

# How Do Charter Schools Affect System-Level Test Scores and Graduation Rates? A National Analysis

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## Overview

Charter schools now represent 7% of national school enrollment and rising. In a growing number of cities, this number is well above 40%. The debate over the rise of charter schools has focused on only some of the ways in which charter schools affect children. In this study, we assess the total effect charter schools have on student outcomes nationwide, including not only students attending charter schools but also indirect effects on students attending nearby public schools.

Using data from essentially all the nation's school systems from 1995 to 2016, we draw the following conclusions about school systems where at least 10% of students attend charter schools:

- We find a 2-4 percentage point increase in high school graduation rates, a 6 percentile increase in math scores, and 3 percentile increase in reading scores.
- The increase in math test scores is largest in metropolitan areas compared with non-metropolitan areas, in mathematics compared with reading, and in middle schools compared with elementary schools.
- The effects on math test scores are positive for every group of students we could examine, including Black, Hispanic, white, low-income, higher-income, and other groups of students.
- The above results focus on school systems where at least 10% of students attend charter schools. Positive effects become apparent at about 5% charter market share and grow until market share reaches 15%. The effects remain positive above 15% charter market share, but do not grow larger.
- Charter schools affect student outcomes through three primary mechanisms: (1) being more or less effective than nearby traditional public schools; (2) creating competitive pressure that leads traditional public schools to improve; and (3) inducing low-performing traditional public schools to close or be taken over. While the first two of these have been actively studied in the past, we find that closures/takeovers also play a key role.

By understanding how charter schools affect student outcomes, education leaders can better design policies to serve the needs of students. Our results expand on prior research by providing a national perspective about charter schools' effects on student outcomes and a more complete picture of the mechanisms behind these effects.

## Background

Charter schools are funded and governed by public agencies but operated by private organizations under government contracts. As private organizations, charter schools have more autonomy over their operations than traditional public schools. Charter school teachers typically do not work under collective bargaining units or have tenure protections, which gives charter leaders more authority over personnel decisions. Also, charter schools do not have “attendance zones,” so families can choose the school that best meets their needs regardless of where they live.

Charter school advocates emphasize the potential benefits of charters compared to traditional public schools. One potential benefit is that charters have more flexibility to deploy teachers, staff, and other resources efficiently so they can better serve students. With more limited regulations and union bargaining than traditional public schools, charters also have the freedom to experiment with new forms of education. Charter advocates also highlight the potential performance boost charter schools can provide to nearby traditional public schools. By creating competition for students and revenue, charter schools can pressure traditional public schools to improve outcomes. In this study, we

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Conversely, critics emphasize the drawbacks of charter schools. These disadvantages can include increased segregation and limited access for historically marginalized students and students with disabilities. Prior research shows that charter schools “cream-skim” students who are relatively advantaged. For example, even if they’re located in low-income neighborhoods, there is evidence that charter school student bodies are somewhat more advantaged relative to other schools in the same neighborhoods. Also, charter schools mean more and smaller schooling organizations, which may create a duplication of administration that wastes resources.

There may also be other less obvious drawbacks of charter schools. By allowing families to attend schools outside residential zones, charter schools can impact the connection between students and their local communities. Two students might be the same age and live next door to each other, but attend schools in different parts of town, so that they and their families do not get to know one another. In this study, we focus on the academic effects of charter schools.

## How Did We Carry Out the Analysis?

A key challenge in understanding the effects of charter schools is separating their impact on student outcomes from the impact of other policies aimed at improving schools. For example, states might adopt charter schools as part of a larger education agenda—such as changes in funding for all schools, investments in school facilities, or teacher evaluation—that also affect student outcomes. The federal No Child Left Behind (NCLB) law is a good example. The 2002 law focused on identifying and turning around low-performing public schools. Isolating the effects of charter schools from NCLB and other policies is a key challenge.

A second problem we face is that charter schools might intentionally seek to open in locations where the performance of traditional public schools is expected to decline. In that case, it might appear that charter schools are having a greater impact than they actually are.

Our methods are designed to address these complicating factors and estimate how charter schools affect student outcomes. We start with a method called difference-in-differences that compares district outcomes before and after charter schools open. If we stopped there, we would be worried that there was a change in outcomes for reasons that may have nothing to do with charter schools, as noted above. To make sure this is not the case, we select a matched comparison group of districts without charter schools. These no-charter comparison districts had very similar trends in student outcomes as charter-heavy districts before charters started opening.

We are specifically interested in comparing the trends in outcomes in the no-charter districts to those with large charter enrollment shares, what we call “charter-heavy” districts. This requires setting a threshold market share. We start by using a 10% charter enrollment threshold; that is, we compare trends in student outcomes of these charter-heavy districts with the no-charter districts.

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To further address the complicating factors, we also used a wide variety of additional methods that are explained in more detail in the technical report. As we explain below, our results turn out to be very similar across all these methods, which reinforces our conclusion that these effects are the result of charter schools. That is, our analysis seems to avoid the “correlation is not causation” problem.

## What Data Did We Use?

We included essentially all school districts in the United States during the years 1995-2016. During this period, 608 of the nation's approximately 12,000 districts had at least one charter school. Sixty-one percent of these districts have 10% or more charter enrollment and 39% of these districts have 20% or more charter enrollment. (The number of districts in each group is smaller with the graduation sample.) The remaining districts serve as a potential comparison group.

These data come from the National Longitudinal School Database (NLSD), which combines outcome data from the Stanford Education Data Archive (SEDA) and demographic data from the federal schooling data and the U.S. Census. High school graduation data come from the federal Common Core of Data (CCD).

Our analyses are based on district-level data. In particular, our district-level outcomes are an average of the outcomes of traditional public schools and charter schools located within districts' geographic boundaries, weighted by enrollment. Looking at the district averages might seem like a disadvantage, but this comes with several advantages as well. One of the main concerns in studies of charter schools is that they might select or "cream-skim" the best students and inflate their outcomes. However, this type of selection is largely irrelevant in a district-level analysis of the total effects of charter schools. All students are counted in the analysis regardless of which type of school they attend. This is why we call this an analysis of "systems" instead of "districts." We are examining the effects on all students attending publicly funded schools, not as in prior studies that focus on either charter schools or traditional public schools, separately.

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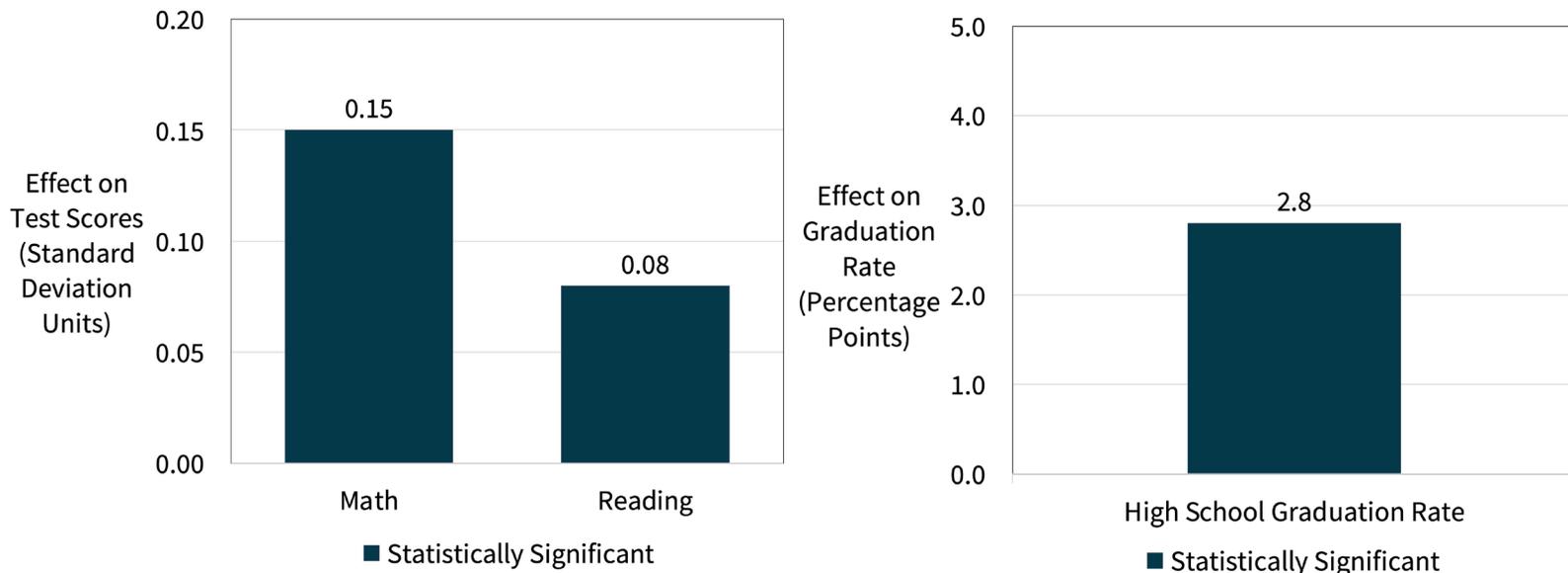
Each state has its own test scale. To account for this, the test score data are expressed in standard deviation form. The national average is set to zero so that schools with above average outcomes have positive scores and those that are below average have negative scores. We then translate some of these into percentiles.

# What Effect Does Having 10% Charter Enrollment Have on Student Outcomes?

We carried out the analysis in many different ways (see below), but focus on comparing districts with 10%+ charter enrollment to no-charter districts and controlled for other district characteristics including race/ethnicity, free-lunch eligibility, and geographic location (e.g., metropolitan areas).

Figure 1 below shows the effects on elementary and middle school test scores in math and reading over a six year period. The first bar indicates that when enough charters open to reach a minimum of 10% enrollment share, math test scores increase by 0.15 standard deviations, or approximately 6 percentile points. These results vary somewhat across our methods, but the general picture is the same. For reading scores, the increase is 0.08 standard deviations (the equivalent of 3 percentile points). The results are similar across a variety of other methods we used.

**Figure 1. Effect on Test Scores and High School Graduation Rates from Having 10% or Greater Charter Enrollment**



Notes: Figure 1 reports average effects across grades 3-8. All effects are based on methods that control for district characteristics such as student demographics. The starting year is the year that the first charter school opens. The effects are reported in standard deviation units.

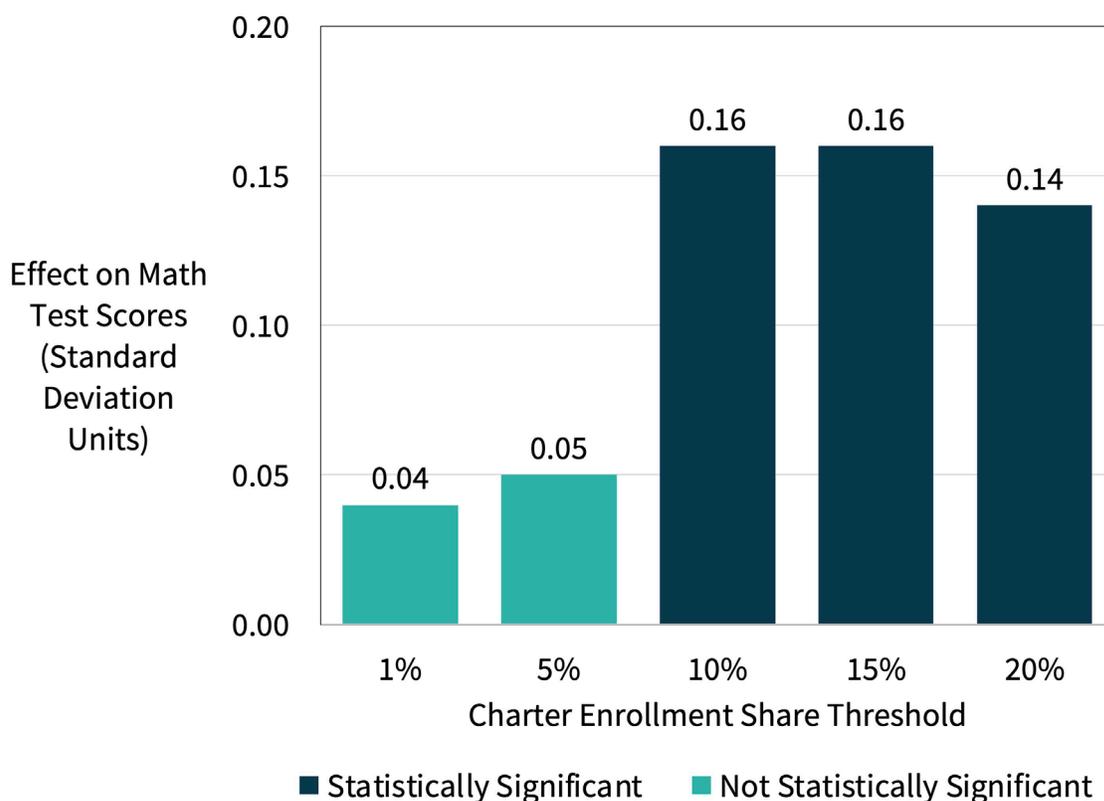
The right side of Figure 1 also shows a 2.8 percentage point increase in high school graduation rates over an eight year period when comparing districts without charter schools to districts with a minimum 10% charter enrollment. This is actually the smallest increase we found. When we used other methods, the graduation increases appear larger. In the above analyses, the number of years with charter schools varies across districts. We also carried out analyses that focus on districts with five years of data and find very similar results.

## Do the Results Vary Across Charter Enrollment Shares?

The 10% charter enrollment share threshold is arbitrary, and there are reasons to expect that the effects would be different if we picked other thresholds. For example, some have argued that having too many charter schools may reduce the performance of traditional public schools because, for example, it can be more difficult for traditional public schools to serve a smaller number of students (i.e., because of economies of scale).

We find that increased charter enrollment share is associated with larger effects. The improvement is especially pronounced once the threshold reaches 10%. When we raise the threshold above 15%, the effects continue to be positive, but they do not get larger.

**Figure 2. Charter Effects on Math Scores by Charter Enrollment Share Threshold**



Notes: The method used here is the same as Figure 1. However, a variety of charter school enrollment thresholds are presented here.

It is important to emphasize that the sample of districts changes as we look at different charter enrollment shares. When the charter enrollment threshold is 10%, those districts with 1-9% enrollment are excluded from the analysis. When we raise the threshold to 20%, those with 1-19% enrollment are excluded, and so on. This is important because it means that as we move from left to right in Figure 2, the number of charter-heavy districts in the analysis is dropping—and the number of districts is very small when we get past 20%.

New Orleans is an extreme case with the highest charter enrollment of any district. It has also been one of the more successful and well documented examples in improving student outcomes. To test whether New Orleans might be driving the results, we dropped it from the analysis. The results are essentially unchanged when we do this.

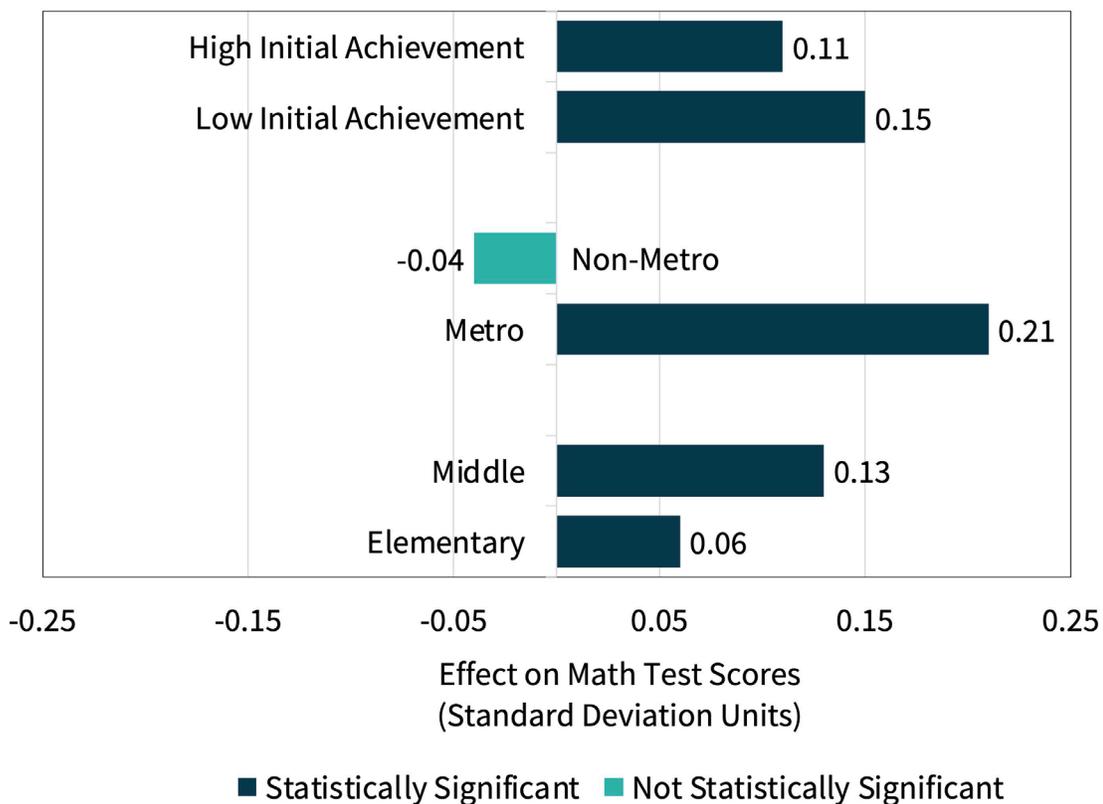
As in the prior analyses, this pattern holds when we use other comparison groups and other methods.

### How Do the Effects on Outcomes Vary by District Characteristics in Districts with Charter Enrollment of 10% or Greater?

The 10% charter enrollment threshold yields a positive effect on math scores for almost all of the subgroups we examine. Figure 3 provides evidence that the increase in math scores for districts with charter schools are larger in metropolitan areas. This is consistent with prior research on urban areas.

More novel is our analysis by grade level and initial achievement level. Here, we consider high initial achievement as the top 50% of math scores and low initial achievement as the bottom 50% of math scores. We find some evidence of larger effects in middle schools and where initial (pre-charter) achievement was low. This is consistent with the theory that it is easier to improve when outcomes are low to start with.

**Figure 3. Charter Effects on Math Scores by School Location, Grade Levels, and Prior Outcomes for Districts with Charter Enrollment of 10% or Greater**

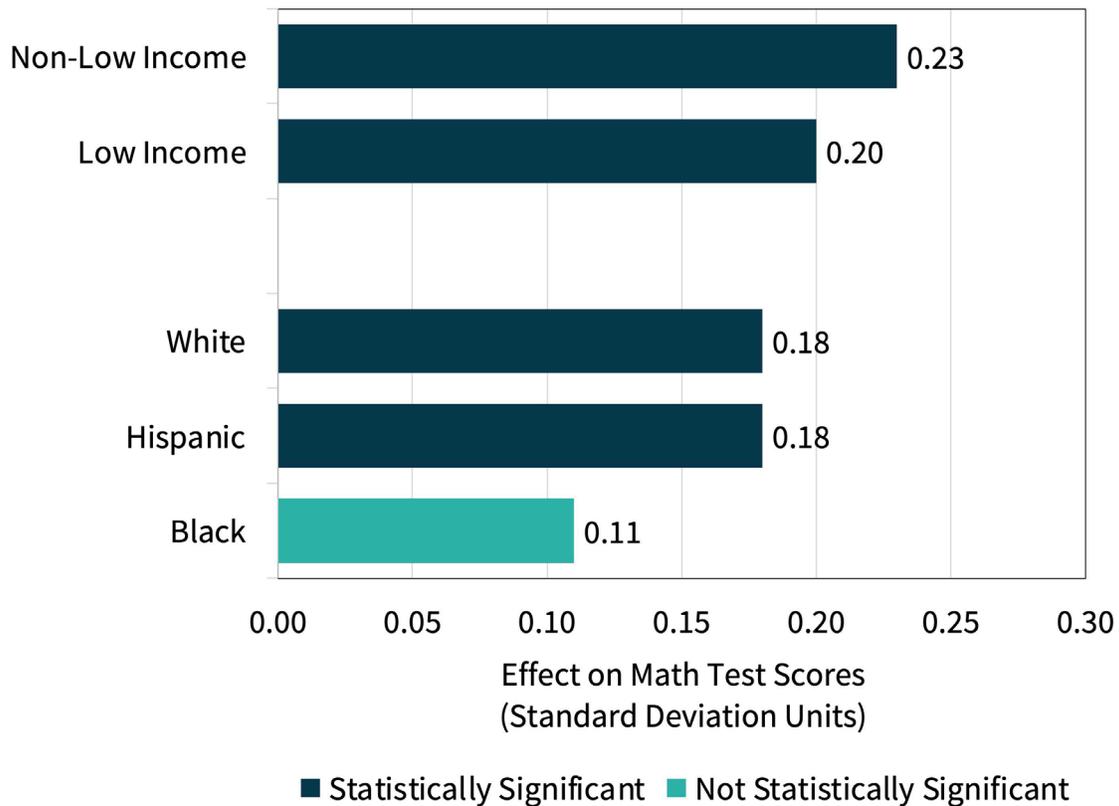


Notes: We use the same difference-in-differences method as in Figure 1 (using the 10% threshold). Statistical significance tests focus on whether each is different from zero. The metropolitan/non-metropolitan estimates are also statistically different from one another. The low-initial-achievement/high-initial achievement and elementary/middle schools results are not statistically different from one another.

## How Do the Effects Vary by Student Characteristics?

Our analysis includes not only average test scores, but also scores by student race/ethnicity and income (free or reduce price lunch eligibility). We find evidence of improvements for every group as well. Figure 4 shows positive and statistically significant effects on math scores for low-income, higher-income, white and Hispanic students. While this particular result is not statistically significant for Black students, all the other results, using alternative methods, are positive and some are statistically significant for this group as well. These effects in Figure 4 range in size from 0.11-0.23 standard deviations, or 4-9 percentile points.

**Figure 4. Effects on Math Scores by Student Race and Income for Districts with Charter Enrollment of 10% or Greater**



Notes: We use the same difference-in-differences method as in Figure 1 (using the 10% threshold).

This study does not include outcomes for special education students as this data is not included in the Stanford Education Data Archive used for this analysis.

## Which of the Mechanisms Explain the Total Effects?

The earlier sections focused on the total effects of charter schools on district outcomes and how these vary across enrollment shares and district and student characteristics. But the question remains: what exactly about charter schools leads to these effects? Prior studies have focused on whether charter schools are more effective than nearby traditional public schools or whether charter schools induce traditional public schools to improve through competition.

One key contribution of the present study is focusing attention on a third possible mechanism: how charter schools might replace low-performing traditional public schools. To analyze this, we used the same methods described above, but here we are interested in whether the opening of charter schools led any traditional public schools to close or be taken over. We find that higher charter enrollment share does increase the likelihood of closure or takeover of traditional public schools.

To further understand this and the other two mechanisms, we used school-level data on achievement growth measures from Stanford Education Data Archive (SEDA). These measures are created by calculating the change in achievement between cohorts and years (for example, the change in scores between 3rd graders in 2010 and 4th graders in the same school in 2011). Prior research suggests that these SEDA growth measures are similar to “value-added” measures that more accurately capture what schools contribute to student learning.

Based on the SEDA measures, we find that traditional public schools that closed as charter schools opened had lower than average achievement growth across the United States. We also found that charter schools tend to locate near relatively low-performing traditional public schools, which may partly explain why charter schools tend to be slightly higher performing.

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We also examined the effects of charter schools on private school closures, but we find no evidence of such effects. This is important, too, given the possibility that students might switch between charter and private schools and/or affect the outcomes of private school students as well.

We might also expect competition between schools when there are more charter schools – more schools means more competition for students and funding. Indeed, we find that traditional public school performance rises with the charter enrollment share, though only slightly. This evidence may reflect correlation more than causation, but it is consistent with prior research that has examined charter entry more rigorously in specific locations.

Putting this research together with prior research, it does seem clear that multiple mechanisms play some role in explaining how charter schools improve student outcomes.

## Conclusion

This study makes several distinctive contributions to our understanding of charter schools. First, this is one of only two analyses of charter school effects that include large national samples of charter schools. This is important now that almost every state in the nation has a charter law.

Second, this is the only national study to examine charter effects on high school graduation rates. The vast majority of studies, including the one other national study, focuses on student test scores.

Third, we reinforce prior evidence that charter effects are larger in urban areas, but also provide a richer picture of the way in which the effects vary. We find that the test score effects are concentrated in middle schools (compared with elementary schools) and some evidence that the effects are larger in districts that are especially low performing to start with. We also find positive effects for all demographic groups we could identify in our data.

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Fourth, the rising number of districts, such as Detroit, New Orleans, and Washington, DC, that are majority-charter also raises the question: Is there some limit regarding how much charter enrollment is good for students? We find that noticeable effects begin emerging at 10% charter market share and remain through about 15% market share.

Fifth, we study all of the ways that increased charter enrollment affects student outcomes, providing suggestive evidence that charter schools affect student outcomes through multiple pathways.

Charter school laws have been arguably the most influential school reform efforts of the past several decades, shifting millions of students—7% of all school-age children—into these new types of schools. That expansion has also made them controversial, prompting calls to stop charter school growth and regulate them more intensively. In this study, we have provided new evidence about whether, when, and how charters work, which can help guide policies toward improved outcomes for all students.

## How Does This Relate To Other REACH Research?

All of REACH's work focuses on the effects of choice policies and charter schools are a key part of that.

One contribution of the present study is examining the mechanisms of charter school effects. In ongoing descriptive work, we are also trying to better measure the extent of closure and takeover in traditional public, charter, and private schools; and to understand the factors that lead to closure and takeover.

One reason that charter schools might be more or less effective is the design and implementation of charter regulation. We are studying the effects of allowing multiple charter authorizers and more equal funding for traditional public and charters schools, to name a few. We are also examining how state policymakers think about charter policy design and regulation through interviews.

In additional work, we are examining the content of charter applications, including differences between those that eventually open and those that are rejected. Since charter schools reduce the extent of regulation, the decision to open a charter school, through this application process, is one of the most important decisions left in the hands of government officials.

## About the National Center for Research on Education Access and Choice (REACH)

Founded in 2018, REACH provides objective, rigorous, and applicable research that informs and improves school choice policy design and implementation, to increase opportunities and outcomes for disadvantaged students. REACH is housed at Tulane University with an Executive Committee that includes researchers from Tulane, Michigan State University, Syracuse University, and the University of Southern California.

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## Corresponding Technical Paper

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