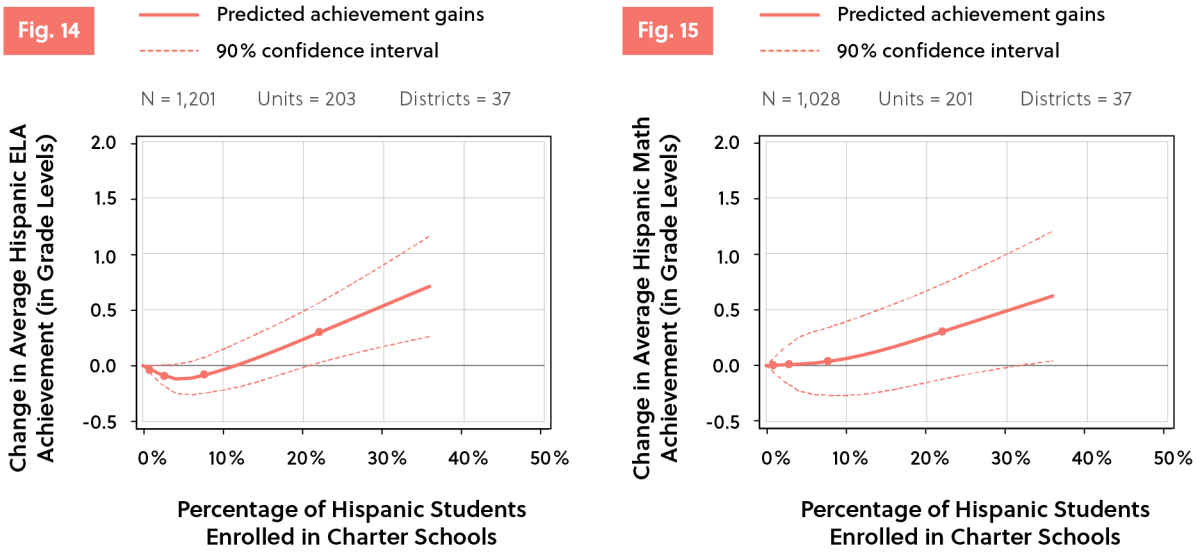



Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 35 percent Hispanic charter market share and average Hispanic enrollment >2500 between 2009 and 2015.

Notably, our estimates for Hispanic students are essentially unchanged if we include the ten large "suburban" districts that meet our enrollment criterion (Figures 14–15), some of which have a decidedly urban reputation despite being classified as suburbs by the National Center for Education Statistics (see *Appendix C*, Table C.3).

Collectively, the thirty-seven districts in this larger group enrolled 45 percent of Hispanic students in communities where at least one Hispanic student attended a charter school. (See *Finding 2* for a discussion of black charter market share in suburban districts.)

**Figures 14–15. In the largest urban and suburban districts, higher "Hispanic charter market share" is associated with significant gains for Hispanic students.**




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all units with 0 to 35 percent Hispanic charter market share and average Hispanic enrollment >2500 between 2009 and 2015.

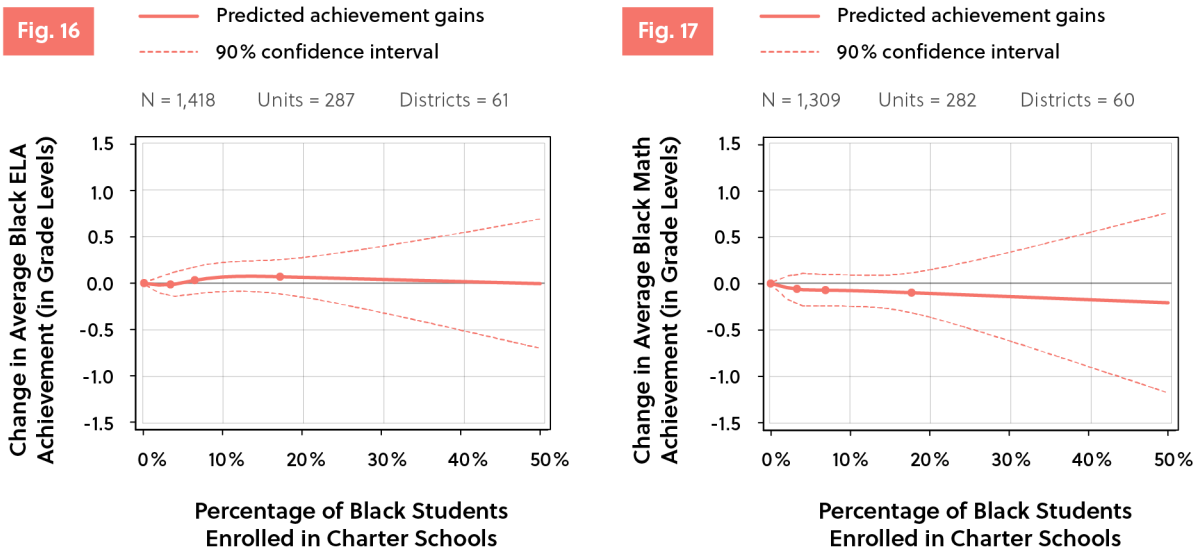
In sum, higher black charter market in urban districts is associated with significant achievement gains for black students—especially in the *largest* urban districts, which enroll the majority of these students. Similarly, higher Hispanic charter market share in urban districts is associated with significant math gains for Hispanic students. And in the districts that enroll the most Hispanic students, it is associated with significant achievement gains in both subjects.

## FINDING 2: In suburban and rural areas, higher charter market share is associated with significant achievement gains for Hispanic students, and black students in rural districts also see gains.

Nearly a quarter of black students and a third of Hispanic students who enrolled in a charter school between 2009 and 2015 were in districts that NCES classifies as suburban, as were roughly a third of all black and Hispanic students in the affected districts. However, because charter penetration is lower in suburban areas, our estimates for these districts should be interpreted cautiously—especially when it comes to black students.

In general, there is no evidence that higher black charter market share in suburban districts is associated with significant achievement gains (or losses) for black students, even when we limit the sample to larger districts. However, since only six suburban districts with >500 black students had a black charter market share that exceeded 25 percent between 2009 and 2015, it's difficult to draw any firm conclusions about the effects of higher black charter market share in suburban areas, except that the outlook isn't as positive as it is in urban areas (Figures 16–17).

### Figures 16–17. In large suburban districts, higher "black charter market share" is *not* associated with significant achievement gains for black students.

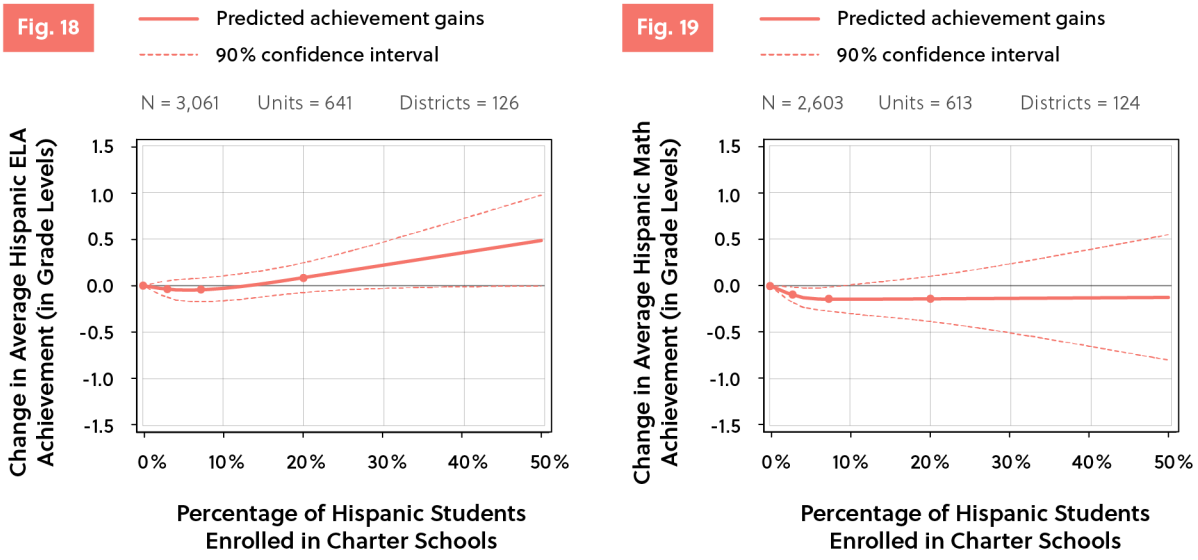



Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all suburban units with 0 to 50 percent black charter market share and average black enrollment >500 between 2009 and 2015.

In contrast, among suburban districts with at least 500 Hispanic students per grade, which enrolled over three-quarters of Hispanic students in suburbs where one or more Hispanic students enrolled in a charter school, our estimates imply that moving from 0 to 50 percent Hispanic charter market share is associated with a gain of 0.5 grade levels in ELA but not in math. Though again, Hispanic charter market share exceeded 25 percent between 2009 and 2015 in just nine of these districts (Figures 18–19).

Per the discussion in *Finding 1*, the distinction between "urban" and "suburban" districts can be murky—especially in Florida, where there are a great many Hispanic students. But regardless of how these larger "suburban" districts are classified, higher charter market share in larger urban and suburban districts seems to be benefitting Hispanic students.

## Figures 18–19. In large suburban districts, higher "Hispanic charter market share" is associated with significant ELA gains for Hispanic students.

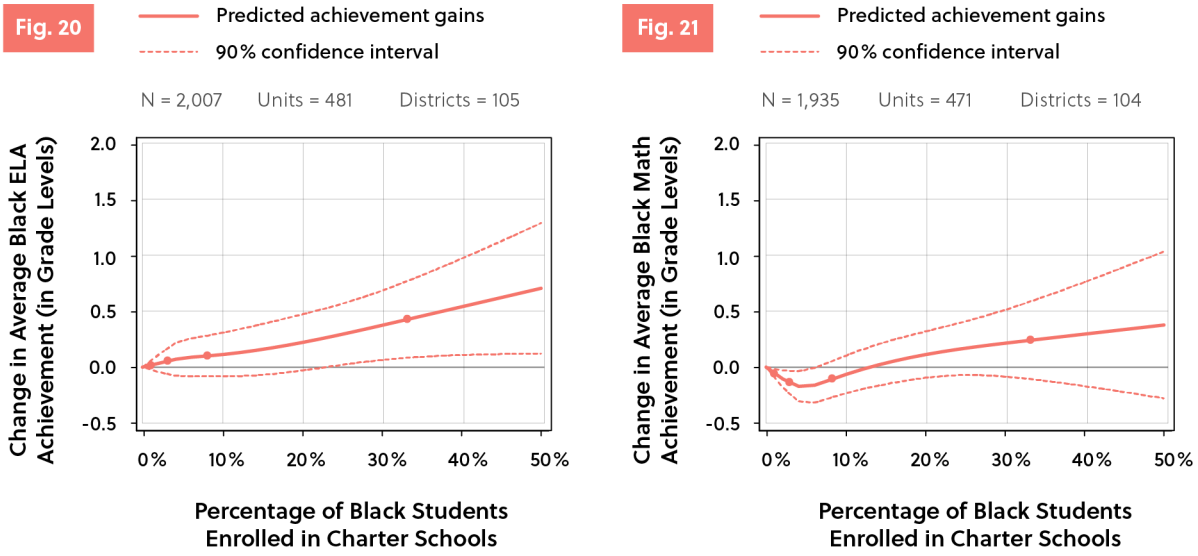



Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all suburban units with 0 to 50 percent Hispanic charter market share and average Hispanic enrollment >500 between 2009 and 2015.

Although rural charter schools are seldom associated with students of color, collectively they enrolled approximately 10,000 black students and 20,000 Hispanic students per year between 2009 and 2015.[19] Moreover, because the average rural district is *much* smaller than the average suburban district, those rural districts that do have charters tend to have higher "charter market share" (making them easier to analyze).

In general, the evidence suggests that higher charter market share is associated with significant achievement gains for both black and Hispanic students in rural areas. For example, among rural districts with at least 100 black students per grade level, our estimates imply that moving from 0 to 50 percent black charter market share is associated with gains of 0.7 grade levels in ELA and 0.4 grade levels in math, although our math estimates never quite achieve statistical significance (Figures 20–21).[20]

### Figures 20–21. In rural districts, higher "black charter market share" is associated with significant gains in ELA achievement for black students.




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all rural units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

Similarly, our estimates for rural districts with at least 100 Hispanic students per grade level are positive but statistically insignificant (not shown). However, the evidence becomes clearer when we restrict the sample to include rural districts with at least 200 Hispanic students per grade, which still account for 60 percent of Hispanic enrollment in rural areas with charters (Figures 22–23). For example, our estimates imply that moving from 0 to 50 percent Hispanic charter market share in these places is associated with a gain of 0.9 grade levels in ELA and 1.0 grade levels in math.

## Figures 22–23. In rural districts, higher "Hispanic charter market share" is associated with significant achievement gains for Hispanic students.

Fig. 22

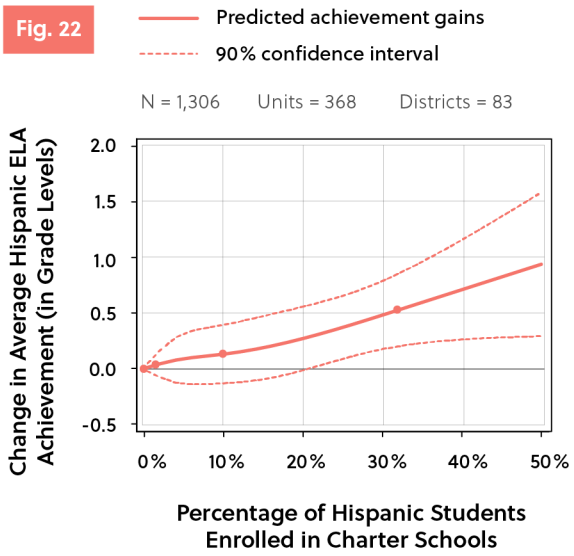
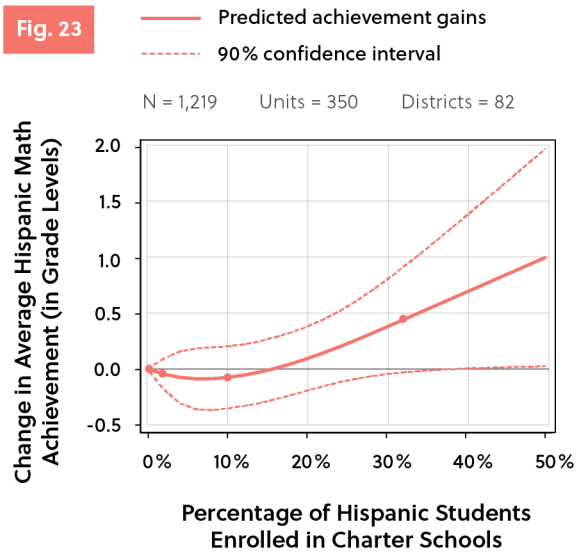



Fig. 23




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 Hispanic students in charter and traditional public schools as district-by-grade-level charter market share increases among Hispanic students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all rural units with 0 to 50 percent Hispanic charter market share and average Hispanic enrollment >200 between 2009 and 2015.

In sum, higher black and Hispanic charter market share in rural districts is associated with significant achievement gains for black and Hispanic students. However, there is no evidence that higher black charter market share in suburban districts benefits black students in these places. Finally, Hispanic students in suburban districts see significant achievement gains in ELA, but not in math.

## FINDING 3: There is no evidence that higher charter market share is associated with achievement gains for white students.

Regardless of district size or location, there is no significant relationship between white charter market share and white students' overall achievement in ELA and math (Figures 24–29), although there is suggestive evidence of a negative relationship in urban and suburban areas (Figures 24–27). Broadly speaking, this is consistent with prior research that suggests charters have a slightly negative effect on white students' academic progress in major urban areas[21] as well as overall—especially in math.[22]

### Figures 24–25. In large urban districts, there is no significant relationship between "white charter market share" and white students' ELA and math achievement.

Fig. 24

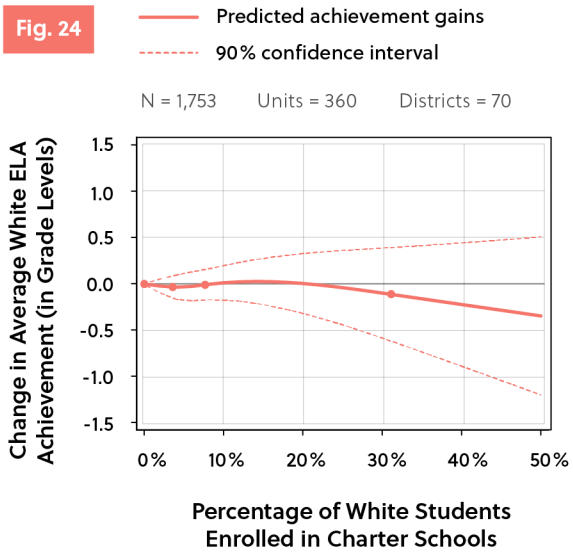
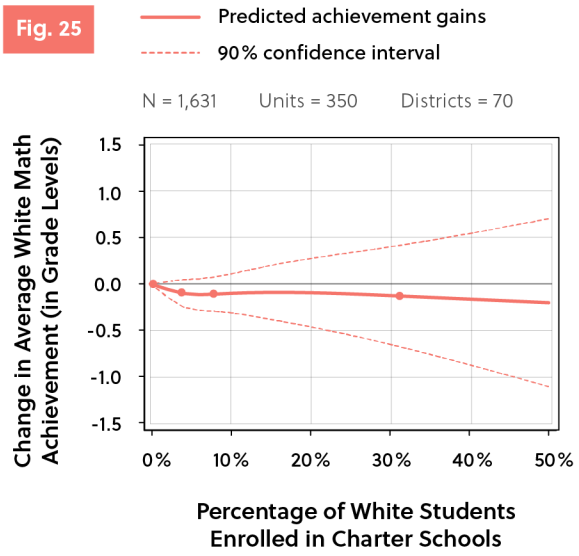



Fig. 25




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 white students in charter and traditional public schools as district-by-grade-level charter market share increases among white students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent white charter market share and average white enrollment >1000 between 2009 and 2015.

## Figures 26–27. In suburban districts, there is no significant relationship between "white charter market share" and white students' ELA and math achievement.

Fig. 26

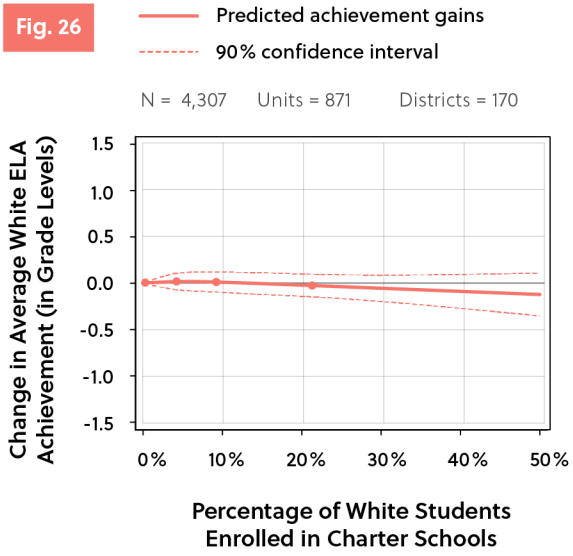
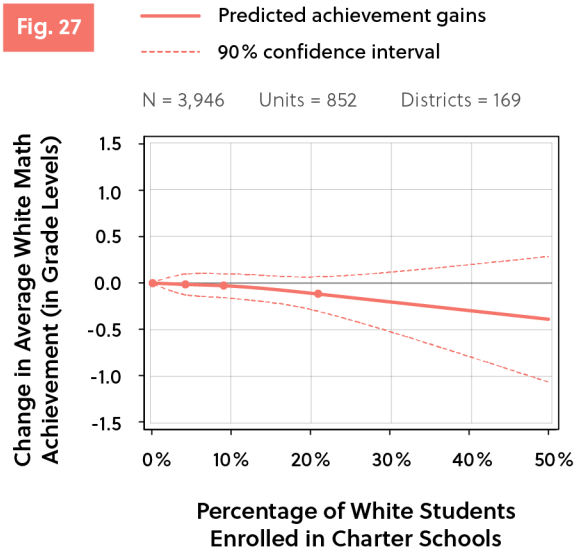



Fig. 27




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 white students in charter and traditional public schools as district-by-grade-level charter market share increases among white students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all suburban units with 0 to 50 percent white charter market share and average white enrollment >500 between 2009 and 2015.

## Figures 28–29. In rural districts, there is no significant relationship between "white charter market share" and white students' ELA and math achievement.

Fig. 28

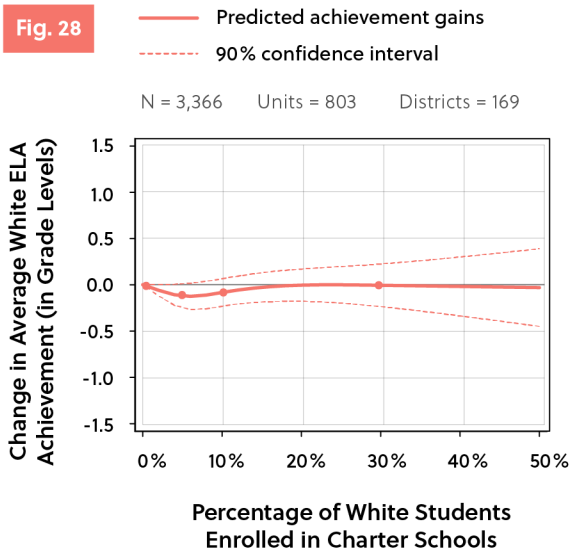
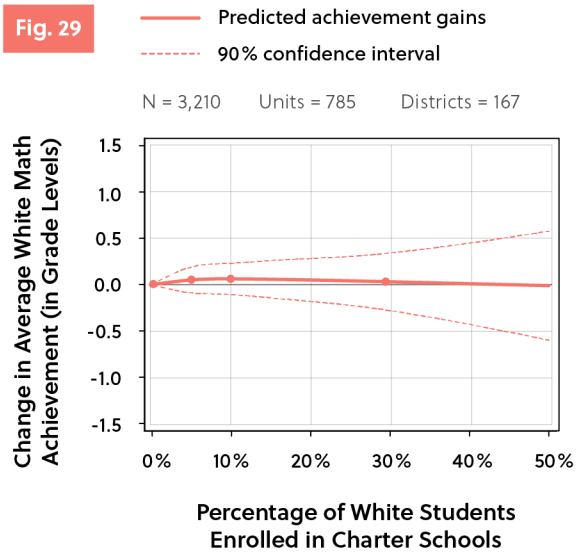



Fig. 29




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 white students in charter and traditional public schools as district-by-grade-level charter market share increases among white students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all rural units with 0 to 50 percent white charter market share and average white enrollment >250 between 2009 and 2015.

# VII. LIMITATIONS

Perhaps the biggest limitation of our study is that charter schools aren't randomly assigned to geographic school districts—and are, in fact, disproportionately likely to cluster in lower-performing districts that serve higher percentages of poor and minority students. As discussed in *Appendix A*, this pattern is like an econometric riptide, dragging our estimates down for reasons that have nothing to do with charters' performance or their impact on traditional public schools. Consequently, insofar as our efforts to control for student demographics and other confounding factors fall short, we may be underestimating the gains associated with higher charter market share.

Similarly, because we are working with just seven years of data, we may not be fully capturing the long-term benefits (or costs) of higher charter market share. For example, research suggests that students who switch schools experience an initial decline in achievement, and many charters open multiple grades simultaneously.[23] So in grades where few students switch schools (e.g., grades 3 or 4), higher charter market share may be inevitably associated with lower achievement in the short run—that is, until the data reflect the experiences of later cohorts. Worse, if a low-performing charter closes during the study period, this may actually make the impact of "higher charter market share" look more *negative*, since our model effectively compares districts to themselves (and since we may not observe the opening of presumptively higher-performing charters that replace the school that closes).[24]

On a related note, it's also important to recognize that our estimates of the likely gains associated with "moving from 0 to 50 percent higher charter market share" are based on the collective experiences of hundreds of school districts and thousands of district-by-grade-level units, most of which didn't actually experience such a large increase in charter market share during the study period. In other words, a fundamental assumption of our model is that the modest increases in charter market share (and the commensurately modest achievement gains) that districts on different (but often overlapping) parts of the charter market share continuum experienced during the study period can be combined into a single estimate of the average district's expected achievement gains over the entirety of that continuum.

Finally, without student-level data, we can't fully account for the movement of individual students across district boundaries, which could potentially bias our estimates in either direction. However, if the achievement gains that we attribute to higher charter market share were actually driven by the unobserved movement of high-achieving charter students across district lines, we would expect the slopes of our graphs to *decrease* as district size increases, which is the *opposite* of what we observe. In other words, it's possible that we are (again) underestimating the benefits of charters due to unobserved student mobility, at least for black and Hispanic students in smaller urban districts.[25]

# VIII. TAKEAWAYS

So does a rising tide of charters lift all education boats?

Although reality is rarely as simple as a good metaphor, our findings suggest that the short answer is "yes"—at least for black students in urban areas and especially for Hispanic students—though not, as far as we can tell, for white students.

In our view, these findings have at least three implications for policy, none of which should come as a surprise to observers who are familiar with the prior research on charter performance and competition:

## 1. Student achievement isn't a zero-sum game.

In general, our results suggest that charters really *are* boosting the achievement of black and Hispanic students, rather than "creaming" the best students in these communities. Moreover, although we can't disentangle the effects of charter competition from the effects of actually attending a charter school, our results are highly consistent with prior estimates of charters' *relative* performance—suggesting that most of the gains that black and Hispanic students experience are driven by charter attendance.

## 2. There is little evidence that charters have a negative effect on traditional public schools.

Again, we can't disentangle the effects of charter competition from the effects of actually attending a charter school. (So, in theory, either one of these effects could be negative if the other was sufficiently positive.) However, when viewed alongside CREDO's estimates of charters' *relative* performance, our estimates for black and Hispanic students imply a neutral (or perhaps slightly positive) effect on the performance of traditional public schools in these communities (see *Appendix B*).

## 3. Expanding charter market share in black and Hispanic communities could dramatically reduce racial achievement gaps.

Although we can't *precisely* quantify the benefits of higher charter market share, our estimates suggest they are substantial for students of color, who currently trail white students by two to three grade levels when it comes to reading, arithmetic, and other prerequisites of upward mobility and effective citizenship.

In light of this evidence and the innumerable other studies that suggest enrolling in a charter is associated with substantial achievement gains for black and Hispanic students, it is simply *wrong* to stand in the way of charters' continued growth in these communities if closing racial achievement gaps is truly the goal.

Henceforth, the burden of proof falls on those who would claim otherwise.

# APPENDIX A

## TECHNICAL APPENDIX

To isolate the relationship between district-by-grade-level charter market share and average district-by-grade-level achievement in ELA and math, we rely on a combination of demographic controls, district-by-grade-level and year fixed-effects, and district-specific time-trends.

Specifically, we control for the percentage of students who are white, black, Hispanic, Asian, or eligible for a free or reduced-priced lunch in a given district-by-grade-level unit and year. Similarly, we control for the percentage of students in the average white, black, or Hispanic student's school who are eligible for federal lunch subsidies (since we don't have data on the percentage of students in these groups who are so eligible). Finally, we control for the percentage of students who are English language learners or eligible for special education services in a given district and year (since these data aren't collected at the district-by-grade level).

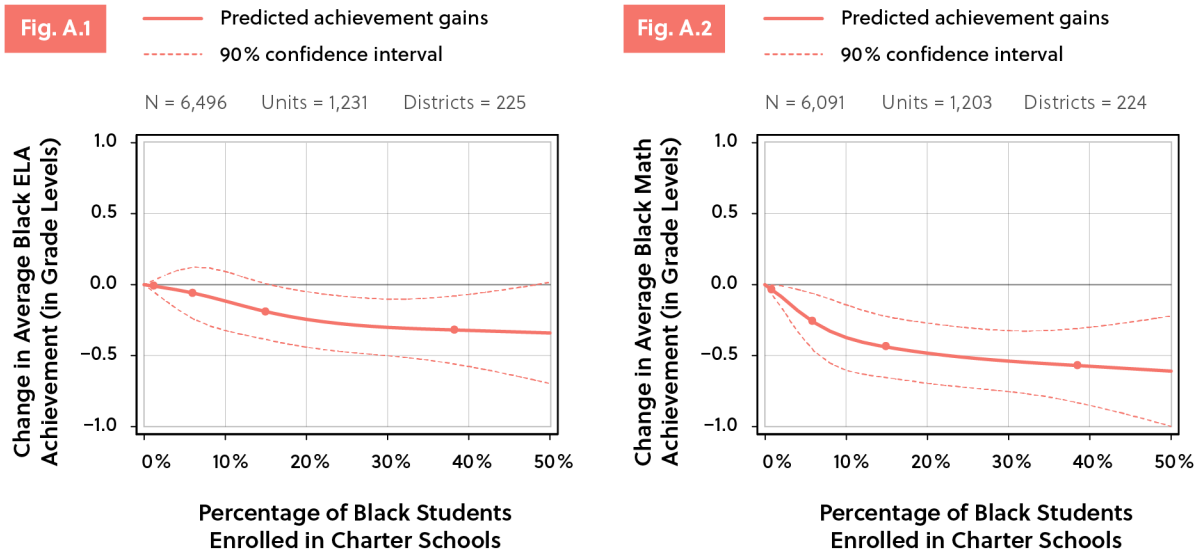
In addition to these observables, we also control for any unobserved year-specific shocks insofar as they are common to all district-by-grade-level units through the inclusion of year-specific dummy variables. (For example, we control for the effects of the recession in 2010, insofar as they were common to all units.) Similarly, we control for any unobserved time-invariant differences between district-by-grade-level units through the inclusion of unit-specific dummies. (For example, we control for the differences between fourth graders in Chicago and seventh graders in Martha's Vineyard, insofar as they remained constant over the course of the study period.)

Finally, since it's likely that academic achievement in most districts was increasing or decreasing for reasons that had nothing to do with charter schools and may not be fully captured by our demographic controls, we include a quadratic "time-trend" for every district in our sample. In other words, insofar as the various district-by-grade-level units in a district were trending in the same direction, we control for that trend. (And since the implication of this step is that our errors could be correlated within districts, we cluster our standard errors at the district level.)

To understand the reasoning behind this combination of techniques, it is helpful to see how the relationships between district-by-grade-level charter market share and average ELA and math achievement change as each technique is introduced. Accordingly, Figures A.1–A.2 show the relationship between district-by-grade-level charter market share among black students and average ELA and math achievement for black students with no statistical controls except for grade-level "dummies" (which ensure that we are comparing students in grade 3 to other third graders, as opposed to seventh graders).

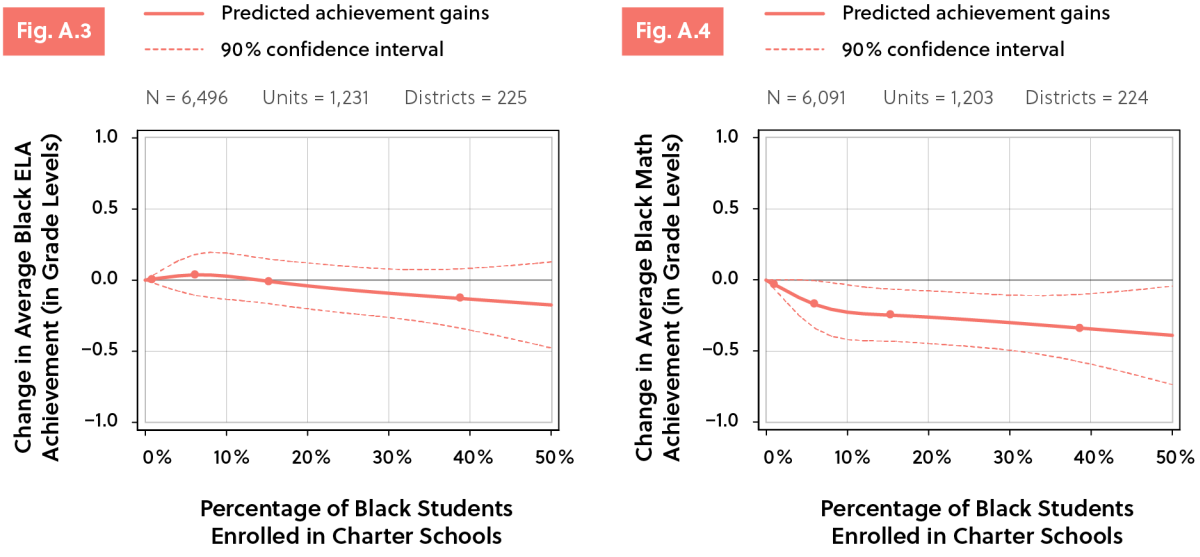
Per the figures, without the appropriate controls, this relationship is negative, which makes sense, given that charters enroll a disproportionate percentage of low-income students. And consistent with that interpretation, controlling for student demographics at the district-by-grade level reduces the negative slopes of our splines (Figures A.3–A.4).

## Figures A.1–A.2. Association between "black charter market share" in urban districts and black ELA and math achievement with no statistical controls.




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots). Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

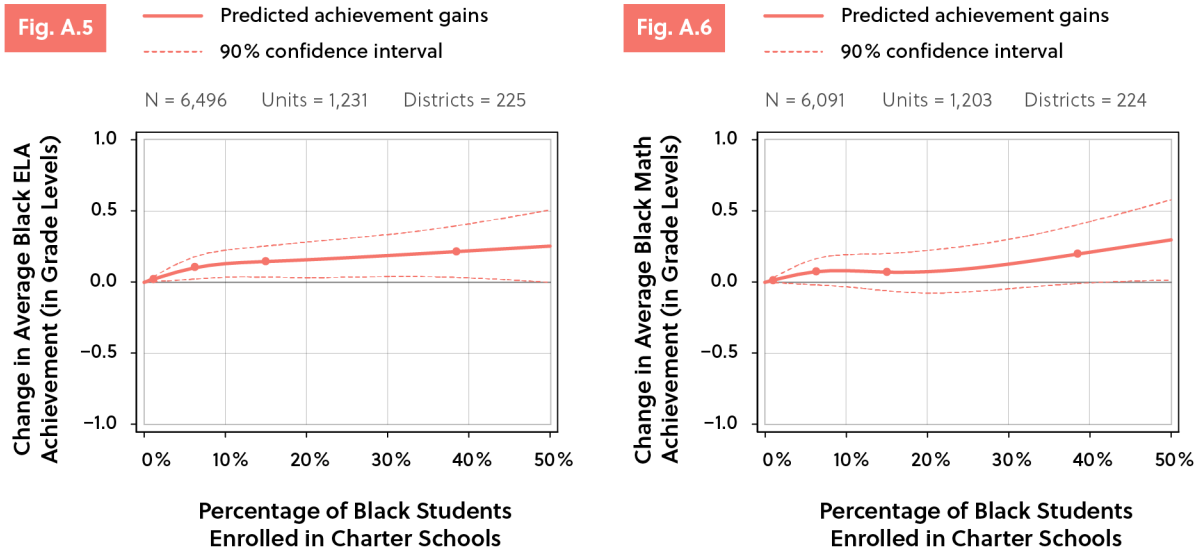
## Figures A.3–A.4. Association between "black charter market share" in urban districts and black ELA and math achievement with demographic controls.




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

Intuitively, since our estimates are less negative when demographic controls are included, it seems likely that any "unobservable" characteristics are still working against charters. (For example, we can control for the percentage of students who are eligible for federal lunch subsidies, but not the *depth* of poverty that families below the subsidy-eligibility threshold experience.) However, by substituting district-by-grade-level fixed-effects for grade-level fixed-effects, we can account for such unobservable differences between district-by-grade-level units insofar as they are "time-invariant"—that is, insofar as the differences between black third graders in San Francisco and black third graders in Detroit remained constant over the course of the study period (Figures A.5–A.6).

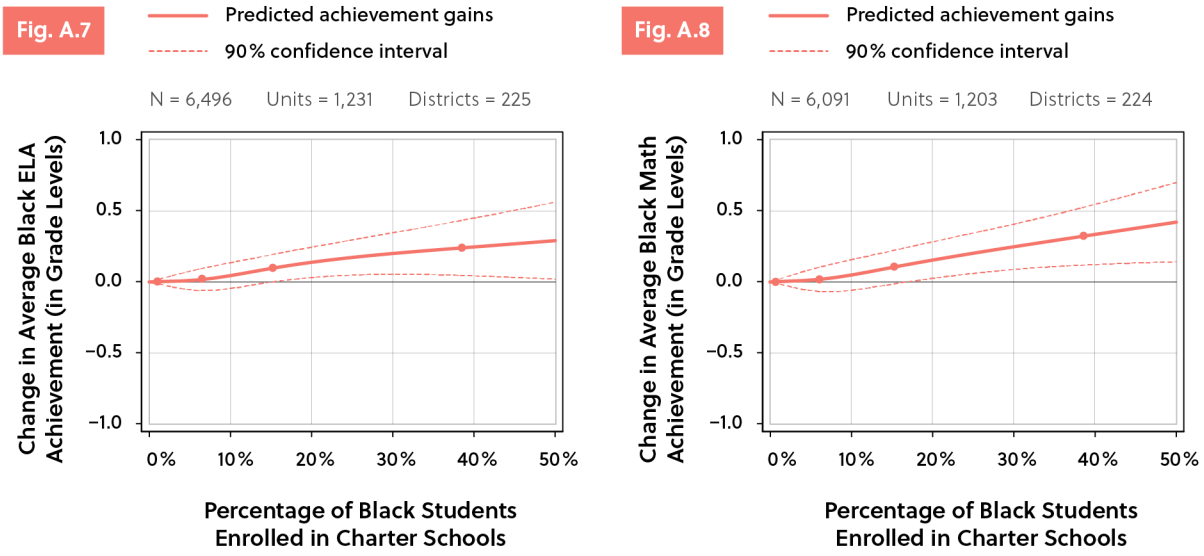
**Figures A.5–A.6. Association between "black charter market share" in urban districts and black ELA and math achievement with unit and year fixed-effects.**




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, as well as district-by-grade-level unit and year fixed-effects. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

Per the figures, taking this step has a dramatic effect on the slope and interpretation of our graphs, suggesting that any unobservable and time-invariant differences between units were indeed working against charters rather than for them. However, because our unit fixed-effects cannot account for time-*variant* differences between district-by-grade-level units, our estimates could still be biased by unobserved trends insofar as these are not fully captured by our demographic controls. Accordingly, in our preferred model (which is the basis for the report), we include *district*-specific quadratic time-trends, in addition to *district-by-grade-level*-specific dummy variables (Figures A.7–A.8).

## Figures A.7–A.8. Association between "black charter market share" in urban districts and black ELA and math achievement with district-specific time-trends.




Note: Figures show the predicted changes in the average ELA and math achievement of grade 3–8 black students in charter and traditional public schools as district-by-grade-level charter market share increases among black students. Estimates were generated using a cubic spline with knots at the 5th, 35th, 65th, and 95th percentiles (see red dots) and controlling for student demographics, district-by-grade-level unit and year fixed-effects, and district-specific quadratic time-trends. Sample includes all urban units with 0 to 50 percent black charter market share and average black enrollment >100 between 2009 and 2015.

Per the figures, taking this final step makes many of our graphs straighter and more intuitive, suggesting that districts were trending in different directions for different ranges of black charter market share. And once again, our confidence intervals are reduced, suggesting that the "unobserved" component of these trends was non-trivial and allowing us to characterize the academic gains associated with higher black charter market share more confidently and precisely.

Notably, controlling for per-pupil expenditures has little effect on the slopes of our graphs (though it does increase the size of our confidence intervals). Similarly, our results are robust to the exclusion of "percent special education," which could also be affected by higher charter market share. And in many cases, they are robust to the exclusion of district-specific time-trends (though we believe these are advisable). Finally, although the skewed distribution of "charter market share" means we are relying on fewer districts and/or units as market share increases, our estimates are not sensitive to the number of "knots" in our splines.

As discussed in *Appendix B*, our preferred estimates are broadly consistent with CREDO's estimates for the time period in question, giving us a useful (if rough) form of cross-validation. Furthermore, the assumptions on which the model is based are deeply intuitive: Different school districts are almost certainly on different achievement trajectories for reasons that have nothing to do with charters. But it's unlikely that the same can be said of district-by-grade-level units. And controlling for district-level trends doesn't prevent us from using the within-district variation in district-by-grade-level charter market share and achievement (relative to the district-level trend) to estimate the former's likely contribution to the latter.

Admittedly, even after taking all of these steps, we cannot fully account for the effects of interdistrict student mobility—especially in smaller urban districts and for lower levels of charter market share. However, if the gains we attribute to higher charter market share were driven by the unobserved movement of high-achieving charter students across district lines, we would expect the slopes of our graphs to decrease as district size increases and the contribution of "interdistrict school choice" to average achievement decreases (as it must, unless students are more likely to commute to the center of large districts than the center of small districts). However, per the findings, this is actually the opposite of what we observe, even when we restrict the sample to urban units, where we would expect student mobility to play a larger role.

Although it's impossible to prove definitively without student-level data, the simplest and most likely explanation for this pattern (and the other patterns we observe) is that higher charter market share in black and Hispanic communities has a positive impact on black and Hispanic students' overall ELA and math achievement, consistent with the prior research on charters' relative performance.

# APPENDIX B

## ARE TRADITIONAL PUBLIC SCHOOLS IMPROVING?

Although we can't disentangle the effects of charter competition from the effects of actually attending a charter school, most of our estimates of charters' impact on *overall* achievement imply a neutral (or perhaps slightly positive) effect on their district neighbors when viewed alongside CREDO's estimates of their *relative* performance during the time period in question.

For example, in its 2015 study of charter performance in forty-one urban regions, CREDO estimated that black students in urban charters gained twenty-six days of learning in ELA and thirty-six days of learning in math per year,[26] implying that over a period of five years (e.g., between kindergarten and fifth grade, which is the average grade level for the units in our sample) they should gain 130 days of learning in ELA and 180 days of learning in math—or roughly 0.7 and 1.0 grade levels—which is theoretically enough to boost average black achievement in urban districts with 50 percent charter market share by 0.35 and 0.5 grade levels in ELA and math, respectively.[27]

As this thought exercise demonstrates, many of our estimates of charters' effect on overall achievement recall prior work on their relative performance. However, an implicit assumption of the arithmetic in the previous paragraph is that students are receiving most or all of the higher charter market share "treatment" for multiple years. In other words, it assumes that an increase in black or Hispanic charter market share in one grade is preceded by *similar* increases in lower grades. And of course, this assumption is frequently violated in reality—for example, when a charter school opens several grades simultaneously or whenever a middle school charter that is not affiliated with an elementary school opens its doors.

Obviously, one potential implication of this line of reasoning is that we are *underestimating* the benefits of higher charter market share by averaging across all grade levels (3–8) instead of limiting ourselves to those where achievement gains are most likely to accumulate. (For example, the gains associated with higher black and Hispanic charter market share in small urban districts are clearer for grades 5–6 than for grades 3–4 or 7–8.) However, another potential implication is that some of the gains we observe are simply too large to explain without some sort of "competitive" or "spillover" effect on traditional public schools.

.

# APPENDIX C

## LARGE URBAN AND "SUBURBAN" DISTRICTS

**Table C.1. Urban districts with at least 2500 black students per grade level (2009–2015)**

| Geographic School District | Average Black Charter Market Share (%) |
|---|---|
| Atlanta Public Schools | 13.5 |
| Baltimore City Public Schools | 18.6 |
| Charlotte-Mecklenburg Schools | 4.5 |
| Chicago Public Schools | 12.9 |
| Clark County School District | 5.6 |
| Cleveland Metropolitan School District | 26.8 |
| Columbus School District | 22.6 |
| Dallas Independent School District | 16.7 |
| Davidson County Schools | 8.7 |
| Detroit Public Schools Community District | 38.4 |
| District of Columbia Public Schools | 42.1 |
| Duval County Public Schools | 5.5 |
| East Baton Rouge Parish School System | 12.0 |
| Guilford County Schools | 3.0 |
| Houston Independent School District | 20.1 |
| Los Angeles Unified School District | 23.5 |
| Memphis City School District | 9.3 |
| Milwaukee Public Schools | 20.0 |
| New York City Public Schools | 11.3 |
| The School District of Philadelphia | 28.6 |
| Wake County Public School System | 4.1 |

## Table C.2. Urban districts with at least 2,500 Hispanic students per grade level (2009–2015)

| Geographic School District | Average Hispanic Charter Market Share (%) |
|---|---|
| Albuquerque Public Schools | 7.5 |
| Austin Independent School District | 7.5 |
| Bakersfield City School District | 0.6 |
| Brownsville Independent School District | 6.3 |
| Chicago Public Schools | 7.2 |
| Clark County School District | 1.5 |
| Dallas Independent School District | 10.8 |
| Denver Public Schools | 12.8 |
| Edinburg Consolidated Independent School District | 6.1 |
| El Paso Independent School District | 3.0 |
| Fort Worth Independent School District | 1.6 |
| Fresno Unified School District | 3.1 |
| Houston Independent School District | 16.4 |
| Long Beach Unified School District | 1.6 |
| Los Angeles Unified School District | 12.8 |
| New York City Department of Education | 4.0 |
| North East Independent School District | 4.3 |
| Northside Independent School District | 3.7 |
| Philadelphia City Independent School District | 19.5 |
| San Antonio Independent School District | 22.0 |
| San Bernardino City Unified School District | 4.1 |
| San Diego Unified School District | 15.6 |
| Santa Ana Unified School District | 4.0 |
| Socorro Independent School District | 0.8 |
| Tucson Unified School District | 10.8 |
| United Independent School District | 2.4 |
| Ysleta Independent School District | 2.6 |

**Table C.3. Suburban districts with at least 2,500 Hispanic students per grade level (2009–2015).**

| Geographic School District | Average Hispanic Charter Market Share (%) |
|---|---|
| Aldine Independent School District (Greater Houston) | 3.4 |
| Broward County Public Schools (Greater Miami) | 14.7 |
| Chula Vista Elementary School District (Greater San Diego) | 20.4 |
| Cypress-Fairbanks Independent School District (Greater Houston) | 1.9 |
| Gwinnett County Public Schools (Greater Atlanta) | 0.5 |
| Hillsborough County Public Schools (Greater Tampa) | 4.9 |
| Miami-Dade County Public Schools (Greater Miami) | 14.8 |
| Orange County Public Schools (Greater Orlando) | 2.4 |
| Palm Beach County School District (Greater Miami) | 4.4 |
| Pharr-San Juan-Alamo Independent School District (Greater McAllen) | 7.5 |

# ENDNOTES


1. Bifulco, Robert and Helen F. Ladd. "The Impacts of Charter Schools on Student Achievement: Evidence from North Carolina." *Education Finance and Policy* 1, no. 1 (Winter 2006): 50–90. https://doi.org/10.1162/edfp.2006.1.1.50.

2. Betts, Julian R. and Y. Emily Tang. "A Meta-Analysis of the Literature on the Effect of Charter Schools on Student Achievement." *Center on Reinventing Public Education*. Paper presented at the Society for Research on Educational Effectiveness Conference, Washington, DC, Spring 2016. https://files.eric.ed.gov/fulltext/ED566972.pdf.

3. Cheng, Albert, Collin Hitt, Brian Kisida, and Jonathan N. Mills. "No Excuses Charter Schools: A Meta-Analysis of the Experimental Evidence on Student Achievement." *Journal of School Choice* 11, no. 2 (March 2017): 209–238. https://doi.org/10.1080/15582159.2017.1286210.

4. Center for Research on Education Outcomes. *Multiple Choice: Charter School Performance in 16 States*. San Francisco: Stanford, June 2009. https://credo.stanford.edu/reports/MULTIPLE_CHOICE_CREDO.pdf.

5. Center for Research on Education Outcomes. *National Charter School Study*. San Francisco: Stanford, 2013. https://credo.stanford.edu/sites/g/files/sbiybj6481/f/ncss_2013_final_draft.pdf.

6. Center for Research on Education Outcomes. *Urban Charter School Study Report on 41 Regions*. San Francisco: Stanford, 2015. https://urbancharters.stanford.edu/download/Urban%20Charter%20School%20Study%20Report%20on%2041%20Regions.pdf.

7. Gill, Brian P. "The Effect of Charter Schools on Students in Traditional Public Schools: A Review of the Evidence." *Education Next*, November 22, 2016. https://www.educationnext.org/the-effect-of-charter-schools-on-students-in-traditional-public-schools-a-review-of-the-evidence/.

8. Jinnai, Yusuke. "The Impact of Charter Schools' Entry on Traditional Public Schools: New Evidence from North Carolina." Paper presented at the Joint Econometric Society Australasian and Australian Conference of Economists Meeting, Hobart, Australia, July 4, 2014, accessed September 6, 2019. https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=ESAMACE2014&paper_id=73.

9. Cremata, Edward J. and Margaret E. Raymond. "The competitive effects of charter schools: Evidence from the District of Columbia." Paper presented at Association for Education Finance and Policy Conference, San Antonio, TX. March 2014. https://web-app.usc.edu/web/rossierphd/publications/14/DC%20Competitive%20Impacts%20-%20Working%20Paper.pdf.

10. Cordes, Sarah A. "In pursuit of the common good: The spillover effects of charter schools on public school students in New York City." *Education Finance and Policy* 13, no. 4 (2018): 484–512.

11. For more on these achievement estimates, see the SEDA documentation: Fahle, Erin M. et al. "Stanford Education Data Archive: Technical Documentation (Version 2.1)." Stanford Center for Education Policy Analysis (CEPA), June 13, 2018, accessed September 12, 2019. https://stacks.stanford.edu/file/druid:db586ns4974/SEDA_documentation_v21.pdf.

12. When constructing our "charter market share" variables, we excluded any charter schools that were classified as virtual schools at any point during the study period, since we have no way of knowing which brick-and-mortar schools or districts were affected by these schools.

13. In practice, the most notable exclusion in New Orleans, where charter market share was approaching 100 percent by the end of the student period.

14. In practice, these cuts sometimes mean that only part of a district is included in the relevant sub-sample. However, to avoid splitting district-by-grade units, all restrictions were based on the average number of black, white, or Hispanic students in district-by-grade-level unit during the study period.

15. Because the distribution of charter market share is heavily skewed (with the 95th percentile sometimes falling closer to 25 percent than 50 percent), the last segment of the spline (i.e., the portion that falls beyond the 95th percentile) tends to dominate some of our graphs. For technical reasons, this last segment is always a straight line. But of course, reality may be more complex.

16. Roughly speaking, one "grade level" is the amount of progress the average cohort in the average district made per year during the study period. For more, see the SEDA documentation: Fahle, Erin M. et al. "Stanford Education Data Archive: Technical Documentation (Version 2.1)." Stanford Center for Education Policy Analysis (CEPA), June 13, 2018, accessed September 12, 2019. https://stacks.stanford.edu/file/druid:db586ns4974/SEDA_documentation_v21.pdf.

17. For example, in its 2013 analysis, CREDO estimated that the average charter student gained eight days of learning in ELA and lost one day of learning in math in the 2010–11 school year. Center for Research on Education Outcomes. *National Charter School Study*. San Francisco: Stanford, 2013, 63. https://credo.stanford.edu/sites/g/files/sbiybj6481/f/ncss_2013_final_draft.pdf.

18. These districts enroll 98.5 percent of black students in urban districts with non-zero "black charter market share."

19. For simplicity's sake, we included districts that were classified as "town" by the National Center for Education Statistics in our "rural" estimates.

20. Although our decision to drop smaller districts means we don't have much data beyond 25 percent black charter market share for rural districts, our estimates are still significant when we restrict the sample to units with less than 25 percent black charter market share (suggesting that our results are not driven by extrapolation).

21. For example, in 2015 CREDO, estimated that white students in urban charters lost 14 days of learning in ELA and 36 days of learning in math.

22. For example, in 2013 CREDO estimated that white students in charter schools lost 14 days of ELA learning and 50 days of math learning per year.

23. Hanushek, Eric A., John F. Kain, and Steven G. Rivkin. "Disruption versus Tiebout Improvement: The Costs and Benefits of Switching Schools." *Journal of Public Economics* 88 no. 9 (August 2004): 1722–1746. https://doi.org/10.1016/S0047-2727(03)00063-X.

24. Since research shows that closure is highly concentrated among the lowest-performing charter schools, the charters that ultimately replace these schools are almost certainly higher performing on average. Center for Research on Education Outcomes. Lights Off: Practice and Impact of Closing Low-Performing Schools (San Francisco: Stanford, 2017), 4. https://credo.stanford.edu/publications/school-closure-study-2017.

25. Although the literature on interdistrict student mobility suggests that mobility rates are higher in smaller and urban areas and among low-income students—and by extension, in and between charter schools—because they enroll only a small fraction of students in most communities, it's likely that charters account for just a modest percentage of total interdistrict mobility, especially when "districts" are defined geographically. However, in the absence of student-level data, higher rates of "churn" in smaller and more urban districts may make it more difficult for the benefits or costs of charters to accumulate across grade levels and within cohorts. Powers, Jeanne, Amy Marcetti Topper, and Amanda Potterton. "Interdistrict mobility and charter schools in Arizona: Understanding the dynamics of public school choice." *Journal of Public Management and Social Policy* 25, no. 3 (Fall 2018): 56–87.

26. Center for Research on Education Outcomes. *Urban Charter School Study Report on 41 Regions*. San Francisco: Stanford, 2015. https://urbancharters.stanford.edu/download/Urban%20Charter%20School%20Study%20Report%20on%2041%20Regions.pdf.

27. Although the appropriate conversion rate between "days of learning" in CREDO and "years of learning" in SEDA isn't clear, 180 days per year seems like a reasonable placeholder.