

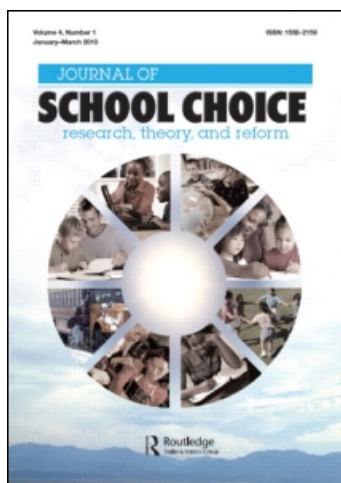
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Journal of School Choice

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t792306916>

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Online publication date: 09 March 2011

To cite this Article Buckley, Jack and Sattin-Bajaj, Carolyn(2011) 'Are ELL Students Underrepresented in Charter Schools? Demographic Trends in New York City, 2006-2008', Journal of School Choice, 5: 1, 40 – 65

To link to this Article: DOI: 10.1080/15582159.2011.548242

URL: <http://dx.doi.org/10.1080/15582159.2011.548242>

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Are ELL Students Underrepresented in Charter Schools? Demographic Trends in New York City, 2006–2008

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Analysts of charter school reform have recently begun to investigate the enrollment patterns of special student populations, namely, low-income students, students classified as special education, and those with English language learner status. Using 3 recent years of data from the New York State School Report Cards and analyzing the charter population at the school level, the authors found that English language learners are consistently underrepresented in charter school populations across 3 academic years. Conversely, students who qualify for reduced-price lunch are overrepresented and students eligible for free lunch are approximately proportionally represented. This gap in enrollments of English language learners is confirmed by comparing to a population estimate drawn from data from the 2006–2008 American Community Survey. These patterns remain generally constant for all school years observed, but the distribution changes slightly as the total number of charter schools operating in New York City increased between 2005–2006 and 2007–2008.

KEYWORDS *English language learners, charter schools, school choice*

INTRODUCTION

The educational experiences of students in poverty and those with special education status have long received scholarly attention, particularly

Order of authors is alphabetical. Thanks to Marc Scott, Amy Ellen Schwartz, and Daphna Bassok for their helpful comments on earlier drafts.

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in relation to access to high-quality school opportunities, patterns of segregation, and biased special education referrals (Chamberlain, 2005; Orfield & Lee, 2005). Until relatively recently, however, English language learners¹ (ELLs) were virtually absent from discussions of equity and access. The rapid growth in the number of ELLs in schools over the past 20 years has brought this increasingly visible student population to the forefront.

Children of immigrants, a term referring to both foreign-born youth and native-born children of immigrant parents, currently account for more than one quarter of all school-age children in the United States (Hernandez, 2009). Correspondingly, ELLs are now the fastest growing segment of the school-age population, their numbers more than doubling between 1989–1990 and 2004–2005 from 2 million to more than 5 million (Terrazas & Batalova, 2008). Between 1996 and 2006 alone, the share of ELL students in U.S. schools rose almost 60%, where as total student enrollment essentially did not change. During this period, the proportion of the total U.S. student population who was classified as ELL increased from 6.8% in 1995–1996 to 10.3% in 2005–2006 (Terrazas & Batalova, 2008). Nationally, more than 70% of ELLs speak Spanish, followed by Vietnamese, which represents only 3% of the total (Batalova, Fix, & Murray, 2007). ELL status is not restricted to first-generation immigrant students. In fact, U.S. born children, including both second-generation children of immigrants and third-generation children of native-born parents, comprise a majority of ELL students in schools today (Batalova et al., 2007; Fix & Capps, 2005). Moreover, the adult ELL population has grown in size to more than 20 million people.

The relation between students' English proficiency and their academic achievement has become an issue of growing concern among educators and policymakers. ELL students have some of the worst academic outcomes of any subgroup, and their failures are highlighted when compared with the performance of their English-dominant peers. For example, almost half (44%) of fourth-grade ELL students scored at the lowest level (below "basic") in math, and nearly three quarters (70%) scored below basic in both reading and math on the 2007 National Assessment of Educational Progress (Batalova et al., 2007). The negative trend was repeated in the middle grades with 69% of ELL students in eighth grade scoring at the lowest level in math and 70% scoring below basic in reading. Only 7% of fourth-grade ELL students and 5% of eighth-grade ELL students scored at or above proficiency in reading compared with 36% and 33% of English speakers, respectively (Batalova et al., 2007). School completion rates tend to be dramatically lower for ELLs than for English-speaking students as well. According to a report from the ELL Working Group (2009), in 1999, 31% of 18–24-year-old language minority students who were not enrolled in secondary school had not completed high school. By contrast, only 10% of English-dominant students in this category had not completed high school.

The disparities in academic performance and graduation rates on a national level are mirrored in data from New York City. According to the most recent report published by the Office of English Language Learners at the New York City Department of Education (NYCDOE, 2009), only 29.4% of fourth-grade and 5.2% of eighth-grade ELL students in district public schools met proficiency standards on the state's English language arts assessment in 2008 and only 63.9% and 42.4% of fourth- and eighth-grade ELL students, respectively, reached proficiency in math. Although the NYCDOE boasted gains in the proportion of ELLs reaching proficiency in both subjects between 2003 and 2008, particularly at the elementary school level, their overall performance indicates substantial gaps in basic academic skills. In addition, some of the gains achieved during this period have been challenged after the state raised proficiency standards amid considerable controversy in 2010. Moreover, the 4-year high school graduation rate for ELL students is the lowest of any subgroup in the city and has remained flat at around 31% since 2003.

In parallel with the growth of the ELL student population, over the course of the last 20 years, charter schools have become an increasingly common feature of the urban educational landscape in the United States. Charter schools are publicly financed, autonomously run schools that operate according to a time-limited contract, or "charter." They are formally public schools but are generally exempt from a number of district public school regulations regarding curriculum, staffing, and budget. However, charter schools are required to meet state academic standards and must comply with federal laws regarding safety, health, civil rights, and student assessment. According to the Center for Education Reform (2009), 40 states and the District of Columbia have charter school laws in place. Moreover, approximately 1.5 million students are educated in more than 5,000 charter schools nationwide. What began as a small-scale experiment has emerged as one of the key pillars of education reform in the United States today. The Obama Administration has made the expansion of charter schools a top priority of its educational platform. In fact, states without charter school laws or states that place caps on the number of charter schools that can be established were at a competitive disadvantage when applying for grants through the \$4.35 billion Federal Race to the Top Fund. Moreover, President Obama has openly stated his goal of doubling the financing for charter schools in the coming years (Dillon, 2009).

Federal support for charter school reform is bolstered by a growing body evidence suggesting that charters can have positive effects on student achievement as measured by standardized test scores (Hoxby, Murarka, & Kang, 2009), although there is some research supporting the conclusion that these charter effects may vary substantially (and not always be positive) because of the extreme heterogeneity of the charter school sector (Center for Research on Education Outcomes [CREDO], 2009). Despite the uncertainty

around the causal impact of charter schools on student outcomes, the federal seal of approval alone justifies the importance of better understanding issues of equity with respect to access to these schools.

In New York City, however, as in most other areas with high proportions of ELL students, analysis and discussion of ELL student access to charter schools has been limited until quite recently.² Immigrant and student advocates have called for explicit reforms to address ELLs' needs in response to their persistent underperformance in New York City schools. Demands have included improved professional development for teachers, increased access to translation and interpretation services, the requirement that new small schools serve ELL students, and additional resources to be directed to ELL populations (Advocates for Children of New York [AFCNY] and the Asian American Legal Defense and Education Fund [AALDEF], 2009; Advocates for Children of New York [AFCNY] and the New York Immigration Coalition [NYIC], 2006; New York Immigrant Coalition and Advocates for Children of New York, 2006). A recent United Federation of Teachers (UFT) report (2010) emphasizing the lag in Hispanic and ELL enrollments in New York City charter schools has sparked public and political attention, as evidenced by the provisions in the amendments to New York State's education law³ concerning charter schools designed to help address the ongoing disparities in ELL enrollment.

Our goal in this article is to empirically examine the gap in ELL enrollment between charter schools and traditional public schools and to look at trends in this gap over several years of data in New York City. The plan of the article is straightforward. After a brief discussion of the literature on the demographics and "educability" of charter school students, we review the history of charter school development in New York City and explain how this site fits into the national conversation about charter schools. Next, we provide a more detailed description of our data sources and methodology and then turn to a discussion of our results. Last, we offer some concluding thoughts about the factors that may contribute to current trends in student enrollment in New York City charter schools and provide initial policy suggestions to address current enrollment imbalances.

WHO ATTENDS CHARTER SCHOOLS?

Researchers, policymakers and activists have repeatedly raised the question of whether students who attend charter schools are qualitatively different from those enrolled in district public schools. In addition to its relevance for accurately measuring charter school effects with observational data, equity concerns and ongoing claims that school choice reforms promote "cream skimming" of students (Henig, 1994; Lee, Croninger, & Smith, 1996; Wells, Scott, Lopez, & Holme, 2005) have made this issue a chief concern in the

literature. A preponderance of evidence indicates that students from higher socioeconomic backgrounds tend to participate in voucher programs, magnet programs, and inter- or intradistrict school choice programs at higher rates than their more economically disadvantaged peers (Archibald, 1998; Armour & Peiser, 1998; Godwin, Kemerer, & Martinez, 1998; Goldring & Hausman, 1999; Wells & Crain, 1997). The patterns of socioeconomic stratification are less clear in charter schools because many of them are located in high-need, urban districts with predominantly low-income residents.

In addition to income inequality, charter school researchers have long been interested in how the racial/ethnic makeup of charter schools compares to traditional public schools. A series of studies (Ascher, Jacobowitz, & McBride, 1999; Frankenberg & Lee, 2003; Wells, Holme, Lopez, & Cooper, 2000) have demonstrated that charter schools enroll proportionately more students of color and tend to be more racially homogenous than are traditional public schools. These findings raise concerns about the potential for charter schools to increase the number of racially homogeneous schools and led to larger discussions about the consequences of racial segregation (albeit through individual decisions) and the value of integration (Frankenberg & Siegel-Hawley, 2009; Scott, 2005). Despite considerable attention paid to socioeconomic indicators and the demographic characteristics of students in charter schools, scholars have only recently begun to investigate charter school representativeness in terms of special education and ELL student enrollments—two key measures of educability.

By examining the charter school population in Washington, DC, in terms of income level, special needs, and English language proficiency, Lacireno-Paquet, Holyoke, Moser, and Henig's (2002) study of cream skimming in charter schools represented an important step in putting these historically overlooked variables into focus. Buckley, Schneider, and Shang (2005) and Buckley and Schneider (2007, chapter 4) engaged the question of whether charter school students are harder to educate more directly, and their study produced some of the most robust results on this issue to date. As part of a broader analysis, they compared the proportion of students in charter schools and district public schools in Washington, DC, from the 2002–2003 academic year who qualified for free or reduced lunch (combined), were classified as special education, or as an ELL using both a simple binomial model and then the estimation of a mixture model that assumes two latent categories of charter schools. Ultimately, their results indicated that charter schools served proportionately more students who qualified for free or reduced-price lunch but significantly fewer ELLs and special education students.

Subsequent studies have continued with Buckley and Schneider's (2007) line of inquiry including Hoxby et al.'s 2009 work, which compared the gender, race, and ethnicity of applicants to New York City charter schools with a composite district public comparison school and all traditional New

York City public school students. They found that female, Hispanic, White, and Asian students were statistically significantly underrepresented in charter schools but Black students were overrepresented. Given certain data limitations, Hoxby et al. (2009) were reluctant to make definitive assessments of the charter schools representativeness in terms of poverty, special education classification, and ELL status. Their provisional findings on these indicators, however, were generally similar to those described by the UFT in their 2010 report on charter school enrollments in New York City from 2007–2008. Both studies found that special education students and those with limited English proficiency were proportionally underrepresented in the charter school population in New York City. They differed in terms of student poverty rates because Hoxby et al. (2009) combined the data for free and reduced lunch and determined that “at the time they apply 91.1 percent of charter school applicants are certified for free or reduced-price lunch” compared with 73.6% of students in traditional public schools in New York City; the UFT found evidence to the contrary when disaggregating by category (free or reduced). In their report, the UFT argued that in the 2007–2008 school year, on average charter schools enrolled about 10 percentage points fewer students who were eligible for free lunch than district public schools. Neither of these studies sought to model the uncertainty inherent in the datasets, and the incompatibility of their results calls for further inquiry into the New York City context.

CHARTER SCHOOLS IN NEW YORK CITY

More than 5,000 charter schools have been founded in districts across the United States since the first charter schools opened their doors in Minnesota in 1991. New York City, like many other urban districts, has adopted charter schools as part of a larger package of educational reforms aimed at addressing historic inequalities in access to high performing schools and combating the persistent “achievement gap” between White students and students of color. Charter school legislation was first passed in New York State in 1998, and under this new legislation, three institutions were given authorization to grant charters: the New York State Board of Regents, the State University of New York, and the NYCDOE. In their capacity as authorizing institutions, these three entities are responsible for approving charter applications, reviewing school performance, providing oversight, and determining whether the school should have its charter renewed or terminated every five years.

In 2000–2001, the first official year of operation for charter schools in New York, five charter schools began serving students in New York City (New York City Independent Budget Office, 2010). The number of charter schools in New York City increased progressively each year after that, and

when the statewide cap on charters was lifted from 100 to 200, an onslaught of charter school applications ensued. By the 2008–2009 school year, 78 charter schools were operating in New York City, and approximately 23,500 students, or 2% of the total public school student population, was being educated in a charter school (New York City Independent Budget Office, 2010). Twenty-one additional charters were opened in 2009–2010, and new legislation was passed in 2010 raising the statewide cap on the number of charter schools from 200 to 460.

The funding of charter schools has been a contentious issue nationally, as well as locally in New York City. Charter school advocates complain that their schools are underfunded while critics reject the use of public resources for schools outside of the district's purview and complain of severe funding imbalances among charter schools based on capacity to raise private funds (Slayton, 2002). A recent fiscal brief released by the New York City Independent Budget Office (2010) analyzed per-pupil spending in traditional New York City public schools and charter schools within the district. It found that in many cases, the discrepancy was much less than previously thought. New York State law determines the allocation of public dollars to charter schools to cover the most basic operating costs. For charter schools located in public school buildings, the annual per-pupil allocation was only \$305 less than what traditional public schools receive, totaling \$16,373. Because more than two-thirds of charter schools in New York City are housed in public school facilities, this figure reflects the majority of cases. New York City is unusual in its provision of public space for a substantial number of charter schools, however, and the size of the funding gaps cannot be generalized to any other districts. Moreover, for those charter schools located in private spaces, the effective per-pupil support was approximately \$3,000 less than that for traditional public schools. In addition, the state places restrictions on which expenses can be covered by the per-pupil allocation, and as a result, charter schools must often pursue additional sources of support including from private donors.

DATA SOURCES

In this article, we attempt to respond to inconsistent findings regarding the relative educability of charter school students in New York City by building on Buckley and Schneider's (2007, chapter 4) and Buckley et al.'s (2005) earlier models and applying them to three consecutive years of data on New York City charter schools. We examine data made publicly available in the New York State School Report Cards on the percentage of students in each New York City charter school who was classified as limited English proficient, the percentage of students eligible for free lunch and separately, the percentage eligible for reduced price lunch in each of three academic years,

2005–2006, 2006–2007, and 2007–2008 (the most recent year for which such data were publicly available at the time of this analysis). Because the report cards do not include any information about the school-based percentage of special education students in charter schools and we were unsuccessful in our attempts to gather these data by alternate means, we are unable to include this variable in our analysis. We compare the charter school-based proportion of students in each of the three available categories of educability to the districtwide average across three years and, in the case of ELL students, to an alternative measure derived from the American Community Survey. We look for evidence of whether charter schools in New York City are serving proportionally fewer “harder to educate” students—particularly students with limited English proficiency—and we analyze how school—and district-level percentages of students in each category change over time.

The New York State Education Department compiles data submitted annually by local school district officials, and, in the case of charter schools, school leaders, to create the New York State Report Cards. These report cards are composed of three distinct parts. The Accountability and Overview Report, which we use for our analyses, provides enrollment figures broken down by grade across three academic years, information about class size, demographic factors including free and reduced lunch percentage, student stability rate, limited English proficiency, and racial/ethnic origin breakdowns. Furthermore, this report includes attendance rates, number of suspensions, information on teacher qualifications, and data on teacher turnover. The final section of the Accountability Report is dedicated to reviewing school performance on state accountability measures linked to the Federal guidelines: the percentage of students who met proficiency on the statewide examination in English language arts and in mathematics. The third performance indicator differs based on school level, and elementary and middle schools are evaluated based on performance in science examinations and high schools based on graduation rates.

The Comprehensive Information Report and the Fiscal Accountability and Special Education Information Supplement constitute the remaining parts of the overall School Report Card. The Comprehensive Information Report gives a concise summary of student performance on New York State Regents exams (high-stakes tests that students must pass in order to graduate from high school); for middle and elementary schools, it includes student achievement on social studies assessments disaggregated by proficiency level. Last, the Fiscal Accountability and Special Education Information Supplement gives districtwide figures of the percentage and number of special education students, expenditures per general education versus special education student, and comparisons on these figures with similar districts and all public schools in New York City. The Fiscal Accountability and Special Education Information Supplement was not publicly available for charter schools in any of the academic years we covered

in our analysis. Instead, we focus solely on part of the information provided in the accountability reports.

Given the relative dearth of empirical studies of ELL student participation in charter schools, much of our analysis and discussion are centered on the enrollment patterns of this subpopulation. We took great care to cross-check the demographic data provided in the State Report Cards with other publicly available sources of information on New York City enrollments yet few comprehensive reports exist and, as with most large, aggregated data sets, there are certain limitations to the data we use.

To start, by relying on reports produced by the State Education Department rather than soliciting data directly from each individual charter school, there is a possibility that some of the state figures are marginally different from what the charter schools had on record, due to rounding or errors in data transfer. Hoxby et al. (2009) described what they believed to be “substantial problems in the recording of special education and English language learner student status” (2009: 13) that results from the NYCDOE’s procedure for maintaining records on charter school enrollments. Charter schools are only required to maintain basic student enrollment information in ATS (the New York City database), and the authors hypothesized that many charter schools leave the indicator “flag” for special education and/or ELL status blank. They argued that since many charter schools use another student information system as their primary database, the school administrators may leave those flags blank, prompting the city’s database to record the student as not requiring special education or ELL services when in fact the charter school just has not provided this information. Hoxby et al. (2009) suggested that there is an eight percentage point underestimation of percentage of ELL students in charter schools for the years covered by their analysis.

The range that we have seen in the calculated percentage of English language learners in New York City charter schools (from 2.8% in official count reported by Hoxby et al. (2009) to 3.1% estimated in the CREDO (2009) study to 3.8% calculated by the UFT (2010) reflects a degree of uncertainty inherent in these data. We thus interpret our findings cautiously, aware of the challenges of using these data to estimate how well represented ELL, students eligible for free lunch, and those who qualify for reduced price lunch are in charter schools in New York City between 2005–2006 and 2007–2008.

EMPIRICAL ANALYSIS

The simplest strategy for empirically investigating the demographics of charter schools is simply to compare the proportion of charter students in a given category (e.g., ELLs or reduced-price lunch eligible) to the proportion in the surrounding traditional public school district. This straightforward approach,

however, is unsatisfactory. As the CREDO (2009) study dramatically illustrated, the population of charter schools is extremely heterogeneous. Charter schools are founded and operated by a diverse group of educators, have a wide range of pedagogical, programmatic, and organizational approaches, and vary widely with respect to quality as defined by virtually any outcome measure.

Accordingly, we follow Buckley et al.'s (2005) approach of estimating the proportion of students in each charter school who are members of each category (ELLs, reduced-price lunch eligible, and free lunch eligible) independently and comparing these estimates to the proportion of students in the traditional public district. We extend their analysis in two ways. First, we estimate these proportions over 3 years, allowing us to see both changes at the individual school level and changes in the populations as a whole as new schools are opened. Second, following Greene's (2005) critique of the literature on segregation in schools of choice, it may be more appropriate to compare charter school students with the population of all students in a geographical area as opposed to only those in the traditional public schools. Accordingly, we include an alternative reference comparison for the ELL students computed by taking the percentage of 5–17-year-olds reported as understanding English less than "very well" in the 2006–2008 estimate for New York City from the American Community Survey (ACS).

Estimating Proportions in Each School

We estimate the proportion of students in each charter school in each category with a series of independent Bayesian models assuming a binomial likelihood and conjugate but noninformative Jeffreys priors (Buckley et al., 2005). More formally, for school i in year t , we model the number of students in a given category x_{it} out of the total number of students in the school, n_{it} using the likelihood:

$$p(x_{it}|\pi_{it}) = \binom{n_{it}}{x_{it}} \pi_{it}^{x_{it}} (1 - \pi_{it})^{n_{it} - x_{it}}, \quad (1)$$

where the prior probability distribution over π_{it} , the proportion of students in each school belonging to the category, is assumed to be distributed beta: $\pi_{it} \sim Be\left(\frac{1}{2}, \frac{1}{2}\right)$.

We choose a Bayesian modeling strategy because although we have, in some sense, data on the entire population of charter schools and their students for these 3 years, we nevertheless wish to formally allow for uncertainty in our estimates without encountering the philosophical problems engendered by using frequentist inference with population data (Gill, 2001). Education researchers often present the results of statistical analyses with the usual confidence intervals and tests of significance even when using data

from an entire population, such as student longitudinal unit record databases or censuses of schools. The Bayesian approach allows us to express our posterior beliefs about the values of parameters of interest probabilistically without making a problematic appeal to hypothetical repeated sampling or some notion of a “superpopulation.”⁴

On the basis of this model, we compute 95% credible intervals (analogous to the traditional confidence interval in frequentist statistics) from the posterior density of π_{it} :

$$\pi_{it} \sim Be\left(\frac{1}{2} + x_{it}, \frac{1}{2} + n_{it} - x_{it}\right), \quad (2)$$

and compare these intervals to the reference proportion of traditional public students (and the value computed from the ACS discussed earlier).

Figure 1 presents the 95% credible intervals computed from the posterior distribution in (2) for LEP students in each charter school in New York City in 2006, 2007, and 2008 (number of schools = 42, 57, and 60, respectively). Schools are held in the same vertical position across the 3

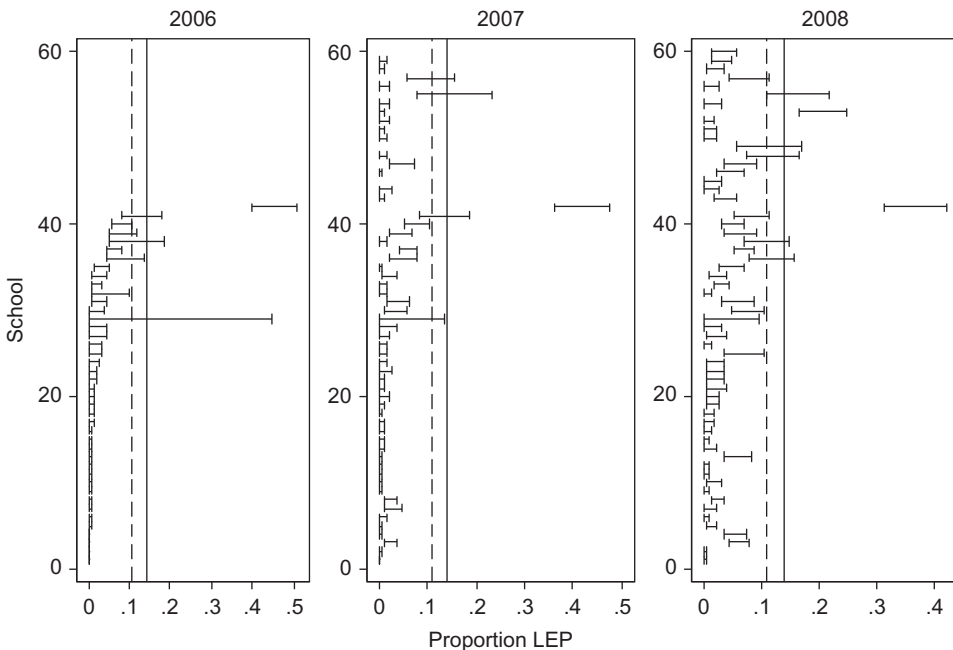


FIGURE 1 Proportion of LEP students in NYC charter schools, 2006–2008. Ranges represent 95% credible intervals from the estimated posterior distribution of the proportion in each school. The solid vertical line depicts the NYC traditional public school percentage LEP (.14 in each year) and the dashed line shows the percentage of 5–17-year-olds reported as understanding English less than “very well” in the 2006–2008 American Community Survey 3-Year Estimate (.108).

years to allow for visual comparison. Schools added in later years are placed in the upper section of the plots. The solid vertical line is the percentage of LEP students (as reported by the state) in New York City's traditional public schools (.14 in each year) and the dashed vertical line is the population comparison estimated from the ACS (.108 over the the 3 years).

In 2006, as Figure 1 shows, most charter schools in New York City have significantly smaller proportions of LEP students than the traditional school district or than the ACS estimate.⁵ There is one school with a much larger proportion of LEP students than either reference population, and a small number (3 or 6 depending on which reference) of schools that are statistically tied with the reference group. These results are summarized in the first row of Table 1.

The second two plots of Figure 1 (and the second two rows of Table 1) illustrate shifts in the distribution of charter schools over time with respect to proportion LEP. By 2008, two trends emerge. First, several schools opened since 2006 that have estimated proportions of charter students statistically indeterminate from the comparison population. Second, the proportion of LEP students in some of the small proportion schools has increased, although still remaining below either reference group. We present a more formal analysis of these trends below.

TABLE 1 Comparing NYC's Charter Schools to Their Surrounding District

Year	<District	Tie	>District	<i>n</i>
LEP (ACS comparison)				
2006	38 (35)	3 (6)	1 (1)	42
2007	53 (53)	3 (4)	1 (1)	57
2008	53 (51)	5 (6)	2 (3)	60
Reduced-price lunch				
2006	3	8	31	42
2007	4	15	38	57
2008	2	13	45	60
Free lunch				
2006	19	11	12	42
2007	25	20	12	57
2008	26	21	13	60

Note. Table shows the number of charter schools with less than (<), statistically tied with, or greater than (>) the proportion of limited English proficient (LEP), reduced-price lunch eligible, or free lunch eligible students in the traditional NYC public schools for 2006, 2007, and 2009. The LEP results also compare the charter schools to the percentage of 5–17-year-olds reported as understanding English less than “very well” in the 2006–2008 American Community Survey 3-Year Estimate. Figures are based on the estimates presented in Figures 1–3.

In Figure 2, we repeat the preceding analysis for proportions of students eligible for reduced-price lunch. Here (and in the second set of results in Table 2), we see that the overwhelming majority of charter schools enroll proportionally more students eligible for reduced-price lunch than the surrounding public school district, even taking into account uncertainty as a result of the small size of many charters. Over time, as Table 1 shows, the percentage of charter schools enrolling more than the district proportion of reduced-price lunch eligible students varies from $31/42 \approx 74\%$ in 2006, through $38/57 \approx 67\%$ in 2007 to $45/60 = 75\%$ in 2008.

Figure 3 shows the estimated 95% credible intervals for the proportion of free lunch eligible students in each charter school in 2006–2008, compared to the New York City traditional public school proportions for those years (the results are summarized in the third section of Table 1 as well). Unlike the case for reduced-price lunch, most charter schools between 2006 and 2008 enrolled fewer than the overall district proportion of free lunch eligible students and only $12/42 \approx 29\%$ in 2006, $12/57 \approx 21\%$ in 2007, and $13/60 \approx 22\%$ in 2008 of charter schools had disproportionately more free lunch-eligible students. However, as Table 1 also shows, because of the large number of charter schools whose 95% credible interval includes the district

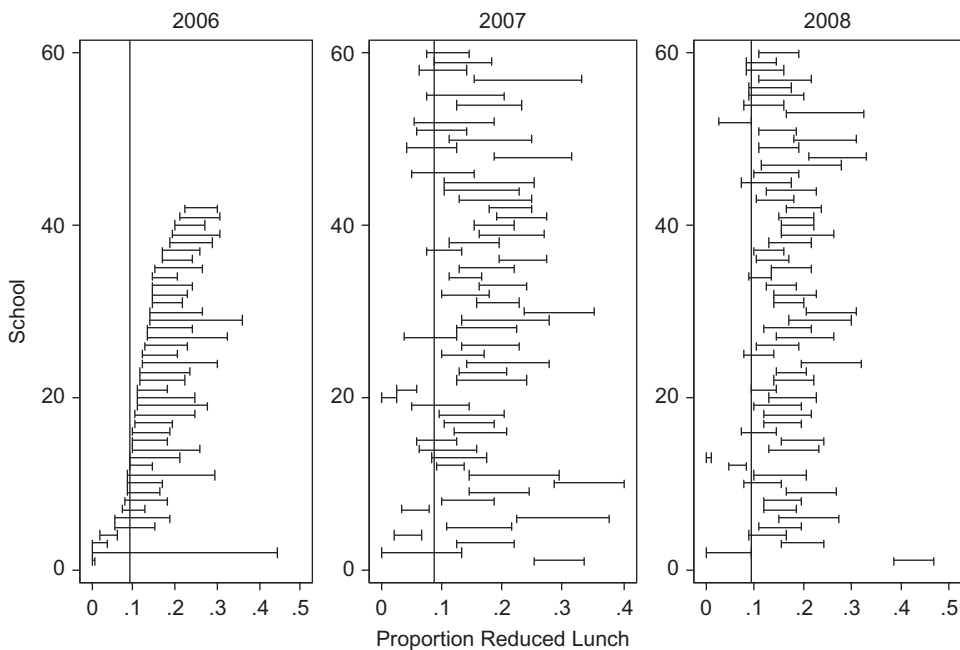


FIGURE 2 Proportion of reduced-price lunch eligible students in NYC charter schools, 2006–2008. Ranges represent 95% credible intervals from the estimated posterior distribution of the proportion in each school. The solid vertical line depicts the NYC traditional public school percentage reduced price lunch (.09 in each year).

TABLE 2 Estimated Proportions of LEP Charter School Students in NYC Over Time

	Posterior mean			Standard deviation			95% credible interval		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
π_1	.0008	.0013	.0085	(.0004)	(.0003)	(.0011)	[.0003, .0016]	[.0007, .0021]	[.0064, .0108]
π_2	.0511	.0467	.0607	(.0039)	(.0030)	(.0037)	[.0438, .0590]	[.0406, .0531]	[.0539, .0683]
π_3	.4426	.4091	.2481	(.0290)	(.0288)	(.0159)	[.3864, .5003]	[.3526, .4650]	[.2184, .2809]
θ_1	.6639	.7130	.5944	(.0713)	(.0585)	(.0635)	[.5191, .7973]	[.5937, .8191]	[.4689, .7164]
θ_2	.2916	.2538	.3434	(.0687)	(.0563)	(.0617)	[.1658, .4326]	[.1518, .3710]	[.2268, .4686]
θ_3	.0445	.0332	.0622	(.0305)	(.0229)	(.0303)	[.0054, .1206]	[.0040, .0901]	[.0172, .1340]

Note. Results are from Markov chain Monte Carlo estimation of three component binomial mixture model for proportion of NYC charter school students classified as limited English proficient (LEP) for 2006, 2007, and 2008. Results are means, standard deviations, and 95% credible intervals computed from 20,000 simulation draws after 180,000 draws discarded as burn-in. The π_k parameters denote the probability of success in each group and the θ_k 's are the group mixing parameters.

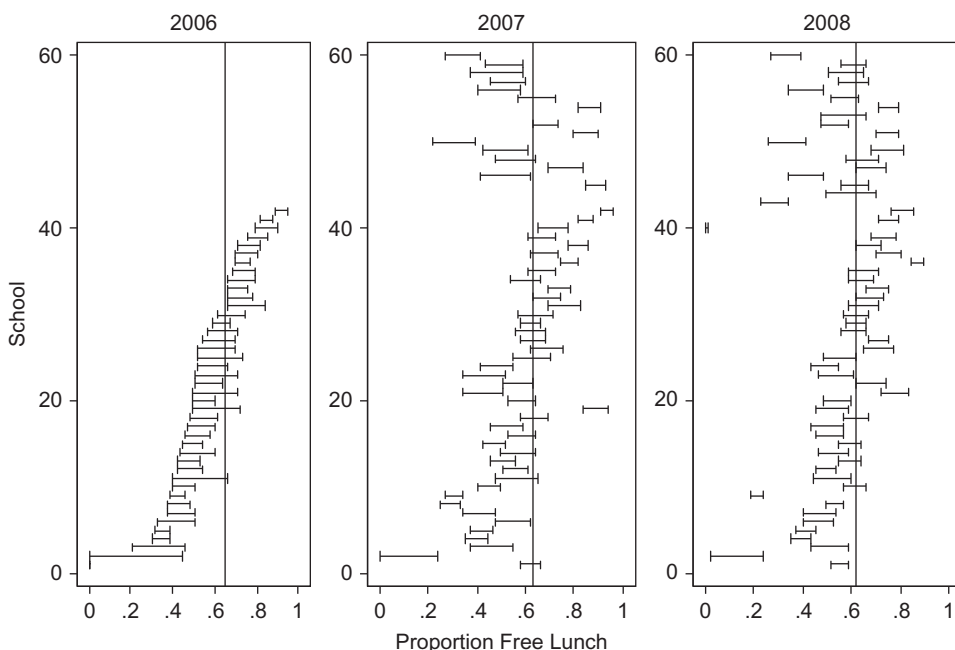


FIGURE 3 Proportion of free lunch eligible students in NYC charter schools, 2006–2008. Ranges represent 95% credible intervals from the estimated posterior distribution of the proportion in each school. The solid vertical line depicts the NYC traditional public school percentage free lunch (.65 in 2006, .64 in 2007, and .62 in 2008).

proportion, it is also true that greater than 50% of charter schools in each year enrolled about as many or more free lunch students, proportionally, than the district average.

In sum, at the school level, New York City charter schools appear to have enrolled a disproportionately high number of reduced-price lunch eligible students, about the same overall proportion of free lunch eligible students (once uncertainty at the school level is accounted for), and disproportionately few LEP students. We now turn to a more detailed examination of the LEP distribution over time.

Trends in LEP Proportion: A Mixture-Model Approach

The results shown in Figures 1–3 suggest that, as expected, the population of charter schools is both heterogeneous and changing over time. Even in the case of the LEP proportions, there is a large group of schools with very few, a handful with a larger proportion and perhaps 1–3 schools, depending on the year, with a large share of LEP students. In their examination of charter schools in Washington, DC, Buckley et al. (2005) and Buckley and Schneider (2007, chapter 4) observe similar heterogeneity in student characteristics and

model the data with a mixture of binomial distributions. Here, we follow a similar strategy, but extend the model by fitting a mixture of three components (still parsimonious, but more reflective of the distribution) and by estimating the model independently for each year to allow an examination of trends in the model parameters.

Instead of assuming a binomial distribution for x_{it} , the number of LEP students in a given school in a given year, we instead model the data as a mixture of $K = 3$ binomials:

$$p(x_{it}|\pi, \theta) \approx \sum_{k=1}^K \theta_{kt} \binom{n_{it}}{x_{it}} \pi_{kt}^{x_{it}} (1 - \pi_{kt})^{n_{it}-x_{it}}, \quad (3)$$

where the π_{kt} are the three latent proportions of LEP students in the charter schools estimated at each time point (the high, middle, and low proportions) and we constrain the subpopulation mixing proportions θ_k at each time t to sum to 1.

Because we are taking a Bayesian approach, we need to specify a full prior distribution for the θ_{kt} parameters. Following Laird (1982) and using the specification suggested by Congdon (2001, 217-8), we assume a conjugate Dirichlet prior:

$$p(\theta|x, \pi) = \frac{\Gamma(\sum_{k=1}^K u_k)}{\prod_{k=1}^K K \Gamma(u_k)} \prod_{k=1}^K \pi_k^{u_k-1}, \quad (4)$$

where $\Gamma()$ denotes the gamma function and the u_k are the prior counts of schools in each of the three categories (low, middle, and high).⁶

We estimate the model via Markov chain Monte Carlo and base the results on 20,000 simulation draws after a burn-in of 180,000. Visual inspection of the simulated posterior distributions, trace plots, and autocorrelations, as well as the Geweke (1992) and Heidelberger and Welch (1983) diagnostics do not suggest nonconvergence. Table 2 reports the posterior means, standard deviations, and 95% credible intervals for the main parameters of interest.

The results of the estimation of the mixture model for proportion LEP, shown in Table 2, are divided into two sets of estimands: the three probabilities of “success” or proportion of LEP students in each group (the three π_k s) and the mixing parameters or the the proportion of schools in each of the three groups (the three θ_k s). Take, for example, the estimates of π_1 over time: .0008, .0013, and .0085 in 2006, 2007, and 2008, respectively. This suggests that the proportion of LEP students in the group of charter schools with the lowest rates of LEP enrollment in the city is increasing over time from essentially 0 to almost 1%. On the other hand, the estimates of θ_1 over time (.6639, .7130, and .5944) suggest that the *share* of schools in this lowest category increased in 2007 and then fell below the initial 2006 level by 2008.

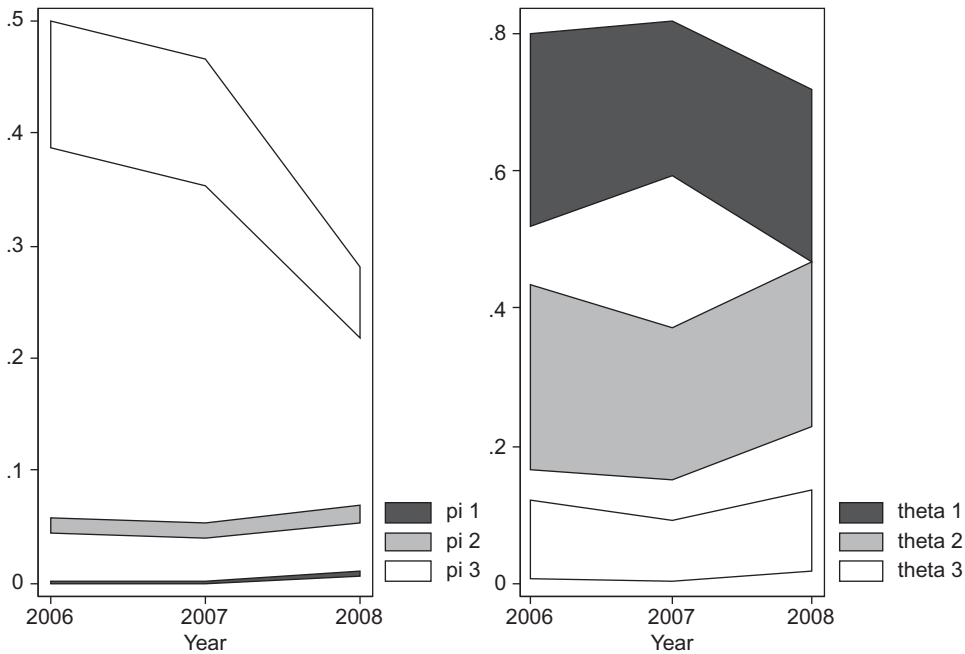


FIGURE 4 Changes in the three estimated group proportions (π_k) and the mixing parameters (θ_k) from the three component binomial mixture model over time, 2006–2008. Polygons denote 95% credible intervals for each estimate. Complete results presented in Table 2.

The results in Table 2 are summarized graphically in Figure 4, which shows the changes over the three years in both the group proportions, π_k and the mixing parameters, θ_k . As the figure shows, over time the low and middle group proportions of LEP charter school students have increased, while the high group proportion has declined. This is largely because the number of schools in the high group increased from one (with an extremely large proportion LEP) to several (with a more balanced average proportion). As the right panel of Figure 4 shows, the mixing parameters vary nonlinearly over time, probably because of the addition of many new charter schools in 2007 and 2008. By 2008, however, the share of schools in the lowest group decreases and the corresponding share in the middle and high groups increases.

DISCUSSION

The enrollment trends observed in New York City's charter schools raise a number of empirical and policy questions, some of which are beyond the scope of this article. We will, however, offer some ideas about how these data relate to the extant literature on the student populations in question

and will suggest policy implications and directions for future research. To start, our results demonstrate the merits of disaggregating data to see more nuanced differences between charter and traditional district public school enrollments. By examining the percentage of students eligible for free and reduced-price lunch separately, we can identify variation in school populations according to poverty level. In other words, we can caveat Hoxby et al.'s (2009) claim that charter schools in New York City serve higher poverty students than district public schools on the grounds that their composite statistic obscures the underlying pattern of approximately equal proportions (at the school level) of free lunch students but overrepresentation of reduced-price lunch students in charters. Unfortunately at the present there is no corresponding disaggregation possible in the case of ELL student enrollments in New York City schools.

However, if data on students' actual English proficiency level (or score on the New York State English as a Second Language Achievement Test) were made available, we could compare ELLs in charter schools and in traditional public schools in terms of their competency in English. In fact, advocacy groups in Massachusetts have raised this issue arguing that even the limited ELL enrollment in charter schools is not drawn from the general ELL student population because they have higher scores on the Massachusetts English Proficiency Assessment than their traditional public school counterparts and on average they have been in the United States longer (META, 2009). The same critique could be applied to CREDO's (2009) approach to analyzing ELL student achievement. They found that on average, ELLs reported significantly better gains in charter schools nationally, but they did not disaggregate by students proficiency in English. Thus, given the considerable limitations to relying on aggregate categories of student characteristics when conducting these comparative analyses, we propose that education agencies release to the public more detailed school- or even student-level data that researchers could use to examine variation in student performance and enrollments.

Our findings also present important questions about equity and access to educational opportunities that may be even more relevant in the face of mounting Federal support of charter schools. The underrepresentation of ELLs in charter schools raises the question: "Why?" Though data constraints prevent us from identifying causal mechanisms, we propose three possible factors that may contribute to the patterns we have observed. First, findings from earlier studies of charter schools in New York City suggest that location is a potential factor. If charter schools are operating in neighborhoods with lower proportions of ELL students than the citywide average, then their underrepresentation in charter schools might be explained in part by location (and the corresponding effect on average travel times). However, according to Hoxby et al. (2009), charter schools are located in neighborhoods with disproportionately high numbers of Black and Hispanic

residents, low median incomes, and high poverty rates. Although these authors do not cite data on the English language proficiency of residents in the census tracts in which charter schools are located, their concentration in the South Bronx and Harlem, areas of the city with large and growing Hispanic and ELL populations, suggest that there should be a sizable number of ELL students living in close geographic proximity to some charter schools. Moreover, the UFT's (2010) analysis compared ELL student enrollments in charter versus district public schools in Harlem, North-Central Brooklyn, and the South Bronx for 2007–2008, and they found that the gap was larger in the South Bronx than the city-wide difference (21.6% ELLs in district public schools versus 9% in charter schools in the area) and consistent in the two other areas (11.6% versus 2.7% in Harlem and 11.2% versus 1.3% in North-Central Brooklyn respectively.) In addition, *The New York Times* (Medina & Gebeloff, 2010) compared each New York City elementary and intermediate charter with the closest “peer” district public school in its neighborhood and found that, on average, charter schools enrolled fewer ELLs and fewer Hispanic students than their peers. Hence, it appears that location cannot be held responsible for the persistent underrepresentation of ELLs in New York City charter schools.

Immigrant advocates have often cited parents' lack of knowledge about the existence of charter schools and how to apply to them as explanations for the disparity in charter school enrollments (META, 2009). We consider this a strong possible factor for the patterns we observe. These claims are consistent with the large body of literature on low-income immigrant parents' limited understanding of schooling policies, procedures, and normative expectations of parent involvement in their children's education in the United States (Delgado-Gaitan, 1992; Reese, Balzano, Gallimore, & Goldenberg, 1995; Stanton-Salazar, 2001; Valdes, 1996; Valencia & Black, 2002). Moreover, culturally informed differences in parents behaviors may come into play here as well given that research has shown that many poor Latin American immigrant parents with low levels of education tend to defer to teachers and school administrators on academic matters that they believe to be outside of their realm of expertise and authority (Delgado-Gaitan, 1992; Reese et al., 1995; Stanton-Salazar, 2001; Suárez-Orozco, 1989; Valdes, 1996; Valencia & Black, 2002). Following the traditional hierarchies and cultural scripts in their countries of origin, parents often treat teachers as educated professionals who know best about academic decisions for their children. Thus, if school authorities do not make recommendations to parents of ELLs about pursuing charter schools, they might not even consider alternatives or seek out this information on their own. In fact, the abundant literature on low-income, minority, and immigrant families' reliance on school-based sources of information about school choice and other educational matters (Andre-Becheley, 2005; Lareau, 2003; Schneider, Teske, & Marschall, 2000; Teske, Schneider, Roch, & Marschall, 2000; Teske, Fitzpatrick, & Kaplan,

2007) confirms this. Therefore, we hypothesize that an information gap might contribute to the current enrollment gap.

Historically, charter schools in New York City have accepted students on the basis of a lottery system (when oversubscribed), and there have been no enrollment requirements or quotas on the basis of student demographic or other characteristics. As a result, although the underenrollment of ELLs and students eligible for free lunch cannot be attributed to intentional exclusion *per se*, there have been no incentives to enroll “harder to educate” students. In fact, because of certain funding mechanisms, some charter school administrators might have found there to be a disincentive to increasing outreach to ELL communities or engaging in other activities to raise the number of ELL applicants and potentially the size of the ELL student population in their school.

Although, as we noted earlier, the New York City Independent Budget Office calculated only a \$305 differential in per-pupil allocations between two thirds of charter schools and district public schools (NYCIBO, 2010), charter schools are not eligible for certain categorical allocations from the state and Federal government. According to representatives from the NYCDOE and the NYSED (personal communications, February 23, 2010, and February 24, 2010), some externally restricted funds like Federal Title III grants for LEP students are administered in the form of district-based allocations, and individual charter schools rarely meet the minimum number of students required to access them. Because each charter school is evaluated individually as a district, it has historically been much more difficult for them to qualify for these funds than it has been for district public schools. In response to the threshold requirement, in the summer of 2009, a group of 17 charter schools in New York City created a consortium through which they applied together as a makeshift district for the purposes of Federal Title III grants. As this is a recent development, it is too early to evaluate the implications of this effort for ELL enrollments in charter schools, but according to state education officials, the consortium will allow each charter school to access their combined Title III funds (a total of \$100,000 awarded) “for the purpose of sharing and/or providing services to the benefit of their limited English Proficient students” (personal communication, February 24, 2010).

It is important to note, however, that critics have contested claims that charter schools are underfunded for English language learners on the grounds that “Limited English Proficiency funding is passed along to charters according to the district-wide average, regardless of a charters particular enrollment,” (Gyurko, 2009). In other words, according to this argument charter schools as a whole receive a larger per-pupil allocation than they should since the proportion of their student population that is classified as ELL is less than the district average (Dashefsky, 2009; Gyurko, 2009). Of course, the same logic should apply with respect to free and reduced-price lunch. Thus, charter schools that serve large numbers of ELLs and

students who qualify for free lunch may be at a relative disadvantage while charter schools in which these students are underrepresented benefit. There remains considerable confusion surrounding charter school funding. The powerful role that funding can play in creating incentives and disincentives for schools to serve harder-to-educate students means that charter school funding mechanisms should be reexamined and, where necessary, revised when incentives are misaligned with the broader educational goals of equity and access.

As our analysis shows, despite substantial evidence of the underenrollment of ELLs in New York City charter schools, not every school follows this trend. Family Life Academy Charter School, an elementary grades charter school with ELL enrollments above 35% of the total student population in each of the 3 years we analyzed, was an outlier in our data set but merits mention nonetheless.⁷ Visits to Family Life Academy Charter School and conversations with the principal revealed a few key strategies that school personnel employ to meet the needs of the ELLs. In this school, which first opened in the fall of 2001, teachers and administrators understand the education of ELLs to be an integral part of the school's mission and ELL applicants are given preference in admission. School personnel share responsibility for teaching ELL students rather than viewing their instruction as belonging primarily in the domain of a small cohort of English-as-a-second language teachers—a practice all too common in many other schools with ELL populations. Teachers in every discipline receive ongoing professional development for techniques to promote English language development, and they are encouraged to infuse language-development activities into their lessons. Last, the school principal dedicates considerable time, energy, and resources to fostering family engagement and uses creative outreach and communication methods in ways that take into account the diverse families language needs, time constraints, and cultural backgrounds. Students in Family Life Academy have consistently performed at high levels, and by later elementary grades many ELLs are able to transition to exclusively mainstream classes.

The ongoing success of Family Life Academy Charter School offers one example of the educational possibilities for ELLs in charter schools. In fact, more and more charter schools are being established with an immigrant and ELL student population in mind (Jackson, 2010; Lazarín & Ortiz-Licon, 2010). The question then becomes whether a charter school must attract or enroll a minimum number of ELLs to effectively provide the range of services they need, generate sufficient funds to cover these costs, and produce positive outcomes.

Some states and districts have already begun to take steps to address the underrepresentation of ELLs in charter schools. In Boston, for example, a new education law requires charter schools to develop recruitment and enrollment strategies so that their student demographics reflect those of

the communities in which they are located (Vaznis, 2010). The amendments to New York State's education law enacted in May 2010 in response to the second round of Race to the Top funding call for charter schools to meet enrollment and retention targets for ELL students (among other subgroups), mandate transparent public reports on the success in meeting these targets, and make repeated failure to meet targets grounds for charter revocation. These policies imply considerable change in most charter schools' approaches to student recruitment and enrollment, and they signify awareness of the ongoing inequities in charter school enrollment. Yet, such policies alone are insufficient to achieve the desired outcome of increased equity in enrollment; careful implementation and strict enforcement of these requirements are critical components of effecting substantive change. Moreover, charter school leaders need support and resources to reach ELL enrollment targets and to effectively serve new student populations with whom they may be less familiar.

Our findings are limited to the New York City schooling context. Similar analyses should be carried out in other school districts, particularly in areas in which there are greater disparities in per-pupil allocations between charter schools and traditional public schools. In addition, little is known about the experiences and perspectives of immigrant and limited English-proficient students and parents with regard to charter schools. Future research should attempt to investigate what families of ELL students understand about charter schools, inquire about the reasons they do or do not participate in charter school lotteries, and identify barriers that may contribute to their underenrollment in charter schools. Last, innovative practices for educating ELLs and engaging with immigrant families that both charters and traditional public schools have successfully implemented should be documented and widely disseminated. Studies of this nature may help researchers, policymakers, and educators understand how charter school personnel and administrators approach educating ELLs and what could be done to improve the current enrollment imbalances.

NOTES

1. The phrases "English language learner" and "limited English proficient" are often used interchangeably to refer to students who receive support services in school to promote English language development. We prefer the term "English language learner" (ELL) because the alternative can connote a deficiency perspective, but will use the phrase "limited English proficient" (LEP) when referencing work that originally used it.

2. An exception appears to be Massachusetts. In Boston, Worcester, and other parts of the greater Boston area, advocacy groups have long made the underrepresentation of ELLs in charter schools a banner issue (Multicultural Education, Training and Advocacy, Inc. [META] 2009; Vaznis, 2010)

3. Bill A.11310/S.7990, signed into law May 28, 2010.

4. For an extended discussion on this point, see Buckley and Schneider (2007, chapter 4).

5. The length of the credible intervals is proportional to the number of students in each school; the single extremely wide estimate in the 2006 plot is due to a very small school size.

6. These prior counts need to include some information (i.e., they can not be completely flat or noninformative) to improve mixing during posterior simulation.

7. This school, in 2006, is essentially the sole member of the high LEP component of the mixture distribution estimated earlier.

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