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Edited by Gregory K. Ingram and Daphne A. Kenyon

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Charter Schools and Minority Access to Quality Public Education

John R. Logan, Julia A. Burdick-Will, and Elisabeta Minca

Charter schools have been advocated in part as a means of increasing the quality of public school choices for children. This chapter presents the results of an analysis of data available for elementary schools around the country in 2010–2011 to determine whether this goal is being achieved and for which children. The focus here is on differences by race and ethnicity, given the considerable evidence of disparities in the performance of schools attended by white and minority children that existed well before the current expansion of charter school alternatives (Logan, Minca, and Adar 2012). The primary indicator in the current study is the proficiency of students in charter and noncharter schools attended by children in various racial/ethnic groups as measured by standardized tests. This means studying the "geography of opportunity"—the quality of the school a child attends—rather than the school's impact on a given child's learning. The assumption is that all else being equal, it is advantageous to attend a school with the highest possible proportion of successful students. This is why, for example, Florida introduced mechanisms to identify "failing schools" in 2002 (Borman et al. 2004). If many children are being "left behind" in public schools, one hard fact is that those children are disproportionately minorities (Bankston and Caldas 1998; Roscigno 1998). Another way to approach the question is to ask to what extent, based on the school a child is enrolled in, he or she is primed for success. A limitation of this approach is that it is impossible to determine whether attending a given type of school actually leads to greater success. The main advantage of the approach is that the geography of opportunity—for all charter and noncharter schools—can be studied in every district where charters exist.

Because racial/ethnic disparities occur only in school systems with some degree of segregation across schools, this chapter also considers the impact of charter schools on segregation. Whether charters increase or decrease segregation is an important policy-related issue, and the racial/ethnic composition of schools is a factor that needs to be taken into account when possible variations in school performance are evaluated. Segregation is important not only because it separates children but also because it leaves minority children in inferior schools (Orfield and Yun 1999). Charter schools would be viewed as particularly successful if they resulted in minority children attending higher-performing schools and schools with greater racial/ethnic diversity.

This chapter also pays close attention to poverty levels. While there is mixed evidence of the effects of charter schools or the racial composition of schools on school performance, the effects of concentrated poverty are well established (Chaplin 2002).

Charter Schools and School Segregation

One question of interest is how the composition of charter schools affects overall segregation across schools within districts, which persists at fairly high levels despite substantial desegregation of schools in the 1970s in the wake of the *Brown* decision[1] (Clotfelter 2004; Logan, Oakley, and Stowell 2008). Charter schools vary greatly in their racial/ethnic composition (Institute on Race and Poverty 2008). Several early studies compared charter schools to noncharter public schools in the surrounding public school district, concluding that charter schools are less racially diverse (Ascher, Jacobowitz, and McBride 1999; Cobb and Glass 1999; Wells et al. 2000). Weiher and Tedin (2002) reported that segregation was greater among charter schools than noncharter schools within the same school districts in Texas (see also Garcia 2007). However, Zimmer and colleagues (2009) studied transfers from traditional to charter public schools in eight states and found only marginal effects. Transfers increased segregation slightly in Philadelphia and Texas but reduced it in Chicago.

In some areas, charter schools have higher shares of white students than noncharter schools. Renzulli and Evans (2005) reported that in a national sample of schools in 1999–2000, the white share in charter schools was higher in districts where there was less segregation among noncharter schools. These cases may represent white flight (within the same district) from integrated schools. However, on average charter schools have higher shares of black and Hispanic children than other public schools (NAEP 2005; Ni 2007). Consequently, when segregation is measured as racial isolation (e.g., the percent of minority children in the school attended by the average minority student), segregation is higher

1. *Brown v. Board of Education*, 347 U.S. 483 (1954).

in charter schools than in noncharter schools (Frankenberg, Siegel-Hawley, and Wang 2010).

In evaluating the relationship between charter schools and overall school segregation, it is important to control for other factors that are known to be related to the racial composition of schools. The 24 largest central city school districts in the United States (with 4.5 million students) have a total public school enrollment that is more than 70 percent black and Hispanic (Orfield and Lee 2005). In 20 of these districts, the student population is 90 percent black. Black and Hispanic children also are more likely to attend high-poverty schools. Saporito and Sohoni (2007) found that unlike the typical white child, who attends a public school in which most of the children are above the poverty line, the typical black or Hispanic child attends a public school in which most of the children are below the poverty line (see also Logan 2002). Orfield and Lee (2005) point out that more than 60 percent of black and Hispanic students attend high-poverty schools (defined as more than 50 percent poor). To the extent that charter schools are more likely to be found in central city and high-poverty school districts, they also have higher shares of minority students. The key question is whether they are more racially isolated than noncharter schools in the same districts.

Charter Schools and School Performance

Most studies on the question of how charter schools affect student performance are based on individual-level performance results. One study conducted as part of the National Assessment of Educational Progress (NAEP) in 2003 found that students attending charter schools had similar reading and math scores as those attending other public schools (NAEP 2005). A more recent study in which charter school students were matched with comparable noncharter school students emphasized the variability in results but concluded that only 17 percent of charter schools "provide superior education opportunities for their students," while "over a third, 37 percent, deliver learning results that are significantly worse than their students would have realized had they remained in traditional public schools" (CREDO 2009, 1). Two national studies that controlled for students' family background (Braun, Jenkins, and Grigg 2006; Nelson, Rosenberg, and Van Meter 2004) found no difference between charter and noncharter schools. Another (CREDO 2009) found that students in charter high schools performed below their peers in regular schools. Several review essays cited by Fuller and Koon (2013) conclude that results from charter schools are uneven (Fuller 2007; Gleason et al. 2010; Lubienski and Lubienski 2006). The study by Zimmer and colleagues (2009) on transfers from traditional public schools found that students generally reproduced their previous performance in their new charter schools, although in two locales (Chicago and Texas) middle school students performed more poorly.

A more specific question is which group or groups of students are affected by charter schools. Bifulco and Ladd (2007) report that charters in North Carolina

had larger negative effects on the achievement of black students than of white students, mostly because black students were more likely to enroll in predominantly black schools.

These results should be interpreted in the contexts of a wider set of studies on the disparities in performance in schools attended by white and minority students, regardless of whether they are charter schools.[2] It is widely reported that minority students attend worse schools than non-Hispanic whites, although few studies have used direct measures of school-level outcomes. Two exceptions are Crosnoe (2005) and Hanushek and Rivkin (2009), both of which included controls for individual-level variables that could affect the kind of school a child attends.

Several key factors that can affect learning outcomes are highly interrelated: the racial/ethnic composition of the school, poverty level, location in the central city or suburbs, and the charter/noncharter distinction that is the focus of the current study. The most sophisticated studies use multilevel analyses, evaluating contextual effects on individual children's outcomes after controlling for their personal characteristics. For the purposes of the current study, even simpler designs based on school-level data are relevant.

Several studies suggest a direct and independent effect of racial composition on student performance (Armor 2002; Bankston and Caldas 1996, 1997; Card and Rothstein 2007; Dawkins and Braddock 1994; Rumberger and Williams 1992; Stiefel, Schwartz, and Chellman 2008). Other studies, including the well-known Coleman Report (Coleman et al. 1966; see also Hauser, Sewell, and Alwin 1976), emphasize the effects of class composition. Many studies confirm the negative impacts of concentrated poverty on student performance and later outcomes, even after controlling for a student's own family background (Chaplin 2002; Chubb and Moe 1990; Gamoran 1996; Jencks and Mayer 1990; Lee and Smith 1997).

Another relevant factor is metropolitan location, which is related to both racial and class composition and is strongly associated with educational outcomes. For example, Swanson (2008) found that high school graduation rates are 15 percent lower in the nation's urban schools compared with those located in the suburbs. In addition to the contextual effects of concentrated poverty, it is argued that poor central city schools are more likely to have inadequate resources and funding, as well as a less qualified teaching staff, compared to suburban schools (Eaddy et al. 2003; Hochschild and Scovronick 2003).

Research Design

This study includes public elementary schools in the United States for which relevant data are available from national sources. It draws on school results on

2. For a review of these studies, see Logan, Minca, and Adar (2012).

statewide standardized tests for 2010–2011 and other data about public elementary schools gathered by the National Center for Education Statistics (NCES). This report is part of a larger study on trends since 2004–2005, when elementary school test scores were available mainly for fourth graders, so it is restricted only to the fourth grade. Because the purpose is to evaluate differences between charter and noncharter schools, schools in states where there was no enabling legislation for charter schools in 2010 were omitted: Alabama, Kentucky, Maine, Montana, Nebraska, North Dakota, South Dakota, Vermont, Washington, and West Virginia. The focus is on districts where there is at least one noncharter and one charter school, so that there is a potential choice between these two types of schools, and within these districts all schools for which racial composition, free lunch, and reading and math test scores are reported are included here. This study has very complete coverage of the nation's public elementary schools, as shown in table 10.1. Nationally (in states with charter legislation, as well as the District of Columbia), there were 3.4 million fourth graders in 2010–2011; a little less than half (1.5 million) of these students were in districts with at least one charter school. The study includes almost all of these children. Slightly more than 100,000 of them (9 percent) were in charter schools.

The testing data are from reading and mathematics tests for elementary school grades. Data are drawn from the state school report cards assembled and made available by the National Center for Education Statistics (NCES) (EDFacts 2013a, b). In most cases, the elementary school tests are for the fourth grade; where those data are not available, the closest available grade was selected. It is well known that the content and scoring of tests vary widely across states. In order to describe patterns across the universe of schools, these data were recalibrated as percentiles of school performance within each state (following the approach by Logan, Minca, and Adar 2012). This allows comparisons across schools in different states, because the reference point in every case is how a school's performance ranks in relation to other schools in the same state.[3] We cannot say that students in a school in the 80th percentile in one state are learning at the same level as those in a school in the 80th percentile in another state,

3. There are other ways to assess relative ranking within a state. Compared to percentiles, the alternative of using z-scores (standardizing by the mean and standard deviation within the state) would tend to reduce differences between schools with similar scores near the middle of the distribution and accentuate the high or low values at either tail. It is likely that the approach here is, therefore, somewhat conservative in measuring the disparities across groups, since whites and Asians tend to lie at the opposite end of the distribution from other groups. One disadvantage of using z-scores is that school test scores are not normally distributed. For example, for fourth-grade reading in Texas, the state with the largest sample of elementary schools, scores have a significant negative skew. However, choice of statistic is unlikely to have much effect on the results: the correlation between z-scores and percentiles in this case is 0.935.

Table 10.1
Characteristics of Fourth Graders in Public Schools, 2010–2011

	National Fourth Grade	Districts with Charter(s)	Sample Schools		
			Total	Noncharter	Charter
Average test score[a]					
Reading	45.7	41.0	41.0	40.9	42.4
Math	44.9	40.8	40.9	41.0	39.6
Free or reduced lunch (%)	51.4	58.9	58.9	59.5	51.3
Mean racial composition (%)					
White	50.1	34.8	34.7	34.3	39.0
Black	16.2	21.9	21.7	21.0	29.4
Hispanic	25.0	34.0	34.2	35.1	23.8
Asian	4.8	5.4	5.4	5.6	3.6
Native American	1.1	0.8	0.8	0.8	0.8
Charter (%)	3.7	8.4	8.2	0.0	100.0
Metropolitan location (%)					
City	31.6	53.3	53.5	53.4	55.4
Suburb	53.9	42.6	42.6	42.9	39.4
Nonmetro	14.6	4.1	3.9	3.8	5.3
Region (%)					
Northeast	16.5	11.0	10.9	10.8	11.4
Midwest	21.8	13.6	13.1	12.3	21.9
West	38.2	41.0	40.8	41.8	28.9
South	23.5	34.4	35.3	35.0	37.8
Number of students	3,412,837	1,489,924	1,434,376	1,316,409	117,967
Number of schools	45,630	19,539	18,349	15,922	2,427
Number of districts	10,908	1,038	1,019	926	937

[a]Test scores are percentiles within states.
Source: Authors' calculations based on data from NCES.

because these scores are based on different tests. But being in the 80th percentile has a similar meaning in relation to peer schools in every state, and in this sense the performance measures are standardized.

NCES also provides several requisite characteristics for each individual public school through its Common Core of Data (NCES 2012). Race/ethnicity is reported in the following categories: non-Hispanic white, black, Hispanic, Asian, and Native American/other races. NCES also reports for most schools the number

of students who are eligible for free or reduced-price lunch, which is used as an indicator of poverty in the current study. Eligibility for reduced-price lunch is reported for the entire school. The assumption in this study is that eligibility of students in the fourth grade mirrors that of the whole school.

Finally, the metropolitan location of the school (central city, suburban, or nonmetropolitan) was coded based on the school's geographic coordinates (NCES 2012). GIS procedures were used to locate schools within principal cities of metropolitan statistical areas (MSAs), the suburban remainder of an MSA, or outside an MSA using the U.S. Census Bureau's geographic definitions as of 2010 (U.S. Census Bureau 2010).

Where Are Charters, and How Do They Recruit from Different Racial/Ethnic Groups?

Table 10.1 summarizes the characteristics of schools (weighted by fourth-grade enrollment so that larger schools count more in the average) for the nation, for districts with a charter school, and for the final sample schools. There is substantial selectivity in which districts have charters. Districts with a charter school alternative have lower average test scores, a higher share of free-lunch-eligible students, and more minority students. They are more likely to be located in central cities and in the South.

Table 10.1 also compares charter and noncharter schools in the districts that have at least one charter and for which complete data on free lunch and test scores are available. These values are also weighted by the number of students, so they can be read as being characteristic of the school where the average fourth grader is enrolled. The table suggests a small advantage of charter schools in reading but an equal disadvantage in math. It shows that charters have substantially lower shares of free-lunch-eligible students and a somewhat different racial composition than noncharter schools. These differences should be taken into account when evaluating the net differences in test scores.

Another approach to evaluating which school districts are more likely to have charter schools is to think not in terms of single predictors, but rather in terms of specific combinations of characteristics. That is done here by identifying a set of district profiles. For example, based on common observations, one profile might be high-poverty, high-minority, central city districts, and a very different profile might be low-poverty, predominantly white, suburban districts. A common approach to identifying such profiles based on how various characteristics are intercorrelated using quantitative models is latent class analysis. An example similar to the approach here but based on individual schools rather than districts is presented in Logan, Minca, and Adar (2012).

Latent class models assume that observed characteristics of districts are indicators of discrete unobserved (or latent) variables that constitute clusters. In this study, every district is assumed to belong to one of a set of K latent classes, with the number of classes and their size not known a priori. Each district is as-

sumed to belong to one class or cluster, and its class membership probabilities are computed from the estimated model parameters and the observed scores. The program Latent GOLD (Vermunt and Magidson 2000) was employed in this study. Latent GOLD can be used with both discrete variables (metropolitan location) and continuous variables (the share of students in each racial/ethnic group and in poverty). Model selection is typically based on fit statistics computed using the log-likelihood value and the number of parameters. Increasing the number of clusters here to as many as 10 or more continued to improve model performance, although each additional cluster included relatively few schools. Therefore, the model choice was based on the interpretability of the results. Each model was compared with the model that included one additional cluster. At each step up to seven clusters, a meaningful addition was found. The eight-cluster model closely resembled the seven-cluster model, but it included a cluster with no main defining characteristics. It also included clusters that closely resembled those in the seven-cluster solution, but they were less sharply defined.

The seven-cluster model is described in table 10.2. The first row shows what share of districts are placed in a given cluster. The next panel (nine rows) reports the model-based profile of each district cluster. The values are the shares of the districts in the cluster with each listed characteristic (e.g., 11 percent of cluster 1 districts are located in central cities). Cluster 1 represents the poorest of all types of districts, with the largest percentage of students who are provided free lunch (66 percent). It is also the second most urban, although rural and suburban districts predominate in this cluster. In terms of racial composition, this cluster has on average the highest percentage of black students (25 percent) among all the clusters, a very high percentage of Hispanic students (33 percent), and the lowest percentage of white students (38.9 percent).

Clusters 2 and 3 are sharply different from cluster 1, with the great majority of students being white (94 percent and 78 percent, respectively), with a low percentage of students who are provided free lunch (29 percent and 27 percent, respectively), and being overwhelmingly suburban (100 percent and 89 percent, respectively). Cluster 3 has somewhat larger percentages of minority students (5 percent black, 9 percent Hispanic, 4 percent Asian) compared with cluster 2 and includes some nonsuburban districts.

Clusters 4 and 5 are overwhelmingly white rural districts, but cluster 5 has a substantial minority (10 percent) of Hispanic students. Cluster 6 is the most urban of all the clusters (28 percent), has the highest percentage of Hispanic students (35 percent), and has relatively large shares of black (11 percent) and Asian (9 percent) students. It has average levels of poverty comparable to clusters 4 and 5, with 47 percent of students who are provided free lunch. Finally, cluster 7 corresponds with a situation of disadvantage that is less often discussed, the poverty of predominantly rural school districts with unusually large shares of Native American students (27 percent).

Districts with charter schools are not evenly distributed among these seven clusters. The final rows in table 10.2 report the number of students and schools in

Table 10.2
Model-Based Profiles of District Clusters

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Cluster size (%)	0.195	0.180	0.161	0.159	0.124	0.098	0.083
Metropolitan location (%)							
City	0.111	0.000	0.064	0.000	0.000	0.278	0.010
Suburb	0.415	1.000	0.891	0.000	0.000	0.631	0.355
Racial composition (%)	0.474	0.000	0.046	1.000	1.000	0.091	0.635
White	0.389	0.935	0.783	0.959	0.848	0.394	0.574
Black	0.245	0.012	0.052	0.007	0.015	0.112	0.020
Hispanic	0.327	0.026	0.091	0.016	0.098	0.354	0.098
Asian	0.007	0.009	0.042	0.004	0.007	0.092	0.007
Native American	0.002	0.003	0.003	0.002	0.011	0.012	0.267
Free or reduced lunch (%)	0.661	0.296	0.267	0.440	0.476	0.470	0.624
Districts with charter schools							
Number of students	459,715	19,291	169,821	2,763	15,065	751,881	15,840
Number of schools	6,256	258	2,155	65	304	8,978	333
Number of districts	303	53	174	25	80	317	67

Source: Authors' calculations based on data from NCES.

the study sample for those districts in every cluster that have at least one charter school. The first row of the table (cluster size) shows that there is a fairly even distribution of districts across clusters. But districts with a charter school are heavily skewed toward cluster 6 (31.1 percent), cluster 1 (29.7 percent), and cluster 3 (17.1 percent). These clusters are more heavily minority, higher poverty, and more likely to be located in central cities than the other four clusters. More than three-quarters of districts with a charter school are one of these three types.[4]

There is much variation in the nature of charter schools, but clearly the probability of having any charter schools at all is strongly related to race, poverty, and location. Another complication is that children of different racial/ethnic backgrounds do not attend similar charter schools. Table 10.3 addresses this phenomenon by comparing charter and noncharter schools in the sample districts, weighted by the number of white, black, Hispanic, Asian, or Native American children who attend those schools. The table also reports the number of students of each race/ethnicity in the sampled schools.

This table goes further than table 10.1 toward suggesting how test performance differs between charter and noncharter schools, because it reports separate

4. See chapter 9 in this volume for more information on the location of charter schools.

Table 10.3
Characteristics of Schools Attended by the Average Fourth Grader, by Race and Charter Versus Noncharter

	White		Black		Hispanic		Asian		Native American	
	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter
Test score[a]										
Reading	53.5	54.8	27.9	27.5	40.4	33.2	54.0	52.0	36.8	36.9
Math	46.6	52.2	28.5	28.2	40.6	35.7	49.7	52.1	34.7	36.8
Free or reduced lunch (%)	30.1	42.9	73.2	74.6	61.7	68.4	38.9	52.0	50.5	63.1
Racial composition (%)										
White	68.9	61.1	12.2	17.4	22.3	18.4	40.5	30.4	39.5	36.2
Black	9.2	10.7	72.5	55.9	14.0	12.2	12.8	12.6	9.7	12.4
Hispanic	13.6	18.9	11.3	20.4	57.7	62.4	19.4	26.6	18.2	30.8
Asian	3.8	4.9	1.6	3.3	3.0	4.2	22.5	24.3	2.9	4.3
Native American	0.8	0.8	0.3	0.5	0.6	0.7	0.6	0.6	25.9	12.9
Metropolitan location (%)										
City	37.6	37.9	75.1	64.6	62.2	61.5	49.9	59.7	42.5	50.5
Suburb	52.8	55.8	23.3	33.4	35.6	36.5	47.7	37.9	34.8	34.9
Nonmetro	9.7	6.3	1.5	2.0	2.2	2.0	2.4	2.4	22.7	14.6
Region (%)										
Northeast	7.2	7.3	19.7	16.1	8.9	10.5	8.8	19.3	2.8	5.1
Midwest	19.8	16.1	36.4	18.0	7.4	5.7	21.1	8.8	20.4	10.7
South	23.5	38.7	34.2	55.5	34.0	40.6	22.4	24.3	14.9	24.4
West	49.4	37.9	9.6	10.4	49.7	43.2	47.8	47.6	62.0	59.8
Number of students	45,973	451,159	34,718	276,979	28,035	462,047	4,272	73,122	942	10,590
Number of schools	1,957	13,893	1,829	13,744	1,892	14,706	972	10,079	497	4,843

[a]Test scores are percentiles within states.
Source: Authors' calculations based on data from NCES.

averages for schools attended by each group. Regardless of school type, the highest average scores are in schools attended by Asians and whites, followed by Hispanics and Native Americans, with blacks well behind. In many categories, there is little difference between charter and noncharter schools. The main exception is for Hispanics: in both reading and math, the charter schools they attend perform better than the noncharter schools by 7 percent and 5 percent, respectively.

There are other group differences that may affect school performance. For Hispanics, it is especially relevant to note that while they are a majority in the charter schools they attend (58 percent), they are an even larger share in their noncharter schools (62 percent). Also relevant to test results is poverty, which is substantially higher in Hispanics' noncharter schools (68 percent) than in their charter schools (62 percent).

Another salient result in table 10.3 is the racial isolation of black students. They are most heavily concentrated in their charter schools (73 percent black) compared to their noncharter schools (56 percent black). This finding was examined further to consider to what degree it suggests that charter schools may lead to higher segregation of black students. Though not shown here, a widely used measure of black-white segregation, the index of dissimilarity (D), was calculated for all schools and for noncharter schools alone.[5] The difference between D for all schools and for noncharter schools alone turns out to be quite small, even though there is a component of increased segregation resulting from blacks' high concentration in charter schools. The D score for noncharter schools averages 58.7, compared with 60.0 for all schools (including the impact of charters). This difference is small partly because only a small share of black students are in charter schools (about 13 percent). But how would the D score be affected if charter schools grew to include as much as 25 percent of the student population in these districts, up from 9 percent in the actual data? To examine this question, a simulation was conducted in which the actual student population in charter schools was inflated to 25 percent. In this scenario, it was assumed that the expanded charter school population would be recruited with the same racial selectivity as current charters. Under these assumptions, D would rise to 61.4. Thus, the current impact of charter schools on overall black-white school segregation appears to be minimal, but there is potential (all else being equal) for the growth of charter enrollment to increase segregation by close to 3 points. In an era when the

5. The index of dissimilarity (D) captures the degree to which two groups are evenly spread among schools in a given district. Evenness is defined with respect to the racial composition of the district as a whole. With values ranging from 0 to 100, D gives the percentage of one group that would have to move to achieve an even residential pattern—one in which every school replicates the group composition of the district. A value of 60 or above is considered very high. For example, a D score of 60 for black-white segregation means that 60 percent of either group must move to a different school for the two groups to become equally distributed. A value of 30 to 60 is considered moderate, while a value of 30 or less is considered low.

average D score has been almost unchanged since 1980, a shift of this magnitude would be noticeable.

Modeling Performance in the Schools Attended by Different Groups

Tables 10.1 to 10.3 point to the need for care in assessing performance differences between charter and noncharter schools. Charters are most likely to be found in certain kinds of districts. They are typically unlike noncharter schools in important ways, and the differences are not the same for children of every racial/ethnic group. In this study, these complexities are approached through multivariate models, estimating school performance and racial composition using a multilevel fixed-effect regression. To do this, cases were duplicated for every student in each school based on the school-level data. For example, if a given school has 100 white students, it was treated as providing 100 cases in which the student is white and all school characteristics are the same for every case. Effectively, then, the data set has about 1.3 million cases in which each student's race is known and each student is properly matched to characteristics of his or her school.[6] These individual-level data allow the estimation of a model predicting a school characteristic for the average student in each racial group: the school's reading score, the school's math score, and the percentage of same-group students of group members (racial isolation). Predictors include the student's race/ethnicity, whether the school is a charter school, and the poverty (free-lunch) share of students in the school. Interactions among these predictors are also included, and their inclusion turns out to be important.

The final model is as follows:

$$(1) \qquad Y_{jk} = \beta_0 + \beta_1 C_{jk} + \beta_2 R_{ijk} + \beta_3 P_{jk} + \beta_4 C_{jk} * R_{ijk} + \beta_5 C_{jk} * P_{jk} + \beta_6 R_{ijk} * P_{jk} + \beta_7 C_{jk} * R_{ijk} * P_{jk} + u_k + e_{ijk}$$

where Y_{jk} = test score (reading or math) percentile of school j in district k that student i attends, or the proportion of school j that is the same race as student i;
C_{jk} = charter status of school j in district k;
R_{ijk} = series of indicators for race/ethnicity for each student i in school j and district k;
P_{jk} = percentage of students in school j receiving free or reduced-price lunch in district k;

6. The actual number of degrees of freedom in these models depends on the number of schools rather than the number of students. Standard errors are adjusted for clustering within schools.

u_k = school district fixed effects that control for all constant differences between school districts, such as metropolitan location and region; and

e_{ijk} = individual-level error term.

With the fixed effect, all comparisons between racial groups, charters and noncharters, and poverty levels are made as deviations from the district mean. Essentially, this means that each school is compared to the others in the same district. Standard errors of coefficients are adjusted to take clustering of cases within schools into account.

The model coefficients are reported in table 10.4. The explained variance is between 0.331 and 0.477, reflecting the power of these three predictors. Chief among them is the free-lunch indicator of poverty. Because many interaction effects are significant, it is difficult to assess separately the effect of each predictor. Therefore, values for various combinations of predictor values, which are easier to interpret, are reported in table 10.5. To prepare this table, the free-lunch variable was broken down into three categories: low poverty is 20 percent or more below the overall mean of 58 percent, high poverty is 20 percent or more above the mean, and medium poverty is in between.

Several patterns are displayed in table 10.5. First, the most important is the interaction between poverty and charter school status. The main pattern can be seen in the reading scores of schools attended by white students. In low-poverty schools, noncharters have higher average scores; in high-poverty schools, charters have the advantage. The same is true for every racial/ethnic group and for both reading and math. This is a result that has not been previously reported, but it may not be surprising. We suspect that for students whose realistic options are between two high-poverty, relatively low-performing schools, selectivity into the charter school is likely to be high. In other words, families with higher ambitions for their children are more likely to make the effort to enroll them in a charter school. When the choice is between low-poverty, relatively high-performing schools, perhaps other factors come more into play. Second, after controlling for all variables in the model, we continued to find large disparities between racial/ethnic groups, with whites and Asians attending the highest-performing schools in any given poverty and charter/noncharter category, and blacks generally attending the worst-performing schools. Not surprisingly, these differences are reinforced by the fact that Asian and white children are disproportionately found in schools with lower poverty. Third, racial isolation is closely related to poverty levels. Whites in low-poverty schools are more isolated than those in high-poverty schools; blacks and Hispanics in low-poverty schools are less isolated than those in high-poverty schools. There is only one group for which charter schools appear to have an independent effect on isolation: blacks. At every level of poverty, black students in charter schools are in schools with higher shares of black students than those in nearby noncharter schools. The share of black students is highest in high-poverty charter schools. Nevertheless, this racial concentration

Table 10.4
Multivariate Ordinary Least Squares (OLS) Models Predicting Test Performance (Percentile) and Racial Isolation of Schools

	Reading		Math		Isolation	
Student's race (white is reference)						
Black	–4.184***	(0.667)	–4.522***	(0.896)	–0.085***	(0.0188)
Hispanic	–2.797**	(1.115)	–1.717*	(1.024)	0.000	(0.0247)
Asian	3.557**	(1.675)	5.601**	(2.285)	–0.232***	(0.0433)
Native American	–1.978***	(0.655)	–1.690**	(0.677)	–0.396***	(0.0180)
Charter (noncharter is reference)	–1.041	(1.081)	–3.741***	(1.423)	0.038***	(0.0126)
Black Charter	–3.144**	(1.544)	0.089	(1.964)	0.115***	(0.0209)
Hispanic Charter	4.092*	(2.280)	5.128**	(2.570)	–0.042*	(0.0236)
Asian Charter	–1.694	(2.093)	–1.457	(2.627)	0.017	(0.0655)
Native American Charter	–7.302***	(2.437)	–4.049*	(2.409)	0.280***	(0.0779)
Percent Free Lunch	–79.940***	(1.573)	–70.190***	(1.541)	–0.503***	(0.0217)
Black Free Lunch	0.571	(2.474)	3.868	(2.620)	1.154***	(0.0454)
Hispanic Free Lunch	8.380	(5.098)	12.060**	(4.703)	1.092***	(0.0533)
Asian Free Lunch	6.162*	(3.460)	9.273*	(5.570)	0.591***	(0.107)
Native American Free Lunch	28.540***	(3.706)	30.570***	(4.261)	0.144***	(0.0319)
Free Lunch Charter	5.848*	(3.467)	8.375***	(3.167)	0.692***	(0.0532)
Black Free Lunch Charter	8.619*	(4.806)	6.489	(5.210)	–0.309***	(0.0619)
Hispanic Free Lunch Charter	–0.359	(4.454)	6.604	(5.505)	–0.299***	(0.0777)
Asian Free Lunch Charter	–22.080***	(4.598)	–20.700***	(6.274)	0.069	(0.157)
Native American Free Lunch Charter	4.260	(10.52)	–6.711	(8.838)	0.353	(0.270)
Constant	42.700***	(0.334)	42.100***	(0.415)	0.555***	(0.0103)
Observations	1,323,425		1,323,425		1,323,425	
R^2	0.476		0.349		0.329	
Number of districts	1,018		1,018		1,018	

Note: ***, **, * = statistically significant at 0.01, 0.05, and 0.10 levels.
Source: Authors' calculations based on data from NCES.

does not outweigh the apparent advantage that charter schools appear to provide in conditions of high poverty.

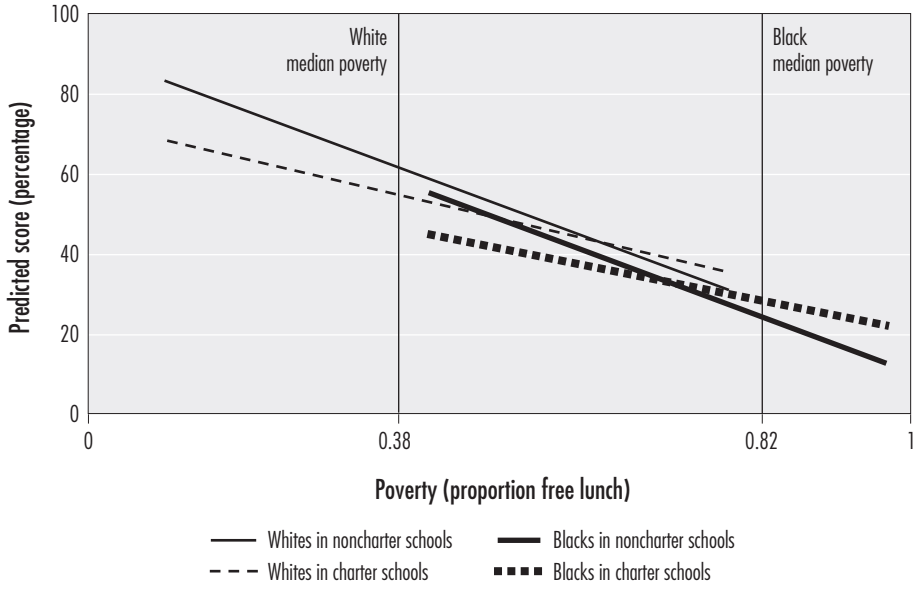
The distribution of students across poverty levels differs dramatically for each racial group. White and Asian students are much more likely to attend low-poverty schools, while black and Hispanic students are much more likely to attend high-poverty schools. Figure 10.1 shows what this difference means for

Table 10.5
Predicted Values of Reading and Math Performance (Percentile) and Isolation in School Attended

	White		Black		Hispanic		Asian		Native American	
	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter	Charter	Noncharter
Reading										
Low poverty	64.8	71.6	49.4	58.9	57.6	59.8	68.1	73.0	53.3	60.4
Medium poverty	51.9	53.0	25.2	24.9	39.7	34.1	52.7	47.1	30.0	36.8
High poverty	34.4	29.2	21.2	15.5	31.3	19.7	38.5	28.2	23.7	22.5
Math										
Low poverty	55.9	67.5	43.9	54.8	50.4	56.4	59.9	69.8	46.9	57.3
Medium poverty	46.5	51.1	27.7	26.2	40.0	35.7	50.0	48.4	31.3	37.1
High poverty	33.5	30.2	25.0	18.3	35.2	24.0	40.9	32.8	27.0	25.0
Isolation										
Low poverty	77.7%	73.3%	42.8%	30.7%	35.2%	39.5%	29.7%	28.7%	36.1%	8.9%
Medium poverty	64.8%	62.0%	73.0%	58.1%	58.8%	60.3%	32.4%	32.2%	47.9%	16.8%
High poverty	47.0%	47.6%	78.1%	65.7%	69.8%	71.9%	34.8%	34.8%	51.1%	21.6%
Number of students										
Low poverty	19,332	111,007	4,378	21,178	5,426	36,390	1,245	15,996	77	490
Medium poverty	22,681	292,835	23,968	186,576	14,336	309,347	1,729	40,712	283	4,050
High poverty	2,003	33,424	4,543	55,481	6,381	101,604	326	6,335	85	1,207

Source: Authors' calculations based on data from NCES.

Figure 10.1
Predicted Reading Score (Percentile) for White and Black Fourth Graders by Charter Status



Source: Authors' calculations based on data from NCES.

white and black students in charter and noncharter schools. The sloped lines represent predicted values of reading test scores based on poverty, race, and charter status. These lines extend only as far as the 10th and 90th percentiles of school poverty for each racial group. Eighty percent of students in each group fall somewhere along those lines. The vertical lines represent the median level of school poverty for whites and blacks. The lines for charter and noncharter schools cross around 75 percent poverty; charters with higher poverty perform better than noncharters, but charters with lower poverty perform worse. The crossing point is relatively similar for each group, but the distribution of students is very different. The black median poverty level is above the 90th percentile of the white distribution, and the white median is below the 10th percentile of the black distribution. This means that on average, black students are in charter schools that are doing better than black students in noncharter schools, but the reverse is true for white students. The pattern is very similar for math scores.

Conclusions

Based on prior research, we anticipated possible negative effects of charter schools, including increased segregation within school districts due to selective

recruitment and lower charter school achievement levels for charter schools compared to the noncharter schools in the same district. We found no such simple effects.

First, this study found that the districts offering charter schools are distinctive. Charters are more likely to be in larger, more urban districts with high proportions of minority and poor students. Therefore, comparing all schools to charter schools across the country would have been misleading. Instead, we focused on within-district comparisons, finding that charter schools do appear to pull black students into more racially isolated schools than noncharter schools in the same district. The impact on overall district segregation is small. However, if as many as 25 percent of district students were in charter schools, the effect would be an increase in segregation of as much as 3 points in the D score, so there is some potential for concern.

Charter schools in contexts of high poverty seem to have substantial positive benefits, while charters in contexts of low poverty seem to constitute a disadvantage. In the former case, it appears that students of any race/ethnicity will do well by choosing the charter alternative, while in the latter case the noncharter option seems preferable. Why this occurs is a new question for studies of educational inequality. In sum, charters have the potential to provide some amelioration of the disadvantages faced by many children in high-poverty communities.

Finally, this analysis underlines some other factors that have much clearer impacts on educational inequality. Students whose only options are high-poverty schools start school with a handicap. Whatever individual talents and attitudes they bring with them, they are generally entering a lower-performing school. Black, Hispanic, and Native American students have independent disadvantages associated with their race/ethnicity. Even in low-poverty settings, their choices are worse than those available to white and Asian children. This analysis may not tell us what difference the type of school makes, but it does reveal a pattern that is consistent with greater obstacles to achievement for less affluent minority students.

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