



Nearly three decades into the charter school movement, what has research told us about charter schools?

Ron Zimmer
University of Kentucky

Richard Buddin
University of Virginia

Sarah Ausmus Smith
University of Kentucky

Danielle Duffy
University of Kentucky

When charter schools first entered the landscape, the debate was contentious, with both advocates and critics using strong rhetoric. Advocates often sold charter schools as a silver bullet solution for not only the students who attend these schools, but the broader traditional public school system as well. Similarly, critics painted charter schools as an apocalyptic threat to public schools. To inform this debate, research has evolved over time, with much of the first generation (through about 2005) of research studies focusing on the effect charter schools have on test scores almost exclusively using non-experimental designs. The second generation of studies more frequently used experimental designs and broadened the scope of outcomes beyond test scores. Furthermore, the second generation of studies has also included studies seeking to explain the variance in performance. In this survey of the research, we summarize the findings across both generations of studies, but we put a greater emphasis on the second generation than prior literature reviews. This includes an examination of indirect effects, examination of explanation of charter effectiveness, and the recent use of charter schools as a mechanism of turning around low-performing schools.

VERSION: November 2019

Suggested citation: Zimmer, Ron, Richard Buddin, Sarah Ausmus Smith, Danielle Duffy. (2019). Nearly three decades into the charter school movement, what has research told us about charter schools?. (EdWorkingPaper: 19-156). Retrieved from Annenberg Institute at Brown University: <http://www.edworkingpapers.com/ai19-156>

**Nearly three decades into the charter school movement, what has research
told us about charter schools?**

Ron Zimmer,
University of Kentucky

Richard Buddin,
University of Virginia

Sarah Ausmus Smith,
University of Kentucky

Danielle Duffy,
University of Kentucky

I. Introduction

Charter schools, which are publicly funded schools of choice, are on the verge of their third decade on the U.S.'s educational landscape. Initially, charter school advocates hoped that charter schools would be able to cut through red tape, offer innovative educational programs, provide new options to families, and promote healthy competition for traditional public schools (TPSs) (Finn, Manno, and Vanourek, 2000). On the flip side, opponents argued that there is little reason to believe that charter schools would be any more effective than TPSs and would exacerbate racial segregation while creating fiscal strains for school districts (Wells et al., 1998).

In recent years, the debate has evolved beyond the initial talking points among advocates and opponents, with the expansion of charter schools to over 7,000 schools serving 3 million students (U.S. Department of Education, 2018). Advocates expanded their view of charter schools as they see them as a means for improving chronically low-performing schools through state takeover. Similarly, opponents expanded their critiques by highlighting concerns over the use of public funds for “private organizations,” sudden closures of charter schools, and argue that these schools are cream skimming the best students from TPSs while pushing out the low-performing students (Ravitch, 2010). Despite this ideological rancor, charter schools have often enjoyed bipartisan support—the Clinton, Bush, Obama, and Trump administrations have all been supportive of charter schools. However, in recent years, the political debate has also become more partisan.

In this chapter, we synthesize the best research to inform the debate. We underscore *best evidence*, as not all studies are created equal. Some studies have inadequate data or poor research designs for evaluating the effectiveness of charter schools. To help sift through the large literature, we use a criterion for inclusion that includes publication in a peer-reviewed journal, prioritizing economic and policy journals since this is an economics of education chapter. However, we recognize that there are a number of current working papers and research reports from research organizations which are contributing significantly to our understanding of charter schools' effectiveness. Therefore, we also include papers that have had an impact on the scholarly or policy community (e.g., having at least 30 citations according to Google Scholar and/or having received significant media attention) and meets a minimum level of quality in research design. We will further discuss the quality of research design in our later summary of the research.

This is not the first synthesis of the charter literature—there have been a number of high-quality literature reviews that have provided important insights (Betts and Tang, 2018; Epple, Romano,

and Zimmer, 2016; Berends, 2015; Bifulco and Bulkley, 2015; Carnoy, et al., 2005; Gill, et al., 2001). However, many of these reviews are dated and have generally focused on studies that evaluated the overall effects of charter schools, rather than studies “inside the black box”—e.g., what factors led to the effects we observed from charter schools. Furthermore, because only recently have charter schools become a widespread tool for “turning” around low-performing schools, these previous reviews have given little attention to whether charter schools have been an effective turnaround policy.

The rest of the chapter proceeds as follows. Section II defines charter schools and recent trends. Section III discusses the literature that has examined the students served by charter schools. Section IV focuses on the direct effects of charter schools, including both student achievement and attainment as well as studies that have examined explanations for these effects. This section also discusses the recent set of studies that have examined the effects of charter schools as a mechanism for turning around low-performing schools. Section V examines charter practices that are linked to charter effectiveness, while section VI highlights indirect effects, including financial and achievement effects. Finally, section VII summarizes the chapter and draws implications.

II. Defining a Charter School

Formally, charter schools are publicly funded schools of choice that form a contract, or “charter,” with a public entity (e.g., a school district, state, or university) in which they are given greater autonomy than other public schools over curriculum, instruction, and operations. In exchange for greater autonomy, they are held accountable for results. School choice itself is also a defining feature of charter schools—parents choose to send their children to these schools. In contrast, students are typically assigned to a TPS based on their residential location. Enrollment choice inherent in charter schools means that these schools are reliant on their ability to attract students from their community. Many of those involved with the initial charter movement do not think of charter schools as a type of school, but as schools that result from a chartering process. Ted Kolderie, who was instrumental in the formation and development of the charter movement, argues that the movement is really about a process of creating new schools (Kolderie, 2004). Thus, from the outset, the charter movement was created to start innovative schools that are outside the direct control of the local school board and, therefore, can be more responsive to the needs of their “customers.”

At present, 44 states plus the District of Columbia permit charter schools to operate. States delegate power to grant charters to at least one authorizing entity. There is considerable variation across states in delegating this power, with several states designating more than one authorizer. Only three states currently designate one authorizer while the remainder designated two or more. In several states, a request for authorization to create a charter school goes first to the local school district in which the charter would locate, with the potential for appeal to the state education agency if the district declines to grant a charter. In 2018, charter schools could be authorized by local school districts in 37 states, the state education agency in 31, a higher education institution in 16, municipal government office in six, and a non-for-profit organization in five (Education Commission of the States, 2019). Of the 44 states that permit charter schools, five states—Arizona, Michigan, Nevada, New Mexico, and Washington—do not allow existing TPSs to be converted to charter schools and eighteen states place a limit on the number of charter schools or the number of charter school applications accepted per year. As of January 2018, 22 of the 44 states with charter schools allow virtual charter schools by law. Of those 22 states, 19 have adopted additional accountability requirements for virtual schools.

State laws also indicate who will provide funding for charter schools. (Education Commission of the States, 2019). In most jurisdictions, charter funding is shared between local districts and the state, often reflecting the respective charter authorizer. Funding is based exclusively on state funding in 8 states, on district funding in 10 other states, and on local government funding in 2 states (Education Commission of the States, 2019). The other 25 states have mixed funding requirements based on who authorized the charter school. Even with state-level funding, district leaders often contend that they would have received additional state funding if students had attended a TPS instead of a charter. Charter laws typically specify that a charter school receive a specified payment from the local district for each district student who attends the charter school. In attempt to evaluate the equitable funding of charter schools while taking into account differences in student composition, Batdorff and colleagues (2014) found that the average charter school student in the US is funded 28% below the average TPS student. However, they also found the relative funding of charter schools to TPSs varies widely across states, ranging from a low near 40% in Louisiana to virtual parity in Tennessee.

However, these differences do not necessarily consider the fact that charter schools often rely on local school districts for certain services, such as transportation or special education

services. The majority of states with charter schools do not indicate which party is required to provide transportation. Eight states require local school districts to provide transportation to charter schools and only five states require the charter schools to provide transportation. In addition, the composition of student populations may differ between the two types of schools. For example, charter schools typically serve fewer special needs students, which are more costly to educate.

Public funding for facilities is also an important source of the financial disparity between TPS and charter schools. According to the Education Commission of the States, Alabama is the only state that provides identical funding for TPS and charter school facilities, while Oregon requires all charter schools to provide their own funding for facilities. Many states allow charter schools the first opportunity to purchase vacant TPS properties. Differences in policies with respect to local funding go well beyond differences in facilities funding, though. Previous research has found that charter schools appeal to philanthropic organizations for financial support, particularly for funding facilities (Nelson, Muir, & Drown, 2000; Farrell, et al. 2012). Battdorf and colleagues (2014) find that funding from “other” (including philanthropic) sources is relatively small and comparable in magnitude for charter schools and TPSs—on the order of 5% of per student revenue for both.

III. Students Served

Because charter schools are schools of choice, it is important to examine whether or not they are serving the full range of students and if they are doing so in integrated settings. Charter school critics argue that charter success might be illusory if charter schools are simply recruiting the best students from TPSs or pushing out the lowest performing students (Henig, 2008). Charter schools could further stratify an already ethnically or racially stratified system (Cobb and Glass, 1999; Wells et al., 1998). In general, these critics fear that charter schools may not only have negative consequences for the charter students who attend these schools, but if charter schools “skim off” high-achieving students from TPSs or push out the lowest performing students into TPSs, they may also have social and academic effects for students who remain in TPSs.

By law, charter schools are required to select students by lottery when they are oversubscribed, which reduces their ability to selectively admit students. This does not imply that student composition of charter schools will replicate the composition of public schools, as a charter school’s composition is affected by their location and potentially their recruitment, conditional on

location. It is clearly of interest to disentangle the two. To accomplish this, research has examined the movement of students from TPSs to charter schools using longitudinal student-level data. This method allows researchers to track students as they move from school to school and examine whether students who exit TPSs to charter schools move to schools with a greater or lower concentration of students of the same race or ethnicity. In addition, using the same approach, researchers can examine whether below- or above-average achieving students are exiting TPSs for charter schools and vice versa. In both cases, the approach provides a more refined counterfactual than making sector-wide comparisons.

However, this method does not provide a comprehensive picture of the student sorting resulting from charter schools, because it includes only the charter students who enter charter schools after having previously been enrolled in TPSs; it does not identify a counterfactual for students who enroll in charter schools beginning in kindergarten. Nonetheless, this addition to the analysis of the changing peer environments of individual students who move to charter schools is valuable in capturing the effects of charters at the neighborhood level, as it overcomes potential issues with other methods, such as missing local variation by examining only higher levels of aggregation or only capturing post-entry school composition. Only a handful of studies have used this approach, partially because it requires longitudinal student-level data, which can be difficult to obtain. Below, we focus on studies that have used longitudinal student-level data.

3.1 Racial Segregation

Although many of the works described in this section use regression-based models, others rely on analysis of descriptive statistics. Regardless of the approach, the bulk of this research, as shown in Table 1, has concluded that charter schools lead to greater racial segregation for African Americans, while the conclusions are less consistent for whites and Hispanics. It is interesting to note that while many of these studies were able to use longitudinal data, they were limited in the array of observable family characteristics to tease out how other family and student characteristics affect families' enrollment decisions. Butler et al (2013) use the Early Childhood Longitudinal Study data, which includes a number of family and student characteristics, to examine motivating factors for enrollment decisions. Once they controlled for family socioeconomic characteristics, race played less of a role in enrollment decisions. Therefore, while it is generally clear that charter schools are leading to more segregated schools for at least African American students, it may be

that family socioeconomic characteristics are leading to these results rather than the race of the student or the racial mix of the school.

Table 1: Studies of Racial Segregation

Study	Location	Research Design	Average Direct Effects
Weiher and Tedin (2002)	Texas	Probit models. Parent surveys.	<ul style="list-style-type: none"> Expressed preferences varied by race— white parents ranked test scores and black parents ranked moral values as most important, while discipline ranked first for Hispanic parents. No group ranked race or ethnicity as a priority. Controlling for a variety of SES and contextual factors, some of these differences went away. However, the average black student in the study opted to attend a charter that had larger shares of black students than their public school. The same was true for Hispanic and white students, respectively. While parents expressed that test scores were important, the majority did not select a school with better performance than their previous school.
Booker et al (2005)	California (six districts), Texas	Logit regression. Student-level data.	<ul style="list-style-type: none"> Black and Hispanic students were more likely to attend charter schools. In Texas, economically disadvantaged students were also more likely to attend. Black students transferring to charter schools were likely to select those with higher concentrations of black students.
Bifulco and Ladd (2007)	North Carolina	Panel regression with fixed effects. Student-level data.	<ul style="list-style-type: none"> Students enrolling in charter schools are more likely to attend schools with students that look like themselves, compared to public schools.
Zimmer et al (2009)	Chicago, San Diego, Philadelphia, Denver, Milwaukee; Ohio, Texas, Florida	Descriptive statistics; panel regression with fixed effects. Student-level data.	<ul style="list-style-type: none"> Black students tend to attend charter schools with higher shares of black students in five of the seven places studied, but the effect was small.
Butler et al (2013)	Nationwide	Modified conditional logit. Household-level data.	<ul style="list-style-type: none"> Race did not seem to matter in charter school selection once the researcher controlled for a rich array of student and family characteristics.
Ladd et al (2014)	North Carolina	Descriptive statistics; regression with fixed effects; value-added models. Student-level data.	<ul style="list-style-type: none"> Over time, charter schools have become increasingly racially segregated. The majority of charter schools enroll either less than 20 percent or greater than 80 percent non-white students. The share of schools with less than 20 percent non-white students has nearly doubled.
Stein (2015)	Indianapolis	Diversity index. Administrative test score data.	<ul style="list-style-type: none"> Black students switched to charter schools with higher percentages of black students compared to the schools from which they were transferring. This trend extended to white students, but not Latinx students.
Ritter et al (2016)	Little Rock	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> Charter school students are less likely to be in hyper-segregated schools (where 90 percent of the enrolled

			<p>students are either from a racial minority or white, respectively).</p> <ul style="list-style-type: none"> • Minority students were much more likely overall to attend a hyper-segregated school. • Benchmarking against the metropolitan area, charter school students attended schools that were less racially representative than TPSs.
Logan and Burdick-Will (2016)	Nationwide	Regression with district fixed effects. School-level data used to generate student-level data.	<ul style="list-style-type: none"> • Black students face more segregation in charter schools than in non-charter schools, both at the elementary and high school levels. • Charter schools are more racially isolating than public schools, controlling for district fixed effects.
Kotok et al (2017)	Pennsylvania	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • Black students move to charter schools that are more segregated than their previous traditional public school. • The majority of students moving from TPS to charter schools were students of color.
Ladd, Clotfelter, Holbein (2017)	North Carolina	Both a descriptive analysis and a school and grade-by-year fixed effect model.	<ul style="list-style-type: none"> • Charter schools in North Carolina are increasingly serving the interests of relatively able white students in racially imbalanced schools.

3.2 Access to Charter Schools by Ability

Many worry that charter schools may or may not serve all students based on ability, behavior, or cost of educating the students (e.g., extra resources required to serve special needs students) (Ravitch, 2010). The worry is that charter schools could either cream skim the best students from TPSs or push out the lowest performing students, which could lead to inequitable access to schools and/or leave TPSs educating the most challenging and costly students. While it is very difficult to discern the motivations behind a student move from a TPS to a charter school or vice versa, researchers can examine whether the patterns of moves are consistent with cream skimming or pushout behavior. Regardless of the reason for a student move, research can observe whether a student transfer is indeed resulting in TPSs left serving the lower performing, more costly, and poorer behaving students.

Most of the early research in this area focused on cream skimming and often focused on test scores. However, some recent studies have examined student moves based on special education status or student behavior. In Table 2, when researchers have examined measures of ability based on test scores or behavioral incidents, they have generally not found evidence consistent with the claim of cream skimming. However, there has been some evidence consistent with the claim of cream skimming when special education has been the focus of analysis (Winters,

2013; 2014). In this research, the author concluded that special needs students were less likely to attend charter schools, confirming previous descriptive research, which suggests that there is a special education gap between charters and TPSs. He also noted that first graders at charter schools were less likely to be identified as having learning disabilities, which may mean that some of this gap is the result of different rates of identifying special needs. Setren (2019) shows that special education and English language learners often lose their status when they enroll in a charter middle or high school, but these students have significant improvements in student achievement and college outcomes relative to lottery losers that remain in a TPS. It is worth noting that qualitative work published by Jabber (2015) highlights understudied cream skimming strategies that go beyond simply comparing students based on prior test scores. For example, the author’s interviews with New Orleans charter school leadership reveal that schools may not advertise mid-year openings so as not to attract students that have been expelled elsewhere.

Table 2: Studies of Cream Skimming

Study	Location	Research Design	Average Direct Effects
Booker et al (2005)	California (six districts), Texas	Logit regression. Student-level data.	<ul style="list-style-type: none"> Students with limited English proficiency or lower third grade test scores were less likely to attend charters in Texas.
Garcia et al (2008)	Arizona	Regression; ANCOVA. Student-level data.	<ul style="list-style-type: none"> Students entering charter schools from TPSs have lower math and reading scores than their peers that remained. Students who switched charter schools had higher previous test scores. Authors conclude there is no evidence of cream skimming.
Zimmer et al (2009)	Chicago, San Diego, Philadelphia, Denver, Milwaukee; Ohio, Texas, Florida	Descriptive statistics; panel regression with fixed effects. Student-level data.	<ul style="list-style-type: none"> Find no evidence of cream skimming by test scores.
Zimmer and Guarino (2013)	Anonymous school district	Linear probability model. Student-level data.	<ul style="list-style-type: none"> Low-performing students were not more likely to exit charter schools than traditional public schools.
Winters (2013)	New York City	Descriptive statistics.	<ul style="list-style-type: none"> Students with disabilities were less likely to apply to charter schools in kindergarten. There was a persistent gap in special education between charter schools and TPSs. Charter

		Student-level data.	schools were less likely to classify students as special needs and more likely to remove that classification.
Winters (2014)	Denver	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • A gap exists in special education attendance between charters and TPSs. • Special needs students were less likely to apply to charter schools. • Schools are less likely to classify students as special needs.
Jabbar (2015)	New Orleans	Qualitative study of 30 schools; interviews, original documents.	<ul style="list-style-type: none"> • A third of the schools engaged in cream skimming or “cropping” strategies.
Nichols-Barrer et al (2016)	Nine states, DC	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • KIPP admits a student body similar to local public schools, who also do not leave the schools at rates meaningfully different from the comparison groups. • Late entrants (middle school enrollees) to the charter school do have higher baseline test scores.
Winters et al (2017)	Denver	Regression. Student-level data.	<ul style="list-style-type: none"> • There is a special education gap between charter and TPS, which grows throughout elementary school. • Charter attendance reduces the likelihood first graders are identified as having learning disabilities, but no effect on other types of disabilities (which are less subjectively identified).

Table 3 summarizes the results for studies of pushout. Again, for research using test scores as a measure of student ability (and comparing exit rates to TPSs’ exit rates) has shown little evidence of student moves consistent with student pushout. However, research has suggested patterns consistent with claims of pushout when using student special education or behavioral incidents as measures of student “ability.” Furthermore, there is evidence that charter schools (partially because of their theory of action) do not backfill for students who attrite—i.e., schools do not try to replace students who exit a charter school (Campbell & Quirk, 2019). In a novel approach towards pushout strategies, Kho and colleagues (2019)¹ examine whether there is evidence consistent with pushout both by test scores and discipline near testing dates, as there have been claims that charter schools

¹ This study has not been published in a peer review journal nor has it reached the 30-citation requirement. However, because there are limited studies on pushout and only one that examined the timing, we decided to include it.

strategically push out students near testing periods (Ravitch, 2010). The authors find no evidence consistent with this claim.

Table 3: Studies of Student Pushout

Study	Location	Research Design	Average Direct Effects
Miron et al (2010)	Delaware	Descriptive statistics. Student-level data. However, the study did not compare exit rates to TPSs.	<ul style="list-style-type: none"> • “Leavers” (those who exit charter schools) at the elementary level have higher test scores than students who remain in the charter. • No notable difference at the middle school level, while leavers have lower test scores than “stayers” at the high school level.
Nichols-Barrer et al (2012)	19 KIPP Schools	Descriptive statistic. Student-level data	<ul style="list-style-type: none"> • Students exiting KIPP schools have similar prior achievement to those exiting nearby schools.
Winters (2013)	New York City	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • No evidence of charter schools pushing out special needs students.
Winters (2014)	Denver	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • No evidence of charter schools pushing out special needs students.
Zimmer and Guarnio (2013)	Anonymous District	Linear Probability Model. Student level data.	<ul style="list-style-type: none"> • No evidence consistent with the claim of pushout.
Kho, et al (2019)	North Carolina and Tennessee	Linear Probability Models. Student level data.	<ul style="list-style-type: none"> • No evidence consistent with the claim of pushout based on student test scores, but some evidence based on behavioral incidents.
Campbell and Quirk, 2019	Washington, D.C.	Descriptive statistics. Student-level data.	<ul style="list-style-type: none"> • No evidence of pushout, but the authors do find evidence that charter schools do not “backfill”—i.e., do not replace students that exit.

Summary

In charter schools’ early days, advocates hoped that they would create greater racial integration and opportunities for low-performing students. Critics feared charter schools would lead to greater racial segregation and lack of access for more challenging students, which would make the jobs of TPSs more difficult. In reality, neither these hopes nor the fears have been fully realized. Like many areas of the charter debate, further research examining variation of outcomes across locations may help provide insights into policy features that affect these outcomes.

IV. Direct Effects of Charter Schools

The most contentious debate regarding charter schools is whether or not they are having a positive effect on student outcomes. As previously noted, advocates argue that charter schools could not only have a direct effect on students attending charter schools, but could also have systemic effects on students attending TPSs through competitive pressure—because TPSs have to compete for students, they will work harder and smarter in educating students. In this section, we lay the groundwork for discussion of charter school effectiveness by discussing alternative empirical approaches and their strengths and weaknesses. In the case of direct effects, the analysis of the effectiveness is complicated by the fact that students and their families generally choose to attend charter schools. By the mere fact that students and families are making these choices suggests that these students are different in potentially unobservable ways (e.g., parental engagement, family income, motivation). If these unobserved characteristics are not accounted for in a study, they can create a “selection bias” and could lead to invalid conclusions.

The most obvious and strongest approach for dealing with the selection bias is to assign students randomly to charters and TPSs from a pool of all students and require families to accept this random assignment. However, research designs using such random assignment have not been implemented. This is not surprising since randomly assigning students would run counter to the reform itself, as the theory behind charter schools prioritizes matching students’ needs and interests with school offerings. Forcing a student to attend a randomly assigned school would break this link. In lieu of a purely randomized design, researchers have often used one of five approaches: 1) lottery-based design (which simulates randomized design), 2) fixed effect approaches, 3) matching procedures, 4) OLS regression designs, and 5) instrumental variable (IV) approaches.

Among these options, many scholars argue that the lottery-based design is the most rigorous as it relies upon lottery assignment of oversubscribed schools as a natural experiment proxying random assignment to schools. The efficacy of the lottery schools is found by comparing the subsequent outcomes of lottery “winners” who attend the oversubscribed school with those of “losers” who are denied admission and attend another school. However, the results would only have inferences to oversubscribed schools that may not be generalizable to other charters. One would expect schools with wait lists to be the best schools, so the results may offer little insights into the performance of undersubscribed schools (Zimmer and Engberg, 2016). The effects also could not be generalized for students whose parents did not seek charter enrollment. In addition, many students who enter an oversubscribed school may enter the school outside of the lottery, via

a sibling or staff exception, for example. Tuttle and colleagues (2012) highlight challenges in employing the lottery approach, as often schools do not keep careful records of whether not students enrolled through a lottery or another process.

A further concern is attrition, which can come in two forms. First, a student assigned to a charter school via a lottery may attend less than the full set of grades offered at a charter school (for example, a student assigned to a charter high school may only attend 9th grade and then transfer out) or may not attend at all. Furthermore, a “lottery loser” could end up in an undersubscribed charter school or could enter a charter school at a later date. Second, a student could exit the data set altogether by attending a private school, moving outside of the data set’s jurisdiction, or dropping out of school. To the degree that either form of attrition is non-random, it can create bias (Engberg, et al., 2014).

There are two ways to address the first form of attrition. First, a researcher could do an intent-to-treat (ITT) analysis, in which a student, for research purposes, maintains his or her original assignment to a charter school or TPS regardless of the type of school a student actually attends. This approach maintains the random assignment, which guards against bias, but answers the policy question of what impact does randomly assigning a student to a charter school (but not necessarily attendance) have on student outcomes. Obviously, this is a less important question than the impact actual attendance at a charter school has on outcomes. Therefore, researchers, in addition or as an alternative to doing an ITT analysis, often conduct a treatment-on-treated (TOT) analysis, in which a researcher uses the random assignment as an instrumental variable. This analysis focuses on the question of the impact actual attendance has on student outcomes but has the drawback of narrower breadth of inferences that comes with an IV approach (which we will describe later). There is a tradeoff between the two approaches, with the ITT approach having greater breadth of inferences while answering a less policy relevant question, while the TOT approach may have greater policy relevance but has less inferential breadth.

For the second form of attrition in which students disappear from the analysis, neither an ITT nor a TOT analysis will alleviate the potential bias. The concern is that students attriting out of a data set may be systematically different from students who remain. For instance, in analysis of magnet schools, Engberg and colleagues (2016) found that more affluent students exited the data set of the urban district they were examining by moving to a suburban district or private school if they did not get into a magnet school via the lottery. It should be noted that some lottery studies

do provide evidence that differential attrition of lottery winners and losers in their particular case is small (Abdulkadiroglu et al., 2011) or provide evidence that their results are robust to correction for potential differential attrition (Dobbie and Fryer, 2011b).

When lottery-based analyses are not possible, a fixed-effect approach with student-level longitudinal data is often used. A fixed-effect approach minimizes the problem of selection bias by comparing the academic gains of individual students switching between a TPS and a charter school (i.e., “switchers”) over time. An advantage of this method is that it can be applied to schools with and without waiting lists for admission. However, some researchers advise proceeding with caution (Hoxby and Murarka, 2007; Ballou, Teasley, and Zeidner, 2007), as the fixed-effect approach does not provide an estimate for students who attend charter schools for the duration of the analysis (i.e., “non-switchers”), as the analysis requires a comparison of student outcomes in both contexts. Switchers may differ from non-switchers in important ways, so the results may not be applicable for students who are continuously enrolled in a charter school. Researchers also wonder about the motivation of students switching into charter school midway through their educational careers. For instance, Hoxby and Murarka (2007) argue that a fixed-effect approach cannot account for the possibility that students who, for example, perform poorly on a test may be especially likely to transfer to a charter school the following year. The dip in the performance could be a real dip caused by poor educational instruction, a disruption in a student’s life unrelated to a school, or it could be just noise in test scores. Regardless of the reason for the dip, the fixed-effect approach could produce biased estimates. Even absent bias, studies that rely on student-level fixed effects answer a different, but also narrow question: Are student outcomes for students who switch between a TPS and a charter school better when the student attends the charter school versus a TPS?

A well-publicized set of studies by CREDO, a research center at Stanford, used an alternative strategy to the fixed effect and lottery approaches (CREDO, 2009; CREDO, 2013a). These studies used what they termed a virtual control records (VCR) approach, which is a matching procedure where a “virtual” match for each charter student is found in a TPS. These students are matched based on known demographic attributes, grade in school, eligibility or participation in special support programs (including free and reduced lunch programs, English language learner status and special education status), and a baseline test result. Much like the fixed-effect model, VCR has the advantage over lottery-based studies in that a broader set of charter schools can be included, not

just oversubscribed schools. However, as with fixed-effects, the internal validity of the analysis requires stronger assumptions than in lottery studies as the approach assumes that students who have similar observed characteristics also have similar unobservable characteristics. The VCR approach has an advantage over fixed-effects—it can include a broader set of students, as the analysis is not restricted to only students switching between schools, but rather includes all students who have a baseline test score in a charter school. The need to have a baseline test score limits the questions the analysis can answer, though, as it cannot examine the accumulated impact for many students who first attend a charter school prior to baseline tested grade. For instance, if a student enters a charter school in Kindergarten and the first year a student is tested is 3rd grade, and this test score is used for matching students between charter and TPSs, the analysis will estimate the differential gain or loss between charter schools and TPSs from this baseline test score to those in later grades. If charter schools are the most or least beneficial to students during these early grades, the analysis would miss that part of the charter school contribution.

A fourth approach is the most basic approach—an OLS regression model with school type as the independent variable of interest and controlling for observed student characteristics. Like the matching model, OLS could be more inclusive of schools and students in the analysis and could lead to valid estimates if the researcher has a large set of observable characteristics, including those associated with student and family motivation. Having a baseline test score would be an essential control variable for the analysis, and therefore, OLS faces the same challenge as the matching approach outlined above. Together, this suggests, much like the matching, OLS requires strong assumptions. Later, when we aggregate the findings from previous research in summary tables, we will combine the matching and OLS research design studies into one category and only highlight those studies that have received the most attention.

A fifth approach, which is less frequently used in examining effectiveness of charter schools (relative to the fixed-effect and lottery-based models), is to use instrumental variable(s) (IV). An IV approach uses a variable or set of variables to tease out the effects of charter schools on student outcomes when reverse causality may be present. A valid instrument must impact the choice of a charter versus TPS but must not itself affect the educational outcome. While an IV model could have advantages relative to the lottery-based and fixed-effect approaches, as it may be more inclusive of students and schools, it is often difficult to find an “instrument” that is correlated with the schooling choice families make while also being uncorrelated with ultimate educational

outcomes. Another limitation of IVs is that the effect only applies to individuals who are at the margin on the instrument used (Angrist, Imbens, and Rubin, 1996). For example, in the context of charter schools, distance to a charter school has been used as an instrument (Booker et al., 2014). This may be a valid instrument, but the results only apply to individuals on the margin based on distance from a charter. From a policy perspective, we would like to know the charter effect for the broader population, but the IV estimates only address questions of effectiveness for a narrow population. This approach has often been used when the outcome is not measured both during and after treatment, such as test scores, but only occurs after treatment, such as graduation rates or college attendance.

It should be noted that evaluating charter schools used for turnaround policies complicate the analysis because in many of these cases, students are not choosing to attend these schools, rather schools are selected for charter school conversion. Here, the worry is not so much the unobservable characteristics of the students, but the unobservable characteristics of the schools. To address these concerns, researchers often employ alternative approaches, such as a difference-in-differences approach, which should control for the unobservable characteristics of the schools if certain assumptions are met including parallel trends among treatment and control groups. Another challenge for evaluating turnaround policies is that many low-performing schools are in low-income and distressed areas where the population is very mobile. Observed improvements or declines in student outcomes may be confounded by unmeasured changes in the mix of students served over time.

These methodological considerations suggest that differences in findings across studies could result from differences in research approaches, not to mention the alternative policy settings in which charter schools are implemented. We will discuss this point further as we synthesize findings across the existing literature.

4.1 Achievement Effects

Early charter school studies relied on fixed-effects methods to assess whether students switching from TPSs to charter schools had improved test scores (Zimmer et al., 2003; Bilfulco and Ladd, 2006, Sass, 2006; Booker et al., 2007; Hanushek et al., 2007; Zimmer et al., 2009). The research results across the studies using fixed effects are mixed—some positive, some negative, and often no statistically significant effect on student achievement (see Table 4). Some studies

found that achievement in charter schools improved as the charter schools matured (Sass, 2006; Bilfulco and Ladd, 2006; Booker et al., 2007, Hanushek et al. 2007; Ni and Rorrer, 2012; Zimmer et al., 2012). The most recent studies continue to have mixed outcomes (Nicotera et al. 2011; Ladd, 2017; Chingos and West, 2015), which, combined with the earlier studies, suggests that the fixed effects studies provide little consistent evidence for the effectiveness of charter schools relative to TPSs.

Table 4: Summary of Student Fixed-Effects Research

Study	Location	Results
Zimmer et al. (2003)	California	<ul style="list-style-type: none"> No reading effect for elementary students; small negative effect in math. No math effect for secondary students; small positive effects in reading.
Zimmer and Buddin (2006)	Los Angeles and San Diego	<ul style="list-style-type: none"> No math or reading effect for Los Angeles elementary students; small negative effects for San Diego elementary students in math and reading. Mixed small effects across locations for secondary students.
Sass (2006)	Florida	<ul style="list-style-type: none"> Small negative math and reading effects in grades 3–10.
Bifulco and Ladd (2006)	North Carolina	<ul style="list-style-type: none"> Negative math and reading effects in grades 4–8.
Booker et al. (2007)	Texas	<ul style="list-style-type: none"> Negative math and reading effects in grades 4–8.
Hanushek et al. (2007)	Texas	<ul style="list-style-type: none"> Negative reading and math effects in grades 4–8.
Zimmer et al. (2009; 2012)	Chicago Denver Milwaukee Philadelphia Ohio San Diego Texas	<ul style="list-style-type: none"> Mixed results across sites for math test scores. Authors found no effects on math scores in Chicago, Philadelphia, and San Diego, but positive effects in Denver and Milwaukee. There were negative effects on math test scores in Ohio and Texas. For reading, three sites had negative effects—Chicago, Ohio, and Texas. The rest showed no effect.
Nicotera et al. (2011)	Indianapolis	<ul style="list-style-type: none"> Results vary by whether the analysis uses spring-to-spring test score gains analysis or fall-to-spring test score gains. Strong positive math effects and no effect in reading for the spring-to-spring analysis. Strong positive math and reading effects for the fall-to-spring analysis.
Ni & Rorrer (2012)	Utah	<ul style="list-style-type: none"> Authors show small negative effects in math and language arts in grades 1-6; no effect in language arts grades 7-11.
Davis & Raymond (2012)	14 states	<ul style="list-style-type: none"> Only 19 percent of charter schools outperformed their local markets.
Clark, Gleason, Tuttle, & Silverberg (2015)	Milwaukee	<ul style="list-style-type: none"> Charter schools, on average, had no significant effect on student achievement. However, this average effect masks important heterogeneity in effectiveness across types of charter schools. Charter schools with higher autonomy from the district in terms of financial budget, academic program, and hiring decisions, were effective.
Ladd, Clotfelter, Holbein (2017)	North Carolina	<ul style="list-style-type: none"> Despite improvements in the charter school sector over time, charter schools were no more effective on average than traditional public schools.

More recent lottery-based analyses have generally shown strong positive effects on student achievement of charter school admission and enrollment. These studies generally show that lottery winners do better than peers who apply to a charter school and lose the admission lottery (see Table 5). However, two studies find insignificant achievement overall effects (Gleason et al., 2010; Clark et al., 2015) with only positive effects for at-risk and low-performing students. Overall, these lottery results are promising, but is mitigated by two factors. First, most charter schools are not oversubscribed and do not have admission lotteries. The results from lottery studies may not be applicable to these other charter schools—indeed the oversubscribed charter schools may in fact be oversubscribed because these schools are more effective than others. Second, the parents that enter admissions lotteries may not be representative of the general population of parents—they may be more motivated or committed to finding the best educational option for their children.

Table 5: Summary of Lottery-Based Research

Study	Location	Results
<u>Hoxby and Rockoff (2004)</u>	Chicago	<ul style="list-style-type: none"> • Large positive effects in math and in reading for elementary students.
<u>Hoxby et al. (2009)</u>	New York City	<ul style="list-style-type: none"> • Small positive effects in both math and reading for students in grades 3 through 8.
<u>Abdulkadiroğlu et al. (2011)</u>	Boston	<ul style="list-style-type: none"> • Moderately large positive effects in English and large effects in math for middle and high school students.
<u>Gleason et al. (2010)</u>	National Sample of Middle Schools	<ul style="list-style-type: none"> • Null average effects for student achievement and behavioral outcomes. The authors did find a positive effect for low-income, low-performing students, but negative effects for more advantaged students.
<u>Dobbie and Fryer (2011a)</u>	Harlem Children’s Zone	<ul style="list-style-type: none"> • Very large math and ELA positive effects both in elementary and middle school students in a poor urban area.
<u>Curto and Fryer(2011)</u>	SEED schools in D.C.	<ul style="list-style-type: none"> • Moderate to large effects in math and reading for middle and high school students.
<u>Clark et al. (2015)</u>	13 States	<ul style="list-style-type: none"> • Insignificant effects on middle schools overall, but big differences from school to school. • Positive effects for disadvantaged schools (i.e., high free/reduced school lunch rates), but negative effect for advantaged schools.

Table 6 highlights research done using alternative methodologies to lotteries and fixed effects. Two early studies using relatively weak research designs of cross-sectional analysis (AFT, 2004; Hoxby, 2004) received a great deal of media attention, including a major story in the New York Times. Despite the large amount of attention these studies received, they had limited controls for the mix of students attending each type of school and therefore, their conclusions are not seen as definitive.

Other studies relied on matched virtual control records or propensity score matching to estimate charter effects (CREDO, 2009 and 2013a; Furgeson et al., 2012a, b). These studies matched individual charter school students with TPS students based on individual characteristics and tests scores. These approaches provide greater balance in observable characteristics of treatment and control groups than earlier OLS approaches and are applicable to a broader range of charter students or schools than either the fixed effects or lottery approaches. Overall, these studies have shown that some charter schools are outperforming TPSs while others are performing worse. Matching may be misleading, however, because the strategy ignores possible selection effects due to unobserved factors affecting charter school enrollment.²

A value-added approach is the most recent method for assessing the efficacy of charter schools (Chingos and West, 2015; Ladd et al., 2017; Spees and Lauren, 2019; Baude et al., 2019). This method uses regression analysis to determine whether current test score in a charter school exceeds that of a comparable TPS student based on prior test scores and student characteristics. The lagged test score information implicitly controls for student heterogeneity and limits selection effects. A key feature of these studies is that they track the performance of charter schools within a state over time. A theme of these studies is that charter sector performance is improving over time. Baude and colleagues (2019) argue that the charter sector in Texas has improved over time because under-performing charter schools close and the surviving charter schools are more effective than the charter schools that exit the market. Chingos and West (2015) found similar results in Arizona, where low-performing charter schools struggle to attract students and subsequently close, while better-performing charter schools persist. Similarly, two studies (Ladd et al., 2014; Spees and Lauren, 2019) find that charter performance in North Carolina has improved over time although in both cases, the perform. While charter performance is improving over time, student achievement is just keeping pace with TPSs in Arizona and North Carolina. In contrast, student achievement in Texas charter schools exceeds that for comparable students in TPSs.

Table 6: Summary of Match and Other Regression Research

Study	Location	Research Design	Results
AFT (2004)	National	<ul style="list-style-type: none"> Cross-sectional 	<ul style="list-style-type: none"> Average 4th-grade achievement was higher for TPSs than for charter schools, both for students overall and for low-

² Using the same methodology, CREDO has produced a number of similar reports for individual states or locations. These reports can be found here: <https://credo.stanford.edu/reports>

		regression.	income students in particular.
Hoxby (2004)	National	<ul style="list-style-type: none"> • Cross-sectional regression, used matching. 	<ul style="list-style-type: none"> • Charter students were 3% more likely than non-charter students in nearby schools to be proficient in reading and 2% more likely to reach proficient levels in math.
CREDO (2009)	16 states	<ul style="list-style-type: none"> • Matched virtual control records. 	<ul style="list-style-type: none"> • Overall, 17% of charter schools outperformed TPSs and 31% performed worse than their TPSs counterpart in math.
Furgeson et al., 2012a, b	Twenty-two anonymous CMOs from several states	<ul style="list-style-type: none"> • Propensity score matching on student characteristics and prior test scores. 	<ul style="list-style-type: none"> • The CMOs had positive but not statistically significant test score impacts for all four academic subjects that were evaluated. • However, impacts varied greatly across CMOs individually. For example, ten CMOs had significant positive impacts on math scores and four had significant negative impacts. Larger CMOs tended to have more favorable impacts.
CREDO (2013a)	27 states	<ul style="list-style-type: none"> • Matched virtual control records. 	<ul style="list-style-type: none"> • Across the states studied, 29% of charter schools outperformed TPSs in math, while 19% performed worse than their TPSs counterpart. • Overall on average, the authors found no significant impact on math scores and a slight positive effect on reading scores.
Chingos and West (2015)	Arizona	<ul style="list-style-type: none"> • Value-added model. 	<ul style="list-style-type: none"> • Charter schools are modestly less effective than TPSs in raising student test scores, but charter school performance is increasing over time both absolutely and relative to TPSs.
Ladd et al. (2017)	North Carolina	<ul style="list-style-type: none"> • Value-added model using lagged test score controls and fixed effects. 	<ul style="list-style-type: none"> • Charter schools have improved performance over time, evidenced by improved parental satisfaction (i.e., greater school retention in charter schools than in TPSs for comparable students).
Spees and Lauren (2019)	North Carolina	<ul style="list-style-type: none"> • Value-added model using lagged test score controls. 	<ul style="list-style-type: none"> • Charter school performance has increased over time but remains lower than TPSs. Economically-disadvantaged students have greater growth, especially in reading.
Baude et al. (2019)	Texas	<ul style="list-style-type: none"> • Value-added model using lagged test score controls. 	<ul style="list-style-type: none"> • Charter schools have improved performance with moderate to large effect sizes in math and reading, respectively. Least effective charter close, so market survivors have stronger performance.

4.2 Charter Effects on Other Outcomes

Several other studies have used similar research methods to examine how charter schools affect educational attainment, school climate, and high-risk student health behaviors (Table 7). While the set of studies are thin, many of the early studies showed that charter high school students were more likely to attend college than counterparts at TPS high schools (Booker et al., 2011; Dobbie and Fryer, 2013; Sass et al., 2016; Harris and Larsen, 2016b). These researchers also found that

charter schools had a positive effect on high school completion and have generally shown greater persistence in college and/or college completion. Angrist and colleagues (2013a, b) found no significant effect on high school graduation but charter students were more to apply to 4-year colleges than TPS students. A study of CMO outcomes found educational attainment results varied from CMO to CMO (Furgeson et al., 2012a, b). Unlike the early studies, two recent studies—one analyzing charter middle schools using a lottery design (Place and Gleason, 2019) and one of Texas charter schools using an OLS approach (Dobbie and Fryer, 2017)—found no downstream effects on educational attainment, college choice, or labor outcomes. Expanding beyond educational attainment and labor outcomes, two studies reported that charter schools improved school discipline and attendance (Imberman, 2011; McEachin, et al., 2019) and charter school students were less likely to be convicted of felonies or misdemeanors as adults, and more likely to register to vote than students entering TPS (McEachin et al., 2019). Some studies found charter high schools were more orderly, provided more support for college, and decreased student mobility (Angrist et al., 2013a, b; Dudovitz et al., 2018). Finally, a couple of studies have found that charter high schools had a positive effect on student health behaviors relative to TPS schools. Two studies examined the effect charter schools have for at-risk low-income students to engage in risky health behaviors (e.g., drug misuse or unsafe sex practices) if they won a charter high school lottery (Wong et al., 2014; Dudovitz et al., 2018). They found that students with better educational opportunities at the charter high schools had fewer risky behaviors than students that attended nearby TPS schools. This suggests that improvements in public education could have collateral benefits in health outcomes.

Table 7: Summary of Results of Analyses of Non-Cognitive Outcomes

Study	Location	Research Design	Results
Booker et al. (2011)	Chicago and Florida	Probit.	<ul style="list-style-type: none"> Charter high school attendance increased probability of graduating high school and attending college, conditional on 8th grade charter enrollment.
Imberman (2011)	Anonymous District	Instrumental variable and fixed effects.	<ul style="list-style-type: none"> Charter schools generate large improvements in discipline and attendance.

Furgeson et al. (2012a, b)	Anonymous CMOs	Propensity score matching using student characteristics and prior test scores.	<ul style="list-style-type: none"> Two years after enrolling in a CMO school, students experience significantly positive math impacts in half of the CMOs (11 of 22) covered by the impact analysis, while students in about one-third of the CMOs (7 of 22) do significantly worse in math. Similarly, students in nearly half of the CMOs (10 of 22) experience significantly positive impacts in reading, while students in about a quarter of CMOs (6 of 22) experience reading impacts that are significantly negative. Among the six CMOs with graduation data, three had positive and statistically significant effects, and only one had a negative impact on graduation. In the remaining two cases, impacts were positive but not significant.
Angrist et al. (2013a, b)	Boston	Used charter high school admission lotteries as a quasi-experimental research design.	<ul style="list-style-type: none"> Authors found positive impacts on measures of college preparation (such as SAT scores), no statistically significant impact on high-school graduation, and an effect of shifting students from 2-year colleges into 4-year colleges.
Dobbie and Fryer (2013)	Harlem Children's Zone	Lottery based assignment for poor urban youth as a quasi-experimental approach.	<ul style="list-style-type: none"> The study found a 14.1% increased likelihood of college enrollment. Females were 12.1% less likely to experience teenage pregnancy, and males were 4.3% less likely to be incarcerated. The study found no impact on self-reported health outcomes.
Wong et al. (2014)	Los Angeles	Used charter high school admission lotteries as a quasi-experimental research design.	<ul style="list-style-type: none"> <i>Charter high school admission lotteries (low-income minority students).</i> Authors found a significantly lower incidence of very risky behaviors (e.g., binge drinking, substance use at school, gang participation) in low-income minority students. No significant difference in behaviors denoted less risky (e.g., alcohol, tobacco, marijuana use).
Harris & Larsen (2016b)	New Orleans	Matching strategy.	<ul style="list-style-type: none"> The authors found that students who attend charter high schools were more likely to graduate high school and attend, persist, and graduate college.
Dobbie & Fryer (2017)	Texas	OLS with controls	<ul style="list-style-type: none"> Authors find that, at the mean, charter schools have no impact on test scores and a negative impact on earnings. "No Excuses" charter schools increase test scores and four-year college enrollment, but have a statistically insignificant impact on earnings.
Dudovitz et al. (2018)	Los Angeles	Used charter high school admission lotteries as a quasi-experimental research design.	<ul style="list-style-type: none"> Charter admission led to less marijuana misuse, more study time, less truancy, more teacher support for college, more orderly schools, and less school mobility for low-income minority students.

McEachin et al. (2019)	North Carolina	Propensity score matching strategy.	<ul style="list-style-type: none"> Charter high school enrollees were less likely to be chronically absent, suspended, convicted of felony or misdemeanor as adult, and more likely to register and vote than students entering TPS.
Place and Gleason (2019)	National Sample of Middle Schools	Used charter middle school admission lotteries as a quasi-experimental research design.	<ul style="list-style-type: none"> Authors found charter attendance had no effect on college enrollment or college choice (two- or four-year college or public or private college), and no effect on degree attainment.

4.3 Charter Schools as a Turnaround Mechanism

A recent development in the charter school movement (and one that has not been explored by previous literature reviews) is the use of charter schools as a mechanism for “turning around” low-performing TPSs. The efforts to improve performance of chronically struggling schools has been at the forefront of education policies for decades; for example, the federal government supported the comprehensive (or whole) school reform initiative from 1998-2007 (U.S. Department of Education, 2010). However, incorporating charter schools in to this effort has been a relatively recent development. Current trends can be traced to accountability and federal reform efforts, including No Child Left Behind (NCLB), School Improvement Grants (SIGs), Race to the Top, NCLB waivers, and most recently, the Every Student Succeeds Act (ESSA). Under these programs, many states have “taken over” chronically low-performing schools and turned the management of these schools over to CMOs. In other cases, states or districts have converted these schools into charter schools. This approach was often adopted under the so-called “portfolio approach” of charter schools, allowing families to choose from an array of choices within a geographic area (Hill, 2006). In other cases, these schools were converted over to neighborhood charter schools (i.e., residentially assigned) rather than schools of choice, which eliminated a key ingredient for the success of charter schools (Zimmer et al., 2017).

In Table 8, we summarize research regarding the effectiveness of charter schools as a turnaround mechanism for TPSs. Echoing the charter literature in general, these analyses report mixed results. The most notable (and highly publicized) success is found in New Orleans (Abdulkadiroğlu, et al., 2016; Bross, Harris, and Liu, 2016; Harris and Larsen, 2016a). This is in contrast with Tennessee, where the results suggest that charter schools are not improving student achievement of low performing schools (Zimmer, et al., 2017; Pham et al., 2019). It is important to note that, while New Orleans charter schools are schools of choice, Tennessee’s charter schools

are not, which may be a potential explanation for the observed difference in performance.³ Research in New Orleans suggests the reform approach has faced new challenges over time as there is a limited pool of effective teachers and principals to staff these schools (Harris & Larsen, 2016a; McEachin, Welsh, & Brewer, 2016). Similarly, in a follow up study in Tennessee, Henry and colleagues (2019) found that the turnover of teachers in schools was among the possible explanations for the lack of success in the turnaround charter schools.

Table 8: Summary of Results from State Take Over

Study	Location	Research Design	Average Impact
Abdulkadiroğlu, Angrist, Hull, & Pathak (2016)	New Orleans and Boston	Used charter high school admission lotteries as a quasi-experimental research design.	<ul style="list-style-type: none"> Find large math and reading impacts from converting underperforming traditional public schools into charter schools in Boston and New Orleans.
Harris and Larsen (2016a)	New Orleans	Difference-in-difference.	<ul style="list-style-type: none"> The results indicate that student test scores improved by the second year. If failing schools are closed instead of contracted out, the students do not experience any increases in test scores.
Zimmer, Henry, Kho (2017) ⁴	Tennessee	Difference-in-difference.	<ul style="list-style-type: none"> Authors found no positive effects for schools taken over by the state and managed by CMOs.

4.4 Final Thoughts on Methods and Results

The evidence on charter effectiveness is complicated by the variety of methods applied in different locations with differing charter circumstances (e.g., quality of nearby TPSs, new versus established charter schools, charter focus and philosophy), and potentially charter school types and policies, which we will discuss in the next section. Lottery studies provide strong evidence for the effectiveness of charter schools at improving student achievement, educational attainment, and other outcomes. However, these lottery studies reflect only a portion of charter schools which are

³ Similar results were found by Gill and colleagues (2007) in Philadelphia. The state took over the 45 lowest performing schools in a district. A subset of schools was converted over to private management organizations, which were not schools of choice.

⁴ In a follow up study, which does not meet the requirement of being published in a peer review journal or have 30 citations and has not received significant media attention, the authors found no improvement six years into CMOs managing takeover schools (Pham, et al., 2019).

oversubscribed and are typically located in urban areas with large concentrations of at-risk students and often are near low-performing TPSs. While these findings have strong internal validity and are impressive for an important population group, the results from fixed-effects and matching approaches, which have broader inferences but weaker internal validity, provide much less positive evidence for the effectiveness for charter schools. As for charter schools as a means of improving chronically low-performing schools, the jury is still out as many locations employing charter schools as a turnaround strategy have not been examined and in the locations in which they have, the results are mixed.

Some argue that the only studies that should be trusted are the ones using lottery-based designs. However, Abdulkadiroğlu and colleagues (2011) found that lottery-based estimates in Boston charter schools were similar to those from an observational-based regression analysis controlling for baseline test scores and student demographics. Several studies have shown that charter outcomes are similar, when lottery and propensity matching methods are applied to the same schools (Fortson et al., 2012; Tuttle et al., 2013). These findings suggest that unobserved factors in many cases may not be sufficient to seriously bias results from some nonexperimental assessments of a subset of charter schools (i.e., oversubscribed lotteries available to researchers). This subset is relatively small, however, and rarely includes elementary students. The risk of more serious selectivity bias from nonexperimental methods remains for the broader group of charter schools where lotteries are unavailable.

More generally, researchers have not reached a consensus on charter school effectiveness when examining test scores because of differences in findings across studies and location. An interpretation that fits the evidence is that some charter schools, especially the oversubscribed schools, are in fact much more effective with respect to student achievement than their counterpart TPSs, while the majority of charter schools are not superior, and some are inferior, to their counterpart TPSs. When alternative outcomes such as educational attainment and labor and health outcomes have been explored, the results have been more consistent as these studies generally report positive impacts.

V. Charter Practices and Effectiveness

While dozens of studies have examined the effects of charter schools, substantially less research has examined how particular charter policies and practices might affect their effectiveness. In part, this limited focus reflects the fact that school-level practices are hard to

measure and harder yet to disentangle. Similarly, the implementation of policies and practices may vary considerably from place to place. A more intensive focus on charter schools themselves has suggested how and why charter schools are successful in some circumstances and less successful in others. If charter school success is tied to specific practices or situations, then other charter schools might modify their programs to achieve similar improvements for students. Similarly, TPSs might adopt similar charter school practices and enhance learning in their schools.

5.1 Different Charter Policies Across States

As the summary of the research above suggests, findings across geographic locations vary, which may be a function of the policies in place across locations. For instance, some states have very flexible policies for starting and operating charter schools, while others have much more restrictive policies. Furthermore, some states allow up to four different types of authorizers, while others allow only a single authorizer. These kinds of policy differences, along with the environment charter schools operate (e.g., the quality of TPSs, types of students, urban versus rural and suburban), types of schools (e.g., online versus “brick and mortar” schools, CMO versus non-CMO), and charter school practices (e.g., longer school day, instructional and curriculum focus) may explain variations in outcomes.

CREDO researchers examined how state policies affected charter school performance. For instance, CREDO’s 2009 study suggested that charter schools perform poorly in states in which they operate under a cap limiting the number of charter schools or have multiple possible authorizers. In contrast, states where charter schools have an appeal process for adverse application decisions have stronger charter school performance. These conclusions should be viewed as initial insights, as the differences in effects were small and the policy variable only varied across 16 states. However, follow up studies have examined whether charter authorizers could play a role in the success of charter schools in individual states. Carlson and colleagues (2012) in Minnesota found no variation in performance associated with the four types of charter authorizers while Zimmer and colleagues (2014) found that charter schools authorized by non-profits had lower achievement gains.

5.2 Charter Type

A few studies have gone beyond overarching state policies and have examined whether or not charter school type and/or operational features affect outcomes. Using student-level data from California, Buddin and Zimmer (2005) examined whether there were differential effects across conversion and startup charter schools and classroom-based versus non-classroom-based charter schools, also known as virtual or online charter schools. The research showed some differences between conversion and startup charter schools, but the differences were generally small. However, the differences were much larger between classroom-based and non-classroom-based/virtual charter schools with the non-classroom-based/virtual charter schools having lower achievement. This result is consistent with follow up research in Ohio (Zimmer et al., 2009; Ahn and McEachin, 2017), Indiana (Fitzpatrick, et al., 2018), and in a study of 17 states (CREDO, 2015a), all of which found virtual schools performed poorly. While some of the authors in these studies cautioned against drawing strong conclusions regarding these virtual/non-classroom-based schools, as they note that these schools typically serve unique students, it does raise some concerns about the rapid expansion of these types of schools in a number of states.

5.3 Management Structure

About 65 percent of charter schools are independent entities operated by a local board of trustees, and the remaining 35 percent are linked with a management network (David, 2018). Charter management organizations (CMOs) are non-profit organizations that provide a common mission and structure for clusters of charter schools. Educational Management Organizations (EMOs) are for-profit organizations that provide similar functions. About 23 percent of charter schools are in CMOs and the remaining 12 percent are in EMOs.

By pooling resources across several schools, management organizations provide opportunities for economies of scale relative to independent charters. These advantages might help in attracting funding and sharing information on best practices. Effective CMOs and EMOs presumably use their reputation with school policymakers and parents in opening new charter schools, especially if the new schools are located near their pre-existing charter schools. Involvement in day-to-day management decisions varies considerably from organization to organization (David, 2018), but CMO and EMO schools generally have more autonomy than TPSs. However, independent charter schools have more autonomy than charter schools in a network, and this autonomy may offset the advantages of scale economies in some cases.

A recent study shows that CMOs and EMOs have stronger effects on student achievement than independent charters (CREDO, 2017). They attribute most of this success to CMOs but find large variance in outcomes across all types of charter schools. The higher average success of management organizations may reflect the concentration of these schools in urban areas where several studies have found charter schools were more successful than in other locales. About 53 percent of independent charter schools are in urban areas as compared with 69 percent of charter schools in management organizations.

Other researchers have evaluated the effectiveness of CMOs, both as a whole and by type. Using student-level data and a matching strategy, Mathematica found no statistically significant effect overall for test scores or graduation, but did find a great deal of variation across CMOs (Furgeson, et al., 2012a, b). In a second Mathematica study of KIPP schools, which is a well-known CMO operator, Tuttle, et al. (2013) used a lottery-based approach in evaluating 13 middle schools and found strong positive effects in math, but no statistically significant effect in reading. The authors then employed observational methodologies and found consistent results with these same 13 schools. Bolstered by the consistency of the results, the authors then applied the same observational approaches to 41 KIPP schools and found strong positive effects across multiple subjects. Again, these results suggest that charter schools should not be viewed as monolithic group.

5.4 Inside the Black Box

Research evidence suggests that charter schools have success in urban areas that typically serve high proportions of poor and minority students (Gleason et al., 2010; CREDO, 2015b). Abdulkadiroğlu and colleagues (2010) show that the “charter effect” in the Boston area is sufficiently large to reduce two-thirds of the black-white test score gap in middle school reading, to eliminate the gap in middle school math, and to eliminate the gap for both reading and math in high schools. Similarly, Dobbie and Fryer (2011b) find that enrollment in Harlem charter elementary schools closes the black-white achievement gap, while enrollment in charter middle schools reduces the reading gap by half and eliminates the math gap entirely.

A possible explanation for the charter success in urban areas is the student achievement at nearby TPSs. In many depressed urban areas, the counterfactual TPSs have low test scores (Chabrief et al., 2016). The positive charter effect could be dampened and even eliminated in areas where school-level

achievement rates are high in wealthier areas and in the suburbs. Charter school enrollment is linked with substantial gains for poor and minority students in urban areas and few if any gains for any groups in suburban schools (Angrist et al., 2013b; Chabrief et al., 2016).

Another key factor for urban charter schools is their emphasis on “no excuses” policies. “No Excuse” charter schools adopt an educational approach that emphasizes discipline, traditional reading and math skills, greater instruction time, and selective teacher hiring. This approach has been adopted by KIPP and other CMOs. Dobbie and Fryer (2011a, 2011b), Hastings and colleagues (2012), and Angrist and colleagues, (2013b) all found strong positive achievement effects for these schools.

In contrast with the “no excuses” approach, suburban charter schools often focus on special concentrations (e.g. performing arts, math/science emphasis), interdisciplinary studies, field work, or customized instruction (Chabrief et al. 2016). Since TPSs have strong academic outcomes in suburban areas, it appears that charter schools are offering less academically focused alternatives to their counterfactual TPS options. Suburban charter schools on average have small (if any) positive effects on measured achievement, but these schools may have positive results on other outcomes that are more directly related to their emphasis.

Further research has attempted to decompose exactly which elements of a “no excuses” approach are important for urban charter schools. Individual studies have small numbers of charter schools, so researchers have struggled to disentangle important from extraneous features of school policies. Dobbie and Fryer (2013) focus on high expectations, regular teacher feedback, data-driven instruction, increased instructional time, and high-dose tutoring. Angrist and colleagues (2013b) emphasize the importance of strict discipline, cold-calling on students, teacher feedback from recorded lessons, and Teach for America alumni. Chabrief and colleagues (2016) pooled evidence from several lottery studies and found that intensive tutoring was the only factor that remained significant in explaining the positive performance for charter schools after controlling for the performance of fallback schools.

A few studies have tried to examine the practices of charter schools beyond the “no excuse” approach using survey or case study data along with test score outcomes. In some cases, researchers were not able to identify many effective operational strategies or practices, which may be the result of small sample sizes and the challenges of identify nuanced differences in operations (Zimmer and Buddin, 2007; Tuttle, et al., 2013). However, other studies have found positive

effects for teachers' focus on academic achievement (Berends, et al, 2010), intensive coaching of teachers (Furgeson, et al., 2012a, b), strong behavioral policies (Angrist, et al. 2013b; Dobbie and Fryer, 2011b; Furgeson, et al. 2012a, b; Tuttle, et al, 2013), increased instructional time, high dosage tutoring, frequent teacher feedback, and the use of data to guide instruction (Dobbie and Fryer, 2011b). Given that an original impetus for charter schools was for these schools to be incubators of effective educational operations and practices, more studies need to open the "black box" of these schools to identify key features that other schools could adopt.

VI. Indirect Effects

While the indirect effects of charter schools on TPSs have received less attention than direct effects, these indirect effects may be as important, if not more important. Despite recent growth, charter school enrollment only represents about six percent of the student population nationwide. Even if charter schools' growth rate accelerated, it would take many years before the charter sector could have widespread direct effects. Meanwhile, there is potential for charter schools to have substantial effects on the broader educational system, either negatively through adverse fiscal effects on school districts, or positively through "healthy" competitive effects.

6.1 Financial Impacts

Fiscal impacts are among the most visible ways charter schools can affect TPSs. Charter schools draw students from TPSs, and in doing so, they draw both costs and resources from TPSs. The channels of these fiscal impacts on TPSs may include payment from TPSs to charter schools as well as changes in state and federal aid from programs that link funding to enrollments. While there have been relatively few studies of the fiscal impact charter schools have on TPSs, there are few that have been helpful. A report from the Institute on Metropolitan Opportunity (2013) summarizes financial impacts on Minneapolis-St. Paul. Schafft, and colleagues (2014) study funding and financial impacts in Pennsylvania. Bifulco and Reback (2014) provide instructive case studies of TPSs' financial adaptation to enrollment declines in Albany and in Buffalo, New York.

From this research, the follow issues emerge. First, as charter schools draw enrollments from TPSs, the district must make adjustments to their operation. Adjustment problems are often aggravated by the fact that a charter school does not draw students from a single TPS school. One could argue that charter schools have little effect on the overall cost of educating students, because

as students move from TPSs to charter schools both the revenue and the costs move with them. However, this perspective does not take into account the difficulties of adjusting costs at an individual school. If an individual TPS only loses two to three students per grade, then the school is unlikely to make any adjustments in staffing as the school has not lost enough students to layoff individual teachers. Eventually, with enough students lost across many TPSs, the district may reorganize student school assignments to address excess capacity, which may mean closing one or more schools and teacher layoffs. Second, charter schools create uncertainty. For example, if a charter school closes on short notice, the TPS district must absorb those students. District administrators find themselves grappling with these fiscal impacts while, at the same time, attempting to maintain or increase quality to avoid the loss of more students. This dynamic may increase the urgency with which TPSs reallocate resources to improve performance. However, Arsen and Ni (2012), in examining Michigan school district budgets, found little evidence that school districts shift resources to achievement-oriented activities in response to charter schools. This finding is consistent with a California school district survey inquiring about the responses of school districts to charter schools (Zimmer et al., 2003; Zimmer and Buddin, 2009). If this is true more generally, then the only avenue for charter schools to have a systemic effect is by forcing staff within TPSs and districts to work “smarter” and/or harder in educating students. Finally, charter funding formulas and levels vary considerably from location to location, and the particular circumstances for particular districts and TPSs vary considerably. Consequently, the burden charter schools impose on TPSs vary across locations.

6.2 Challenges in Estimating Competitive Impacts on Effectiveness of TPSs

Estimating the impact of competition from charter schools on TPS’s educational effectiveness is difficult for two reasons, one of which is conceptual and the other methodological.⁵ The conceptual challenge has two parts. First, it is difficult to establish good proxies for competitive pressure. While the vast majority of research has used geographic proximity to charter schools as a proxy for whether a TPS feels competitive pressure, it may be more complicated. Competitive

⁵ We should also note that if charter schools do indeed create competitive effects, these indirect effects could be the threat to the estimates of the direct effect we discussed in the previous section. More specifically, if charter schools are creating competitive effects for TPSs, then the TPSs would no longer serve as a good counterfactual. The performance of TPS students would be inflated by the fact that the achievement of students improved as a result of TPS competing with charter schools.

pressure may only occur when charter schools gain a significant portion of the “market share” of students. Or, it could only occur if there is the sense that charter schools are outperforming a TPS, which hurts the reputation of a TPS. Or, the individual charter school may need to take a significant share of student from an individual TPS. Or, it could be a combination of all of the above.

The second conceptual challenge is associated with the complexity of providing education in general, as education is provided through multiple layers, including teachers within classrooms who are managed by principals, who are in turn provided resources and instructional/curriculum guidelines by the district. While actors in any single layer may feel competitive pressure, it might not ultimately affect the performance of students if the other layers are not equally motivated to improve. Alternatively, it might only matter that particular layers feel competitive pressures. For instance, a perceived competitive threat by teachers may be the only thing that matters because they are at the front lines of providing education. Or, it could be that the key to improving school-wide performance is to motivate the principal. On the other hand, it might not matter whether principals or teachers feel competitive pressure if many of the curriculum, instructional, and staffing decisions are made at the district level. In addition, each of these actors within these layers may perceive competitive threats differently, and each may have a different ability to react.

Adding to the complexity of drawing conclusions across studies is the real possibility that charter schools have different competitive effects in different types of environments. For instance, a growing trend among districts nationwide is to offer intra-district choice through open enrollment, whereby families can choose among all schools within the district, or through magnet schools. Other districts use a more traditional enrollment assignment based on geographic residency. Charter schools may have very different competitive effects in these environments. For districts with preexisting school choice, an already competitive market may diminish the competitive pressure created by charter schools. In contrast, the introduction of charter schools in a noncompetitive market with no choice program could be more impactful. In addition, some districts may have growing enrollments and existing schools may be overcrowded. Here, charter schools could serve as a “release valve” for these districts. Other districts may have declining enrollments and the loss of additional students to charter schools could exert real fiscal pressure on existing schools. These observations suggest that developing theoretical models could help to guide empirical research on competitive effects.

The challenges we described so far do not include the methodological challenges, which are significant. If researchers examine whether the performance of TPSs changes when charter schools are introduced nearby, they may not know whether any change in performance is a result of a change in student population or an actual change in performance. For instance, a charter school could be introduced into a neighborhood and begin attracting students away from a nearby TPS. If the students choosing a charter school are disproportionately low-performing, then the average test scores for students within TPS may improve, not because the quality of education of the TPS is improving, but because the school has less low-performing students. In addition, there may be observable and unobservable characteristics of students and individual TPSs that should be accounted for when examining competitive effects. Furthermore, charter schools do not locate at random. They may locate in neighborhoods for a variety of reasons, including operators' perception of how well they can compete with TPSs based on both observable and unobservable characteristics of TPSs.

Researchers can address some of these methodological challenges by using student-level longitudinal data. Longitudinal data can help control for a changing student population within a TPS by tracking students moving in and out of a school. Furthermore, longitudinal data can help control for both observable and unobservable differences in students and schools by using a combination of student-and school-fixed effects, known as “spell effects,” which compare the performance of the same students in the same school over time. However, many researchers have not had access to these types of data and have used school-level data instead. In our review, we focus primarily on studies that have used longitudinal data. Nevertheless, there is some question of whether longitudinal data fully addresses all of the methodological challenges, especially the non-random location of charter schools. Therefore, it is our view that the analysis on the question of competitive effects is not as strong as that on some of the other questions.

6.3 Summary of Indirect Achievement Effects

Table 9 summarizes findings for studies of competitive effects. Most of these studies use geographic distance as a proxy for competition, but not all. For example, Cremata and Raymond (2014) introduce measures for charter school quality to attenuate their analysis, and others have also employed the share of TPS transfers to charter schools as a measure (Zimmer and Buddin 2009; Winters 2012). Overall, findings have been somewhat mixed—while Bettinger (2005) and

Zimmer and Buddin (2009) found no evidence of competitive effects, other studies listed had mixed or positive results across model specifications. Nissar (2012) also notes that there are heterogenous competitive effects across student subpopulations; in his study of Milwaukee schools, he finds that positive competitive effects were amplified for African-American students and students who were low-achieving.

While this research has almost exclusively been framed as examining competitive effects, it also informs the debate of whether or not charter schools are having an adverse effect on TPSs. Many critics of charter schools argue that charter schools have adverse effects on TPSs because they are drawing the best students from the TPS system (which reduces positive peer influences within TPSs) and/or siphon off money. On this score, almost uniformly, the research suggests that charter school do not have any adverse effects on TPSs. Only Imberman (2011) when using an IV approach found negative effects.

Finally, in a different twist on the debate surround competitive effects, three papers have recently emerged that not only look at the impact of charter schools on enrollment patterns in TPSs, but also in private schools. Toma et al. (2006) and Chakrabarti and Roy (2010) exclusively focused on Michigan, while Buddin (2012) conducted a national evaluation. While this research has not been completely consistent, two (Toma et al., 2006; Buddin, 2012) of the three studies did find evidence that that private schools disproportionately lose students to charter schools relative to TPSs. This may imply that charter schools exert stronger competitive effects on private schools than TPSs as private schools are so financially sensitive to losing students and their tuition dollars.

Table 9
Summary of Competitive Effects

Study	Location	Research Design	Average Direct Effects
Hoxby (2003)	Michigan, Arizona	Difference-in-differences.	<ul style="list-style-type: none"> • Author found competitive effects present in test scores.
Bettinger (2005)	Michigan	Difference-in-differences and instrumental variable models; used number of charter schools in 5-mile radius to approximate competition.	<ul style="list-style-type: none"> • Author found no evidence of competitive effects on test scores of nearby TPS students.

Sass (2006)	Florida	Fixed-effects regression; used a geographic radius of 2.5 miles to approximate competition. Student-level data.	<ul style="list-style-type: none"> Analysis found a slight positive competitive effect on math scores, but not reading scores.
Imberman (2007)	Anonymous School District	Instrumental variable regression, fixed effects regression. Student-level data.	<ul style="list-style-type: none"> Mixed results across specifications, with positive effects on test scores in value-added fixed-effects models and negative effects in the IV models. Found competition to have a positive impact on school discipline in some models.
Booker et al (2008)	Texas	Fixed-effects regression; used a geographic radius of 5 miles as a competition proxy. Student-level data.	<ul style="list-style-type: none"> Authors found charter competition had a positive effect on student math and reading test scores.
Zimmer and Buddin (2009)	California	Fixed-effects regression, survey; used both geographic distance and number of student transfers to charter schools as a proxy for competition. Student-level data.	<ul style="list-style-type: none"> TPS principals did not report feeling competitive pressures in a survey. Found no evidence of competitive effects on TPS student test performance.
Zimmer et al (2009)	Chicago, Denver, Milwaukee, San Diego, Philadelphia, Ohio, Texas	Fixed-effects regression; used geographic distance to approximate competition. Student-level data.	<ul style="list-style-type: none"> Small competitive effects detected for Texas test scores, but not other locations.
Winters (2012)	New York City	Fixed-effects regression; used exit share of TPS to approximate competition. Student-level data.	<ul style="list-style-type: none"> Found some evidence of slight effects on TPS test scores, but not in all models.
Nissar (2012)	Milwaukee	Fixed-effects regression. Student-level data.	<ul style="list-style-type: none"> Charter schools that are not district-sponsored have positive effects on test scores for nearby TPSs. Competitive effects were heterogeneous for student subgroups, such as African-American students or low-achieving students.
Cremata and Raymond (2014)	Washington, DC	Difference-in-differences, fixed effects regressions; used several measures of competition, focusing on attrition and charter quality. Student-level data.	<ul style="list-style-type: none"> Found that competition (particularly with higher quality) had positive effects on reading, with mixed results for math test scores.
Cordes (2018)	New York City	Difference-in-differences, fixed-effects regression; used	<ul style="list-style-type: none"> Found that charter competition increased TPS performance in ELA and math. Co-location amplified these effects.

		geographic distance to proxy competition. Student-level data.	
--	--	---	--

VII. Summary and Conclusions

When charter schools first entered the landscape, the debate was contentious, with both advocates and critics using strong rhetoric. Advocates often sold charter schools as a silver bullet solution for not only the students who attend these schools, but the broader TPS system as well. Similarly, critics painted charter schools as an apocalyptic threat to public schools. To inform this debate, research has evolved over time, with much of the first generation (through about 2005) of research studies focusing on the effect charter schools have on test scores almost exclusively using non-experimental designs. The second generation of studies more frequently used experimental designs and broadened the scope of outcomes beyond test scores. Furthermore, the second generation of studies has also included studies seeking to explain the variance in performance. In this survey of the research, we summarize the findings across both generations of studies, but we put a greater emphasis on the second generation than prior literature reviews. This includes an examination of indirect effects, examination of explanation of charter effectiveness, and the recent use of charter schools as a mechanism of turning around low-performing schools.

In general, the first generation of studies found mixed results for the effectiveness of charter schools with much of the research finding very little difference in performance for charter students relative to TPSs. In contrast, the second generation, which has more often used experimental designs, has been more positive. Because most of the positive effects have been from lottery-based studies with limited inferences (i.e., to oversubscribed schools), it is not clear whether the overall performance of the charter school sector has improved. Researchers, when they have examined whether charter school sector has improved over time using a consistent non-experimental approach with a broader set of schools, have generally found some improvement in the charter sector (Chingos and West, 2015; Baude, et al., 2019; Ladd, et al., 2017), but these gains have not been profound and do not approach the level of impacts shown in the lottery-based studies. This raises the question of whether or not the general differences between the generation of studies can be explained by differences in approaches and whether we should trust the results from non-lottery-based studies. When researchers have used both observational or lottery-based strategies

in the same location with the same schools, they have generally found similar results (Abdulkadiroğlu, et al, 2011; Fortson et al., 2012; Tuttle et al., 2013). This suggests that the non-experimental studies have merit and we argue that caution is warranted for claiming broad charter school success from these lottery-based studies as there is some evidence that the less positive observational studies provide valid results and raises the question of the generalizability of the lottery studies. Overall, our conclusion is that while charter schools have had some success, it has not been consistent, which might be predictable given the variation of policies across states and the general variance of practices across charter schools.

But that is not where the story ends as the second generation of studies have also moved beyond test score outcomes and examined the effects of charter enrollment on health behaviors, educational attainment, and labor outcomes. In these cases, charter schools have generally had positive effects on these noncognitive outcomes. However, additional studies examining a broad set of outcomes is needed, as not all studies of alternative outcomes have been positive. Therefore, it is premature to draw strong conclusions on these outcomes.

In addition, the second generation of studies have been more informative on the indirect effects of charter schools. These studies have almost uniformly found no or small positive effects. However, it should be noted that this research has not been able to fully deal with either the conceptual issues (e.g., developing good proxies for competition, who needs to feel the pressure to motivate action) nor methodological issues and therefore, have less definitive conclusions. In addition, while this research has been cast as a means to examine whether charter schools create competitive effects or not, it actually has implications for whether charter schools create negative system effects for TPS—a point rarely made in the empirical analyses. From this lens, only one study at this point has shown negative effects (Imberman, 2011).

Finally, the second generation of studies have examined issues of student access and racial segregation. For racial segregation, the research has generally examined whether students moving to charter schools are moving to schools with a higher concentration of their own race. While this research has been mixed for Hispanics and white students, it has provided fairly consistent evidence for African American students. More specifically, the research suggests that African American students are moving to charter schools with a greater share of African American students than the TPSs they left. However, this same research has also shown that these differences have generally been small, with the exception of research from North Carolina (Bifulco and Ladd,

2007). Furthermore, research examining the moves of students into or out of charter schools have generally shown little evidence consistent with the claims of cream skimming high-performing students or pushing out low-performing students by charter schools.

Overall, our view is that charter schools are having a positive effect for some students for some outcomes in some locations. However, because charter schools were initially sold as a silver bullet solution, charter schools will probably never live up to the pre-reform hype and therefore, never be seen as a success from this standard.⁶ Similarly, because critics argued against charter schools in apocalyptic terms, charter schools will probably never live up to pre-reform disasters critics portrayed. In sum, the research results have not lived up to the hopes nor the fears of the advocates nor critics.

Going forward, because charter schools have been recently employed as a means of improving chronically low-performing schools through turnaround polices, there needs to be more research in a broader set of locations on the effectiveness of charter schools as a turnaround policy. Currently, there are only a handful of studies largely concentrated in New Orleans and Tennessee. Additionally, while there is a growing literature examining alternative outcomes, including long-term outcomes, there needs to be additional research examining a broad set of outcomes before a consensus can be drawn. Finally, while researchers have made initial attempts to understand the variation in charter school effectiveness, they have generally used easily attainable information such as charter school type (e.g., CMO, no excuse, conversion, startup, online) and basic charter school features (e.g., longer school day or longer school year) to draw their conclusions. Going forward, researchers need to do the difficult work of collecting more nuanced information about schools in terms of instructional practices, curriculum, school environment, etc., before we can draw strong conclusion about promising practices.

References

Abdulkadiroğlu, A., Angrist, J. D., Dynarski, S. M., Kane, T. J., & Pathak, P. A. (2011). Accountability and flexibility in public schools: Evidence from Boston's charters and pilots. *The Quarterly Journal of Economics*, 126(2), 699-748.

⁶ Rick Hess (2010) made a similar point for the broader school choice movement.

- Abdulkadiroğlu, A., Angrist, J., Hull, P., & Pathak, P. (2016). Charters without Lotteries: Testing Takeovers in New Orleans and Boston. *The American Economic Review*, 106(7), 1878-1920. Retrieved from <http://www.jstor.org/stable/43861115>
- AFT (American Federation of Teachers) (F.H. Nelson, B. Rosenberg., N. Van Meter). (2004). *Charter School Achievement on the 2003 National Assessment of Education Progress*. Washington, D.C.: American Federation of Teachers.
- Angrist, J. D., Cohodes, S. R., Dynarski, S. M., Pathak, P. A., & Walters, C. D. (2013a). *Charter schools and the road to college readiness: The effects on college preparation, attendance and choice*. Boston: Boston Foundation and New Schools Venture Fund.
- Angrist, Joshua D., Parag A. Pathak, and Christopher R. Walters. (2013b). "Explaining Charter School Effectiveness." *American Economic Journal: Applied Economics* 5
- Angrist, J. Imbens, G., & Rubin, D. (1996). "Identification of Causal Effects Using Instrumental Variables," *Journal of the American Statistical Association*, 91(23), 222-455.
- Ahn, J., & McEachin, A. (2017). "Student Enrollment Patterns and Achievement in Ohio's Online Charter Schools." *Education Research*: 46(1), 44-57.
- Arsen, D. & Ni, Y. (2012). The effects of charter school competition on school district resource allocation. *Educational Administration Quarterly*. 48(1), 3-38. Published, 09/2012.
- Ballou, D., Teasley, B., & Zeidner, T. (2007). Charter Schools in Idaho, in M.Berends, M.G. Springer, & H.J. Walberg, eds., *Charter school outcomes* (pp. 221-241). New York: L. Erlbaum Associates.
- Batdorff, M., Maloney, L., May, J., Speakman, S., Wolf, P., Cheng, A., (2014). Charter School Funding: Inequity Increases. School Choice Demonstration Project. Available at: <http://www.uaedreform.org/wp-content/uploads/charter-funding-inequity-expands.pdf>
- Baude, P. L., Casey, M., Hanushek, E. A., Phelan, G. R., & Rivkin, S. G. (2019). The Evolution of Charter School Quality. *Economica*.
- Berends, M. (2015). "Sociology and School Choice: What We Know After Two Decades of Charter Schools." *Annual Review Sociology*. 41:159–80
- Berends, M., Goldring, E., Stein, M., & Cravens, X. (2010) "Instructional Conditions in Charter Schools and Students' Mathematics Achievement Gains," *American Journal of Education* 116, no. 3: 303-335.
- Bettinger, E. P. (2005). The effect of charter schools on charter students and public schools. *Economics of Education Review*, 24(2), 133-147.
- Betts JR, Tang YE. (2018). *A meta-analysis of the literature on the effect of charter schools on student achievement*. San Diego Education Research Alliance at UC San Diego, Discussion Paper 2018-1.

- Bifulco, Robert & Bulkley, Katrina. (2015) "Charter Schools." In Ladd, H.F. and Peg Goertz (Eds.) *Handbook of Research in Education Finance and Policy*, Vol. 2. Lawrence Erlbaum Association
- Bifulco, R. & Reback, R. (2014) "Fiscal Impacts of Charter Schools: Lessons for New York", *Education Finance and Policy* 9(1).
- Bifulco, R., & Ladd, H. F. (2006). The impact of charter schools on student achievement: Evidence from North Carolina. *Journal of Education Finance and Policy*, 1(1), 50–90.
- Bifulco, R., & Ladd, H.F. (2007). School Choice, Racial Segregation, and Test-Score Gaps: Evidence from North Carolina's Charter School Program, *Journal of Policy Analysis and Management*, 26(1), 31-56.
- Booker, K., Gill, B., Sass, T., & Zimmer, R. (2011) "The Effects of Charter High Schools on Educational Attainment." *Journal of Labor Economics*, Vol. 29(2) pp. 377-415,
- Booker, T. K., Gilpatric, S. M., Gronberg, T. J., & Jansen, D. W. (2007). The impact of charter school student attendance on student performance. *Journal of Public Economics*, 91(5–6), 849–876.
- Booker, T. K., Gilpatric, S. M., Gronberg, T. J., & Jansen, D. W. (2008). "The effect of charter schools on traditional public school students in Texas: Are children who stay behind left behind?" *Journal of Urban Economics*, Vol. 64(1): 123-145.
- Booker, K., Zimmer, R., & Buddin, R. (2005). The effect of charter schools on school peer composition. RAND Working Paper: WR-306-EDU. Retrieved January 3, 2013, from http://www.ncspe.org/publications_files/RAND_WR306.pdf
- Buddin, R. & Zimmer, R. (2005). "Student Achievement in Charter Schools: A Complex Picture," *Journal of Policy Analysis and Management* 24: (2), 351–371.
- Buddin, R., 2012. The Impact of Charter Schools on Public and Private School Enrollments Cato Institute Policy Analysis No. 707. Available at SSRN: <http://ssrn.com/abstract/42226597>.
- Butler, J.S., Carr, D., Toma, E.F, & Zimmer, R. (2013.) School Attributes and Distance: Tradeoffs in the School Choice Decision. *Journal of Policy Analysis and Management*. 32(4): 785-806.
- Carlson, D., Lavery, L., & Witte, J.F. (2012). Charter School Authorizers and Student Achievement. *Economics of Education Review* 31(2): 254-267.
- Carnoy, Martin, Jacobsen, Rebecca., Mishel, Lawrence, & Rothstein, Richard. (2005). *The Charter School Dust Up*. Economic Policy Institute: New York, NY.

- Cambell, Neil, Quirk, Abby. (2019). "Student Mobility, Backfill, and Charter Schools." Center for American Progress. Available at: <https://www.americanprogress.org/issues/education-k-12/reports/2019/08/06/472090/student-mobility-backfill-charter-schools/>. Accessed August 25, 2019.
- Chabrier, J., Cohodes, S., & Oreopoulos, P. (2016). "What Can We Learn from Charter School Lotteries?" *Journal of Economic Perspectives*, 30 (3): 57-84.
- Chakrabarti, R. & Roy, J., (2016). "Do charter schools crowd out private school enrollment? Evidence from Michigan," *Journal of Urban Economics*, Elsevier, vol. 91(C), pages 88-103.
- Chingos, M.M., & West, M.R. (2015). "The Uneven Performance of Arizona's Charter Schools." *Educational Evaluation and Policy Analysis*, Vol. 37(1): 120-134.
- Clark, M.A., Gleason, P.M., Tuttle, M.A., & Silverberg, M.K. (2015). "Do Charter Schools Improve Student Achievement?" *Educational Evaluation and Policy Analysis* 37(4): 419-436
- Cobb, C. D. and G. V. Glass. (1999). "Ethnic Segregation in Arizona Charter Schools." *Education Policy Analysis Archives*, 7(1).
- Cordes, Sarah (2018). "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(4): 484-512.
- CREDO (2009). National Charter School Study. <http://credo.stanford.edu/documents/NCSS%202013%20Final%20Draft.pdf>
- CREDO (2015a). Online Charter School Study. https://credo.stanford.edu/sites/g/files/sbiybj6481/f/online_charter_study_final.pdf
- CREDO (2015b). Urban Charter School Study, accessed at <https://urbancharters.stanford.edu/download/Urban%20Charter%20School%20Study%20Report%20on%2041%20Regions.pdf>
- CREDO. (2103a). National Charter School Study. <http://credo.stanford.edu/documents/NCSS%202013%20Final%20Draft.pdf>
- CREDO (2017). Charter Management Organizations https://credo.stanford.edu/sites/g/files/sbiybj6481/f/cmo_final.pdf
- Cremata, E.J., & Raymond, M.E. (2014). "The Competitive Effects of Charter Schools: Evidence from the District of Columbia" Association for Education Finance and Policy Conference Working Paper. Available at: <https://web->

app.usc.edu/web/rossierphd/publications/14/DC%20Competitive%20Impacts%20-%20Working%20Paper.pdf

Curto, V.E., & Fryer, R.G. Jr. (2011). “Estimating the Returns to Urban Boarding Schools: Evidence from SEED.” National Bureau of Economic Research (NBER) Working Paper 16746.

David, Rebecca (2018). “National Charter School Management Overview: 2016-17 School Year,” National Alliance for Public Charter Schools.

Davis, D., & Raymond, M. (2012). Choices for studying choice: Assessing charter school effectiveness using two quasi-experimental methods. *Economics of Education Review*, 31, 225-236.

DeAngelis, C.A., Wolf, P.J., Maloney, L.D., & May, J.F. (2018). “Charter School Funding: (More) Inequity in the City.” School Choice Demonstration Project Available at: <http://www.uaedreform.org/downloads/2018/11/charter-school-funding-more-inequity-in-the-city.pdf>

Dobbie W. & Fryer, R. G. (2017). Charter schools and labor market outcomes. NBER Working Paper No. 22502. Cambridge, MA: National Bureau of Economic Research. Updated version retrieved April 23, 2018 from: <https://sites.google.com/site/willdobbie/>.

Dobbie, W., & Fryer, R. G., Jr. (2013). *The medium-term impacts of high-achieving charter schools on non-test score outcomes*. Working Paper. Princeton, NJ: Princeton University.

Dobbie, W., & Fryer, R. G., Jr. (2011a). “Getting Beneath the Veil of Effective Schools: Evidence from New York City.” *American Economic Journal: Applied Economics* 2013,5(4) 28–60.

Dobbie, W., & Fryer, R. G., Jr. (2011b). “Are High-Quality Schools Enough to Increase Achievement Among the Poor? Evidence from the Harlem Children’s Zone,” *American Economic Journal: Applied Economics* 3: 158–187.

Dudovitz, R.N., Chung, P.J., Reber, S., Kennedy, D., Tucker, JS, Shoptaw, S., Dosanjh, KK, & Wong, MD. “ Assessment of Exposure to High-Performing Schools and Risk of Adolescent Substance Use: A Natural Experiment” *JAMA Pediatrics*. 172(12): 1135–1144.

Education Commission of the States, “Charter Schools: How is the funding for a charter school determined,” 2019, available at: <http://ecs.force.com/mbdata/mbquestNB2C?rep=CS1716>.

- Engberg, J., Epple, D., Sieg, H., & Zimmer, R. (2014) "Evaluating Education Programs That Have Lotteried Admission and Selective Attrition," *Journal of Labor Economics*, Vol. 32(1).
- Epple, D., Romano, R., & Zimmer, R. (2016). "Charter Schools: A Survey of Research on their Characteristics and Effectiveness," in *Handbook of Economics of Education*, Vol. 5, Chapter 3, Edited by E. Hanushek, S. Machin, and L. Woessmann, Elsevier: North Holland: 139-208.
- Farrell, Caitlin, Priscilla Wohlstetter and Joanna Smith, "Charter Management Organizations: An Emerging Approach to Scaling Up What Works", *Educational Policy* 2012 26(4) 499–532.
- Finn, C. E., Manno, B.V., & G. Vanourek. (2000) *Charter Schools in Action: Renewing Public Education*. Princeton, N.J.: Princeton University Press.
- Fitzpatrick, B., Berends, M., Ferrare, J. J., & Waddington, R. J. (2018). Virtual charter school teachers and student achievement: Increasing educational opportunity or doing harm? Paper presented at the 43rd Annual Meeting of the Association for Education Finance and Policy, Portland, OR.
- Fortson, K., Verbitsky-Savitz, N., Kopa, E., Gleason, P. (2012). Using an Experimental Evaluation of Charter Schools to Test Whether Nonexperimental Comparison Group Methods Can Replicate Experimental Impact Estimates. U.S. Department of Education, NCEE 2012-4019.
- Furgeson, J., Gill, B., Haimson, J., Killewald, A., McCullough, M., Nichols-Barrer, I., et al., 2012a. *Charter-School Management Organizations: Diverse Strategies and Diverse Student Impacts*. Mathematica Policy Research, Inc., Princeton, NJ. Updated Edition.
- Furgeson, J., Brian, G., Haimson, J., Killewald, A., McCullough, M., Nichols-Barrer, I., Teh, B.-R., Verbitsky-Savitz, N., 2012b. *The National Study of Charter Management: Organization (CMO) Effectiveness Charter-School Management Organizations: Diverse Strategies and Diverse Student Impacts*. Mathematical Policy Research, Princeton, NJ.
- Garcia, D. R., McIlroy, L., & Barber, R. T. (2008). Starting behind: A comparative analysis of the academic standing of students entering charter schools. *Social Science Quarterly*, 89(1), 199-216.
- Gill, Brian, Timpane, Michael, Ross, Karen, & Brewer, D. (2001). *Rhetoric versus Reality*. RAND: Santa Monica CA.
- Gill, B., Zimmer, R., Christman, J., & Blanc, S. (2007). *State Takeover, Restructuring, Private Management, and Student Achievement in Philadelphia*. RAND MG-533-RFA. Available at: http://www.rand.org/content/dam/rand/pubs/monographs/2007/RAND_MG533.pdf
- Gleason, P., Clark, M., Tuttle, C. C., & Dwoyer, E. (2010). *The evaluation of charter school impacts: Final report*. (NCEE 2010-4029). Washington, DC: U.S. Department of

Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

- Hanushek, E. A., Kain, J. F., Rivkin, S. G., & Branch, G. F. (2007). Charter school quality and parental decision making with school choice. *Journal of Public Economics*, 91(5), 823-848.
- Harris, D., & Larsen, M.F. (2016a). "The Effects of the New Orleans Post-Katrina School Reforms on Student Academic Outcomes" Education Research Alliance. Available at: <https://educationresearchalliancenola.org/files/publications/The-Effects-of-the-New-Orleans-Post-Katrina-School-Reforms-on-Student-Academic-Outcomes.pdf>
- Harris, D., & Larsen, M.F. (2016b). "What effect did the New Orleans school reforms have on student achievement, high school graduation, and college outcomes? Education Research Alliance. Available at: <https://educationresearchalliancenola.org/files/publications/071518-Harris-Larsen-What-Effect-Did-the-New-Orleans-School-Reforms-Have-on-Student-Achievement-High-School-Graduation-and-College-Outcomes.pdf>
- Hastings, J.S., Neilson, C.A., & Zimmerman, S.D. (2012). The effect of school choice on intrinsic motivation and academic outcomes (NBER Working Paper No. 18324). Retrieved from the NBER website: <http://www.nber.org/papers/w18324>
- Hess, R. (2010). "Does School Choice Work?" National Affairs, Vol 41. Available at: <https://www.nationalaffairs.com/publications/detail/does-school-choice-work>
- Hoxby, C. (2003), School choice and school productivity (or, could school choice be a tide that lifts all boats?), in C. Hoxby (ed.), *The Economics of School Choice*, University of Chicago Press, Chicago.
- Hoxby, C. (2004). "A Straightforward Comparison of Charter Schools and Regular Public Schools in the United States." Available at: <https://www.wacharterschools.org/learn/studies/hoxbyallcharters.pdf>
- Hoxby, C., Kang, J., & Murarka, S. (2009). Technical Report: *How New York City's charter schools affect achievement*, New York City Charter Schools Evaluation Project. Retrieved July 5, 2013 at: http://users.nber.org/~schools/charterschoolseval/how_nyc_charter_schools_affect_achievement_technical_report_2009.pdf
- Hoxby, C. M., & Murarka, S. (2007). Charter schools in New York City: Who enrolls and how they affect their students' achievement. Cambridge, MA: National Bureau of Economic Research. Retrieved November 5, 2008, from http://www.nber.org/~schools/charterschoolseval/nyc_charter_schools_technical_report_july2007.pdf.

- Hoxby, C. M., & Rockoff, J. E. (2004). *The impact of charter schools on student achievement*. Unpublished paper. Department of Economics, Harvard University.
- Henig, J. R. (2008). What do we know about the outcomes of KIPP schools? (EPIC/EPRU Policy Brief). Retrieved January 3, 2013:
www.greatlakescenter.org/docs/Policy_Briefs/Henig_Kipp.pdf
- Henry, G., Pham, L., Kho, A., & Zimmer, R. (2019). "Peeking into the Black Box of School Turnaround: A Formal Test of Mediators and Suppressors." Annenberg Brown University Working Paper No. 19-44 Available at:
<http://edworkingpapers.com/sites/default/files/ai19-44.pdf>
- Hill, P. (2006). "Put Learning First: A Portfolio Approach to Public Schools," Washington, D.C.: Progressive Policy Institute, As of January 2, 2007:
http://www.ppionline.org/documents/Portfolio_Districts021006.pdf
- Imberman, S. A. (2011). Achievement and behavior in charter schools: Drawing a more complete picture. *The Review of Economics and Statistics*, 93(2), 416-435.
- Imberman, S.A. (2007). "The Effect of Charter Schools on Non Charter Students: An Instrumental Variable Approach" NSCPE Working Paper, Accessed on August 1, 2014 from: http://www.ncspe.org/publications_files/OP149.pdf
- [Institute for Metropolitan Opportunity \(2013\). "Charter Schools in the Twin Cities: 2013 Update," University of Minnesota Law School.](#)
- Jabbar, Huriya. (2015). "'Every kid is money' market-like competition and school leader strategies in New Orleans." *Educational Evaluation and Policy Analysis*, 37(4): 638-659.
- Kho, A., Zimmer, R., & McEachin, A. (2019). "A Descriptive Analysis of Cream-Skimming and Pushout in Choice versus Traditional Public Schools". University of Kentucky Working Paper.
- Kolderie, T., *Creating the Capacity for Change: How and Why Governors and Legislatures Are Opening a New-Schools Sector in Public Education*, Bethesda, Md.: Education Week Press, 2004.
- Kotok, Stephen, Erica Frankenberg, Kai A. Shafft, Bryan A. Mann, Edward J. Fuller. (2017). "School choice, racial segregation, and poverty concentration: Evidence from Pennsylvania charter school transfers." *Educational Policy*, 31(4), 415-447.
- Ladd, H. F., Clotfelter, C. T., & Holbein, J. B. (2017). The growing segmentation of the charter school sector in North Carolina. *Education Finance and Policy*, 12(4), 536-563.
- Ladd, S., Clotfelter, C., & Holbein, J.B. (2014) "The Evolution of the Charter School Sector in North Carolina" Paper to be presented at the Annual Meeting of the Association for Public Policy Analysis and Management, Albuquerque, New Mexico, November 2014

- Logan, John R., Julia Burdick-Will. (2016). "School segregation, charter schools, and access to quality education." *Journal of Urban Affairs*, 38(3): 323-343.
- McEachin, A., Lauen, D.L., Fuller, S.C., Perera, R.M. (2019). "Social Returns to Private Choice? Effects of Charter Schools on Behavioral Outcomes, Arrests, and Civic Participation" *Annenberg at Brown University Working Paper 19-90*.
- McEachin, A. J., Welsh, R. O., & Brewer, D. J. (2016). The variation in student achievement and behavior within a portfolio management model: Early results from New Orleans. *Educational Evaluation and Policy Analysis*, 38(4), 669–691.
- Miron, G., Urschel, J. L., Mathis, W. J., & Tornquist, E. (2010). *Schools without Diversity: Education Management Organizations, Charter Schools and the Demographic Stratification of the American School System*. Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit. Retrieved January 6, 2013, from <http://epicpolicy.org/publication/schools-without-diversity>.
- Ni, Y. & Rorrer, A. K. (2012). Twice Considered: Charter schools and student achievement in Utah. *Economics of Education Review*, 31(5), 835-849.
- Nichols-Barrer, I., Gill, B., Gleason, P., & Tuttle, C. (2012). *Student Selection, Attrition, and Replacement in KIPP Middle Schools*, Mathematica Policy Research, Retrieved January 3, 2013, from http://mathematica-mpr.com/publications/PDFs/education/KIPP_middle_schools_wp.pdf
- Nichols-Barrer, Ira, Philip Gleason, Brian Gill, Christina Clark Tuttle. (2016). "Student selection, attrition, and replacement in KIPP middle schools." *Educational Evaluation and Policy Analysis*, 38(1):5-20.
- Nicotera, Anna, Maria Mendiburo, and Mark Berends. 2011. "Charter School Effects in an Urban School District: An Analysis of Student Achievement Gains in Indianapolis." In *School Choice and School Improvement: Research in State, District, and Community Contexts*, ed. Mark Berends, Marisa Cannata, and Ellen Goldring. Cambridge, MA: Harvard Education Press
- Nisar, H. "Heterogeneous Competitive Effects of Charter Schools in Milwaukee," Draft, Abt Associates Inc., March 2012.
- Nelson, F. H., Muir, E., & Drown, R. (2000). *Venturesome capital: State charter school finance systems*. Washington, DC: U.S. Department of Education.
- Pham, L., Henry, G., Kho, A., & Zimmer, R. (2019). "School Turnaround in Tennessee: Insights After Six Years." Tennessee Education Research Alliance. Available at: https://peabody.vanderbilt.edu/TERA/files/School_Turnaround_After_Six_Years.pdf

- Place, K. & Gleason, P. (2019). "Do charter middle schools improve students' college outcomes?" Institute of Education Sciences. Evaluation Brief. Available at: <https://ies.ed.gov/ncee/pubs/20194005/pdf/20194005.pdf>
- Ravitch, D. (2010) *The Death and Life of the Great American School System: How Testing and Choice Are Undermining Education*. Basic Books: New York.
- Reardon, S.F. (2009) Review of "How New York City's Charter Schools Affect Achievement." Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit. Retrieved August 25, 2014 from <http://epicpolicy.org/thinktank/review-How-New-York-City-Charter>
- Ritter, Gary W., Nathan C. Jensen, Brian Kisida, Daniel H. Bowen. (2016). "Urban school choice and integration: The effect of charter schools in Little Rock." *Education and Urban Society*, 48(6): 535-555.
- Sass, T. R. (2006). Charter schools and student achievement in Florida. *Education Finance and Policy*, 1(1), 91–122.
- Sass, Tim, Ron Zimmer, Brian Gill, & Kevin Booker. (2016) "Charter High School's Effect on Educational Attainment and Earnings", *Journal of Policy Analysis and Management*, Vol 35(3), pp. 683-706
- Schafft, Kai A., Erica Frankenberg, Ed Fuller, William Hartman, Stephen Kotok, and Bryan Mann. "Assessing the Enrollment Trends and Financial Impacts of Charter Schools on Rural and Non-Rural School Districts in Pennsylvania," Penn State University, Department of Education Policy Studies, 2014.
- Setren, Elizabeth (2019), "Learning About the Education Production Function: Evidence on the Impact of Special Education and English Language Learner Services," available at <https://drive.google.com/file/d/1PqvyZ5KniyUI0iX-7jN5h6bbpcL6l-E1/view>.
- Spees, L.P. & Lauen, D.E. (2019). "Evaluating Charter School Achievement Growth in North Carolina: Differentiated Effects among Disadvantaged Students, Stayers, and Switchers," *American Journal of Education* 125, no. 3: 417-451.
- Stein, Marc L. (2015). "Public school choice and racial sorting: An examination of charter schools in Indianapolis." *American Journal of Education*, 121(4): 597-627.
- Tuttle, C. C., Gleason, P., & Clark, M. (2012). Using lotteries to evaluate schools of choice: Evidence from a National Study of Charter Schools. *Economics of Education Review*, 31, 237–253.

- Tuttle, C. C., Gill, B., Gleason, P., Knechtel, V., Nichols-Barrer, I., & Resch, A. (2013). KIPP middle schools: Impacts on achievement and other outcomes. Washington, DC: Mathematica Policy Research.
- Toma, E., Zimmer, R., Jones, J., (2006). "Beyond achievement: enrollment consequences of charter schools in Michigan." *Adv. Appl. Microecon.* 14, 241–255.
- U.S. Department of Education, Institute for Educational Sciences, Office of Education Statistics, *Digest of Education Statistics, 2018*, Washington, D.C., 2018.
- U.S. Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service, *Evaluation of the Comprehensive School Reform Program Implementation and Outcomes: Fifth-Year Report*, Washington, D.C., 2010.
- Weihner, G.R., & Tedin, K.L. (2002). Does Choice Lead to Racially Distinctive Schools? Charter Schools and Household Preferences. *Journal of Policy Analysis and Management*, 21 (1), 79-92.
- Wells, A. S., L. Artiles, S. Carnochan, C. W. Cooper, C. Grutzik, J. J. Holme, A. Lopez, J. Scott, J. Slayton, and A. Vasudeva, *Beyond the Rhetoric of Charter School Reform: A Study of Ten California School Districts*, Los Angeles, Calif.: UCLA Graduate School of Education & Information Studies, 1998.
- Winters, M. A. (2012). "Measuring the Competitive Effect of Charter Schools on Public School Student Achievement in an Urban Environment: Evidence from New York City." *Economics of Education Review*, 31(2), pp: 293-301.
- Winters, M. A. (2013). "Why the Gap? Special Education and New York City Charter Schools." Center on Reinventing Public Education.
- Winters, M. A. (2014). "Understanding the Charter School Special Education Gap: Evidence from Denver, Colorado." Center on Reinventing Public Education.
- Winters, Marcus A.; Dick M. Carpenter; Grant Clayton. (2017). "Does attending a charter school reduce the likelihood of being placed into special education? Evidence from Denver, Colorado." *Educational Evaluation and Policy Analysis*, 39(3): 448-463.
- Wong, M.D., Coller, K.M., Dudovitz, R., Kennedy, D.P., Buddin, R., ...Chung, P.J. (2014). Successful Schools and Risky Behaviors Among Low-Income Adolescents. *Journal of Pediatrics*. Available at: <http://pediatrics.aappublications.org/content/early/2014/07/16/peds.2013-3573.abstract>.
- Zimmer, R & Buddin, R. (2007). "Getting Inside the Black Box: Examining how the Operation of Charter Schools Affect Performance." *Peabody Journal*, Vol. 82(2-3), 231-273.

- Zimmer, R. & Buddin, R. (2006). "Charter School Performance in Urban Districts," *Journal of Urban Economics*, Vol. 60(2), pp. 307-326.
- Zimmer, R. & Buddin, R. (2009). "Is Charter School Competition in California Improving the Performance of Traditional Public Schools?" *Public Administration Review* Vol. 69, No. 5: pp. 831-845 (15 pages)
- Zimmer, R., Buddin, R., Chau, D., Gill, B., Guarino, C., Hamilton, L.,...Brewer, D. (2003). *Charter school operation and performance: Evidence from California*. MR-1700. Santa Monica, CA: RAND.
- Zimmer, R. W., & Guarino, C. M. (2013). Is there empirical evidence that charter schools "push out" low-performing students? *Educational Evaluation and Policy Analysis*, 35(4), 461-480.
- Zimmer, R., & Engberg, J. (2016). Can broad inferences be drawn from lottery analyses of school choice programs? An exploration of appropriate sensitivity analyses. *School Choice Journal*
- Zimmer, R. Gill, B., Attridge, J., & Obenauf, K. (2014). Charter School Authorizers and Student Achievement. *Education, Finance, and Policy*. 9(1): 59-85.
- Zimmer, R., Gill, B., Booker, K., Lavertu, S., Sass, T., & Witte, J. (2009). *Charter Schools in Eight States: Effects on achievement, attainment, integration, and competition*. MG-869. Pittsburgh: RAND.
- Zimmer, R., Gill, B., Booker, K., Lavertu, S., & Witte, J. (2012). Examining charter school achievement in seven states. *Economics of Education Review*, 31(2), 213–224.
- Zimmer, R., Henry, G. T., & Kho, A. (2017). The Effects of School Turnaround in Tennessee's Achievement School District and Innovation Zones. *Educational Evaluation and Policy Analysis*, 39(4), 670–696.