

# **The New York City Charter Schools Evaluation Project**

## **New York City's Charter Schools Overall Report**



July 2007  
reporting on results through  
the 2005-06 school year

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# Executive Summary

## **Where are New York City's charter schools located?**

New York City's charter schools are located in four of the five boroughs. On a variety of dimensions, the neighborhoods around the schools are disadvantaged relative to the average New York City neighborhood. The charter schools' neighborhoods contain households with below average incomes, below average educational attainment, and above average shares of children who live with single parents. The charter schools' neighborhoods contain below average shares of white and Asian residents. The neighborhoods are also disproportionately black (and, therefore, disproportionately non-Hispanic because most of the New York City population is either black or Hispanic.) See Section I.

## **What are the policies and practices of New York City's charter schools?**

Because charter schools are public schools, they have many policies in common with traditional public schools. For instance, they administer the New York State tests and participate in the state's accountability system. Charter schools are independent schools within the public sector, however, so they vary in their policies and practices. Some policies that are unusual in traditional public schools but fairly common among New York City's charter schools include long school years, long school days, long math periods, school uniforms, parent contracts, one or more seats reserved for parents on the school board, and school on Saturday. See Section I.

## **Who applies to New York City's charter schools?**

The applicants include a disproportionate number of black students, both relative to New York City public schools overall and relative to the traditional public schools from which charter schools draw students. Because the population from which they draw is very largely black and Hispanic, the disproportionately high likelihood of black students applying translates automatically into a disproportionately low likelihood of Hispanic students applying. On other dimensions of gender and race, applicants reflect the neighborhoods and traditional public schools from which the charter schools draw. Keep in mind that these neighborhoods and traditional public schools are relatively disadvantaged.

A number of measurement problems arise when we attempt to compare charter school applicants to students in the traditional public schools on the basis of poverty, disability, and English proficiency. We are therefore appropriately cautious about drawing conclusions, but we think it is safe to say that charter school applicants are more likely to be poor than the average New York City public school student and applicants are similarly likely to participate in special education.

It is not so safe to draw conclusions about English Language Learner classification and prior achievement. More generally, it is simply not possible to make fully valid comparisons between the average applicant and the average student in the traditional New York City public schools. See Section II for a discussion.

### **Do the charter schools' application lotteries appear to be random?**

The data we examine on charter schools' lotteries do not suggest that any of them was non-random. When a charter school has more applicants than places, it runs a lottery. If the lottery is random, we expect the characteristics of students who are "lotteried-in" and "lotteried-out" to be similar in a statistical sense, so long as the number of students who fall into each group is not small. For instance, if there are 50 lotteried-in and 50 lotteried-out students, we expect the two groups to be similar. We find that all lotteries of this size are balanced statistically and also that more than 90 percent of lotteries that are half this size are balanced. As statistical theory leads us to expect, the lotteries that are unbalanced tend to have a small number of lotteried-in students, lotteried-out students, or both. For instance, a lottery among five students for one vacant place in a school's fourth grade is unlikely to be balanced even though it is random. See Sections II and III.

### **How are the lotteries used in this study?**

We use the lotteried-in and lotteried-out groups in much the same way that a scientific or medical experiment uses random assignment to ensure that we make an "apples-to-apples" comparison of students who do and do not attend charter schools. See Section III.

### **What is the average effect of the charter schools on test scores?**

We are able to compute effects in which we have a high degree of statistical confidence for the New York State tests that are administered in grades three through eight. For these tests, we find that the average effect of the charter schools on math is 0.09 standard deviations for every year that a student spends in his or her charter school. The average effect on reading is 0.04 standard deviations for every year that a student spends in his or her charter school. The math effect translates into about 3.8 scale score points and about 12 percent of a performance level (the exact translation depends on the grade). The reading effect translates into about 1.6 scale score points and about 3.5 percent of a performance level (the exact translation depends on the grade). See Section III. Keep in mind that the effects described are in addition to whatever gains students would have been expected to make in the traditional public schools, had they been lotteried-out.

Unfortunately, as of the 2005-06 round of testing (the most recent available for this report), so few charter school applicants were in high school grades that we are unable to compute effects in which we have statistical confidence for the Regents Examinations. We expect that there will be sufficient students in the high school grades to show meaningful results in future years' reports.

### **Are there any charter school policies that are associated with better effects on achievement?**

It is very difficult, for this year's report, to detect associations between charter schools' policies and their effects on achievement. Essentially, we need more years' worth of data. Even with much more data, we could detect only associations, not causal effects of policies on achievement. Our attempt to detect associations is also challenging because policies tend to come in "packages." For instance, schools that adopt a long school year tend also to adopt a long school day. The only policy that seems safe to highlight as having a positive association with achievement effects is the long school year.

# I. NEW YORK CITY'S CHARTER SCHOOLS

## **The opening of New York City's charter schools**

The New York State Charter Schools Act of 1998 authorized the establishment of charter schools in New York State. The first year of operation for charter schools in New York City was 2000-01, and ten schools began operating that year. Four of these schools were converted from previously-existing public schools: Wildcat Academy, Renaissance, KIPP Academy, and Beginning with Children. After the first year, five schools opened in 2001, two schools opened in 2002, five schools opened in 2003, nine schools opened in 2004, and eleven schools opened in 2005 (including one conversion school, Future Leaders Institute).

## **The participation of New York City's charter schools in this study**

This is a multi-year study in which we hope to engage all New York City charter schools with an exception described below. It is important to distinguish this report, which is merely the first report in a series, and the study, which will continue for several more years. Because there are new schools opening each year in New York City, some schools that currently exist are not covered by this year's report even though they are participating in the study. The 2005-06 school year is the most recent period for which we have achievement data for the analysis contained in this year's report. Therefore, we will describe participation focusing on schools operating in 2005-06.

There were 47 charter schools operating in New York City as of 2005-06, and all but a few are participating in this study. Two schools, Manhattan Charter School and South Bronx Charter School for International Cultures and the Arts, are not included in this year's report but have agreed to participate in the study and will be included in future years' reports. Because the two schools do not yet have any students in test-taking grades, our not including them in this year's report has no effect on the results. One school, Readnet Bronx Charter School, was in the process of closing in 2005-06. We will include this school in future years' reports if we are able to retrieve information retrospectively about applicants to the school's lotteries. The omission of Readnet Bronx is likely to have only small effects because the school had only two years of test-taking students: third and fourth graders in 2005-06 and third graders in 2004-05. The NY Center for Autism Charter School is not included in the study because it serves a very special population and is not compatible with many elements of the study. The UFT Elementary Charter School has declined to participate in the study thus far, but we hope to engage its participation in the future. Because it does not yet any students in test-taking grades, our not including it in this year's report has no effect on the results.

All of the other charter schools in New York City are covered by this year's report. It is important to realize that charter schools that are larger and that have a larger number of students in test-taking grades have more effect on the results reported here. It is also important to realize that most of the results reported here are *aggregate* or *average* results. Charter schools differ, and there is no charter school that is a mirror image of the aggregate results. We describe the variation in charter schools in this report, but we do not identify individual charter schools with their individual results.

### **The grades served by New York City's charter schools**

Of the 42 charter schools in the study for 2005-06, four plan eventually to serve all of grades kindergarten through twelve. 26 schools plan to focus on elementary grades. Specifically, one school plans eventually to serve grades kindergarten through four, twelve schools plan to serve grades kindergarten through five, four schools plan to serve grades kindergarten through six, ten schools plan to serve grades kindergarten through eight, and one school plans to serve grades one through eight. The remaining schools plan to focus on traditional middle-school grades or a combination of middle and high school grades. Specifically, four schools plan eventually to serve grades five through eight, four plan to serve grades five through twelve, one plans to serve grades six through twelve, one plans to serve grades eight through twelve, and one plans to serve grades nine through twelve. See Table IIIa in Section III for a breakdown of the number of schools offering each grade level during each recent school year.

A typical feature of start-up charter schools in New York City is that they open with only their lowest grade, the "intake" grade, and add a grade each subsequent year. This is known as "rolling-up." For example, a charter high school may open with only ninth grade in its first year. In its second year, the ninth graders will roll up to become tenth graders and the school will welcome a new batch of ninth graders, thereby serving ninth and tenth graders. By its fourth year, the school will be serving all of the high school grades from nine to twelve. Because kindergarten and first grade are both traditional intake grades, charter elementary schools in New York City often open with both kindergarten and first grade and then add one grade each year. Thus, they serve kindergarten through grade five by their fifth year of operation. The logic of rolling-up is that it gives schools a manageable way to grow and to instill the school's culture in students.

Charter schools do not always roll up, however. Some open by admitting students into intake and non-intake grades alike. This makes their first year of operation different from subsequent years in which their admissions will be dominated by the intake grades. Typically, non-intake grades admit only a trickle of students to fill places that open up when students depart. Conversion charter schools in New York City typically convert to charter school status with their full complement of grades.

Table Ib shows how the prevalence of charter schools with intake grades of kindergarten, one, and five affects the proportion of applicants for each grade. One third of all applicants over time have applied for kindergarten, and about half of all applicants have applied for kindergarten and grade one combined. Another 13 percent of applicants have applied for grade five. Fewer than 5 percent of applicants have applied for grades nine through twelve combined.

### **Locations of Charter Schools within New York City**

Charter schools are located in all of the boroughs of New York City except Staten Island. There are large clusters of charter schools in Harlem (Manhattan) and in the South Bronx. Figure 1a shows the approximate locations of the charter schools within New York City.

When a charter school locates in a neighborhood, it can expect to serve students who are disproportionately from that neighborhood. This is especially true for schools that serve elementary grades. Thus, it is important to know something about the neighborhoods where

charter schools locate. We use tract data from the U.S. Census to describe these neighborhoods. (A Census tract is a small, fairly homogeneous neighborhood with about 4000 people living in it.)

Comparing the average charter school's census tract to New York City as a whole, we see that charter schools locate in neighborhoods that have unusually low proportions of white and Asian residents and unusually high proportions of black and Hispanic residents. For instance, charter schools' neighborhoods are 46.1 percent black whereas New York City as a whole is only 24.5 percent black. Charter schools' neighborhoods are also economically disadvantaged. For instance, the median income of families in charter schools' census tracts is \$28,993 while the median income of families in New York City overall is \$41,887. Charter schools' neighborhoods also have disproportionate shares of residents living in poverty, of adults with low educational attainment, and of children living with a single parent. See Table Ia. 62 percent of the charter schools are located in a tract where, relative to the New York City averages, a high percentage of families live in poverty (greater than 21.2 percent), a low percentage of adults have bachelor degrees (lower than 27.4 percent), and a high percentage of children live with single parents (greater than 28.8 percent). Another 17 percent of the charter schools are located in neighborhoods that satisfy two of the three above criteria. The only charter school located in an affluent tract, Wildcat Academy, is exclusively targeted for likely high school drop-outs. Its location makes sense not because its students reside near the school but because they do internships with firms as part of their education. Many firms are located close to the school.

**Table 1a**  
**Census Tract Information for Charter School Neighborhoods Compared to New York City**

Ethnic or socioeconomic Characteristic	Census tract information for 42 charter schools in study (on average)	Census tract information for New York City
% White (non-Hispanic)	12.2%	35.0%
% Black (non-Hispanic)	46.1%	24.5%
% Hispanic	35.6%	27.0%
% Asian	2.8%	9.7%
Median family income	\$28,993	\$41,887
% living in poverty	31.4%	21.2%
% of adults with high school diploma or higher	59.6%	72.3%
% of adults with bachelor's degree or higher	16.4%	27.4%
% of school-aged children living with a single female householder	39.2%	28.8%

Source: Authors' calculations based on 2000 U.S. Census of Population and Housing.

**Figure 1a: Map of NYC Charter Schools  
2005-06**



**Table 1b**  
**Student Applicants by Grade**

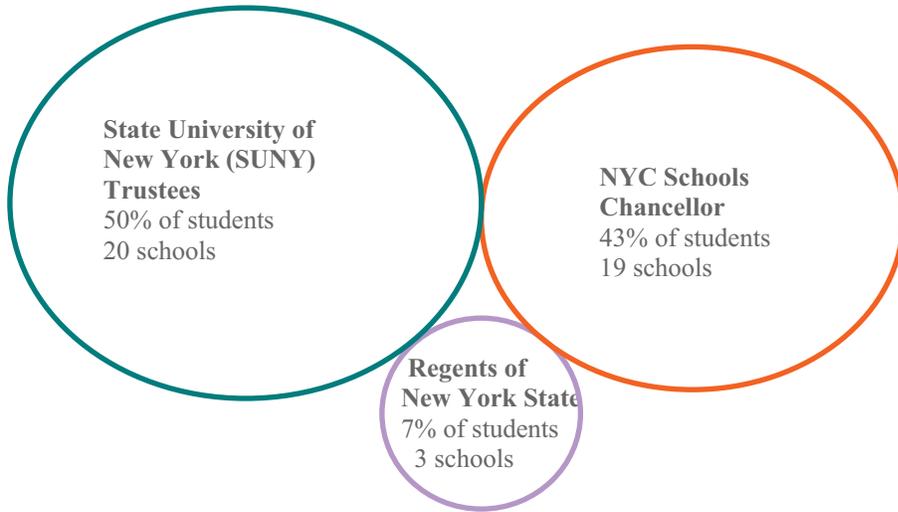
	<b>New York City Charter Schools All years thru 2005-06</b>	<b>New York City Charter Schools Opened in 2003-04 or earlier</b>
	Grade accounts for this percentage of all applicants	Grade accounts for this percentage of all applicants
Kindergarten	31.6%	28.3%
Grade 1	16.5%	15.2%
Grade 2	9.7%	10.1%
Grade 3	7.6%	8.9%
Grade 4	5.4%	6.6%
Grade 5	13.9%	15.1%
Grade 6	6.9%	7.0%
Grade 7	2.4%	2.6%
Grade 8	1.0%	1.2%
Grade 9	2.5%	2.1%
Grade 10	1.8%	2.2%
Grade 11	0.4%	0.5%
Grade 12	0.2%	0.2%

### **The Authorizers and Operating Agencies of New York City Charter Schools**

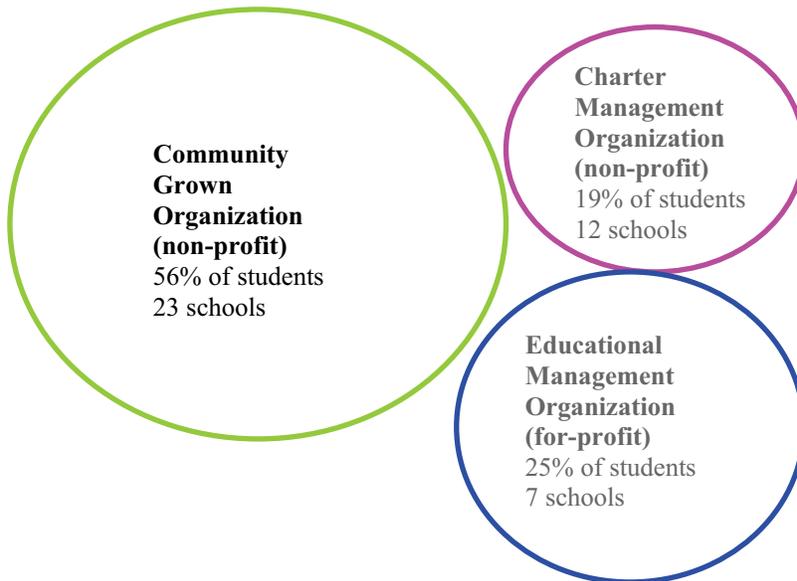
There are three agencies in New York City with the power to authorize new charter schools: the State University of New York (SUNY) trustees, the Chancellor of the New York City Schools, and the New York State Board of Regents. When a group of individuals decides to form a charter school, they write a proposal. They may submit this proposal to only one authorizer at a time. As Figure 1b shows, SUNY and the Chancellor have together authorized the majority of charter schools, in roughly equal proportions. The Board of Regents has authorized only three schools in New York City but has authorized many charter schools in New York State outside of the city.

Distinct from the authorizer is the operating agency. If, as is typical, the operating agency helps to write the charter school proposal, it is also referred to as the founding agency. There are three broadly-defined types of operating agencies in New York City: non-profit Community Grown Organizations (CGOs), non-profit Charter Management Organizations (CMOs), and for-profit Education Management Organizations (EMOs). CMOs and EMOs are formal organizations that exist to manage charter schools; the biggest ones in New York City as of 2005-06 are the KIPP Foundation (CMO) and Victory Schools (EMO). CGOs, on the other hand, are much more varied. They may consist of a group of parents and teachers, or a community organization that already provides social services to local residents, or an individual from the business world who partners with people working in education. As Figure 1c shows, a little over half of the charter schools in the study are CGOs, with a smaller proportion of CMOs and even smaller proportion of EMOs, though the EMOs enrolled more students as of 2005-06 than the CMOs. Conversion charter schools have been grouped under CGOs for our purposes as many of them were started as non-traditional public schools by groups of parents and teachers or community organizations.

**Figure 1b**  
**Charter Schools Grouped by Authorizer**  
**2005-2006**



**Figure 1c**  
**Charter Schools Grouped by Type of Operating Agency**  
**2005-2006**



## **Charter Schools' Missions**

All charter schools craft a mission statement that describes their overall vision and focus as a school. Schools with the same operating agency sometimes share the same mission statement, but they do not always do so. A school's mission statement is a strong indicator to parents, students, school staff members, and the public of the school's educational philosophy. In New York City, there are several broad educational philosophies held by clusters of schools. Obviously, there is no way to accurately boil down the schools' carefully crafted mission statements into a simple framework, and we encourage people to read each statement for itself. They reveal a variety of interesting thoughts about education in New York City.

While we cannot reduce mission statements to simple variables, we can categorize them roughly. Using the statements, we grouped charter school into five broad missions (in descending order of prevalence): a child-centered or progressive philosophy (29 percent of students), a general or traditional educational mission (28 percent of students), a rigorous academic focus (25 percent), a mission to serve a targeted population of students (11 percent of students), and a mission to offer a specific curriculum (7 percent of students). Figure 1d shows the proportions of students and schools in each category.

While clearly there is much overlap in schools' missions, there are a few key features of schools statements that helped us categorize them. Child-centered or progressive schools typically seek to develop students' love of learning, respect for others, and creativity. Such schools' mission statements may also focus on helping students realize their potential and on building strong connections between students and their families and communities. Schools with a general or traditional educational mission typically seek to develop students' core skills and would like to see their students meet or exceed New York State academic standards. Schools with a rigorous academic focus are characterized by mission statements that almost exclusively mention academic pursuits such as excelling in school and going to college. These schools also frequently state that they would like students to become leaders. Schools with a mission to serve a targeted population of students use their statement to describe their target: low-income students, special needs students, likely drop-outs, male students, female students. The targeted curriculum category contains schools that use a special focus, such as science or the arts, to structure their whole curriculum.

## **Each Charter School has Its Own Policies and Practices**

We cannot emphasize too often that charter schools are not all alike. In fact, there are many reasons to expect charter schools to differ. They are independent and fairly autonomous. Their founding groups or agencies have a variety of histories. They are most often start-ups and therefore more likely to experiment with new policies than are established schools. On the other hand, there are some reasons to think that charter schools will share certain policies. We have seen that they commonly serve disadvantaged students; they are all under pressure to attract parents and to satisfy their authorizers; they may imitate one another consciously (as when they purposely adopt another school's policy that seems to be working) or unconsciously (as when teachers who have worked at one school are hired by another and bring their knowledge with them).

It is no surprise, therefore, that charter schools in New York City exhibit a variety of characteristics but that there are distinguishable patterns. Table Ic shows the share of the charter schools covered by this year's report with each of a number of characteristics. Of course, we are only able to include characteristics that can be measured objectively with data that are available for most schools. Schools have many characteristics that plausibly affect student achievement but that are not measurable. For instance, the charisma of the school leader and the quality of instruction are very difficult to measure in a manner that is consistent across schools.

There are two things to take away from an examination of charter schools' policies, as shown in Table Ic. First, one can gauge the types of policy innovations with which charter schools are experimenting. Second, in Section III, we will show that different charter schools have different effects on achievement, and we will attempt to see which characteristics are associated with more positive effects on achievement.

There are a few policies that the vast majority of charter schools in New York City have adopted but that are uncommon in the traditional public schools. About 90 percent of the charter schools require student uniforms. Also, over 90 percent of charter schools voluntarily administer standardized exams that are not required by the state or city of New York. Such exams include Terra Nova, the Iowa Test of Basic Skills, and the Stanford 9. Charter schools use these exams to track their progress as a school and to identify students who need extra or different instruction. (All charter schools also administer the standardized exams required by the state of New York.) Finally, the advisory system is used by nearly all the charter schools that serve middle and high school grades. In an advisory system, a teacher or pair of teachers is assigned to a group of students for an entire school year. Teachers meet frequently (daily or weekly) with their students and are responsible for making sure that each student is making progress and is not falling through the cracks, so to speak. Because students in kindergarten through grade five are typically assigned to one teacher for most of the school day, advisory systems would be duplicative and are therefore not used by elementary schools.

Well over half of the charter schools (64 percent) have chosen to implement a long school year of 190 days or more. This is at least two more weeks of schools than the 180-day school year used by traditional New York City public schools. A little over half of the charter schools have an extended English or Language Arts period of over 90 minutes. 90 minutes is the length of the literacy block mandated for elementary school grades by the Children First initiative in New York City. A similar proportion of charter schools have a math period of 90 minutes or more, whereas traditional public elementary schools in New York City are required to have between 60 and 75 minutes of math instruction daily, depending on the grade.

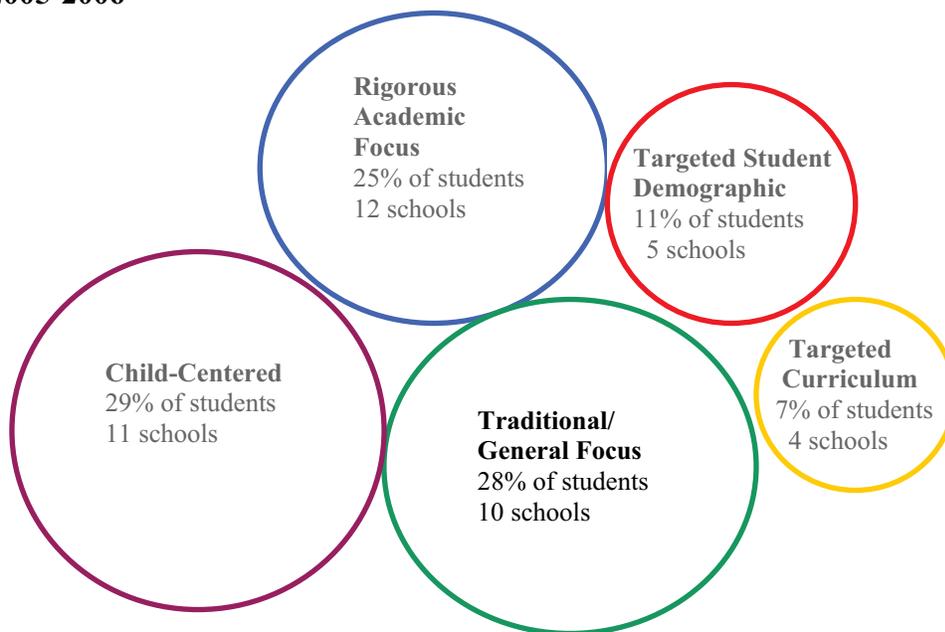
Other policies exhibited by the majority of New York City charter schools include a parent contract, a seat on the school's Board of Trustees reserved for a parent, and Saturday School (sometimes optional, sometimes mandatory). There is no one dominant math curriculum in the charter schools although clusters of schools use Saxon Math and Everyday Math. Similarly, there is no dominant English and Language Arts curriculum. Open Court Reading, the most popular choice, is used by about a fifth of schools. About 38 percent of charter schools use the Core Knowledge curriculum, which does not offer textbooks, alongside other curricula that do offer

textbooks, assignments, assessments, and other materials. See the Frequently Asked Questions for short descriptions of each curriculum.

We have some information about teachers in the charter schools. About 16 percent of the charter schools have unionized teachers. This phenomenon is mainly due to the conversion charter schools, all of which converted with unionization in place. A little less than half of the charter schools offer some sort of a non-traditional teacher payment scheme, such as merit-based pay or year-end bonuses. In future reports, we plan to include information on teacher certification, education, and experience. Unfortunately, this information was not available on a consistent basis for this year's report.

Many of the policies just described tend to appear in “packages”. For example, it is very common for schools with a long school year to have a long school day or Saturday School also. The packages of policies reveal that most charter schools fall roughly into types that parents and authorizers should be able to recognize. Unfortunately, the packages of policies make it hard to investigate definitively the relationship between *each* policy and achievement. We discuss this issue more thoroughly in Section III.

**Figure 1d**  
**Charter Schools Grouped by Mission**  
**2005-2006**



**Table 1c**  
**Characteristics, curriculum, and policies of NYC charter schools**

School characteristic or practice 2005-06	Share of New York City	
	Charter School Students	Charter Schools
Operated by a Charter Management Organization (CMO)	28.6%	18.4%
Operated by an Education Management Organization (EMO)	16.7%	25.3%
Operated by a Community Grown Organization (CGO)	54.8%	56.3%
Long school day (8 hours or more)	54.8%	45.5%
Long school year (190 days or more)	64.3%	57.1%
Optional after-school program available	66.7%	69.0%
Saturday School (mandatory for all or certain students)	57.1%	59.7%
Long English/language arts period (over 90 minutes)	53.7%	55.0%
Long mathematics period (90 minutes or more)	53.7%	54.2%
Saxon Math curriculum	40.5%	36.8%
Everyday Math curriculum	23.8%	32.5%
Open Court Reading curriculum	23.8%	26.5%
Core Knowledge curriculum	38.1%	35.5%
Student-faculty advisory	38.1%	38.8%
Internal assessments regularly administered	95.1%	93.0%
Parent contract	52.4%	48.9%
Seat on the Board of Trustees reserved for a parent	52.4%	58.5%
No Broken Windows discipline philosophy	21.4%	13.5%
Uniforms required	90.5%	80.7%
Teachers unionized	16.7%	21.9%
Merit pay or bonuses for teachers	48.8%	50.2%

## II. THE STUDENTS OF NEW YORK CITY'S CHARTER SCHOOLS

In this section, we look at who attends New York City's charter schools. How do they compare to New York City students as a whole? How do they compare to their former classmates at the traditional public school from which they were drawn? How do they compare to the students who also applied to the charter schools but who were lotteried-out? Finally, how do they compare to the students who also applied to the charter schools and were lotteried-in but who ultimately chose not to enroll?

It should be noted that there are no right or wrong answers to these questions. There is no group of students who is supposed to apply to charter schools and there is no group of students who is not supposed to apply. Furthermore, students are not *supposed* to attend just because they apply and are offered a place (by means of a lottery if one is held).

We cannot even assert that all lotteries should be "balanced." A balanced lottery is one where the students who are offered spots (lotteried-in) and the students who are not offered spots (lotteried-out) have the same characteristics on average. While we expect large lotteries (one with 50 students lotteried-in and 50 lotteried-out, say) to be balanced, some of the charter schools' lotteries are so small that we do not expect them to be balanced. For instance, if a school has two places open in its fourth grade class and twenty students apply, it is quite likely that the two lotteried-in students will happen to have different average characteristics than the eighteen lotteried-out students. Later in this report, when we show lottery-based analysis of charter schools' effects on achievement, we will only make use of the balanced lotteries. This is because they tend to ensure that we are making a true "apples-to-apples" comparison.

### Students in the New York City public schools

In order to understand New York City's charter schools, it is first important to know something about New York City's public schools as a whole. New York City is not only the largest school district in the nation; it is also one of the most diverse. 32 percent of its students are non-Hispanic and black, 39 percent are Hispanic, 14 percent are non-Hispanic and white, 14 percent are Asian, and less than one percent classify themselves in another racial or ethnic group. See the right-hand column of Table IIa. (The five race and ethnicity categories listed above are the ones provided to us by New York City Department of Education, and we use them throughout this report. See Frequently Asked Questions.)

74 percent of the students in New York City's public schools are certified for free or reduced-price lunch in the federal school lunch program, meaning that their household's income has been documented to be within 185 percent of the federal poverty line (or, in other words, to be \$37,000 for a family of four). 14 percent of New York City's students are English Language Learners, and 13 percent participated in some form of special education.

In 2004-05, which is the "prior" year for most of the applicants to charter schools whom we analyze in this report, the average third grader in the New York City schools had a scale score of 618 in math and 629 in reading on the New York State tests. The average fourth grader had a

scale score of 662 in math and 654 in reading; the average fifth grader had a scale score of 666 in math and 671 in reading; the average sixth grader had a scale score of 670 in math and 675 in reading; the average seventh grader had a scale score of 682 in math and 683 in reading; and the average eighth grader had a scale score of 707 in math and 687 in reading. Although it will be most useful to keep these 2004-05 scores in mind, it is worth noting that the tests administered were changed between the 2004-05 and 2005-06 school years, with the consequence that the 2005-06 scores are quite different. (In 2005-06, most grades' average scale scores were closer to 650 and were between 640 and 670. All of the scores mentioned in this paragraph are computed using the New York City Department of Education database and may differ slightly from published statistics.)

These average scores just mentioned are, however, only averages. Among New York City's public school students, there is enormous variation in achievement as measured by test scores. In 2004-05 for grades three through eight, the standard deviation of math test scores was in the range of 44 and the standard deviation in reading test scores was in the range of 39.

Few New York City neighborhoods look just like the overall portrait of the district. Instead, some neighborhoods are mainly Hispanic, some are poor, some are mixed-income and mixed ethnicity, some are mainly Asian, and so on. Thus, when a charter school--particularly a charter school that serves the elementary grades--locates in a particular neighborhood, we expect that its applicants will look disproportionately like students in that and surrounding neighborhoods.

## **Confusion is often caused by the high percentages of black and Hispanic students**

Before considering the characteristics of charter school students in New York City, it is important to discuss a fact that often causes confusion. As will be seen, New York City's charter schools draw from a student population that is overwhelmingly black and Hispanic. Therefore, if a school's applicants are disproportionately more black, they will automatically be disproportionately less Hispanic. If a school's applicants are disproportionately more Hispanic, they will automatically be disproportionately less black. People find these automatic relationships confusing because they expect that some schools will be *both* more black and more Hispanic. People often say, "That's a high minority school," and they mean that the school has more blacks and Hispanics and fewer whites. But, in the areas from which New York City charter schools draw, such statements do not make sense because white students form such a small share of the population. That is, the white share of the relevant student population is sufficiently small that the school cannot plausibly become much more black or much more Hispanic by becoming much less white.

The bottom line is that when we say that a charter school is more black, we are also saying that it is less Hispanic--automatically. And vice versa. If a school is more black and less Hispanic, these are *not* two separate findings: they are two ways of stating the same finding.

## **Race and Ethnicity of New York City's Charter School Applicants**

Table IIa shows who applied to New York City's charter schools in 2005-06. 63.9 percent of applicants were black, 27.0 percent were Hispanic, 3.6 percent were white, 3.3 percent were Asian, and less than one percent identified themselves as another race or ethnicity. This means that a charter school applicant is about twice as likely to be black than the average New York City public school student. As already discussed, saying that a student is more likely to be black is roughly equivalent to saying that he is less likely to be Hispanic, and this is indeed true. Because they are more likely to be black, charter school applicants are less likely to be Hispanic than the average New York City public school students (39 percent Hispanic). Charter school applicants are less likely to be white or Asian than the average New York City public school student. We will see that the lack of white and Asian applicants is largely due to the neighborhoods in which the charter schools are located.

It worth mentioning that there are apparently some problems in the recording of a student's race and ethnicity, particularly if he is multi-racial. The problems cause some overstatement of black students and some understatement of Hispanic students in charter schools. See the Frequently Asked Questions for more information.

## **Problems with the Measures of Special Education, English Language Learners, and Free and Reduced-Price Lunch**

We now turn to topics like certification for the free and reduced-price lunch program, participation in special education, and classification as an English Language Learner. But here multiple problems arise.

### Problems with the recording of program measures

The first set of problems is in the *recording* of special education, English language proficiency, and free and reduced-price lunch. The problems can lead to very substantial underestimates of disability, limited English proficiency, and poverty in charter schools.

Consider special education first. A school that refers a student for special education must work with the Committee on Special Education to get him formally designated, and some charter schools have experienced major delays getting this done. The charter schools don't control the timing because the Committee on Special Education is the responsibility of the host district: New York City. Students can sit in the referral queue for extended periods, and so long as they are in the queue, they appear not to have special needs. Even when a student has been formally designated, a subsystem of the New York City database known as CAPS must be updated to reflect the new designation. Traditional public schools have direct access to CAPS, but most charter schools can get updates done only by working through the Committee on Special Education or through a third party contractor. Not only can there be delays and problems in the updating of a student's designation, but the system must also be updated to show that a student has moved into a charter school. Apparently, this second update is sometimes overlooked, with the result that student's special education status is not attributed to the charter school. Finally, although there is a "flag" for special education in the main part of the database system known as ATS, charter schools are only required to maintain students' enrollment and other basic information in ATS. This is because many charter schools use another student information

system as their primary system. In contrast, ATS *is* the primary student information for traditional public schools, which are required to maintain not only their basic information but also items like the special education flag. When a charter school leaves the special education flag blank, the system seems to say that no students are in special education when, really, the system just does not contain the information on special education.

In short, there are three important problems with the recording of charter school students' need for special education, and all three problems cause under-reporting. When we compare the percentage of special education students in charter schools that we compute using the data extracted for us from the database to the official state count (8.90 percent), the official count is more than three times our count! This is such a large discrepancy that, at present, we cannot use the database numbers to make comparisons between students in charter schools and students in traditional public schools. However, as explained below, we do show statistics based on the pre-lottery designations of students who apply to charter schools while they are in the traditional public schools. Pre-lottery designations have a problem of their own, but on the whole they are much more reliable because all of the recording is done through the same traditional system.

There is a "flag" for English Language Learners in the ATS part of the database system, but--like the flag for special education--charter schools are not required to maintain it and may leave it blank for all students. The system then seems to say that no students are English Language Learners when, in reality, the system just does not contain information on the English Language Learners. This problem is exacerbated by the fact that charter schools receive only a fraction of the compensation for English Language Learners that traditional public schools receive. This gives them little incentive to fill in the flag. When we compare the percentage of English Language Learners in charter schools recorded in the database to the official state count (2.80 percent), the official count is more than twice the database count. This also is such a large discrepancy that the database numbers cannot be used to make comparisons between students in charter schools and students in traditional public schools. We do show statistics based on pre-lottery designations, however.

Some of the same problems (recording delays, ATS flags not filled in) exist for the recording of students who have been certified for the National School Lunch Program. Charter schools' numbers are understated as a result, especially for new entrants. We estimate the magnitude of the understatement to be about 8 percentage points.

Problems caused by using program *participation* when we want to measure a student's *needs*

The second set of problems is not about recording a student's special education or other designations but differences in the ways charter schools and traditional public schools get students certified for free and reduced-price lunch, place students in special education, and classify students as English Language Learners. What we want is a measure of the student needs that schools must respond to: poverty, disability, limited English proficiency. What we *have* is a measure of students' participation in certain program, and participation and need are not the same thing.

For example, consider free and reduced-price lunch eligibility. Parents must certify their children for the program by documenting their household's income and composition (adults, dependent

children, other dependents, and so on). Certifying parents is a sufficiently challenging task that federal audits regularly find that some schools certify numerous students who are not really eligible and that other schools fail to certify numerous students who are really eligible. The matter is complicated by the fact that schools can provide a schoolwide lunch program if they certify a sufficient share of their students. Thus, an administrator who is aggressive about certifying students if he is at a school that is just shy of the threshold for a schoolwide program may be unaggressive if he is at a school that has already passed the threshold. Charter schools are, for the purpose of federal programs, separate school districts (Local Education Agencies in federal parlance). Therefore, they conduct their own process of certifying students and may choose not to offer a federal lunch program at all. Numerous small school districts in the United States do not participate in the federal program owing to the fact that the paperwork involved is considerable but the subsidy is small for small districts because it is on a strictly per-pupil basis. In short, participation in free and reduced-price lunch is at best a noisy measure of poverty and, at worst, a measure that systematically understates poverty in small school districts, including charter schools.

Problems also arise with special education and English Language Learner classification: small schools, including charter schools, are more likely to offer a student a mainstream classroom experience, whereas a larger school might classify him as disabled or an English Language Learner and put him in a special program. In fact, some researchers have reported that families deliberately apply to charter schools to get their possibly classifiable child into a mainstream environment.

#### Using program participation at the *time of application* to make things more comparable

We can partially address the problems we've identified if we describe charter school applicants' free and reduced-price lunch classification, special education participation, and English Language Learner status at the time of their application if they were in the traditional public schools at that time. By focusing on the *time of application*, we can see how students were classified by traditional New York City schools. This helps us to perform reliable comparisons because the same system is classifying all the students we examine. Unfortunately, although time-of-application comparisons help, they do not *fix* the problem because the typical charter school applicant is applying to kindergarten, first, or second grade (see Table 1b) and usually does not have a classification history. Thus, it is impossible to see how the *typical* charter school applicant would have been classified by the traditional New York City schools.

#### The problem of different grade composition

Last but by not least is the problem of grade composition. An example will probably help. Consider a new charter school that plans to roll up but that currently has students only in kindergarten and the first grade. We might end up comparing this school's program participation numbers to those of a traditional public elementary school with a full array of grades. If a student needs to attend school for a while before staff identify him as needing special education, English language services, or free or reduced-price lunch, then the charter school will contain a disproportionate number of students who have not yet been designated. The traditional public school will not have this disproportionality. We can partly solve this problem by weighting the data on charter school applicants so that they have the same grade composition as the traditional public schools. This re-weighting is not a full solution because students who decide to apply

when they are going into fourth grade are fundamentally different from students who apply as prospective kindergarteners. (The fourth grader has already experienced other schools and must have found a less than perfect fit.)

In short, when we examine charter school applicants' program participation, we focus on their classification at the time of application and, when necessary, re-weight to make the grade composition comparable. However, it is simple impossible for us to compare the average charter school student to the average student in New York City's traditional public schools.

## **Charter School Applicants' Program Participation at the Time they Applied**

At the time they applied, 91.1 percent of charter school applicants were certified for free or reduced-price lunch, 8.1 percent participated in special education, and 2.6 percent were classified as English Language Learners. If we adjust these numbers so that the charter schools have a normal grade composition, 93.0 percent of charter school applicants were certified for free or reduced-price lunch, 11.1 percent participated in special education, and 4.2 percent were classified as English Language Learners. See Table IIa. The adjusted numbers should be used for comparisons to traditional public schools. Unfortunately, even the adjusted numbers do not describe the typical charter school applicant--only applicants who had already been classified by the traditional public schools when they applied. Nevertheless, for what it is worth, in 2005-06, 73.6 percent of New York City public school students were certified for free or reduced-price lunch, 12.6 percent participated in special education, and 13.6 percent were classified as English Language Learners

## **The Difficulties of Comparing Students' Prior Test Scores**

People often want to know about the prior test scores of students who apply to charter schools. The reason that this fact is interesting is that we would like to know whether a district's high achievers or low achievers are disproportionately applying to charter schools.

We have seen that, for classification-type variables, it is impossible to compare the typical charter school applicant to the average student in the New York City public schools. Unfortunately, the problem of non-representativeness gets even worse when we consider students' prior test scores. This is because we can only get prior test scores for students who apply to grades four or higher in a charter school. Such applicants are atypical: they account for only 36 percent of students who apply to charter schools. This is a serious problem. It is simply impossible to compare the prior test scores of the typical charter school applicant to the average New York City public school student.

Nevertheless, among charter school applicants who have prior test scores, the average scale score in math is 660.2. The average scale score in reading is 659.5. See Table IIa. Again, it is impossible to compare the typical charter school applicant to the average student in New York City's schools. However, for what it is worth, New York City public school students had average test scores of 667.19 in math and 666.87 in reading in 2004-05 (the "prior year" for charter school applicants in 2005-06).

Summing Up: Charter School Applicants versus All Students in New York City's Public Schools  
Charter schools' applicants include a disproportionately high share of black students (and, thus, a disproportionately low share of Hispanic students) for New York City schools. On a number of dimensions other than gender, race, and ethnicity, it is impossible to make comparisons between the *typical* charter school applicant and the average New York City public school student. It is probably safe to conclude that charter school applicants are more likely to be poor than the average New York City public school student because the difference in lunch program participation is large: applicants are 17.5 percent more likely to participate than the average public school student. Given the problems inherent in making such comparisons, we do not think that it is safe to draw conclusions about special education where the difference between applicants and the average public school student is very small. We are also cautious about English Language Learners, but we note that the greater tendency of blacks to apply to charter schools probably translates into a higher share of native English speakers in the charter schools than in the New York City public schools overall. Obviously, more native English speakers would mean fewer English learners. On prior test scores, we do not think that it is safe to draw conclusions because the differences between applicants and the average public school student are small.

## **Charter school applicants and enrollees vs. students in the traditional New York City public schools from which charter schools draw**

In this section, we examine not only New York City's charter school applicants but also the students they enroll. We compare them to students in the traditional public schools from which the charter schools draw. See Tables IIa and IIb.

### What is the "Composite Comparison School"?

We expect New York City's charter schools to draw disproportionately from the neighborhoods in their vicinity and no neighborhood is a mirror image of the city as a whole. Therefore, to evaluate how charter school applicants compare to the student bodies of the traditional public schools from which they draw, we have constructed a "composite comparison school." The composite comparison school is a weighted average of the traditional public schools from which the applicants to charter schools are drawn. For example, if 5 percent of applicants come from traditional public school PS A, this school's student body receives a weight of 5 percent when constructing the composite school. The composite comparison school is not a real school that exists; rather, it has been statistically created for the purposes of comparison. Keep in mind as well that we have used the charter schools' actual draws to create the composite comparison school. If a charter school happens to draw from a very wide range of neighborhoods, all those neighborhoods' schools are represented commensurately. If a charter school draws a single student from a traditional public school, that school's student will get some weight but it will be only a tiny weight.

### Gender, Race, and Ethnicity of Charter School Students versus the Composite Comparison School Students

In 2005-06, 47.9 percent of charter school applicants and 50.4 percent of charter school enrollees were female. At the same time, 50.3 percent of composite comparison school students were female. See Table IIa. In short, slightly more males than females apply to charter schools, but the charter schools actually enroll a gender-balanced group of students just like the composite comparison school. Table IIa does not show information about the gender ratio in *individual* charter schools, but we can state that, excluding the two single-sex charter schools, only four charter schools have gender ratios that differ from the overall average (50.4 percent female) by more than five percentage points.

Recall that charter school applicants are unlikely to be white, Asian, or "other" race or ethnicity. Similarly, only very small shares of charter school enrollees are white (2.8 percent), Asian (3.0 percent), or other (0.4 percent). For these races, the applicants and enrollees simply reflect the traditional public schools from which they are drawn. Composite comparison school students are 2.8 percent white, 2.7 percent Asian, and 0.5 percent other. See Table IIa.

Charter school applicants are, however, more likely to be black (63.9 percent) than composite comparison school students (44.1 percent). See Table IIa. Similarly, charter school enrollees are more likely to be black than the average student in the traditional public schools from which they are drawn. The other way to state this same result is that charter school applicants and enrollees are less likely to be Hispanic than the average student in the traditional public schools from which they are drawn. Remember: these are not two separate results but the same result stated two ways. If charter schools are disproportionately black, they are automatically disproportionately non-Hispanic, given the population from which they draw.

Although Table IIa does not show information about race and ethnicity in *individual* charter schools, we can state that 93 percent of charter schools have higher proportions of black students than their individual composite comparison schools. The remaining charter schools have lower proportions of black students than their composite comparison schools, but the proportions differ by less than 5 percentage points.

### The Program Participation of Charter School Students versus the Composite Comparison School Students

For the reasons explained above, it is impossible to compare the program participation of the *typical* charter school student to the program participation of the average student in a composite comparison school. We can only examine program participation (free and reduced-price lunch, special education, and English Language Learner) for charter school students who, when they applied, had already participated in a program in the traditional public schools. These students are atypical, so all of the following numbers must be interpreted cautiously.

Among those who were already participating in programs when they applied, 91.1 percent of charter school applicants and 91.7 percent of enrollees were certified for free or reduced-price lunch. Among the same group, 8.1 percent of charter school applicants and 7.7 percent of enrollees participated in special education and 2.6 percent of applicants and 1.8 percent of enrollees were English Language Learners. In other words, the charter school enrollees looked

like the applicants. If we want to compare these numbers to the parallel numbers for traditional public schools, we need to adjust for grade composition. When we do this, we find that 93.0 percent of applicants and 93.6 percent of enrollees were certified for free or reduced-price lunch; 11.1 percent of applicants and 10.8 of enrollees participate in special education; and 4.2 percent of applicants and 3.6 percent of enrollees are English Language Learners.

In the composite comparison school, 86.1 students are certified for free or reduced-price lunch, 11.9 percent participate in special education, and 14.0 percent are English Language Learners. Unfortunately, there is no way to use these numbers to compare the typical charter school student to the average composite comparison student. However, it is fair to say that the charter schools are much more like the schools from which they draw than they are like the average New York City school. Also, because we have seen that charter school applicants and enrollees are more likely to be black (less likely to be Hispanic) than the average composite comparison student, we can be fairly confident that charter schools have more native English speakers (and thus fewer English learners) than the schools from which they draw.

Although Table IIa does not show program participation for *individual* charter schools, 80 percent of charter schools and their individual composite comparison schools have classification numbers much like those above. The remaining charter schools have applicants or enrollees who, relative to the students in their individual composite comparison schools are less likely to be certified for free or reduced-price lunch, more likely to have participated in special education, or more likely to have been classified as English Language Learners.

#### The Prior Test Scores of Charter School Students versus the Composite Comparison School Students

For the reasons explained above, it is impossible to compare the prior test scores of the *typical* charter school student to those of the average student in a composite comparison school. We can only examine test scores for the 36 percent of charter school students who had already taken statewide tests (grades three and up) when they applied. These students are very atypical, so the following numbers must be interpreted very cautiously.

Among those who had already been tested when they applied, charter school applicants scored 660.1 and enrollees scored 662.7 in math. Among the same tested group, charter school applicants scored 659.5 and enrollees scored 657.2 in reading. In other words, charter school enrollees looked like charter school applicants.

In 2004-05 (the prior year of 2005-06 applicants), composite comparison school students had test scores of 650.5 in math and 649.6 in reading. Unfortunately, there is no way to use these numbers to compare the typical charter school student to the average composite comparison student.

**Table IIa**  
**Charter School Applicants in 2005-06 versus the Traditional Public Schools from which they Draw Applicants**  
**Demographics, Prior Test Scores, and Program Participation**

<u>Most recent year</u> <u>2005-2006</u>	All Applicants to All Charter Schools in <u>2005-2006</u>	Applicants who were Lotteried-In	Applicants who Enrolled	Composite Comparison "School" (weighted average of the schools from which charter schools draw applicants)	All NYC Traditional Public School Students
% Female	47.87	47.96	50.36	50.33	49.15
% Black Non-Hispanic	63.93	69.68	68.02	44.13	32.44
% White Non-Hispanic	3.63	2.70	2.79	2.84	14.35
% Hispanic	27.03	22.11	24.01	49.80	39.20
% Asian	3.27	2.75	3.03	2.72	13.56
% Other	0.51	0.48	0.35	0.52	0.45
different grade composition as traditional public schools/ <b>same grade composition as traditional public schools</b>					
<b>Classification</b>					
<b>At the Time of Application</b> among those attending a NYC public school when they applied (reliable but not representative of charter school applicants†)	% Free or Reduced- Price Lunch % Participate in Special Education % Classified as English Language Learners	91.06/ <b>93.00†</b> 8.07/ <b>11.12†</b> 2.57/ <b>4.17†</b>	91.70/ <b>93.63†</b> 7.85/ <b>10.90†</b> 1.98/ <b>3.58†</b>	91.66/ <b>93.60†</b> 7.70/ <b>10.75†</b> 1.76/ <b>3.56†</b>	86.05 11.94 13.99
<b>Previous Test Scores</b> among those who attended grade 3 or higher in a NYC public school when they applied (reliable but not representative of charter school applicants†)	Math  Reading	660.16†  659.50†	659.12†  655.80†	650.52§  649.62§	667.19§  666.87§

† = reliable but not representative of the typical charter school applicant. Numbers in bold have been adjusted so that the grade composition of the charter schools matches that of the composite comparison school. The bold numbers should be used for the purpose of comparison to traditional public schools. Because of their "rolling-up", charter schools often have large numbers of kindergartners and other students in the lower grades and small numbers of students in the upper grades. The adjusted numbers are based on their data re-weighted to produce a typical grade composition.  
§ data for 2004-05 for reasons explained in the text

**Table IIb**  
**Charter School Applicants in All Years versus the Traditional Public Schools from which they Draw Applicants**  
**Demographics, Prior Test Scores, and Program Participation**

<b>All Available Years</b> <b>2000-2001 to 2005-06</b>	All Applicants to All Charter Schools in All Years	Applicants who were Lotteried-In	Applicants who Enrolled	Composite Comparison "School" (weighted average of the schools from which charter schools draw applicants)
% Female	48.91	49.73	51.50	50.22
% Black Non-Hispanic	63.46	65.36	60.97	47.27
% White Non-Hispanic	3.55	3.77	3.95	2.80
% Hispanic	28.02	25.24	29.47	46.93
% Asian	3.00	3.32	3.54	2.50
% Other	0.52	0.51	0.39	0.50
<b>Classification</b>				
<b>At the Time of Application</b> among those attending a NYC public school when they applied (reliable but not representative of charter school applicants†)	different grade composition as traditional public schools/ <b>same grade composition as traditional public schools</b>			
% Free or Reduced-Price Lunch	89.97/ <b>91.91†</b>	89.23/ <b>91.17†</b>	89.50/ <b>91.44†</b>	86.33
% Participate in Special Education	7.57/ <b>10.62†</b>	7.75/ <b>10.80†</b>	7.55/ <b>10.60†</b>	11.78
% Classified as English Language Learners	2.38/ <b>3.98†</b>	2.23/ <b>3.83†</b>	2.43/ <b>4.03†</b>	14.39
<b>Previous Test Scores</b>				
among those who attended grade 3 or higher in a NYC public school when they applied (reliable but not representative of charter school applicants†)				
Math	653.40†	650.89†	656.55†	643.15§
Reading	653.77†	650.85†	655.12†	643.32§

† = reliable but not representative of the typical charter school applicant. Numbers in bold have been adjusted so that the grade composition of the charter schools matches that of the composite comparison school. The bold numbers should be used for the purpose of comparison to traditional public schools. Because of their "rolling-up", charter schools often have large numbers of kindergartners and other students in the lower grades and small numbers of students in the upper grades. The adjusted numbers are based on their data re-weighted to produce a typical grade composition.  
§ data for 2004-05 for reasons explained in the text

## **Changes in Who Applied to Charter Schools Over Time**

### Students who Applied to Charter Schools in All Years

So far, we have focused on statistics for students who applied to charter schools in 2005-06 (Table IIa). For completeness, we show parallel statistics in Table IIb for students who applied in all years from 2000-01 through 2005-06. The statements that we have made already hold up in all cases, in an approximate sense. For instance, the gender and ethnic makeup of the applicants from all years parallels the gender and ethnic makeup for 2005-06 applicants. The classification of applicants from all years parallels the classifications for 2005-06 applicants. The test scores of applicants from all years are lower but then again so are the test scores of composite comparison students. All the test scores are lower by seven points. This is simply a reflection of the change in the statewide tests: new tests with new scoring were introduced in 2005-06.

### Changes in Charter School Applicants and Enrollees Over Time

By examining the characteristics of students who applied in each separate year, we can see how New York City's charter schools and their applicant pools have evolved. See Table IIc. Keep in mind that most of the evolution is not caused by an individual charter school changing its composition. Most of the evolution is caused by the start-up of new charter schools or expansion of old ones. For instance, if there was only one charter school in a largely Hispanic neighborhood and two new charter schools open in similar neighborhoods, the share of applicants who are Hispanic is likely to rise.

The gender of applicants has not varied much from half male and half female, though there is a slight and steady decrease over time in the percentage of applicants who are female, from 53.7 percent in 2000-01 to 47.9 percent in 2005-06. The ethnicity of applicants has changed more noticeably. The percentage of black applicants increased for two years from 42.6 percent in 2001-02 to 72.8 percent in 2003-04, and then decreased slightly over the next two years to 63.9 percent in 2005-06. Because there is an automatic equal-and-opposite effect for Hispanics (approximately), the percentage of Hispanic applicants decreased for two years from 50.0 percent in 2001-02 to 21.7 percent in 2003-04, and then increased slightly over the next two years to 27.0 percent in 2005-06. The proportions of white, Asian, and other ethnicity applicants have been consistently under 5 percent, except in 2000-01. Applicants for the 2000-01 school year were anomalous compared to all the following years because 14.6 percent applicants were white and 8.3 percent were Asian. Keep in mind that 2000-01 was a very early year by the standards of New York City's charter school movement: only ten of the city's charter schools were open by that year and four of the ten were conversion schools that brought their student populations with them.

The average age and grade at the time of application both fall steadily from 2000-01 through 2003-04 and then increase very slightly. These statistics reflect the opening of elementary-graded charter schools, the bulk of whose applicants are in the intake grades of kindergarten or first grade.

The program participation of applicants (free and reduced-price lunch, special education, and English Language Learner) has remained relatively consistent from the 2000-01 application year

to the 2005-06 application year. The percentage of students who qualified for free or reduced-price lunch at the time they applied ranges from a low of 83.6 percent in 2000-01 to a high of 92.8 percent in 2002-03, with an overall average of about 90 percent. Special education participation at the time of application varies less, ranging from a low of 5.5 percent in 2003-04 to a high of 8.7 percent in 2001-02, with an overall average of 7.6 percent. English Language Learner classification at the time of application ranges from a low of 0.8 percent in 2003-04 to a high of 7.7 percent in 2000-01, with an overall average of 2.4 percent.

The prior test scores of applicants do not vary much from one application year to another, with the exception of the 2000-01. In that year, the average prior test scores of applicants were about 15 points higher than they were in all subsequent years. Again, 2000-01 is an early year in which four of the ten new charter schools were conversion schools. The 2005-06 test scores cannot be compared to previous years' scores because new tests were introduced in New York.

**Table IIc**  
**Charter School Applicants by Year Applied**  
**Demographics, Prior Test Scores, and Program Participation**

	Applicants to Charter Schools in <b>All Years</b>	Applicants to Charter Schools in <b>2005-2006</b>	Applicants to Charter Schools in <b>2004-2005</b>	Applicants to Charter Schools in <b>2003-2004</b>	Applicants to Charter Schools in <b>2002-2003</b>	Applicants to Charter Schools in <b>2001-2002</b>	Applicants to Charter Schools in <b>2000-2001</b>
% Female	48.91	47.87	48.44	50.60	50.63	52.71	53.65
% Black Non-Hispanic	63.46	63.93	66.30	72.81	51.70	42.51	31.77
% White Non-Hispanic	3.55	3.63	2.95	1.97	3.94	4.13	14.58
% Hispanic	28.02	27.03	25.87	21.66	39.70	49.96	44.92
% Asian	3.00	3.27	2.70	2.13	2.33	2.19	8.33
% Other	0.52	0.51	0.64	0.24	0.81	0.49	0.39
Age at the time of application	7.94	7.74	7.82	7.53	8.09	9.20	12.20
Grade at the time of application	1.95	1.78	1.78	1.40	2.25	3.11	5.90
		different grade composition as traditional public schools/ same grade composition as traditional public schools					
<b>Classification At the Time of Application</b> among those attending a NYC public school when they applied (reliable but not representative of charter school applicants†)	% Free or Reduced-Price Lunch	89.97/ <b>91.91</b> †	90.39/ <b>92.33</b> †	88.89/ <b>90.83</b> †	92.81/ <b>94.75</b> †	85.63/ <b>87.57</b> †	83.58/ <b>85.52</b> †
	% Participate in Special Education	7.57/ <b>10.62</b> †	7.65/ <b>10.70</b> †	5.47/ <b>8.52</b> †	7.44/ <b>10.49</b> †	8.66/ <b>11.71</b> †	7.42/ <b>10.47</b> †
	% Classified as English Language Learners	2.38/ <b>3.98</b> †	1.76/ <b>3.36</b> †	0.77/ <b>2.37</b> †	2.06/ <b>3.66</b> †	6.32/ <b>7.92</b> †	7.68/ <b>9.28</b> †
		653.40†	660.16†	641.55†	649.27†	647.17†	646.93†
<b>Previous Test Scores</b> among those who attended grade 3 or higher in a NYC public school when they applied (reliable but not representative of charter school applicants†)	Math	653.77†	642.11†	647.78†	654.91†	652.22†	671.34†
	Reading						

† = reliable but not representative of the typical charter school applicant. Numbers in bold have been adjusted so that the grade composition of the charter schools matches that of the composite comparison school. The bold numbers should be used for the purpose of comparison to traditional public schools. Because of their "rolling-up", charter schools often have large numbers of kindergartners and other students in the lower grades and small numbers of students in the upper grades. The adjusted numbers are based on their data re-weighted to produce a typical grade composition.

## Lotteried-In and Lotteried-Out Students

In this section, we describe the characteristics of students who are offered spots in charter schools' admissions lotteries (the lotteried-in) and of students who not offered spots (the lotteried-out). We also describe the share of lotteries that are balanced and thus useful for analyzing test scores.

### Should Lotteried-in and Lotteried-Out Students be Alike?

A lottery is *not* balanced if the students who are offered spots (the lotteried-in) have characteristics that are statistically significantly different from those of the students who are lotteried-out. For our analysis of test scores, we work with balanced lotteries where we can be fairly sure that comparing lotteried-in and lotteried-out is an "apples-to-apples" comparison. Thus, it would be convenient for our purposes if every lottery were balanced. However, even if every lottery is random and fair, every lottery will not be balanced. This is because lotteries with small numbers of lotteried-in or lotteried-out students are unlikely to balance as a purely statistical matter. For instance, suppose that a school has two places open in its fourth grade class and twenty students apply for the places. It is unlikely that the two lotteried-in students will happen to have the same average characteristics as the eighteen lotteried-out students. On the other hand, if 50 students are lotteried-in and 50 are lotteried-out, the two groups are likely to be similar on average and the lottery is likely to be balanced statistically.

### Lotteried-In versus Lotteried-Out Students

Table IId shows numerous characteristics for applicants to charter schools. Within each panel, the left-hand column shows the average of the characteristic for lotteried-in applicants. The middle column shows the difference between the average lotteried-out applicant and the average-lotteried-in applicant. The right-hand column contains the word "yes" if the difference is statistically significantly different from zero; it contains the word "no" otherwise. We will concentrate on the 2005-06 lotteries because it is the only year for which we have complete coverage of the schools in our study. (Some schools did not save their lottery information from years prior to the commencement of this study. This is simply because they did not know that such information would later be needed.)

Looking at the 2005-06 lotteries (left-hand panel of Table IId), we see that lotteried-in and lotteried-out groups are statistically similar for the vast majority of student characteristics: probability of being female, black, white, Hispanic, other race; age and grade at the time of application; classification variables at the time of application (free or reduced-price lunch, special education, English Language Learner); and prior test scores.

Lotteried-out students are statistically significantly different from lotteried-in students on just one characteristic: the likelihood of being Asian. Even this difference is small in terms of importance: lotteried-out students are 1.9 percent less likely to be Asian. There are a two more statistically significant differences if we examine lotteries in all years, but they are also small: a 2.8 percent difference in the likelihood of being female and a 0.1 difference in grade at the time of application. Keep in mind that a small number of statistically significant differences is *not* evidence that charter schools have held non-random lotteries. Whenever there are small numbers of lotteried-in or lotteried-out students in a lottery, the groups may have different characteristics.

### What Percentage of Students Participate in Balanced Admissions Lotteries?

When we formally test each lottery to see whether it is balanced, we find that 86 percent of students who participated in a lottery in 2005-06 were in a balanced lottery. The remaining 14 percent of students were in an unbalanced lottery. Most of the unbalanced lotteries are in grades that are not intake grades. Intake grades, such as kindergarten for an elementary school, tend to have sizeable and, therefore, balanced lotteries. In fact, every lottery that was held in 2005-06 and that had at least 50 lotteried-in students and 50 lotteried-out students was a balanced lottery. Indeed, 91 percent of 2005-06 lotteries with at least 25 lotteried-in and 25 lotteried-out students were balanced. Unbalanced lotteries are small ones, just as statistics would lead us to expect. (When we formally test lotteries for balance, we do so using a test that simultaneously examines all the available characteristics of students.)

Of course, some students--about 5 percent--apply and are not put into lotteries at all. Most of the non-lotteried students apply to a school that has enough places for the number of applicants--usually, this is a new school that is just starting up. A small percentage of the non-lotteried students apply to a school that has no vacancies in the relevant grade.

**Table III**  
**Charter Schools' Lotteried-in and Lotteried-Out Students**  
**Demographics, Previous Test Scores, School Program Participation**

	Students who Applied in 2005-06			Students who Applied in All Years		
	Lotteried-In Applicants (regardless of whether they attend)	Lotteried-Out Applicants (above/below Lotteried-In)	Statistically Significant Difference?	Lotteried-In Applicants (regardless of whether they attend)	Lotteried-Out Applicants (above/below Lotteried-In) (2005-2006)	Statistically Significant Difference?
% Female	47.96	-1.58	no	49.73	-2.81	yes
% Black Non-Hispanic	69.68	+0.89	no	65.36	+0.88	no
% White Non-Hispanic	2.70	-0.19	no	3.77	+0.00	no
% Hispanic	22.11	+1.67	no	25.24	+0.45	no
% Asian	2.75	-1.86	yes	3.32	-0.75	yes
% Other	0.48	+0.15	no	0.51	+0.10	no
Age at the time of application	7.48	-0.01	no	7.80	+0.02	no
Grade at the time of application	1.59	-0.01	no	1.83	+0.08	yes
<b>Classification At the Time of Application</b>						
% Free or Reduced-Price Lunch	91.70†	-1.20	no	89.23†	-0.85	no
% Participate in Special Education	7.85†	+0.26	no	7.75†	+0.66	no
% Classified as English Language Learners	1.98†	-0.17	no	2.23†	+0.05	no
<b>Previous Test Scores</b>						
among those who attended grade 3+ in a NYC public school when they applied (reliable but not representative of charter applicants†)						
Math	659.12†	-1.20	no	650.89†	-1.22	no
Reading	655.80†	-0.44	no	650.85†	-1.28	no

† = reliable but not representative of the typical charter school applicant. These numbers do not have the same grade composition as traditional public schools and should therefore not be used for the purposes of such comparisons.

## Enrolled and Not-Enrolled Students

We have seen that the vast majority of students who participated in a lottery were in a balanced lottery, and we have also seen that the differences between lotteried-in and lotteried-out students are small to negligible. This does not necessarily mean that students who enroll in charter schools are extremely similar to those who do not enroll. A student who is offered a place through a lottery does not have to accept it. He may, upon reflection, decide to stay in the traditional public schools. All kinds of circumstances may intervene which make a student refuse the place offered him. He may be offered a place in a magnet school within the traditional public system. His parents may meet his teacher for the next year and decide that the teacher suits them very well. His sibling or friend may have been lotteried-out and therefore remain in the traditional public schools. His parents may just decide that the charter school is not for them after all. In short, we should not expect enrolled and not-enrolled students to be very similar.

### Is it a Problem that Enrolled and Not-Enrolled Students Might Differ?

No, it is not a problem for our analysis. This is because we have many lotteried-in and lotteried-out students who participate in balanced lotteries and we can use a student's lottery status to preserve the random assignment nature of our analysis. (Formally, we instrument for a student's enrollment status with his lottery status.)

### Why, then, are we interested in comparing enrolled and not-enrolled students?

We are curious about whether certain types of students are disproportionately likely to turn down a place at a charter school when they are offered one. We are also interested in students who apply to charter schools but who do not participate in a lottery, usually because the school had sufficient places in the relevant grade and year. In other words, there are no right or wrong answers here. There is no requirement that every type of student finds the offer of a place at a charter school equally attractive. It is simply interesting to know who enrolls and does not enroll.

### Applicants who enroll at charter schools versus those who do not

Table IIe shows numerous characteristics for applicants to charter schools. Within each panel, the left-hand column shows the average of the characteristic for applicants who enroll at the charter school to which they apply. The middle column shows the difference between the average enrollee and average non-enrollee. The right-hand column contains the word "yes" if the difference is statistically significantly different from zero; it contains the word "no" otherwise. We will concentrate on the 2005-06 applicants because, again, it is the only year for which we have complete coverage of the schools in our study. (Some schools did not save information on their non-enrollees from years prior to the commencement of this study. This is simply because they did not know that such information would later be needed.)

Looking the 2005-06 applicants (left-hand panel of Table IIe), we see that enrollees and non-enrollees are statistically similar for most characteristics: the probability of being black, white, Hispanic, other race; being certified for free or reduced-price lunch at the time of application; being classified as an English Language Learner at the time of application; and prior test scores.

Non-enrollees are statistically significantly different from students who enroll on a few characteristics: the likelihood of being female (3.6 percent less likely); the likelihood of being

Asian (1.4 percent less likely); age at the time of application (0.03 fewer years); grade at the time of application (0.03 fewer grades); and likelihood of participating in special education (1.75 percent more likely). The difference in the probability of being Asian is just a consequence of the happenstance that the Asians were slightly more likely to be lotteried-in. The differences in age and grade at the time of application are negligible in magnitude. The difference associated with females turns out to be a quirk associated with the two single-sex charter schools. (All-female Girls Prep admitted all its applicants in 2005-06, its first year of operation. In contrast, all-male Excellence Charter School of Bedford-Stuyvesant held a lottery.) Once we exclude the single-sex charter schools, the difference in the likelihood of being female disappears. Therefore, the only difference that is potentially interesting is special education participants' lower likelihood of accepting a place at a charter school if offered one. The difference is small, affecting less than two percent of students. It might therefore be difficult to investigate: no pattern of experiences is likely to show up in such a small number of students. Nevertheless, it would be interesting to know if special education participants are slightly less likely to enroll because they discover that they do not like the charter school's program for their disability as much as they thought they would or because they discover that they like the traditional public schools' program for their disability more than they thought they would. The difference could even be explained by parents using the charter school place as leverage to get their child the program they prefer in the traditional public schools. (There is anecdotal evidence that parents in areas other than New York City have used their child's acceptance in a charter school to gain such leverage in their traditional public school.)

When we examine enrollment from all years, there are more statistically significant differences between enrollees and non-enrollees. However, we are loath to interpret these strongly because we do not have complete coverage of pre-2005 lotteries. Also, the earlier the application year, the more students were admitted to charter schools without participating in a lottery (usually owing to a start-up). Thus, when we examine, say, prior test scores, the enrollees are disproportionately drawn from the earlier years in which charter school applicants' prior test scores were higher, as we have already shown.

**Table IIe**  
**All Charter Schools' Enrolled and Non-Enrolled Students**  
**Demographics, Previous Test Scores, School Program Participation**

	Students who Applied in 2005-06		Students who Applied in All Years	
	Students who Enrolled	Students who did not enroll above/below Enrollees	Students who Enrolled	Students who did not enroll above/below Enrollees
		Statistically Significant Difference?		Statistically Significant Difference?
% Female	50.36	yes	51.50	yes
% Black Non-Hispanic	68.02	no	60.97	no
% White Non-Hispanic	2.79	no	3.95	yes
% Hispanic	24.01	no	29.47	no
% Asian	3.03	yes	3.54	yes
% Other	0.35	no	0.39	yes
Age at the time of application	8.29	yes	8.84	no
Grade at the time of application	2.39	yes	2.87	yes
<b>Classification At the Time of Application</b>				
% Free or Reduced-Price Lunch	91.66†	no	89.50†	no
% Participate in Special Education	7.70†	yes	7.55†	yes
% Classified as English Language Learners	1.76†	no	2.43†	yes
<b>Previous Test Scores</b>				
among those who attended grade 3+ in a NYC public school when they applied (reliable but not representative of charter applicants†)				
Math	662.70†	no	656.55†	yes
Reading	657.16†	no	655.12†	yes

† = reliable but not representative of the typical charter school applicant. These numbers do not have the same grade composition as traditional public schools and should therefore not be used for the purposes of such comparisons.

### **III. THE EFFECT OF NEW YORK CITY'S CHARTER SCHOOLS ON TEST SCORES**

#### **WHY TEST SCORES?**

Test scores are *not* the only outcome that we would like study when we evaluate charter schools or any schools. In fact, in future year's editions of this report, we hope to study outcomes such as attendance, disciplinary records, on-time graduation, and post-graduation pursuits (college, jobs, and so on).

For this year's report, however, we have a limited amount of information because most of New York City's charter schools are fairly new or even brand new and most offer only the elementary grades. Even for older charter schools, we often have only one or two years of data collected since the commencement of this study. Under these circumstances, test scores are the most practical outcome to examine. This is because tests are taken every year by nearly all students in grades three through eight. Regents Exams are taken by nearly all students in grades nine through twelve (though students need not take the exams on a rigid schedule). Moreover, the New York state tests are taken by both lotteried-in and lotteried-out students, with scores recorded in the same way in the Department of Education's system. Other outcomes, such as behavior and attitudes, may not be recorded in such a uniform manner and may therefore furnish a more problematic basis of comparison.

We plan to study dropping-out, graduation, and post-graduation outcomes when a larger number of charter school applicants will have reached the twelfth grade. As of the 2005-06 data, only a handful of applicants had reached this grade level, giving us insufficient statistical power to study how charter schools affect events that occur late in or after secondary school.

We plan to add outcomes that can be analyzed in a rigorous statistical manner as they become available. For instance, we expect that attendance outcomes will be included in next year's report. See the Frequently Asked Questions for additional detail.

## THE SUPERIORITY OF LOTTERY-BASED ANALYSIS

### **Why is lottery-based evaluation the gold standard?**

Lottery analysis is *by far* the best way to determine the effect of a charter school on the test scores of the sort of students who tend to apply to the school. In fact, lottery analysis produces results that are so much more reliable than those of any other method that no other results should be given any credence when lottery-based results are available. Only when lottery-based results are unavailable should one turn to other methods--and even then only with extreme caution.

### **Guaranteeing an "apples to apples" comparison**

Why are lottery-based results the gold standard? While students at traditional public schools normally attend the school closest to where they live, students attending charter schools have specifically chosen to apply to them. Thus, if we simply compare students who attend a charter school to students who attend traditional public schools, we may be comparing "apples to oranges." We will almost certainly confuse evidence on the *effects* of the charter school with evidence on who *selects into* the charter school. This is known as selection bias.

Lottery-based analysis completely eliminates this bias so long as a charter school holds a random lottery among applicants and has a sufficient number of lotteried-in and lotteried-out students to generate balance. (The lotteried-in and lotteried-out groups are "balanced" if they are not distinguishable on a statistical basis.) Intuitively, the reason why lottery-based analysis eliminates bias is that *both* the lotteried-in and lotteried-out students have applied to the same charter school, so there is no difference in selection between the two groups.

### **What about students who are offered a place in a charter school's lottery but who decide not to attend anyway?**

We conduct a lottery-based analysis that even eliminates biases caused by students who are lotteried in but who decide not to attend the charter school after all. (In technical terms, we estimate "treatment-on-the-treated" effects by using lotteried-in status as an instrument for enrollment.)

### **What about other methods, for occasions when lottery-based analysis is not available?**

When lottery-based analysis is not available, researchers usually compare charter school students to students in traditional public schools, most of whom did not apply to charter schools. These comparisons are usually biased. Researchers can remedy some of this bias by using statistical methods to account for differences that we can readily observe between students who do and do not apply to charter schools. However, we do not expect such statistical methods, even when used in a highly competent manner, to eliminate all of the bias. The statistical methods can even make the bias worse!

### **How about analyzing gains in achievement?**

Lottery-based analysis automatically analyzes gains. When people say that they are doing "gains analysis," however, they usually are not referring to lottery analysis. As a rule, they are talking about comparing the *gains* made by charter school students to the *gains* made by traditional public school students who did not apply to charter schools. Comparing gains can be but is not necessarily helpful. Comparing gains can even make bias worse.

### **What about value-added analysis?**

When lottery-based analysis is not available, some people mistakenly turn to pure value-added analysis. However, pure value-added analysis should *not* be used in the case of charter schools because it is the one method that systematically makes bias worse. Pure value-added analysis can only be used on charter school students who switch from a traditional public school to a charter school (or vice versa) after being tested for at least two years in their initial school.

Unfortunately, selection bias is at its worst among precisely these students. Intuitively, when a family observes the gain that their child is making and then decides to switch to a wholly different school despite the loss of friends and familiarity, the family is making a strong selection decision. It is exactly such strong decisions that generate bias in a statistical analysis. The bottom line is that pure value-added analysis produces systemically biased results.

### **What's the difference between gains analysis and value-added analysis?**

People often get pure value-added analysis mixed up with comparison of gains, but they are different methods.

- Comparison of Gains compares the gains of students in charter schools to the gains of *other* students in traditional public schools.
- Pure Value-Added Analysis compares the gains of a student from periods when he is in charter school to his *own* gains from periods when he is in traditional public school.

In other words, if the only students being analyzed are those who attend charter schools at some point, it is pure value-added analysis.

### **How do we know which evaluation methods work well?**

Lottery-based results serve as a gold standard as long as they are available. When comparing lottery analysis to other methods, we find that comparison-based results can be reliable but often are not. Value-added analysis produces unreliable results.

### **Summing up...**

When evaluating the effectiveness of charter schools, you should bear in mind the following:

- Results based on lottery analysis are reliable when they are available.
- When lottery-based results are unavailable, it may be useful to consider results based on comparing charter school students to traditional public school students. However, such results should be interpreted with a great deal of caution. Caution should be applied even if the comparisons are based on achievement *gains*.
- Results based on pure value-added analysis are unreliable. There is never an occasion to use value-added analysis because some form of comparison-based results is always available.

## THE AVAILABILITY OF LOTTERY-BASED ANALYSIS FOR NEW YORK CITY'S CHARTER SCHOOLS' EFFECTS ON TEST SCORES

### **Who has taken the statewide achievement tests at New York City's charter schools?**

Among the New York City Charter Schools participating in the study, two were open in 1999-00, ten were open in 2000-01, 15 were open in 2001-02, 17 were open in 2002-03, 22 were open in 2003-04, 31 were open in 2004-05, and 44 were open in 2005-06. This year's report covers 42 of those 44 schools. The other two joined the study too late to have their data analyzed for this report, but they will be included in all future reports. Keep in mind that most New York City charter schools open with only a subset of their planned grades. They typically add grades as their students are promoted into them. For instance, a school that plans to serve kindergarten through grade five might open with kindergarten and grade one, and then add a grade each subsequent year, ending up with its full complement of grades in its fifth year of operation.

Thus, each year of testing has added to our knowledge of charter schools in *three* ways. First, each year has seen the introduction of additional schools. Second, each year has seen existing schools add new grades. Third, each year has seen existing schools add test data in their existing grades. This means that this evaluation will become stronger and more revealing with each passing year.

These facts are summarized in Table IIIa. The test-taking grades (third through twelfth grades) are highlighted. By 2005-06, the final year for which we currently have test data, the third grade is well represented by 22 schools, the fourth grade is somewhat well represented by 17 schools, the fifth grade is very well represented by 26 schools, and the sixth grade is somewhat well represented by 18 schools. The seventh and eighth grades are lightly represented by, respectively, 11 and nine schools. The ninth through twelfth grades are very lightly represented by only a few schools.

The final row of Table IIIa shows that, when New York City's charter schools have completed their planned growth, all of the grades between kindergarten and twelve will be offered by at least 13 schools. Grade five will be represented by 42 schools--a good number for investigating achievement effects.

### **How does this study represent New York City's charter schools?**

The current report covers 42 of New York City's charter schools, but it reflects the achievement results of only 35 of those schools. This is because--as of 2005-06--seven of these schools did not yet offer any test-taking grades. The seven recently opened schools offered only kindergarten through second grade. Of course, all of these schools' achievement results will be reflected in future years' reports from this study.

It is worth noting that this study is representative of New York City's charter school *students*: the more students a school has enrolled, the more influence it will have on the results of this study. .

Schools that have affected more students are commensurately more important in the study.

**What years of achievement test results are covered by this study?**

This study is able to evaluate achievement test results from the school years starting in 2000-01 and ending in 2005-06. These are the years that are currently available in the New York City database. Next year's study will evaluate test results up through 2006-07; the subsequent year's study will evaluate results up through 2007-08; and so on.

**Can lottery-based evaluation be used for New York City's charter schools?**

Yes. In all the years from 2000-01 through 2005-06, New York City's charter schools had test takers in the third through eighth grades who had participated in admissions lotteries that were statistically balanced. They also had students who had participated in balanced lotteries and who took the main Regents Exams. To earn a high school diploma, a student must pass exams in Living Environment, Mathematics, Global History, Comprehensive English, and U.S. History. Students are recommended to take the examinations in a certain grade, but need not do so. The recommended exam/grade pairings are as follows: Living Environment (biology), grade 9; Math A, grade 10; Global History, grade 10; Comprehensive English, grade 11; U.S. History, grade 11.

See Table IIIb for the number of students taking each test in each school year. The "All Available" column in Table IIIb contains the total number of such students over the school years available currently in the New York City Department of Education database: 2000-01 to 2005-06. The numbers shown include both the lotteried-in and lotteried-out students, and the numbers largely reflect how many charter schools offered each grade in each school year (Table IIIa).

There are thousands of students who took the third through eighth grade tests and who participated in balanced lotteries. These should be sufficient numbers to analyze the charter schools' effects on achievement.

In contrast, there are fewer than one hundred students (over all years) who took the Regents tests and participated in balanced lotteries. Therefore, in this year's report, the analysis of charter schools' effect on Regents performance is very unlikely to deliver results that are sufficiently precise to be useful. This problem will be remedied in the future as the charter schools that offer grades nine through twelve hold more lotteries, enroll more students, and have more students attempting the Regents Examinations that are required for graduation in New York.

**Did all of New York City's charter school students participate in balanced lotteries?**

Table IIIb shows that, at least for the grade three through eight tests, there are sufficient numbers of test-taking students to conduct an analysis of charter schools' effects on achievement. Nevertheless, not all of New York City's charter school students participated in balanced lotteries. There are three reasons why applicants to a charter school might not have participated in a lottery. First, a charter school may have had more space than applicants, so that it did not need to hold a lottery among applicants. Second, a charter school may have held a lottery but the

number of participants may have been so small that the lotteried-in and lotteried-out groups were statistically significantly different at the 90 percent level. Third, a charter school may have held a lottery but failed to keep full application information on lotteried-out students. This is perfectly normal: in the years before this study commenced, some schools failed to keep full application information on lotteried-out students simply because they were unaware that such information might later be needed. Since the commencement of this study, all participating schools have retained their lottery information.

**Are New York City's charter schools good candidates for lottery-based evaluation?**

Yes, because of the high rate of participation in New York's exams and because of the prevalence of balanced admissions lotteries in New York City's charter schools, the schools are generally good candidates for lottery-based evaluation. Schools that have held several large admissions lotteries are excellent candidates for lottery-based evaluation. Schools that have so far only held a few lotteries or small lotteries are fair to good candidates for evaluation *now*, but they will become excellent candidates as they enroll more and more students through balanced lotteries. Most schools are only fair candidates in their start-up year (or the year in which students admitted in the start-up year reach third grade, the first year in which they are tested). Most schools are excellent candidates for lottery-based evaluation by the time they have three or more "classes" of applicants taking tests. In the future, New York City's charter schools will become better and better candidates for evaluation as more and more students participate in their admissions lotteries and take tests.

**Table IIIa: Number of Charter Schools and Grades Offered by Charter Schools in New York City**

school year	# of schools open and in this study	Number of Schools Offering...													
		K	1	2	3	4	5	6	7	8	9	10	11	12	
1999-00	2	1	1	1	1	0	1	1	1	1	0	0	0	0	
2000-01	10	6	7	4	3	2	4	4	2	2	2	2	2	2	
2001-02	15	10	12	10	6	4	5	5	5	3	2	2	2	2	
2002-03	17	12	13	14	12	7	7	5	5	6	2	2	2	2	
2003-04	22	16	17	15	16	13	11	6	5	6	3	2	2	2	
2004-05	31	23	24	20	15	16	17	12	7	6	4	3	2	2	
2005-06	44 (42 covered by this report)	33	35	26	22	17	26	18	11	9	4	4	3	2	
<b>planned</b>	<b>44+</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>42</b>	<b>32</b>	<b>28</b>	<b>29</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	

Notes: The table shows the number of New York City charter schools participating in this study and the grades offered by them in each school year. The final row shows the grades that they plan to offer. Highlighted areas mark years in which students take New York State tests for which we have data.

**Table IIIb: Number of Students Available for Assessing the Achievement Effects of New York City's Charter Schools (Number of Test-Taking Students Who Participated in Balanced Lotteries)**

	Year of Test-Testing			Total for all available years
	2005-06	2004-05	2003-04	
Grade 3 tests	3111	1709	1265	7436
Grade 4 tests	2603	2013	1158	6902
Grade 5 tests	3586	1777	1104	7767
Grade 6 tests	3020	1539	688	6455
Grade 7 tests	1864	834	604	4278
Grade 8 tests	961	656	525	2999
Living Environment Math A test	4	15	9	28
Global History test	10	24	2	36
Comprehensive English test	6	25	0	31
U.S. History test	11	14	0	25
	1	4	1	6

Notes: The table shows the number of test-taking students in each year who participated in balanced lotteries held by New York City charter schools. The "All Available" column contains the total number of students over the school years available currently in New York City Department of Education database: 2000-01 to 2005-06. A school will have no balanced lottery available if it held no lottery among applicants, if it failed to keep full application information on lotteried-out students, or if the number of participants in the lottery was so small that the lotteried-in and lotteried-out groups were statistically significantly different at the 90 percent level. In the years before this study commenced, many schools failed to keep full application information on lotteried-out students simply because they were unaware that such information might later be needed.

## LOTTERY-BASED RESULTS: THE EFFECTS OF NEW YORK CITY'S CHARTER SCHOOLS ON TEST SCORES

### What is the main result or the bottom line for the grade 3-8 tests?

New York City's charter schools raise their third through eighth graders' math scores by 0.09 standard deviations for every year they spend in the school. Remember, these gains are *in addition* to whatever gains the students would have been expected to make in the traditional public schools, had they been lotteried-out. This result is statistically significant with a high level of confidence. (The p-value, shown in parentheses, is less than 0.001.) That means that we are very confident, more than 99% confident, that the effects of New York City's charter schools on math achievement are not zero or negative. For this result, see the top part of Table IIIc. For a more complete explanation of p-values, see Frequently Asked Questions elsewhere in this report.

New York City's Charter Schools raise their third through eighth graders' reading scores by 0.04 standard deviations for every year they spend in the school. Remember, these gains are *in addition* to whatever gains the students would have been expected to make in the traditional public schools, had they been lotteried-out. This result is statistically significant with a high level of confidence. (The p-value, shown in parentheses, is 0.016.) That means that we are very confident (98% confident) that the effects of New York City's Charter Schools on reading achievement are not zero or negative. For this result, see the top part of Table IIIc.

### What is a standard deviation?

A standard deviation or "effect size" is a conventional way of expressing test scores that works for all tests. If students' scores rise by one standard deviation, it is a *large* change in achievement. On most tests it corresponds to more than a grade's worth of learning and more than a performance level.

### How do I translate the results into scale scores or performance levels?

The bottom part of Table IIIc shows the results translated into 2005-06 scale score points. For each year spent at a New York City charter school, students' math scale scores increase by 3.75 to 3.98 points (depending on the grade). For each year spent at a New York City charter school, students' reading scale scores increase by 1.53 to 1.61 points (depending on the grade). Remember, these gains are *in addition* to whatever gains the students would have been expected to make in the traditional public schools, had they been lotteried-out.

Appendix Figure 1 shows that, in grades three through eight, a student's math scale score has to rise by an average of 32 points to go from the top of the Performance Level 1 range (not meeting learning standards) to the bottom of the Performance Level 3 range (meeting learning standards). Appendix Figure 2 shows that, in grades three through eight, a student's reading scale score has to rise by an average of 44 points to go from the top of the Performance Level 1 range (not meeting learning standards) to the bottom of the Performance Level 3 range (meeting learning standards).

Thus, for every year that students spend at New York City's charter schools, they can expect to improve by about 12 percent of a performance level in math. For every year that students spend at New York City's charter schools, they can expect to improve by about 3.5 percent of a performance level in reading.

**Why are New York City's charter schools' effects larger in math than in reading?**

There are many reasons why the charter schools' effects are larger in math than in reading, but it may be helpful to know that it is normal for a school's effect to be more discernable in math than in reading. Most researchers believe that schools mostly control students' learning in math but that both families and schools have a lot of influence over students' learning in reading. Because the school is only one of the two big influences on reading, the school's effects are more difficult to discern for reading than they are for math, where the school dominates learning.

**Should the charter schools expect to see similar results when the 2006-07 test scores for grades three through eight are included?**

Only somewhat similar. Many of New York City's charter schools are new or have only one or two "classes" taking statewide tests. Therefore, with each additional year, the data available expands considerably. While the estimated effects will probably not change radically when the new (2006-07) test data are included, we do expect the effects to change somewhat. Keep in mind that the effects can change for two reasons. First, the grades and schools and students included in the study expand. Second, as we include more data, the results become more precise.

**Table IIIc: Lottery-Based Estimates of the Effect of Attending New York City's Charter Schools, Per Year of Attendance, on Test Scores for Grades 3 through 8**

		Estimated Effect of Attending New York City's Charter Schools, Per Year of Attendance	
		effect on Math	effect on Reading
Effect in terms of Effect Size or Standard Deviations		<b>0.09</b> [statistically significant] (p-value < 0.001)	<b>0.04</b> [statistically significant] (p-value = 0.016)
Translation of effect into 2005-06 Scale Score points*	grade 3 scale points	<b>3.78</b>	<b>1.61</b>
	grade 4 scale points	<b>3.95</b>	<b>1.59</b>
	grade 5 scale points	<b>3.81</b>	<b>1.61</b>
	grade 6 scale points	<b>3.94</b>	<b>1.56</b>
	grade 7 scale points	<b>3.75</b>	<b>1.57</b>
	grade 8 scale points	<b>3.98</b>	<b>1.53</b>

Estimation details:

results based on all balanced lotteries?	yes
treatment on the treated results? (estimation accounts for lotteried-in students who do not attend)	yes
results account for differences in student characteristics?	yes
results account for differences in students' pre-lottery test scores?	yes
results account for students who attend school only part of year?	yes
results account for differences in student's grade at time of test?	yes
results account for differences in school year of test?	yes
estimation includes lottery fixed effects?	yes
robust standard errors clustered at the student level?	yes

\* See Appendix Figures 1 and 2 for the 2005-06 relationship between scale scores and performance levels.

Notes: The table shows the effect of attending New York City's charter schools for one school year. An effect is judged to be statistically significant if it is statistically significantly different from zero with 85% confidence. The effects shown are "treatment on the treated" estimates; that is, an indicator for being lotteried-in is used as an instrument for attending the charter school. A student's observation is included in the estimation if he or she participated in a balanced lottery (see previous table). The estimates control for *pre-determined* student characteristics such as race, gender, pre-lottery eligibility for school meals program, pre-lottery participation in special education, pre-lottery limited English proficiency, and pre-lottery test score (if any). Note, however, that these controls have a negligible effect on the estimates. A student who attends school for only part of year has his or her observation weighted commensurately. Thus, a student who attends a charter school for only half the year has a weight of 0.5 placed on his observation. A student who attends all year has a weight of 1.0. The estimation includes grade indicator variables, school year indicator variables, and lottery indicator variables. The standard errors are computed using Stata's "robust" command clustered at the student level.

Sources: Student test scores and characteristics are from the New York City Basic Educational Data System (BEDS). Student applicant and lottery lists are from the charter school.

### **What is the main result or the bottom line for the Regents Examinations?**

It is too early to say how New York City's charter schools affect the Regents Examination scores of ninth through twelfth graders. This is not surprising given the very small numbers of charter school applicants who have taken Regents Examinations since participating in a lottery. (See Table IIIb.) In the case of the Mathematics A examination, we are able to compute an estimate, but even this estimate is *highly* uncertain. We are only able to rule out extreme effects: charter schools are unlikely to be raising Mathematics A test scores by more than 14 points or lowering them by more than 10 points for each year that the student spends in a charter school. Notice that, in Table IIIc, an estimated effect is shown for the Mathematics A examination but it is followed by the words "not statistically significant." Since we cannot confidently rule out the case in which the charter schools have a zero effect or negative effect, we discourage readers from interpreting the estimate as a positive sign. It should be interpreted merely as an indication that we need more data if we are to learn about charter schools' effect on the Mathematics A exam with any precision.

For the other Regents Examinations, the data are so insufficient that we cannot rule out even very extreme effects. Thus, in Table IIIc, no estimates are shown for these exams, and we simply note that we have insufficient statistical power.

### **When can we expect to see meaningful results that reveal how attending a New York City charter school affects a student's performance on Regents Examinations?**

The answer to this question is, "It depends." On the one hand, with each passing year, there are more students who have applied to charter schools offering grades nine to twelve. See Table IIIa. On the other hand, students, whether lotteried-in or lotteried-out, need not take Regents Examinations on a rigid schedule. Therefore, we cannot predict in advance how many students will have taken, say, the Comprehensive English exam by such-and-such a date. Furthermore, even if every student took his or her exams at the recommended time, we would still have a very small number of applicants on whom to base our estimates.

Thus, we can say for sure that each new year's worth of data will add substantially to our ability to investigate effects on Regents Examination. We cannot say for sure how quickly we will obtain fairly precise estimates. But we are hopeful that, if a large percentage of charter school applicants take their Mathematics A examinations "on schedule" by June 2007 of their tenth grade year, next year's report will contain statistically meaningful estimates for at least that one examination.

**Table IIIId: Lottery-Based Estimates of the Effect of Attending New York City's Charter Schools on Regents Examination Scores**

	Estimated Effect of Attending New York City's Charter Schools				
	effect on Math A	effect on Comprehensive English	effect on Living Environment	effect on Global History	effect on U.S. History
effect in terms of score on exam [statistically significant effect?]	1.84 [NOT Statistically Significant] (p-value=0.76)	<i>insufficient statistical power to report results</i>			

Estimation details:

results based on all balanced lotteries?	yes
treatment on the treated results? (estimation accounts for lotteried-in students who do not attend)	yes
results account for differences in student characteristics?	yes
results account for differences in students' pre-lottery test scores?	yes
results account for students who attend school only part of year?	yes
results account for differences in student's grade at time of test?	yes
results account for differences in school year of test?	yes
estimation includes lottery fixed effects?	yes
robust standard errors clustered at the student level?	yes

Notes: The table shows the effect of attending New York City's Charter Schools on a specific Regents Examination. Students are recommended to take the examinations in a certain grade, but need not do so. The exam/grade combinations are as follows: Comprehensive English, grade 11; Math A, grade 10; Living Environment (biology), grade 9; Global History, grade 10; U.S. History, grade 11. An effect is judged to be statistically significant if it is statistically significantly different from zero with 85% confidence. The effects shown are "treatment on the treated" estimates; that is, an indicator for being lotteried-in is used as an instrument for attending the charter school. A student's observation is included in the estimation if he or she participated in a balanced lottery (see previous table). The estimates control for *pre-determined* student characteristics such as race, gender, pre-lottery eligibility for school meals program, pre-lottery participation in special education, pre-lottery limited English proficiency, and pre-lottery test score (if any). Note, however, that these controls have a negligible effect on the estimates. A student who attends school for only part of year has his or her observation weighted commensurately. Thus, a student who attends a charter school for only half the year has a weight of 0.5 placed on his observation. A student who attends all year has a weight of 1.0. The estimation includes grade indicator variables, school year indicator variables, and lottery indicator variables. The standard errors are computed using Stata's "robust" command clustered at the student level.

Sources: Student test scores and characteristics are from the New York City Basic Educational Data System (BEDS). Student applicant and lottery lists are from the charter school.

## BREAKDOWNS OF THE TEST SCORE EFFECTS OF NEW YORK CITY'S CHARTER SCHOOLS

We tried breaking down the test score effects (for grades three through eight) in several ways. We looked for patterns by the grade of testing: were, for instance, third graders affected differently from fourth or eighth graders? We looked for patterns by the grade at which the student had entered the charter school: were students who entered as kindergarteners affected differently from, say, students who entered as fifth graders? We looked for patterns that suggested that students might first experience a positive effect and then plateau. We looked for patterns that suggested that students might first experience a negative effect and then a positive effect. We did not see statistically significant or even suggestive evidence of any of the patterns mentioned above. (Suggestive evidence is based on differences in the estimated effects even if those differences are not statistically significant.)

There are two main reasons why we might not see patterns like those we describe above. First, it is possible that such patterns do exist but only subtly. Our current data might be insufficient for discerning subtle patterns. In this case, we will be able to pick out the subtle patterns in future reports where we have more data. Second, students in a particular *grade* at New York City's charter schools probably have much less in common than students in a particular charter *school* regardless of grade. That is, given the differences among the charter schools in their intake grades, the grades they have offered in each school year, and the curricula they employ, there is little reason to think that there would be much commonality among students in a particular grade across different schools. For the same reasons, the experiences of students who entered at a particular grade may not have much in common, either. (Recall that the vast majority of students enter at the intake grades once a school has been in operation for several years. Many of New York City's charter schools are fairly new, however, and they have a variety of intake grades anyway.)

We will continue to look for interesting breakdowns of the results in future reports as more data becomes available. We will report patterns whenever they emerge. Currently, we are more likely to find interesting patterns by breaking down the results *by school* than by breaking down the results by grade or grade-of-entry.

## **DO ALL OF NEW YORK CITY'S CHARTER SCHOOLS HAVE SIMILAR EFFECTS?**

**In this section, we investigate the *range* of effects that we found on test scores for grades three through eight. We do so in a way that does not identify individual charter schools; however, what we show would allow a reader to say what *share* of charter school students are experiencing a strong positive effect, a weak positive effect, no apparent effect, and so on.**

**There is reason to expect that the effects of New York City's charter schools might differ** Although New York City's charter schools operate under a single New York state charter school law, we have already seen that they have different authorizers, different locations, different school leaders, different mission statements, different operational characteristics (for instance, the length of the school year), and different curricular characteristics (for example, the employment of a particular mathematics textbook). New York City's charter schools also have different histories: some have been in operation for a considerable time (especially the schools that converted to charter status); some had been open only one year by June 2006. In short, there are many reasons to expect that New York City's charter schools might have effects that are not all alike.

**There is also reason to expect that the effects of New York City's charter schools might converge**

All of New York City's charter schools are under pressure to perform, and the pressure comes from three sources. First, they are subject to formal accountability systems: New York City's, New York State's, and No Child Left Behind. Second, they can be held accountable by their authorizers and boards of trustees. The authorizers wield especially great power when the schools' charters are up for renewal. Third, the charter schools need to attract parents. This necessity imposes an indirect accountability to parents. In short, there are some commonalities in pressure to perform among the charter schools.

Although the charter schools are not forced to learn from one another, they may choose to do so when under similar pressures. They may learn from one another informally (for instance, by hiring staff who have worked at other charter schools) or more formally (by consciously adopting a policy that seems to be working well for another school). The density of New York City's charter schools--there are now about 50 in a relatively compact space--promotes opportunities for learning.

In short, there are reasons why New York City's charter schools might have different effects and reasons why they might have convergent effects. The data must speak for themselves.

### **Thinking about the *range* of effects among New York City's charter schools**

Recall that the *average* effect of New York City's charter schools is 0.09 standard deviations in math and 0.04 standard deviations in reading, per year, for grades three through eight. In other words, students improve by about 0.1 standard deviations in math and by about half as much in reading for each year they spend in the charter schools, relative to the gains they would have attained in the traditional public schools. These average effects are statistically significant and are based on all students who apply to charter schools through a balanced lottery.

Of the students who took part in a balanced lottery, 64 percent applied to a school with effects that we can calculate. For these schools, we have enough data to compute an effect that is statistically precise enough to be useful for considering the range of effects of New York City's charter schools. We wish to be absolutely clear about what we are saying about the remaining 36 percent of students. We are *not* saying that the effect of attending a charter school is essentially zero or is statistically insignificant for the remaining 36 percent of students. *All* students' achievement is included in the effects (0.09 standard deviations in math and 0.04 standard deviations in reading) described above. We are simply saying that, when we compute effects for individual charter schools, some of the schools currently have such a small amount of data that we cannot confidently compute the effect of the individual school. These schools are therefore not useful for thinking about how the effects differ among charter schools in New York City.

Specifically, if a school's estimated effect has such large standard errors that it is statistically insignificant and an effect of 0.1 standard deviations would also be statistically insignificant, we do not use it for considering the range of effects. The confidence standard is 85 percent.

### **How do math effects differ among New York City's charter schools?**

If we examine the range of effects for students whose individual schools have reasonably precise effects, we find that about 19 percent of charter school students attend a school that is estimated to have a positive effect on math that is greater than 0.3 standard deviations. About 56 percent of charter school students attend a school that is estimated to have a positive effect on math that is between 0.1 and 0.3 standard deviations. About 18 percent of charter school students attend a school that is estimated to have a positive effect on math between 0 and 0.1 standard deviations. Finally, the remaining six percent of students attend a school that is estimated to have an effect on math that is negative. (Percentages do not add up to 100 because of rounding.)

### **How do reading effects differ among New York City's charter schools?**

If we examine the range of effects for students whose individual schools have reasonably precise effects, we find that about nine percent of charter school students attend a school that is estimated to have a positive effect on reading that is greater than 0.3 standard deviations. About 71 percent of charter school students attend a school that is estimated to have a positive effect that is between 0.1 and 0.3 standard deviations. About 13 percent of charter school students attend a school that is estimated to have a positive effect between 0 and 0.1 standard deviations. Finally, the remaining eight percent of students attend a school that is estimated to have an effect that is negative. (Percentages do not add to 100 because of rounding.)

### **How can we see the range of math effects?**

See Figure IIIa for the range of estimated effects of New York City's charter schools on math in grades three through eight. We created this figure by estimating an effect on math for each school separately. Then we plotted the distribution of the schools' effects, taking care that schools were represented according to the number of students they enroll. Thus, the distribution of effects is representative of the charter school *students* of New York City. We smoothed the distribution slightly so that readers could not pick out the effects of individual charter schools.

People are most familiar with bell-shaped distributions like the well-known Normal Distribution, but not all distributions need be bell-shaped. All distributions do, however, need to contain the whole population (charter school students, in this case) in the area under the curve. Thus, when you look at the distribution of estimated math effects of New York City's charter schools (the shaded area with three peaks), you can see that most charter school students attend a school that is having a moderate to large positive effects on math. A second, much smaller group of students (a quarter the size of the first group) attends a charter school that is having modest positive effects on math. A third group that is even smaller (one twelfth the size of the first group) attends a charter school that is having modest to moderate negative effects on math.

### **How can we see the range of reading effects?**

See Figure IIIb, which is constructed like the previous figure, except that it shows reading effects.

When you look at the distribution of estimated reading effects of New York City's charter schools (the shaded area with five peaks), you can see that most charter school students attend a school that is having moderate to large positive effects on reading. A much smaller group of students (one sixth the size of the first group) attend a charter school that is having modest positive effects on reading. And a third group that is much smaller again (one tenth the size of the first group) attends a charter school that is having moderate negative effects on reading.

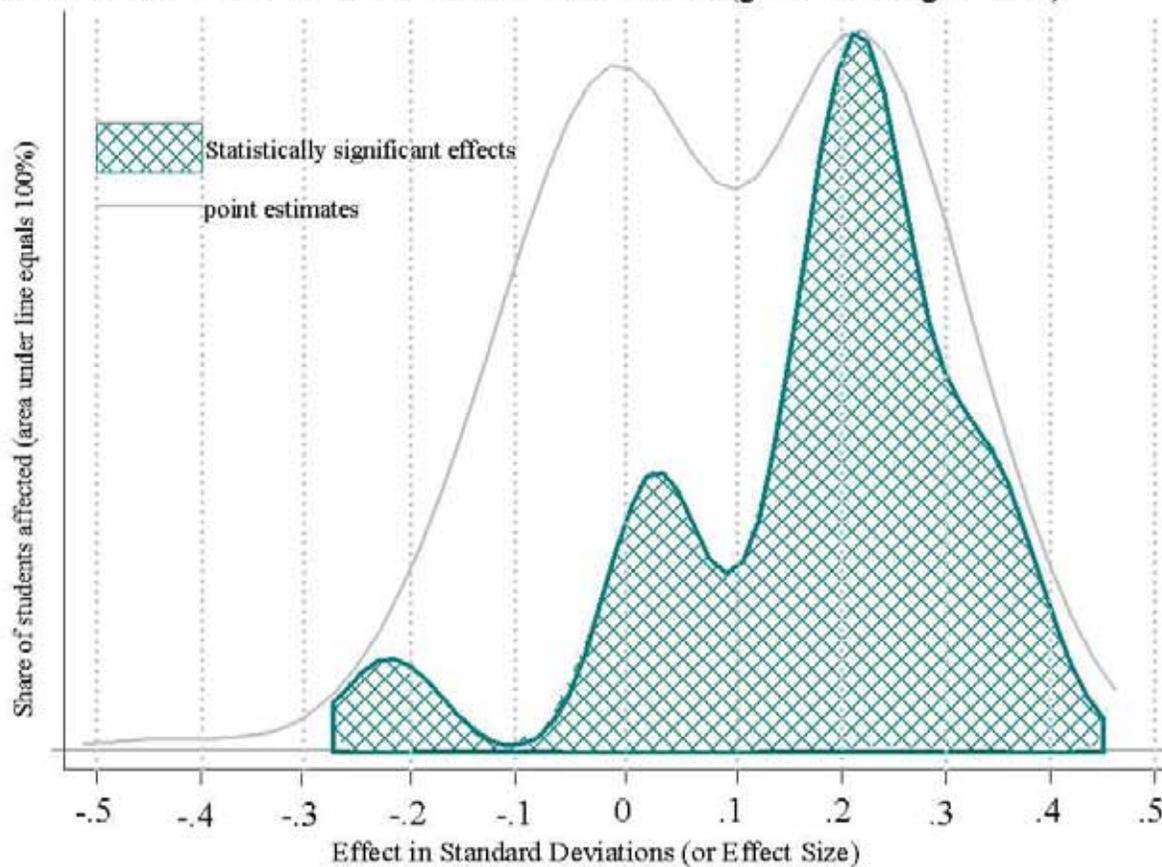
### **Summing up**

The vast majority of charter schools for which an individual school estimate can be computed with reasonable precision are having a positive effect on their students' math and reading achievement in the third through eighth grades. Some schools in this majority have a strong positive effect (more than 0.3 standard deviations per year) and others have a modest positive effect (less than 0.1 standard deviations per year). Most have an effect that is moderate (between 0.1 and 0.3 standard deviations per year). A small share of students (six percent in math, eight percent in reading) attend a school that is estimated to have a modest to moderate negative effect.

None of this is too surprising. Any average effect is going to be a combination of greater and lesser effects. What would be useful to know, however, is whether there are any characteristics of charter schools that make them more likely to have a strong positive effect?

**Figure IIIa**

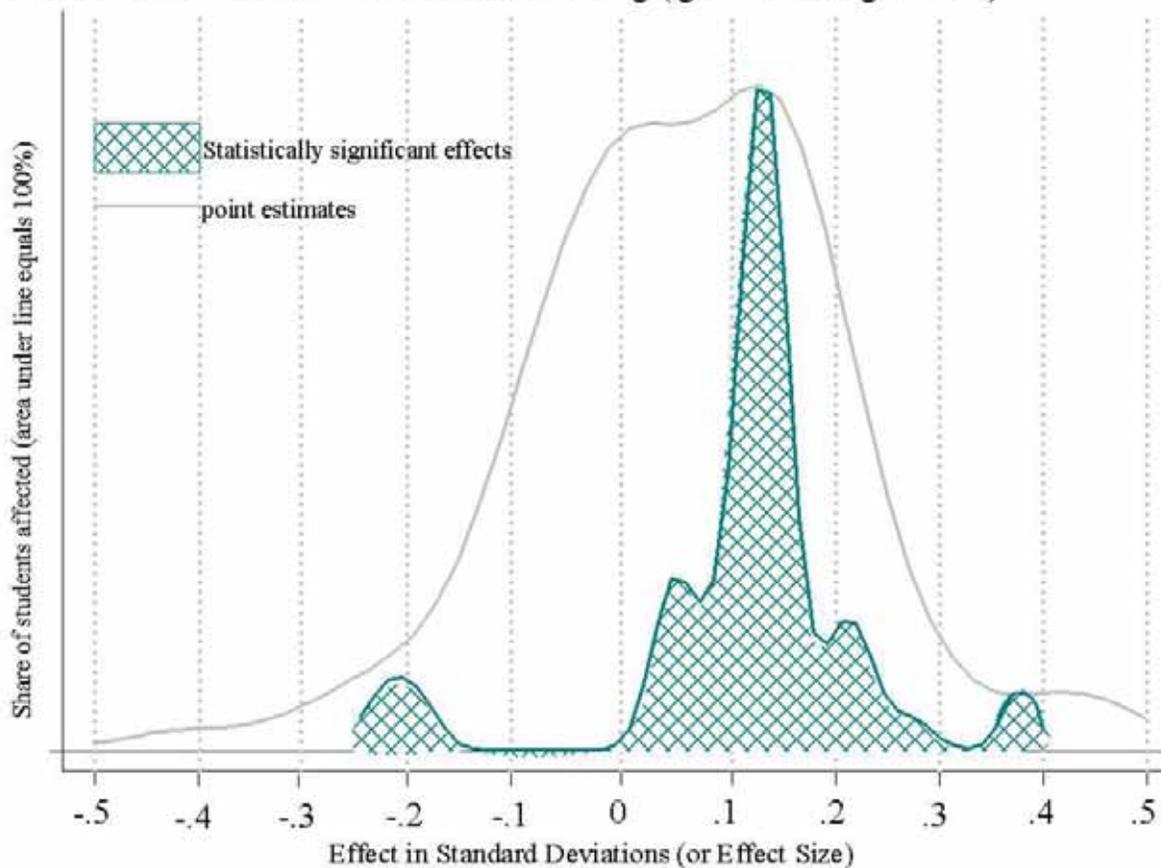
Distribution of Charter School Effects on Mathematics (grade 3 through 8 tests)



Notes: The shaded area shows the distribution of estimated effects of charter schools on math (grades three through eight) that are sufficiently precise that they are either statistically significantly different from zero with 85 percent confidence or that an effect of 0.1 standard deviations would be statistically significantly different from zero with 85 percent confidence. See preceding text for shares of students in various intervals within the distribution. The point estimates line includes estimates that are very imprecise (so imprecise that the confidence interval includes implausibly extreme effects that are both negative and positive).

**Figure IIIb**

Distribution of Charter School Effects on Reading ( grade 3 through 8 tests)



Notes: The shaded area shows the distribution of estimated effects of charter schools on math (grades three through eight) that are sufficiently precise that they are either statistically significantly different from zero with 85 percent confidence or that an effect of 0.1 standard deviations would be statistically significantly different from zero with 85 percent confidence. See preceding text for shares of students in various intervals within the distribution. The point estimates line includes estimates that are very imprecise (so imprecise that the confidence interval includes implausibly extreme effects that are both negative and positive).

# **Associating Charter School Characteristics with Effects on Achievement**

## **Relating the charter schools' effects to their characteristics**

In section I, we showed that New York City's charter schools differ on a number of dimensions such as how long they have been in operation, the type of organization that manages them, the length of the school year and school day, curriculum, and disciplinary policy. In this part of the report, we investigate whether certain school characteristics are routinely associated with positive effects on achievement.

## **What method do we use for this investigation?**

We do this investigation using multiple regression, a statistical method of examining the correlation between variables while holding other things constant. We follow normal statistical procedure by giving weight to a school's estimated effect that is commensurate with the precision of the estimate.

## **Associations, not causation**

We cannot make causal claims about charter schools' characteristics and their effects on achievement. We can only describe associations between characteristics and achievement effects. This may seem like a subtle distinction, but it is in fact an important one. An example will illustrate the difference.

Suppose that charismatic school leaders were a key cause of positive achievement effects, and suppose that charismatic leaders just happened to like long school years. We cannot measure charisma, but we can measure the length of the school year. Therefore, we might find an *association* between a long school year and positive achievement effects even if the charisma, and not the long school year, *caused* higher achievement. The distinction could matter a lot in practice. A school that lengthened its school year might be disappointed in the results, not realizing that what it had really needed to do was to hire a charismatic leader.

## **What kinds of answers can we give?**

An example will illustrate the kinds of answers we can and cannot hope to give.

Suppose that half of New York City's charter schools have adopted a curriculum (textbooks, lesson plans, and so on) known as A and the other half have adopted a curriculum known as B. It is fairly likely that, if one of the two curricula were associated with substantially more positive effects on achievement, we would discern this association statistically. However, if the two curricula were associated with only slightly different effects, we might not be able to discern the difference. (In the future, as we add data to this study, we will be increasingly able to discern slight differences.)

If the vast majority of schools used curriculum A and only a few used curriculum B, we might not be able to discern the associations even if they were substantial. Similarly, if 45 percent of

schools used curriculum A, 45 percent used B, and the remaining 10 percent used a third curriculum C, we would probably be able to discern associations between achievement and curricula A and B but would probably be unable to discern associations between achievement and curriculum C.

Another dimension on which New York City charter schools differ is school uniforms. Suppose that a quarter of New York City charter schools had curriculum A and uniforms, a quarter had curriculum A and no uniforms, a quarter had curriculum B and uniforms, and a quarter had curriculum B and no uniforms. In this case, we would probably be able to discern the association of curricula A and B with achievement *and* be able to discern separately the association of school uniforms with achievement. Now suppose instead that every school that adopted curriculum A also adopted uniforms and that every school that adopted curriculum B had no uniforms. Then, we could answer questions about the "package" of curriculum A and uniforms as opposed to the package of curriculum B and no uniforms. We could not, however, answer questions about the effect of uniforms *independent* from the effect of curriculum A. The prevalence of "packaging" poses a real problem for understanding the association between charter schools' characteristics and their effects on achievement. Although New York City charter schools do not adopt policies in formal packages, we see informal, loose packages. For instance, schools that adopt a long school year very often also adopt a long school day. Schools that have a No Broken Windows disciplinary strategy often have larger class sizes. And so on.

## Associations between Achievement and Charter Schools' Characteristics

### What's the bottom line from the analysis of associations between achievement effects and charter school characteristics

We find that the data on New York City charter schools are still too thin to make any confident statements about the associations between achievement effects and charter school characteristics when they are considered simultaneously (as they should be in a rigorous analysis). The multiple regression analysis (shown in Table III E) does reveal certain patterns, but all of them should be viewed as merely *suggestive* and *preliminary*. This is because we really need more precise estimates of achievement effects and more charter schools in New York City, each pursuing its own set of policies, to draw confident conclusions about the associations between achievement effects and school characteristics. Because our data is expanding considerably with every school year and because the number of charter schools in New York City is expanding also, we expect the evidence will become more definitive in future years' reports so long as the schools pursue different policies. If the schools converge on a set of policies, we will find it very difficult to learn about the associations.

### Years in Operation

When considered simultaneously with other characteristics, a charter school's years in operation has an association with achievement effects that is not statistically significantly different from zero. Because the standard error is fairly large, we think that this does not provide evidence one way or the other about the question of whether schools improve with experience. It is interesting to note, however, that if we do *not* control for the school's policies and we look at the association between a charter school's years in operation and its achievement effect, we find that older schools have more positive achievement effects. The fact that this correlation disappears when we control for policies indicates to us that the likely reason older schools have more positive achievement effects is that they adopt more effective policies. That is, it is not experience *per se* that is associated with more positive achievement but the adoption of more effective policies as schools learn from experience.

### Operating Agency Type

When considered simultaneously with other characteristics, a charter school's operating agency type (CMO, EMO, or CGO) has an association with achievement effects that is not statistically significantly different from zero. Because the standard errors are large, we think that this does not provide evidence one way or the other about the question of whether one agency type is more associated with positive achievement effects. It is interesting to note, however, that if we do *not* control for the school's policies and we look at the association between a charter school's agency type and its achievement effect, we find statistically significant correlations. The fact that these correlations disappear when we control for policies indicates to us it is not agency type that matters but the policies that schools adopt. In other words, a certain agency type may be more likely to adopt a certain policy, but that policy's association with positive achievement effects is about the same regardless of the school's agency type. A school can have any agency

type and, so long as it adopts a set of policies, we expect its associations with achievement to be about the same.

### Long School Year

When considered simultaneously with other characteristics, a long school year is positively associated with positive achievement effects. This association is statistically significantly different from zero with 99 percent confidence. Schools with years that are ten days longer are associated with achievement effects that are 0.2 standard deviations higher. This is an association of considerable magnitude, and a ten day difference is quite common. (Twelve days is the standard deviation in the length of the school year among charter schools.)

### Long School Day

When considered simultaneously with other characteristics, a long school day has an association with achievement effects that is not statistically significantly different from zero. Here, we run into the package problem once again. Having a long school year and a long school day are highly correlated: most schools that have one policy have the other. However, there *are* schools that have one policy and not the other. In a situation like this, where we have two highly correlated policies and one has positive effect (long school year) and the other (long school day) does not have a statistically significant effect, we have to be very cautious drawing conclusions. (Researchers may be interested to know that, if we drop one of the variables, the other is positive and statistically significantly different from zero.) What seems safe to say is that a package that combines a long school year and a long school day--especially one emphasizing a long school year--is associated with more positive achievement effects. With the data we have now, we do not know whether having just a long school day is associated with positive achievement effects.

### Saturday School

The effect of Saturday school is also difficult to discern because it is usually adopted in combination with a long school year. Indeed, if Saturday School is mandatory for everyone, not just students struggling with their school work, then Saturday School automatically adds days to the school year. In any case, once we control for the length of the school year, Saturday School's association with achievement effects appears to be unimportant, but we do not feel confident about this conclusion because the package of a long school year and Saturday School is common. What seems safe to say is that a package that combines a long school year and Saturday School is associated with more positive achievement effects.

### Optional After-School Programs

When considered simultaneously with other characteristics, optional after-school programs have an association with achievement effects that is not statistically significantly different from zero. Because the standard error is very large, we think that this does not provide evidence one way or the other about the question of whether after-school programs have a positive, negative, or zero association. We wish to emphasize that we have not found a zero association. Rather, we simply do not know.

### Math Curricula

We describe the math curricula in the appendix, using descriptions that rely on the publisher's own materials. We describe only math curricula used by at least a few New York City charter schools. Among the math curricula, Everyday Math has a negative association with achievement effects. This association is statistically significant at the 99 percent level. The remaining math curricula have associations with achievement effects that are not statistically significantly different from zero. Because the standard errors are large, this does not provide evidence one way or the other about the question of whether the remaining math curricula have a positive, negative, or zero association. That is, we have *not* found zero associations. Rather, we simply do not know.

### Reading Curricula

We describe the reading curricula in the appendix, using descriptions that rely on the publisher's own materials. We describe only the reading curricula used by at least a few New York City charter schools. Among the reading curricula, Open Court reading has a negative association with achievement effects. This association is statistically significant at the 99 percent level. The remaining reading curricula have associations with achievement effects that are not statistically significantly different from zero. Because the standard errors are large, this does not provide evidence one way or the other about the question of whether the remaining reading curricula have a positive, negative, or zero association. That is, we have *not* found zero associations. Rather, we simply do not know.

### Class Size

When considered simultaneously with other characteristics, average class size has an association with achievement effects that is not statistically significantly different from zero. The standard error is such that we can rule out large negative associations and large positive associations. (Specifically, for class size that is one student smaller, we can rule out associations less than -0.05 and greater than 0.06.) Remember that, with class size, *negative* associations are desirable: larger class size means fewer teachers per child. We encourage readers to interpret the statistically insignificant association between class size and achievement with caution. The reason is that larger class size is often found in packages with longer school years. We surmise that if a school wants to a longer school year, it needs to find room in its budget. By raising class size by, say, four students, a school may be able to free up twenty percent of its budget, allowing an expansion of the school year. A cautious interpretation of the results would be that *because* long school years are associated with achievement and *because* long school years and days are hard to attain without larger class sizes, the package of long school year and larger class size has a positive association with achievement. It is hard to say what association with achievement class size would have if schools had large enough budgets to reduce it while also expanding the school year.

### Internal Evaluations

When considered simultaneously with other characteristics, administering internal evaluations for diagnostic purposes has an association with achievement effects that is not statistically

significantly different from zero. Because the standard errors are very large, we think that this does not provide evidence one way or the other about the question of whether internal evaluations have a positive, negative, or zero association. That is, we have *not* found a zero association. Rather, we simply do not know.

#### School Uniforms and a School Dress Code

When considered simultaneously with other characteristics, dress codes and policies that mandate the wearing of school uniforms have an association with achievement effects that are not statistically significantly different from zero. A difficulty with analyzing these policies is that they are very widely adopted by New York City's charter schools. Any policy that is very commonly (or rarely) adopted is hard to analyze because there is not much variation in it.

#### No Broken Windows Disciplinary Policy

In disciplinary policies, the "No Broken Windows" school of thought holds that expecting small courtesies and punishing small infractions (usually at classroom level) is important. This is in contrast to disciplinary strategies that focus more on preventing or punishing large infractions (often at an administrative level above the classroom). A school may call its disciplinary policy by a variety of names but, for this purpose, we classified it as "No Broken Windows" if it fit that school of thought. When considered simultaneously with other characteristics, a disciplinary policy that belongs to the No Broken Windows school of thought has an association with achievement effects that is not statistically significantly different from zero. Because the standard errors are large, we think that this does not provide evidence that such a "No Broken Windows" disciplinary policy has a positive, negative, or zero association. That is, we have *not* found a zero association. Rather, we simply do not know.

#### Parent Contracts

Some charter schools ask parents to sign a contract. The typical parent contract specifies expectations about attendance, on-time arrival at school, homework, and similar issues. When considered simultaneously with other characteristics, a policy of asking parents to sign a contract has an association with achievement effects that is not statistically significantly different from zero. Because the standard errors are large, we think that this does not provide evidence one way or the other about the question of whether internal evaluations have a positive, negative, or zero association. That is, we have *not* found a zero association. Rather, we simply do not know.

#### Reserving One or More Seats for Parents on the School's Board

Some charter schools reserve one or more seats on their board for parents. This ensures that there is parent representation. Of course, parents may serve on a board even if there is no seat *reserved* for them. As noted already, all parents exercise indirect control on charter schools because they can "vote with their feet." The parent on the board is, thus, meant to exercise a different type of control. When considered simultaneously with other characteristics, a policy of reserving one or more seats on the board for parents has a positive association with achievement effects that is marginal statistically significantly different from zero (with 88 percent confidence).

### Number of School Leaders

Some charter schools have multiple school leaders--for instance, a chief officer and a headmaster. When considered simultaneously with other characteristics, a policy of having multiple leaders has an association with achievement effects that is not statistically significantly different from zero at conventional levels. However, for readers who are willing to accept a confidence level of only 84 percent, the association is positive.

### Other School Characteristics

There are a number of other school characteristics that we do not mention above. This is either because they cannot be measured in a consistent way across schools or because there was insufficient variation in their use among New York City charter schools for us to compute their associations with any sort of precision. We hope to investigate several more school characteristics in future reports. Our ability to do this depends on the increase in the data available to us and the adoption of policies by charter schools.

### **Summing Up**

We are very cautious about all of the associations with achievement that we describe above. First, these associations are preliminary and may change substantially as more data are added or more New York City charter schools open. Second, the associations can be difficult to interpret because some policies are routinely found together in packages: an example is the package of a long school year, a long school day, Saturday school, and larger class size. It is difficult to disentangle the role played by each part of this package except that it seems fair to say that the long school year seems to be important. Third, it is essential to remember that none of the associations we have described is a causal effect. We are *not* asserting that if a school adopts a certain policy, its achievement effects will rise. One must have causal effects to make such assertions. We cannot tell whether the policies themselves make the difference or whether the policies are merely correlated with factors that do make the difference (school leaders' charisma, problems in the neighborhood of the school, etc.). We strongly discourage readers from treating the associations as though they were causal effects--for instance, by changing a policy based on the estimates shown.

With all these caveats, the positive associations are with a long school year, having a parent on the school board (marginal), and--possibly--having multiple school leaders (more marginal). The negative associations are with Everyday math and Open Court reading.

Most of the associations between schools' policies and their achievement effects are statistically insignificant *not* because they are likely to be zero associations but simply because we currently have too little data to draw confident conclusions. We expect that we will be able to provide substantially more information about such associations with each new report from this study. This is because each additional year of achievement data will allow us to estimate more achievement effects and estimate each effect with substantially more precision.

**Table III: Associations between Charter Schools' Characteristics and Their Estimated Effects on Math and Reading Achievement (multiple regression analysis)**

Characteristic	Average level of this characteristic among New York City charter schools	An increase of unit in this characteristic is associated with what increase/decrease in the school's achievement effect*	Confidence that contribution shown in previous column is not equal to zero	
Years that School has been Operating	3.8	<i>not statistically significant</i>		
Operating Agency is a	Community Grown Organization (CGO)	55%	<i>not statistically significant</i>	
	Charter Management Organization (CMO)	29%	<i>not statistically significant</i>	
	Educational Management Organization (EMO)	17%	<i>not statistically significant</i>	
Number of Days in School Year	192.9	0.02	99%	
Number of Hours in School Day	7.9	<i>not statistically significant</i>		
Saturday School	57%	<i>not statistically significant</i>		
Optional After-School Program	64%	<i>not statistically significant</i>		
Math curriculum is	Saxon	40%	<i>not statistically significant</i>	
	Scott Foresman	5%	<i>not statistically significant</i>	
	Everyday	21%	-0.33	99%
Reading curriculum is	SRA	12%	<i>not statistically significant</i>	
	Scott Foresman	14%	<i>not statistically significant</i>	
	Open Court	24%	-0.38	99%
	Core Knowledge	38%	<i>not statistically significant</i>	
School's Own Math & Reading Curricula	29%	<i>not statistically significant</i>		
Average Class Size	23.6	<i>not statistically significant</i>		
Internal Evaluations Administered	95%	<i>not statistically significant</i>		
School Uniforms Required	88%	<i>not statistically significant</i>		
Dress Code (with or without uniforms)	90%	<i>not statistically significant</i>		
No Broken Windows Disciplinary Policy	21%	<i>not statistically significant</i>		
Parent Contract	50%	<i>not statistically significant</i>		
Reserved Seat(s) for Parent on Board	52%	0.23	88%	
Number of School Leaders	1.3	<i>not statistically significant</i>		

Notes: Table shows results from a multivariate regression of charter schools' estimated achievement effects on their characteristics and test subject indicator. Observations are weighted by the precision (inverse of the variance) of the charter school's estimated effect. For coefficients that are statistically significant from zero at the 85 percent at least, the degree of confidence is shown in the right-hand column.

## IV. PROGRESS IN SCHOOL AND RELATED OUTCOMES

In future years, we plan to use this section of the report to describe how New York City's charter schools affect a variety of outcomes related to students' progress in school: attendance, taking Regents Examination "on time," dropping-out, graduation from high school, and so on.

Attendance is not only a measure of how much time students are actually spending in school. Spotty attendance can also be a strong early indicator that a student is likely to drop out or fail to graduate in a timely manner. Unfortunately, we lack data on attendance for this year's report and there are insufficient charter school applicants who have reached secondary school to examine the other outcomes mentioned.

There is one progress-related outcome that we can show this year, however. It is the answer to the question, "How often do students who are attending charter school decide to return to the traditional public schools?" Keep in mind that there is no right answer to this question. Since charter schools are intended to be schools that students attend only if they choose to do so, it is not wrong for students who decide that they prefer the traditional public schools to choose to return to them.

Since we are interested in students having *decided* to return to the traditional public schools from the charter school where they have been enrolled, we count students as having decided to return to the traditional public schools if they return in a grade when they could have continued attending their charter school. In other words, if a student's charter school ends at grade eight and he returns to the traditional public schools for grade nine, we do not count him. Instead, we view him as having "graduated" from his charter school and gone on to the next level of school, where a charter school may or may not have been available to him but we know that his initial charter school was not. Keep in mind that because most of New York City's charter schools serve the elementary grades, some serve the middle school grades, and only a handful serve the high school grades, it is necessary for the vast majority of "graduates" from charter schools to continue their education in the traditional public schools or other non-charter schools.

Unfortunately, we do not know the reasons why students decide to return to the traditional public schools. They might find that the charter school does not suit them academically as well as their local traditional public school does. They might find that traveling to the charter school (which is likely to be farther from their home than the traditional public school) is more problematic than they expected it to be. They might have a sibling who begins attending a certain school that makes it difficult for family to keep the student in a separate charter school. They might have a change in family circumstances. They might find that their traditional public school option has improved, either because their local school has improved or because they have gained entrance to a special school that particularly appeals to them.

Table IVa shows the share of charter school students who decide to return to the traditional public schools. Among students who spend one year or less in a charter school, the probability of return is 7.7 percent. We think of these students as "trial" enrollees. They try the charter school for a fairly short time before deciding to return. After the first year, the probability of return drops substantially--to 4.4 percent among students who spend more than one year but less than or equal to two years in a charter school. The probability of return falls steadily thereafter,

so that a student who has spent more than four years in a charter school has only a 1.3 percent probability of returning to the traditional public schools.

**Table IVa**  
**Students Deciding to Return from Charter Schools to the Traditional Public Schools**

	Probability of deciding to return to traditional public schools after attending charter school for this number of years				
	1 year or less	1+ to 2 years	2+ to 3 years	3+ to 4 years	4+ years
Probability of attrition to public schools	7.7%	4.4%	3.8%	3.3%	1.3%

Notes: A student is counted as deciding to return from a charter school to the traditional public schools if he or she has been observed in the data as attending a charter school in at least two consecutive attendance periods and then returns to attending a traditional public school. A student is not counted as deciding to return if he or she leaves a charter school at the end of the final grade offered by that charter school.

We were interested in the question of whether "trials" (in other words, fairly short stays in charter schools of one year or less) that resulted in returns to the traditional public schools were more common among students who applied as kindergarteners, first graders, second graders, third graders, or fourth graders. On the one hand, a student who enrolls in a charter school as a kindergartener absorbs that school's culture from the beginning and probably has absorbed no previous school's culture. This may make attending a charter school less of a shock and may make returning to the traditional public schools more of one. On the other hand, a family who enrolls their fourth grader in a charter school probably thinks that he is not a great fit at his traditional public school and may be less willing to return for that reason. A family who enrolls their kindergartener in a charter school may not have had a firm idea of how their child would fare in the traditional public schools.

We find that the "trial" rate of return (after one year or less at a charter school) for students who apply to kindergarten is 5.9 percent. For those who apply first grade, it is 5.3 percent; second grade, 4.4 percent; third grade, 4.5 percent; and fourth grade, 7.8 percent. We do not see a strong pattern here, but it is possible that we are seeing a mixture of the two forces of acculturation and experience. That is, compared to second and third grade applicants, "trial" rates of return may be a bit higher for kindergarten applicants because they lack experience in the traditional public schools when they apply. Compared to second and third grade applicants, "trial" rates of return may be a bit higher for fourth grade applicants because they are already acculturated to the traditional public schools when they apply.

Researchers may be interested in how we deal with the achievement data of students who return to the traditional public schools. Formally, their measure of "treatment" in the charter schools stops accumulating when they return to the traditional public schools, but their measure of the "intention to treat" instrumental variable does not stop accumulating until such time as they would have left the charter school by graduating from its final grade.

## V. HOW REPRESENTATIVE ARE THE STUDENTS IN THE STUDY?

In this section, we review information that answers the question, "How representative are the students in this study?" The goal is to have them be representative of the charter schools that are participating in the study, not representative of all students or even of all charter school students.

### **Matching charter school applicants to New York City Department of Education records**

In order to include a student in the study, we obtained information from his charter school application including, if possible, his or her name, gender, date of birth, address, telephone number, parents' names, grade to which he or she was applying, and current school (for those attending school at the time they applied). For a small percentage of students, we were able to obtain the student's identification number in the New York City public school database. We sent this information to the New York City Department of Education, where a contractor matched the applicants to their records in the city's database. Any student who enrolled in a charter school should have been matched to his or her record. Any student who did not enroll in a charter school but did enroll in another New York City public school should have been matched to his or her record. However, an applicant who was not attending a New York City public school at the time he or she applied and who did not subsequently attend one should not have been matched to a record. For instance, a child who was applying for kindergarten and who subsequently attended a private school or moved out of the district should not have been matched to a record. Similarly, a child who was attending a private school or another district's schools at the time he or she applied and continued to attend such a school should not have been matched. (Students can apply to a New York City charter school so long as they will be living in the district when they actually attend the school. Thus, families planning to move into the district over the summer apply from other districts in the spring.)

In short, although we hope to match a high percentage of applicants to their records, we should not be able to match 100 percent of students. Given the percentage of students who apply from private schools or outside the district and given the private school attendance rates of New York City students with characteristics like the applicants, we believe that a match rate between 85 and 93 percent is ideal. Although we aim to have an appropriately high match rate with every charter school, charter schools' appropriate match rates should differ depending on whether they attract applicants from private schools and outside the district.

As shown in Table Va, we match a high percentage of applicants to their records in the Department of Education database. For instance, among students who applied in 2005-06 and 2004-05, the match rates were--respectively--91 percent and 88 percent. Match rates for earlier years' applicants are lower, but we are not surprised by this. Because these earlier years considerably precede the commencement of this study, schools were not aware that information on their applicants would later be needed. As a result, they quite reasonably made less effort to get or keep records of all of the pieces of information that are useful for matching. For instance, a student's prior school and telephone number are very useful information in the matching process, but numerous charter schools did not ask for or archive this information. We believe that the 2005-06 match rate of 91 percent is most similar to the match rates that we will attain in

future years of the study, and we believe that this match rate is in the vicinity of the ideal match rate that we could reasonably hope to attain.

**Table Va**  
**Matching of Charter Schools Applicants to their Records in the New York City**  
**Department of Education Database, By Year of Intended Entry into Charter School**

	Students who applied with the intention of entering a charter school in...					
	2005-06	2004-05	2003-04	2002-03	2001-02	2000-01
Number of recorded applicants to charter schools in study*	14,301	9,610	5,523	2,957	3,238	1,613
<b>% Matched to DOE data</b>	90.8%	88.4%	88.7%	82.8%	79.2%	88.0%
Number of recorded applicants to charter schools who participated in lotteries	13,400	9,044	5,278	2,776	2,613	936
<b>% Matched to DOE data</b>	91.1%	88.9%	88.1%	81.7%	74.2%	79.3%
Number of students ever attending a NYC charter school**	5,104	3,450	1,727	527	1,045	1,095
Number of students who have attended a NYC charter school and are in study	4,817	3,416	1,673	527	1,045	1,095

Notes:

\* A “recorded applicant” is a student whose application to a charter school was given to the study for matching into the NYC Department of Education student database. Not all students who applied to charter schools are recorded applicants because some charter schools did not keep records of their applicants from years prior to the commencement of the study.

\*\* There are some early years of data for which we are missing enrollment data from certain charter schools because these charter schools had not yet started using the New York City’s ATS system for tracking enrollment. These figures also do not include the closed Reisenbach Charter School or the New York Center for Autism Charter School.

Table Va also shows that most applicants participate in a lottery. For instance, among both 2005-06 and 2004-05 applicants, the lottery participation rate was 94 percent. Applicants do not participate in a lottery if they are applying to a school that has sufficient space for applicants in the grade they wish to enter. As a rule, schools with sufficient space are start-up schools in their first year or two of operation. Finally, the table shows that an extremely high percentage of students who have ever attended a New York City charter school are included in the study. Over all the years available, the percentage is 97 percent. (See the notes to the table for additional detail.)

### **Attrition from the study**

If one side of the coin is getting students into the study by matching them to their records, the other side of the coin is keeping students in the study. Students who disappear from the study are said to “attrit,” and some attrition is inevitable. Families move out of the district. A student might begin attending a private school or begin home schooling. A student might even attrit owing to his name being entered differently when he moves to a new school within the district. If his old and new records do not match up, he will appear to have attrited.

Attrition is not much of a problem for studies of this kind if it is random. What is a problem is attrition that is (a) substantial, (b) systematically related to students' characteristics, and (c) systematically related to being lotteried-in or lotteried-out. For instance, suppose that no low achieving applicants and no high achieving lotteried-in applicants attrited but that high achieving lotteried-out applicants attrited with a 30 percent probability. Such attrition would cause problems because the lotteried-out group would systematically lose a substantial portion of its high achievers while lotteried-in group would keep its high achievers.

Fortunately, the attrition rates in this study are so far extremely low. Among all applicants, only 0.12 percent (one eighth of 1 percent) of those who have enrolled in charter schools have attrited. See Table Vb. The attrition rate is just 0.02 percent (two one hundredths of 1 percent) lower for applicants who have not attended a charter school. The percentage who have attrited is less than one percent among all types of applicants: female, black, Hispanic, white, Asian, other race, qualified for free or reduced price lunch, participants in special education, English Language Learners. These low attrition rates hold regardless of whether the student attends or not and regardless of whether he is lotteried-in or out.

We believe that the very low attrition rates are due, in part, to the fact that New York City is a massive district and that the charter school applicants tend to be disadvantaged. A student can move quite far among the five boroughs and remain in the district. Applicants are unlikely to move to distant suburbs in Westchester County, Connecticut, and New Jersey simply because these suburbs are often outside their families' price range. Second, the study is still young. In many cases, we are using data on a student from just one, two, or three years after he has applied. Even if he is going to attrit eventually, he might very well not have attrited yet. Only in one case do we find a statistically significant correlation with attrition: lotteried-out applicants are 0.1 percent (one tenth of 1 percent) less likely to attrit. We believe that this tiny difference is probably due to a difference in the probability that a record-keeping problem arises. A lotteried-out student usually remains in his traditional public school so that his record naturally matches from one year to the next. A lotteried-in student usually switches to a charter school where, when he is re-entered into the system, there is a very small probability that his pre-application and post-application "selves" will not match up. This will show up as attrition by the pre-application "self".

Summarizing, we believe that attrition is currently not a problem for this study because even if it were systemically related to some student characteristic (and there is no indication that it is), it is so small that it could not significantly affect any important result. Nevertheless, we will monitor attrition closely in future reports.

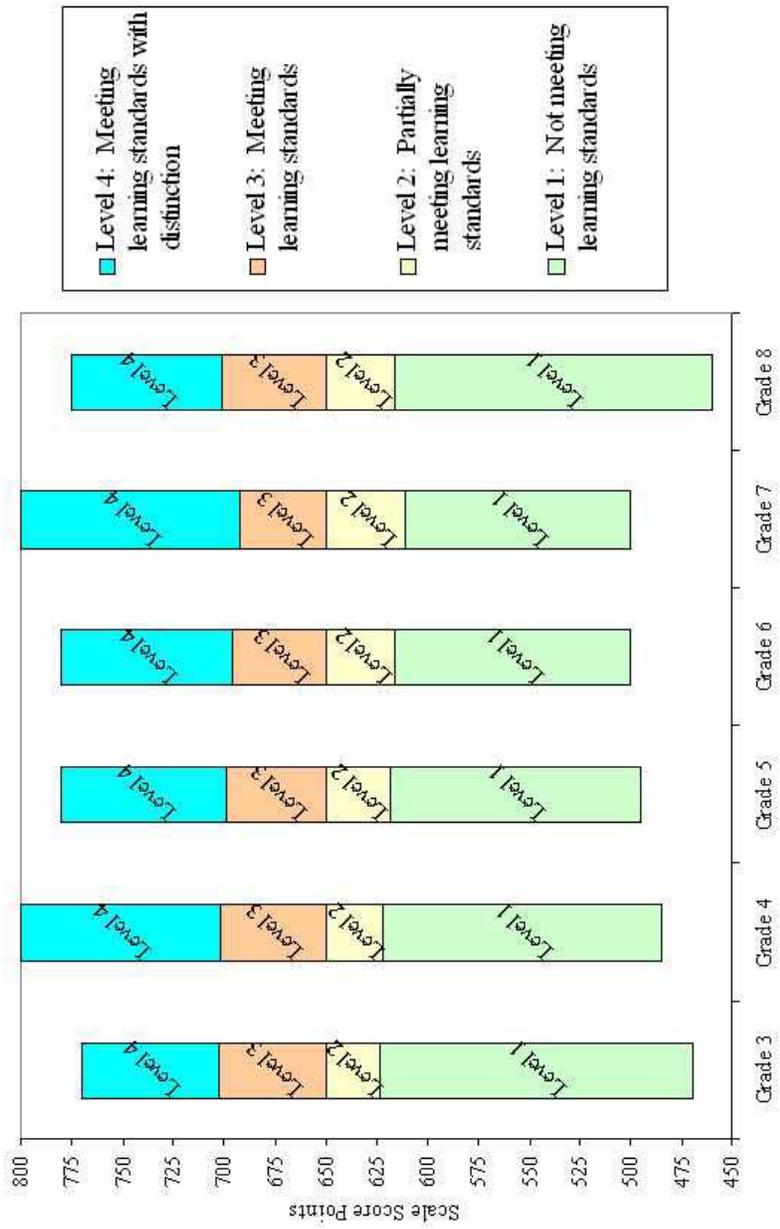
**Table Vb**  
**Attrition of Student Applicants from the Data,**  
**By Enrolled vs. Not Enrolled and Lotteried-in vs. Lotteried-out**

	Number of students who could attrit	Probability of attrition among those enrolled in a charter school	Increase or decrease in probability of attrition associated with not being enrolled	Indicator of statistically significant difference, if any	Probability of attrition among lotteried-in applicants	Increase or decrease in probability of attrition associated with being lotteried-out	Indicator of statistically significant difference, if any
<b>All students</b>	<b>32,551</b>	0.12%	-0.02	no	0.15%	-0.11	yes
Female	16,022	0.11%	+0.03	no	0.17%	-0.05	no
Black	20,822	0.12%	-0.10	no	0.13%	-0.09	no
White	1,337	0.16%	+0.00	no	0.00%	+0.00	no
Hispanic	8,825	0.11%	+0.14	no	0.21%	-0.20	no
Asian	919	0.00%	+0.00	no	0.00%	+0.00	no
Other race	181	0.00%	+0.00	no	0.00%	+0.00	no
Free/reduced-price lunch eligible	27,467	0.07%	-0.01	no	0.08%	-0.05	no
Special education participant	4,541	0.06%	+0.00	no	0.05%	+0.00	no
English Language Learner	2,017	0.00%	+0.24	no	0.12%	-0.19	no

Notes: A student only has the potential to attrit from the data if he or she has been observed in the data as attending a traditional public school or a charter school for at least two-thirds of an academic year. A student is considered an attritor once he or she has been observed in the dataset for two-thirds of a year or more and then no longer has any attendance data for any of the years afterwards. The two most common reasons a student would attrit from the data is that the student has moved out of New York City or that the student leaves the public school system to attend a private school (or home school). A student who graduates from 12<sup>th</sup> grade is not considered an attritor.

Indicators of statistical significance: **yes**: statistically significantly different with 90% confidence. **yes**: statistically significantly different with 95% confidence.

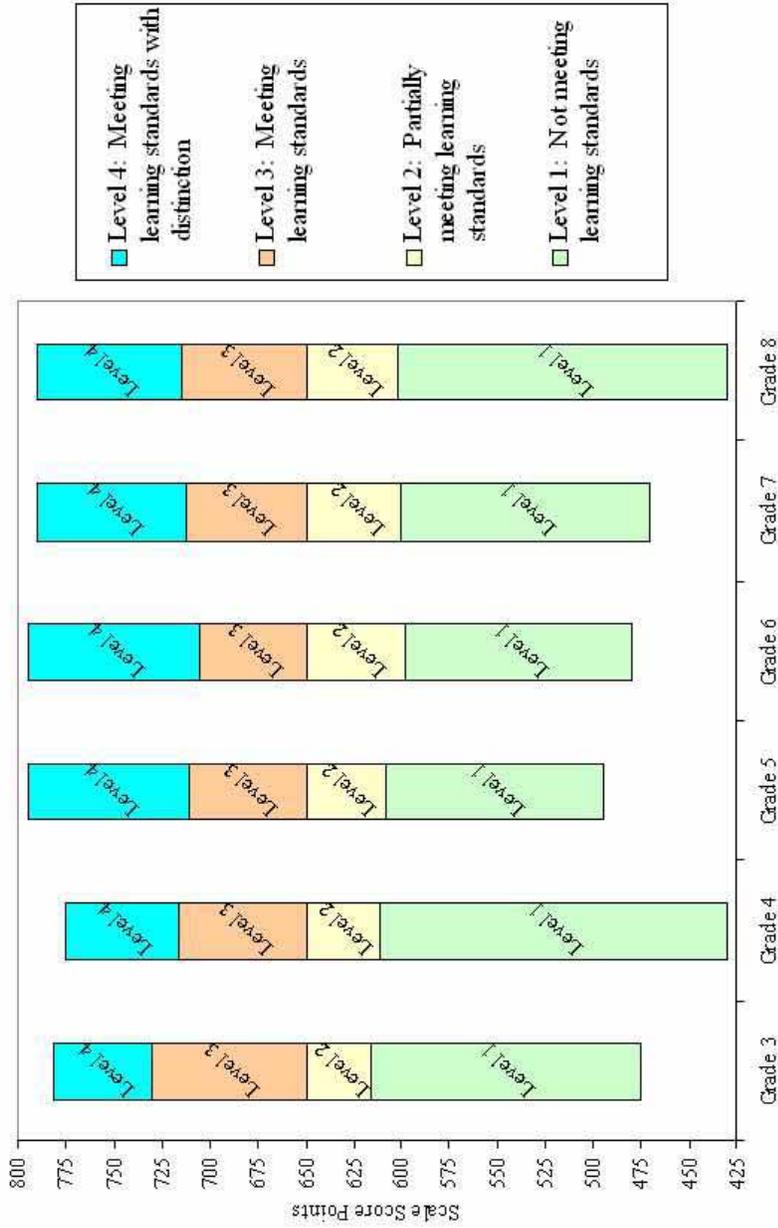
Appendix Figure 1  
 Relationship between Scale Scores and Performance Levels,  
 Math 2006



Results of the New York state math assessments are reported as Scaled Scores and Performance Levels. Scaled Scores are the number of correct answers converted to a common scale so that achievement can be compared across grade levels. Performance Levels are four proficiency levels that show how students have mastered the knowledge and skills that make up the learning standards.

Source: New York City Department of Education, "Scaled Score and Performance Levels," report posted online at <http://schools.nyc.gov/daa/>.

Appendix Figure 2  
 Relationship between Scale Scores and Performance Levels,  
 English/Language Arts 2006



Results of the New York state English/language arts assessments are reported as Scaled Scores and Performance Levels. Scaled Scores are the number of correct answers converted to a common scale so that achievement can be compared across grade levels. Performance Levels are four proficiency levels that show how students have mastered the knowledge and skills that make up the learning standards.

Source: New York City Department of Education, "Scaled Score and Performance Levels," report posted online at <http://schools.nyc.gov/daa/>.

# FREQUENTLY ASKED QUESTIONS

## General questions and questions related to Section I

### ***Who conducted this report and how is it funded?***

This is a first year report from an independent study of New York City's traditional public schools and charter schools. It is funded by the Institute for Education Sciences, which is the research arm of the United States Department of Education.

The principal investigator for the study is Dr. Caroline M. Hoxby, a professor of economics affiliated with Harvard University and the National Bureau of Economic Research (NBER). The principal authors of this year's report are Dr. Hoxby and Sonali Murarka, Project Manager of Economics of Education at NBER. They are grateful for the cooperation and help they have received in the data gathering process from the New York City Department of Education, the New York City Center for Charter School Excellence, and the charter schools located in New York City. All of these organizations have also helped the investigators by answering questions and clarifying details about the data. However, the investigators are solely responsible for the content of the report.

### ***How can we get a copy of the full report?***

You can download a copy of the full report from this website:  
<http://www.nber.org/~schools/charterschoolseval>

### ***How does this first year report relate to the overall study?***

The study is funded for several years, and we expect to produce a similar report for achievement results based on the 2006-07, 2007-08, 2008-09, and 2009-10 school years. There may be additional reports after the years mentioned.

### ***Is there a technical version of this report directed towards researchers?***

Yes. You can download a copy of the technical version of this report from the Working Papers section of the website [www.nber.org](http://www.nber.org). The technical report covers the same material and results, but it contains additional details on statistics and computations.

### ***What is the source of the data used in the report?***

Most of the data in this report comes from the data bases of the New York City Department of Education, which has a very active research and evaluation program. Visit the website <http://schools.New York City.gov/daa/research/> for more information on the Department's data for research. Data from the applications of students who applied to the charter schools come from the charter schools themselves. See Section V of the report for information on how these two sources for data were combined. Some additional data are derived from published statistics of the United States Census of Population and Housing.

### ***Can we see information and results on individual charter schools?***

The study will not be issuing results for individual charter schools, and we report results in such a way that individual charter schools are not identified. However, this overall report does

describe the variation among New York City charter school on many dimensions, including their effects on achievement.

***Does the aggregate report include closed charter schools?***

Our study does not yet include the two charter schools that have closed in New York City, Reisenbach and Readnet Bronx, as we have so far been unable to retrieve retrospective data on the students who applied to them and did not enroll. We hope to include these schools in future analyses.

***Where can I get more information on individual charter schools' mission statements, policies, locations and the like?***

Many charter schools have their own websites that contain the information you may be seeking. To find links to them and information on charter schools in New York City in general, we encourage readers to visit the websites of the Office of Charter Schools in the New York City Department of Education (<http://schools.nyc.gov/OurSchools/Region84/Schools/default.htm>), the Charter Schools Institute of the State University of New York (<http://www.newyorkcharters.org/>), the New York State Board of Regents (<http://www.regents.nysed.gov/>), the New York City Center for Charter School Excellence ([www.nycchartercenter.org](http://www.nycchartercenter.org)), Inside Schools ([www.insideschools.org](http://www.insideschools.org)), and GreatSchools ([www.greatschools.net](http://www.greatschools.net)).

**Questions regarding Section II**

***How is the average grade calculated? Why might it be negative?***

To make the averages work out neatly, we treat pre-kindergarten as grade equal to -1 and kindergarten as grade equal to 0. Grades 1-12 are given the appropriate numerical equivalents. Because we are calculating average grade *at the time of application*, an average grade of zero or less than zero means that a majority of students are applying as preschoolers or kindergarteners.

***What does "statistical significance" mean?***

The indicators of statistical significance are signs about whether we are confident about a particular result. If a result is statistically significant at the 90 percent level ("yes"), this roughly means that we are 90 percent confident that the result you see is not the same as zero. For example, let's say that 65 percent of lotteried-in students are female and 60 percent of lotteried-out students are female. The difference is 5 percentage points. We might report that this 5 percentage point difference is statistically significant at the 90 percent level. This means that we are 90 percent confident that the 5 percentage point difference indicates a real difference between the two groups and that the true difference is not zero.

***What is a "p-value"?***

A p-value is another conventional way of describing the statistical significance of a result. If you subject the p-value from the number 1, you obtain our confidence that the result is not the same as zero. For instance, if the p-value for a result is 0.05, then our confidence that the result is not zero is 0.95 or 95 percent.

***Why did you choose the race categories you use in the tables?***

The race categories we use are black and non-Hispanic ("black" for short), white and non-Hispanic ("white" for short), Hispanic, Asian, and "other". These are the categories given to us by the New York City Department of Education. We are therefore unfortunately unable to break down the data into more specific groups, such as Asian subgroups or mixed race groups.

***What is the difference between a student who is lotteried-in and a student who enrolls in a charter school?***

A lotteried-in student is anyone who applied to a charter school, had his application entered in a lottery owing to the scarcity of places, and was offered a place in the charter school. A student who enrolls is anyone who applied to a charter school and enrolled in it at some point. The main difference between lotteried-in and enrolled groups of students is the subset of students who are offered a place but decline to enroll. These "decliners" are in the lotteried-in group but not the enrolled group. Another reason that the lotteried-in and enrolled groups of students differ is that some students apply and enroll but do not have to participate in lotteries because there is sufficient space for them in the grade and school to which they apply. See Section V for additional detail.

***What is the "composite comparison school"?***

The composite comparison school is a weighted average of all of the New York City traditional public schools from which New York City charter schools draw applicants. Suppose that the charter schools drew 50 percent of their applicants from traditional public school A, 25 percent from traditional public school B, 10 percent from school C, and 5 percent from each of schools D, E, and F. The composite comparison school is the weighted average of the percent female of schools A through F, where a 50 percent weight is given to school A's number, a 25 percent weight is given to School B's, and so on. All of the other characteristics for the composite comparison school are computed in a parallel way--percent black, percent Hispanic, and so on.

***Why are some comparisons of special education, English Language Learner status, and free and reduced-price lunch statistics unreliable?***

It turns out that when schools are recording indicators of a student's program participation (participation in special education, classification as an English Language Learner, and certification for free and reduced-price lunch), charter schools and traditional public schools do not have the same recording procedures. This makes some statistics unreliable for the purpose of comparing charter school applicants to traditional public school students. We show only reliable statistics based on pre-application indicators in this report, but unfortunately pre-application data are not available for all charter school applicants. There is no perfect fix for the problems associated with the differences in recording the indicators.

Fortunately, the recording problems do not affect the lottery-based analysis of achievement. This is because that analysis depends on comparing lotteried-in and lotteried-out *among* applicants. It does not depend on comparing applicants to non-applicants.

***Are there other reasons to be concerned about the free and reduced-price lunch numbers?***

It can be difficult to make comparisons among schools based on the percentage of students who qualify for the federal National School Lunch Program. Comparisons between school systems are particularly likely to be problematic. Small differences may not be interpretable and all differences should be interpreted with caution. It is important to note that, so far as the federal government is concerned, each of New York City's charter schools is a school system ("Local Education Agency" in federal terminology).

Schools vary in their efforts to qualify children for the school lunch program. It is important to realize that a student who is *eligible* for the program (household income within 185 percent of the federal poverty line) needs to get *qualified* for the program through a process of reporting the household's income and composition. Thus, a student who is eligible might get qualified for the program if he were to attend one school but not if he were to attend another. Variation in qualifying students takes several forms: some schools may be more insistent about parents or guardians filling out applications; schools may answer questions about eligibility, household composition, and what goes into the income calculation in slightly different ways; schools may differ in how they explain the certification and verification processes. Furthermore, not all schools have the same incentive to qualify students for the program. Some schools, by qualifying more students, can become eligible for a schoolwide program. Other schools already have a schoolwide program and have less incentive to qualify the marginal student who is eligible. Still other schools could not become eligible for a schoolwide program even if every eligible student were qualified. In addition, small schools like some charter schools may find it financially unattractive to participate in the federal lunch program even if they run a school meals program. This is because federal reimbursement is on a strictly per-pupil basis. In a small school, the reimbursement is less likely to cover the relatively fixed administrative costs (paperwork and so on) of running a program that earns federal reimbursement. The National School Lunch Program itself reports that schools differ widely in the degree to which they qualify eligible students for the program.

***Are there other reasons to be concerned about the special education and English Language Learner numbers?***

It can also be difficult to make comparisons among schools based on the percentage of students who participate in special education or who are classified as English Language Learners. This is because there are always students who on the margin of participation or classification. One school might find that, given its circumstances, a student on the margin is best off in regular education in a mainstream classroom. Another school, with different circumstances, might find the student is best off with an Individual Education Program (special education) or English language services. Small differences in special education and English language learners may not be interpretable and all differences should be interpreted with caution.

***Why are some statistics shown for students at the time they applied?***

Lunch program qualification, special education participation, and English Language Learner classification are shown for charter school applicants at the time they applied because all of these statistics are based on how the New York City traditional public schools qualify and classify students. Thus, when comparing applicants to students in the traditional public schools, these numbers are helpful because the "yardstick" is the same. However, time-of-application statistics

are not available for the *typical* charter school applicant because he or she is likely to be applying for kindergarten or first grade and has thus often not yet been qualified or classified. Unfortunately, it is *impossible* to do a fair comparison between the typical charter school applicant and the average student in the New York City public schools. Therefore, all comparisons of lunch program qualification, special education participation, and English Language Learner classification should be interpreted with caution. Small differences may not be interpretable and all differences should be interpreted with caution.

### **Questions regarding Section III**

#### ***Are there outcomes besides test scores that can be analyzed?***

The main reasons we focus on test scores are strictly practical. They are available for nearly all students in the test-taking grades, the tests are the same in all the schools in the study (traditional public and charter schools alike), and the scores are available now.

There are many other outcomes that we would like to analyze in order to make a holistic assessment of achievement. Some of these outcomes will be available for future year's reports but are not available for this year's report. For example, we would like to analyze how charter school affect a student's probability of dropping out of school, graduating from high school on time, and attending various types of postsecondary schools. However, we simply do not have a sufficient number of charter school applicants who have reached the twelfth grade or thereabouts to look at such indicators in this year's report. Another example is attendance. We are interested in attendance data and working on including it in the study. The data were not available in time for this year's report, unfortunately.

There are also outcomes that we would like to analyze but that are hard to measure. Keep in mind that applicants who do not enroll in charter schools are spread out all across the traditional public schools in New York City. Thus, if we were to conduct an attitudinal survey, say, we could do it fairly efficiently in the charter schools because many participants in the study are located in each school. However, we would be far less efficient in the traditional public schools because a school might contain only one or two charter school applicants who had not enrolled. We think it likely that we would end up with different rates of participation from charter school enrollees and non-enrollees, making it very hard to interpret any results.

We are open to suggestions about outcomes that readers might find interesting and that they believe could be collected in practice.

#### ***Why might a school have a lottery that is unbalanced?***

A lottery is *not* balanced if the students who are offered spots (the lotteried-in) have characteristics that are statistically significantly different from those of the students who are lotteried-out. Even if every lottery is random and fair, not every lottery will be balanced. This is because lotteries with small numbers of lotteried-in or lotteried-out students are unlikely to balance as a purely statistical matter. For instance, suppose that a school has two places open in its fourth grade class and twenty students apply for the places. It is unlikely that the two lotteried-in students will happen to have the same average characteristics as the eighteen

lotteried-out students. This outcome would cause a lottery to be unbalanced even though it was a truly random. On the other hand, if 50 students were lotteried-in and 50 were lotteried-out, the two groups are likely to be similar on average and the lottery is likely to be balanced statistically.

***Are all charter school students who are in the study included in the lottery-based achievement results?***

Not all students who are in the study are included in the lottery-based analysis of achievement. A student may be excluded for one of three reasons: (1) he had not yet taken a New York State test as of 2005-06; (2) he applied to a charter school that did not need to hold a lottery for the grade and year relevant to him; or (3) he participated in an admissions lottery but it was unbalanced. The vast majority of students who are in the study but not included in achievement analysis are in kindergarten through second grade, grades in which there are no New York State exams. The tables in Sections III and V contain details about how many students are in the study and how many are included in the lottery-based analysis of achievement.

***Why are there no results based on comparison-of-gains or other non-lottery methods?***

We are obtaining data from the New York City Department of Education that will allow us to conduct analysis based on comparisons of gains. In this method, charter students can be compared to similar students in the schools and neighborhoods from which they were drawn. We may include some analysis based on comparison of gains in next year's report if we think that it provides helpful additional information. It should be noted, however, that results from lottery-based methods are strictly superior to results based on comparison-of-gains for achievement data where both methods are available. Comparison-of-gains methods are mainly helpful for data on which lottery-based methods cannot be used. See Section III for information on why value-added methods are not appropriate for comparing achievement in charter schools to achievement elsewhere. Researchers interested in methodological questions should consult the technical report.

***What do the indicators of statistical significance mean?***

The indicators of statistical significance are signals of whether we are confident about a particular result. If a result is statistically significant at the 95 percent level, say, this means that we are 95 percent confident that the result is not equal to zero.

***What is a "p-value"?***

A p-value is another conventional way of describing the statistical significance of a result. If you subject the p-value from the number 1, you obtain our confidence that the result is not the same as zero. For instance, if the p-value for a result is 0.05, then our confidence that the result is not zero is 0.95 or 95 percent.

***What are lottery "fixed effects"?***

It is not random *whether* a student participates in a lottery because, of course, he has to apply to participate. What is random is whether he is offered a place as a result of the lottery. Therefore, we want to use the randomness *within* lotteries to ensure an apples-to-apples comparison but we do not want to use the non-random differences *between* lotteries. This may sound complicated but lottery "fixed effects" are actually a simple statistical technique that does just what we want. The technique accounts for differences between lotteries but still allows us to use all of the

random assignment within lotteries. Researchers interested in further information should consult the technical report.

***What are “robust standard errors clustered at the student level”?***

Robust standard errors clustered at the student level are used so that a student who applies to a charter school multiple times or applies to multiple charter schools is not treated as multiple, separate individuals. For example, suppose that a student applies to two charter schools and is lotteried out of both. He keeps attending his traditional public school. The robust standard errors ensure that he gets counted only as one person, not two people.

***The report frequently refers to the expected gains of lotteried-out students. Do we know what these expected gains are?***

Calculating the average gain of lotteried-out students is complicated because New York City changed tests between 2004-05 and 2005-06. There is unfortunately no widely accepted way to rescale the old tests and the new tests so that a student's gain from 2004-05 to 2005-06 makes sense. We realize, however, that people may be interested in this statistic since charter schools' estimated effect on achievement is *relative* to the gains made by lotteried-out students. A reader may get an approximate idea of the gains by consulting the reports published by the New York City Department of Education that are based on scores from 2004-05 and previous years. A reader who wants only an approximate idea may also consult the authors by writing to them at the address shown at the front of this report.

***What are some of the curricula used by New York City charter schools?***

Below, we offer short descriptions of the curricula mentioned in Section III. These descriptions are based on the published materials for each curriculum. Consult the websites given below for additional detail.

*Saxon Math*

Using Saxon Math Courses 1, 2, and 3 each day, students work toward mastery in three ways: by reviewing, maintaining and building upon previously learned skills; through direct, explicit instruction of new content, mathematical thinking and vocabulary; and by applying, reinforcing and demonstrating cumulative learning.

Source: <http://www.harcourtachieve.com> (accessed June 2007).

*Scott Foresman-Wesley Addison Mathematics*

Scott Foresman-Addison Wesley Mathematics (Diamond Edition) is a research-based Pre-K-6 curriculum that focuses on developing students' conceptual understanding and skills through step-by-step instruction. The focus is on key ideas in mathematics, rich problem-solving lessons that build the reading and writing skills necessary for powerful problem solving, and differentiated instructional options to meet the needs of varied learners.

Source: <http://www.scottforesman.com> (accessed June 2007).

*Everyday Mathematics*

Everyday Mathematics is a research-based curriculum developed by the University of Chicago School Mathematics Project. Development of Everyday Mathematics began with a research phase. Based on their findings, the authors established several basic principles that have guided

the development of Everyday Mathematics: Students acquire knowledge and skills, and develop an understanding of mathematics from their own experience; children begin school with more mathematical knowledge and intuition than previously believed; teachers, and their ability to provide excellent instruction, are the key factors in the success of any program.

Source: <http://everydaymath.uchicago.edu/about.shtml> (accessed June 2007).

#### *SRA Reading Mastery Plus*

Reading Mastery Plus gives students the skills and the clear, explicit instruction and guidance they need to master the fundamentals of reading. Oral language, phonemic awareness, and systematic phonics are the starting point. Vocabulary development, fluency, and comprehension are fundamental throughout. The program is set up so students are active participants. Group responses make learning highly efficient and enable teachers to provide instant feedback that confirms or corrects their responses. Less-structured activities and opportunities for independent work help students develop self-reliance. On-going assessment tools are used by the instructor to ensure that no student "falls through the cracks."

Source: [www.sraonline.com](http://www.sraonline.com) (accessed June 2007).

#### *Scott Foresman Reading Street*

Scott Foresman Reading Street 2008 is an all-new reading program for Grades PreK–6. Reading Street is designed to help teachers build readers through motivating and engaging literature, scientifically research-based instruction, and a wealth of reliable teaching tools. The program takes the guesswork out of differentiating instruction with a strong emphasis on ongoing progress-monitoring and an explicit plan to help with managing small groups of students. In addition, Reading Street prioritizes skill instruction at each grade level, so teachers can be assured they will focus on the right skill, at the right time, and for every student.

Source: <http://www.scottforesman.com> (accessed June 2007).

#### *Open Court Reading*

Open Court Reading is a complete elementary basal reading program for Grades K-6. It maintains strong instruction in the areas of decoding (learning how to read), comprehension (understanding what you read), inquiry and investigation (learning how to apply what you have read), and writing (how to communicate with others in print). Open Court Reading is designed such that no assumptions are made about students' prior knowledge. Each skill is systematically and explicitly taught in a logical progression to develop understanding and mastery.

Source: [www.sraonline.com](http://www.sraonline.com) (accessed June 2007).

#### *Core Knowledge Reading*

Core Knowledge does not at present require any particular reading program. Schools are free to select from programs on the market. However, we recommend that schools choose a program that has strong phonics instruction, and we recommend that schools build oral language through frequent reading aloud on topics in the Core Knowledge Sequence. An ideal reading program will include good phonics instruction (followed by fluency work) combined with frequent reading aloud to expose children to new words and key subjects like the subjects listed in the Core Knowledge Sequence. Moreover, the reading aloud will include not only fictional stories but also generous amounts of nonfiction.

Source: [www.coreknowledge.org](http://www.coreknowledge.org) (accessed June 2007).

### **Questions regarding Section IV**

***You mention that you would like to study dropping-out, graduation from high school, and a variety of other outcomes that are not in this year's Section IV. When are they likely to be included?***

Section IV of reports will eventually include a number of outcomes related to students' progress in school including (but not limited to) attendance, sitting the Regents Examinations, dropping out, and graduation. We expect that attendance will be included in next year's report. However, in order to analyze outcomes like as dropping out and graduation in a rigorous way, many more charter school applicants must reach the upper secondary grade than have currently done so. Based on the grades that charter school applicants have reached as of now, we expect that we will be able to show interesting results for such outcomes no earlier than the report based on 2007-08 data.

### **Question regarding Section V**

***What is the study doing to ensure a high match rate between applicants and their New York City Department of Education records?***

We have asked charter schools to collect certain information on applications that some of them did not collect before the commencement of this study. For instance, we have asked them to collect information on the student's prior school and grade at the time of application.

***What about students who have priority because they are siblings of students who have already been lotteried into and enrolled in a charter school?***

Such students can be thought of as applying in a special group with other students who are applying to the same grade and school and who *also* have sibling-based priority. In some cases, a school has room for all such students and they were effectively lotteried-in with their siblings. In other cases, a school must run a new lottery among such students, and they are effectively in a fresh lottery.

## RESEARCH TEAM

### **Caroline M. Hoxby**

Dr. Caroline M. Hoxby is the director of the Economics of Education Program at the National Bureau of Economic Research. Hoxby writes and researches topics in the economics of education. Her research is routinely published in peer reviewed journals, and she is the editor of two recent books: *The Economics of School Choice* and *College Choices: The Economics of Where to Go, When to Go, and How to Pay for It* (both published by University of Chicago Press). Her recent work on K-12 education includes research on Chicago charter schools, choice among public schools, bilingual education, school finance equalization, class size, teacher pay, and teacher quality. She has testified for state governments and the federal government on many of these issues.

### **Sonali Murarka**

Sonali Murarka is project manager of the Economics of Education Program at the National Bureau of Economic Research. She previously worked at Abt Associates, a social policy consulting firm, assisting in several evaluations of government-sponsored education programs. Her current research focuses on evaluation methodology and on school choice programs, primarily looking at the effects of charter schools on student achievement. She is the co-author, along with Caroline Hoxby, of a piece on the methodology of evaluating charter schools: "Methods of Assessing Achievement of Students in Charter Schools," in *Charter School Outcomes*, ed. M. Behrens (New York: The Analytic Press).