

Assessing Success in New York City High Schools

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I. Introduction

This study assesses key indicators of success in New York City high schools, and identifies some of the factors associated with that success. The New York City Public School System serves approximately 300,000 students in grades nine through twelve in almost three hundred high schools that range in size from one hundred fifty to nearly five thousand students. Some schools are highly selective, enrolling students on the basis of test scores or auditions. Others draw students with special interests, and still others admit students who show up at their door in September. A number of schools produce high graduation rates and send most students on to college. Others graduate few students and produce high numbers of dropouts.

Some high schools are successful by traditional standards: they admit high-achieving ninth graders and produce high-achieving graduates four years later. However, in a highly diverse school system serving an extremely diverse student population, some schools defy prediction. They admit low-achieving students, or even students who have already dropped out, and they produce unexpectedly strong student outcomes. These prediction-defying high schools are more challenging to identify. However, once identified, they may yield instructive insights into the factors associated with high school success.

Our study of key indicators of high school success proceeds through several stages. First, we examine school success across different outcome measures while controlling for student demographic characteristics and academic performance prior to high school. The three outcome measures we explore are:

- o High school graduation,
- o Student enrollment in the City University of New York (CUNY) and
- o Grade point average of high school graduates in their first semester at CUNY.

We explore these outcome measures through two different approaches. The first approach assesses how effectively the city's high schools move their entering ninth grade students to graduation across four years of academic engagement, then examines how many graduates of each high school enroll in CUNY, and finally assesses how well those students do once they enroll in CUNY. The second approach examines school success using a different value-added method. We identify schools that admit low-achieving ninth grade students and raise their achievement much higher than predicted, given their entering academic record. We call these strong gaining schools "Beat the Odds" schools.

Finally, we analyze what school characteristics are associated with high schools that are effective in graduating their students, enrolling them in CUNY, and helping them do well at CUNY, as well as what characterizes the Beat the Odds schools. We identify these success

characteristics to inform New York City – and other urban school systems – about what might make their high schools more effective.

II. The dataset

We assembled a rich school-level dataset from three sources: the New York City Department of Education's (NYCDOE) Annual School Report (ASR); NYCDOE's annual School-Based Expenditure Report (SBER); and a school-level database we aggregated from student-level data supplied by NYCDOE and CUNY (see Appendix 2). All databases contain data for the 1997-2002 academic years. In this study, we focus on the 2001 academic year.¹ The ASR and SBER databases provide data for all students in high school in 2001, while the aggregated student-level database provides data for the 2001 cohort, that is, students who were expected to graduate in 2001.

The ASR database includes variables for each school's grade range, number of students, student demographic and academic performance information, and teacher characteristics. The SBER database provides expenditure data for each school, including average teacher salary and per pupil expenditures. The database aggregated from student-level data includes student demographics, academic performance and graduation information, as well as information on students' subsequent experience at CUNY.

Our initial dataset included 283 high schools. For reasons related to our methodology, we dropped from the student sample all students who graduated with something other than a local or Regents diploma (i.e., a GED or special education certificate) or who, after four years, were not still enrolled in school (i.e., were discharged). In addition, we dropped from the school sample all schools with ten or fewer students; schools with five or fewer graduates who were enrolled in CUNY and for whom there was GPA data, SAT scores and English and math Regents scores; and schools whose graduates obtained only GEDs. In all, about 30,000 students and 135 schools were excluded from the analysis, leaving a sample of approximately 50,000 students in 148 schools.²

As Table 1 shows, the typical New York City high school has a student body that is 53% female. Forty percent are African-American, 35% Hispanic, 13% white, 11% Asian and less than 1% Native American or other. Sixty-three percent are eligible for free- or reduced-price lunch;

¹ We chose the 2001 academic year for several reasons. To begin to resolve the complex issues we faced when we estimated the student-level regressions using a pooled sample, we undertook an extensive cross-sectional study. As a result, we dropped the earliest cohorts of students (1997-1999) because data quality for those cohorts is much lower than for the more recent cohorts (see Interim Report #3). We eliminated the year 2000 as a choice because an important demographic variable, the percentage of students who were eligible for free- or reduced-price lunch when they were in eighth grade, is not available for that cohort. Finally, we chose 2001 over 2002 because students who graduated in 2001 and went on to CUNY may have one additional year of CUNY data.

² See Appendix 2 for a discussion of the student-level data set, Appendix 4 for a list of schools that were included in the analysis and Appendix 5 for a list of schools that were excluded from the analysis.

20% are foreign-born; 10% are English language learners; 7% are in full-time special education classes; and 27% are at least one year overage at the time they enter high school.

New York City high schools display a strikingly wide variability in student demographic characteristics, academic performance, school size, school expenditures and teacher resources. For example, while the average percentage of foreign-born students in a New York City high school is 20%, some schools have student bodies that are virtually all foreign-born and others have student bodies that are entirely native-born.

Academic performance prior to high school is also highly variable. Some schools admit students who, on average, score two standard deviations higher than the typical entering ninth grader on the eighth grade math and English tests. Others admit students who score at the citywide average or below on these tests. Student academic performance during high school also varies greatly from school to school. Although more than half the students in the average high school graduate within four years (57%), in some schools as few as 14% do, and in others, virtually all students complete high school and graduate within that timeframe. Graduating students receive either local diplomas (41%) or state-endorsed Regents diplomas (16%).³ Students who fail to graduate in four years either drop out (13%) or are still enrolled (30%). Seventy-seven percent of the students in the typical school meet graduation requirements in English, while 71% do so in math. But only thirty percent of high school students, on average, take at least three years of math courses, and 32% take at least three years of science. The typical New York City high school sends 42% of its graduates to one of the CUNY colleges; more than half (26%) attending one of CUNY's four-year senior colleges.

The vast majority of the schools in our sample, enrolling 75 percent of New York City's high school students, are academic/comprehensive high schools (111). Four are specialized (exam or audition) high schools, 16 are vocational schools and 17 are articulated alternative schools. The schools range in size from very small (151 students) to very large (4,631 students), with an average size of 1,769 students. Per pupil spending and teacher experience, education and licensure characteristics vary greatly across these schools. For example, while 84% of high school teachers are licensed, on average, this indicator ranges from 52% to 100% across the 148 schools in the sample. The percentage of teachers with five years' teaching experience is even more variable: while 61% of the faculty on average has five years' teaching experience, the range across the 148 schools is from 15% to 90%.

³ In New York City, high school graduates receive either a Regents diploma or a local diploma. The New York State Board of Regents grants a Regents-endorsed diploma to students who complete required college-preparatory courses and demonstrate content mastery by passing a set of subject-area exit examinations. The content, number and passing grades of the tests required for a Regents diploma changed throughout the study period. New York City also issues a local diploma, with less rigorous requirements.

III. The most successful high schools

First we identify those high schools that are most successful as measured by four-year high school graduation, CUNY enrollment, and CUNY GPA. We estimate three student-level regressions for all the high schools in our sample. One regression assesses the probability of graduating high school within four years, the second assesses the probability of going to CUNY, and the third assesses first-semester GPA at CUNY. Each regression controls for student demographic characteristics and eighth grade test scores. The GPA regression also controls for the number of semesters between the time a student graduates high school and the time she enrolls in CUNY. All three models include indicators for each high school and generate school fixed effects through which we capture and compare each school's contribution to its students' success.⁴

The first outcome measure we use in examining high school success is the probability of graduating from high school within four years. Table 2 below lists the top 20 percent of the 148 sample high schools in which the probability of graduating within four years is highest, controlling for student demographic characteristics and academic performance prior to high school. Four-year graduation rates among these 30 top schools range from 49% to 100%. The average graduation rate is 79%, compared to 57% for the entire 148-school sample.

Not surprisingly, the group of top schools includes three schools whose student selection process is based on a competitive exam (Stuyvesant High School, Bronx High School of Science and Brooklyn Technical High School). These schools would be expected to have a very high four-year graduation rate, and they do. Other selective schools are also on this list -- for example, Staten Island Technical High School and Townsend Harris High School.

As Table 2 makes clear, some of the New York City high schools most successful at getting their students to graduate within four years grant Regents-endorsed diplomas to virtually all students who entered four years earlier. Other schools award mostly local diplomas to their graduates. The percentage of students who receive a Regents diploma in these top schools for graduation ranges from 0 to 98 percent, with an average of 34 percent across the top 30 schools. This compares to an average of 16 percent in the 148-school sample. In other words, the top 30 schools for graduation award a higher percentage of Regents diplomas than the typical New York City school.

The second outcome measure we use to examine high school success is the probability of enrolling in CUNY after graduating within four years. Table 3 lists the top 20% of the 148-school sample in which the probability of enrolling in CUNY is highest. The average CUNY

⁴ These indicators capture the schools' unobserved characteristics that affect student outcomes. Each indicator represents the contribution of that school to student success, beyond the characteristics of the students. The larger the fixed effect, the greater the contribution of that particular school. Thus, each school's contributions can be measured and compared.

enrollment rate for these 30 schools is 57%, compared to 42% for the typical school in the 148-school sample. CUNY enrollment rates among the top 20% of the schools range from 49% to 66%.

Students who enroll in a CUNY college may enroll in either a senior (four-year) college or a two-year community college. As Table 3 shows, the percentage of students who enroll in a senior college ranges from 12 to 38 percent, with an average of 24%. This compares to the senior college enrollment rate of 26% across the 148-school sample. Thus, on average, the schools with the highest probability of enrolling their students in CUNY are about as likely to enroll their students in a senior college as the typical high school.

The third outcome measure we use is the GPA students obtain during their first semester at CUNY. Table 4 lists the top 20% of the 148 high schools for GPA in their graduates' first semester at CUNY.⁵ Not surprisingly, a number of these high schools with high GPAs are highly selective, including the three exam schools -- Stuyvesant High School, Bronx High School of Science and Brooklyn Technical High School. Less predictably, two of the schools whose graduates achieve high GPAs at CUNY are vocational schools -- Aviation High School and Automotive Trades High School

These top schools for CUNY GPA have an average four-year graduation rate of 78%, compared to the 148-school average of 57%. Their other statistics are similarly impressive. Forty-two percent of the graduates receive Regents diplomas, compared to 16% in the typical school. Forty per cent enroll in CUNY -- 22% in a senior college -- about average for a New York City high school.

Although their average graduation and Regents diploma rates are high when compared to the sample's average, the effectiveness of any individual high school must be assessed in relationship to that school's graduation rate and to the percentage of that school's graduates who enroll in CUNY. If, for example, only a very small percentage of entering ninth graders graduate from a given high school four years later, but all those graduates enroll in and do well at CUNY, we might not consider these few graduates' success at CUNY reliable evidence of their high school's effectiveness. For example, the school whose graduates have the highest GPA at CUNY is Cascades Center for Teaching and Learning. But the probability of graduating from Cascades is among the lowest in the entire sample. Therefore, although the few students who graduate from Cascades do well in college, most students at Cascades do not even graduate high school. Similarly, if only a small percentage of graduates from a particular high school enroll in CUNY because most students go on to other colleges, their graduates' experience at CUNY may not be representative of the success of that high school in preparing students for graduation and college.

⁵ CUNY researchers have estimated that first semester GPA is a good proxy for overall CUNY achievement.

Thus more than one outcome measure must be examined to assess the extent of overall high school success.

Fourteen of the top 30 schools for CUNY GPA succeed on at least two of our three measures of success (Table 5). Students in these schools have, on average, a strong probability of graduating high school and, if they enroll in CUNY, of doing very well there. However, if only a few graduates from these schools enroll in CUNY, and these few graduates are the school's highest performing students, their accomplishment would project a false picture of success, because it is based on a non-representative sample of the school's student body.

Four of these fourteen schools have above-average CUNY enrollment rates. Jacqueline Kennedy Onassis High School, Edward R. Murrow High School, Francis Lewis High School and the High School of Telecommunications Arts and Technology together serve 10,000 New York City public high school students. Two of the schools – Jacqueline Kennedy Onassis and Edward R. Murrow – have four-year graduation rates (87% and 85%, respectively) that are not only higher than the sample average (57%), but are even higher than the average rate of the top 30 schools for graduation (79%). Jacqueline Kennedy Onassis High School is also among the top 30 schools for CUNY enrollment.

IV. Characteristics of the most successful high schools

The research literature points to several school characteristics as being associated with high school success: school size, school expenditures and teacher quality, peers and academic quality. Table 6 displays school characteristics for the four most successful high schools described above.

Two of the four schools are small. Jacqueline Kennedy Onassis High School serves 568 students, and the High School for Telecommunication Arts & Technology, with 1,155 students, is twice as large, but still far below the sample average of 1,769 students. But the other two schools are more than twice as large as the average sample school: Francis Lewis High School has 3,745 students, and Edward R. Murrow High School has 3,835 students.

These four schools have higher percentages of licensed and experienced teachers. Ninety-one percent of their teachers are licensed, compared to 84 percent in the 148-school sample. Sixty-seven percent have at least five years' teaching experience, compared to 61 percent in the entire sample. Two of the schools (the smaller ones) spend about the same amount of money per student as the typical high school, but the two larger schools spend much less.

In terms of student characteristics, the average percentage of students eligible for free- or reduced-price lunch in these four high schools (59%) is similar to that of the 148-school sample. But most other student characteristics vary, both across these four schools and in comparison to the typical school. Two schools have predominantly black or Hispanic student bodies; the other two do not. Two serve high percentages of foreign-born students. Two have a mostly female

student body. Most important, on average, only 16 percent of the students enter these four high schools at least one year overage for their grade, compared to 27 percent in the entire sample. Students at these schools are more likely to be high achievers on entry than are students at the typical high school.

One indicator of academic quality, the percentage of students who prepare for college-level work by taking three years of math and science courses, is an important factor in these four schools. In three of them, more than twice as many students take at least three years of math and science as in the 148-school sample.

Thus, the characteristics of schools that are most successful at preparing their graduates for success at CUNY, and that have at least average graduation and CUNY enrollment rates, are students with above average academic achievement prior to high school who are less likely to be overage than students at the typical high school. Teachers in these schools are more likely to be licensed and experienced. And the schools prepare their students for success by requiring at least three years of math and science courses.

V. Characteristics of high-graduating high schools

Table 7 displays school characteristics of the top 30 schools whose students have the highest probability of graduating within four years, ranked by the percentage of Regents diplomas they grant their students. Five of the schools award mostly Regents diplomas to their graduates – at least 85%. At the other extreme, 16 of the schools award mostly local diplomas (at least 80%) to their graduates. The remaining nine schools award a mix of Regents and local diplomas.

Three of the five schools with high Regents diploma rates are large (2,716 to 4,115 students), while two are fairly small (710 to 1,061 students). The schools spend, on average, about 10% less per student than the average high school, even though their teachers are far more likely to be licensed and experienced.

The student composition of the five schools that award mostly Regents diplomas is very different from the typical sample school. On average, 18% of the students in these schools are black or Hispanic, compared to 86% in the typical school. They are less likely to be foreign-born or poor, and are very unlikely to be overage. Not a single student is an English language learner, compared to 10% in the typical school. Four of the five schools have more males than females, while the typical high school has more females than males. Because these top schools are all highly selective, their students are, by definition, very high achievers when they enter high school, with eighth grade scores almost two standard deviations higher than the average school.

Virtually all students in the five top schools (97%) take at least three years of math and science courses and perform at a very high academic level. For example, the average math Regents (Sequential I) score in these schools is 92%, compared to 72% in the typical school.

In contrast, the sixteen schools with high local diploma rates are mostly very small, with an average of 546 students. Only one is somewhat larger – East New York Transit Technology High School, which, with 1,445 students, is still smaller than the average New York City public high school (1,769 students).

These sixteen schools spend, on average, about 10% more per student than the average high school, though their teachers are far less likely to be licensed and experienced. Their students are almost all black or Hispanic, are less likely to be foreign-born and are about as likely to be poor, overage or an English language learner as the typical sample school. They are more likely to be female and average achievers prior to entering high school. Students in these successful schools are about as likely to take three years of math and science courses as students in the typical sample school.

VI. Characteristics of high-CUNY-enrolling high schools

Table 8 displays school characteristics of the top 30 schools whose graduates have the highest probability of enrolling in CUNY, ranked by the percentage of students enrolled in senior colleges. Five schools enroll their graduates mostly in senior colleges (at least 35%). Nine schools enroll relatively few of their graduates in senior colleges (less than 16%). The remaining sixteen schools send 16% to 35% of their graduates to senior colleges.

The five top schools for CUNY enrollment with the most graduates attending senior colleges are smaller than the typical school (under 1,000 students). Their students are less likely to be black or Hispanic, foreign born, English language learners or overage than students in the 148-school sample. They were higher-than-average achievers before entering high school. About 60% take three years of math and science courses and achieve at an above-average level.

The nine top schools for CUNY enrollment with the smallest percentage of graduates enrolling in senior colleges are difficult to characterize. On average, they are somewhat smaller than the average high school (about 1,400 students), but their range is enormous -- from 151 to 3,964 students. School spending per student is about average, as are student characteristics, except that they have more overage students compared to the typical sample school. Their students were slightly below average achievers before entering high school. They are much less likely to take three years of math and science courses, or even the English and math Regents exams, compared to students in the typical school.

VII. Characteristics of high-GPA high schools

Table 9 displays school characteristics of the top 30 schools whose graduates enrolling in CUNY received the highest first-semester GPA, ranked by the percentage of students enrolled in senior colleges. Four schools' graduates enroll mostly in senior colleges (at least 25%). Eight schools enroll relatively few of their graduates in senior colleges (7% or less). The remaining eighteen schools send 9% to 23% of their graduates to senior colleges.

The four top schools for CUNY GPA with the most graduates attending senior colleges are very large schools, averaging more than 3,200 students. They spend less per pupil than the typical sample school and have a very high percentage of teachers who are licensed and experienced. About half their students are black or Hispanic, and are somewhat less likely to be English language learners or overage. They were fairly high achievers before entering high school. About two-thirds of these students take three years of math and science courses and achieve at an above-average level while in high school.

The eight top schools for CUNY GPA with the fewest graduates attending senior colleges are somewhat larger than the typical sample school, with teachers who are more likely to be licensed and experienced than those in the typical school. Their students are much more likely to be male and overage than the average high school student, and they were slightly below average achievers before entering high school. Students in these schools are much less likely to take three years of math and science courses than students in the average school.

VIII. Beat the Odds schools

Another way to think about relative success is to identify high schools whose contribution to their students' likelihood of graduating and/or performance at CUNY is greater than predicted, based on their students' demographic characteristics and academic achievement prior to entering high school. Focusing on the schools in the 148-school sample whose students enter ninth grade as below-average achievers, we use a value-added approach to identify which high schools that admit low-achieving ninth graders are able to raise their achievement level beyond what their student demographics and prior achievement would predict. We call such schools "Beat the Odds" schools and list them in Table 10 below.

To conduct this analysis, we rank the 148 schools in the sample by deciles, according to their students' average eighth grade reading (or math) score. Then we rank the schools by deciles according to the extent of their contribution to their students' likelihood of graduating or doing well at CUNY (i.e., the size of their fixed effects). If a school remains in the same decile for both rankings, it is contributing as much as predicted to its students' success. If the school moves up one or more deciles between the first and second rankings, it is contributing more to its students' success than predicted. We identify successful or Beat the Odds schools as those schools that

move up at least five deciles between the first and second rankings. These schools contribute considerably more to their students' success than predicted, based on their students' demographic and performance profile.

The first column in Table 10 indicates which schools' contribution to their students' probability of graduating in four years is at least five deciles higher than predicted, based on their students' demographic and performance profile, using average eighth grade reading score as the prior performance indicator. Eleven schools meet these criteria and thus beat the odds for graduation, controlling for eighth grade reading performance. The second column uses the average eighth grade math score as the prior performance indicator. Eleven schools meet these criteria and thus beat the odds for graduation, controlling for eighth grade math performance. Nine schools beat the odds for graduation when controlling for both reading and math performance in eighth grade.

The third and fourth columns use CUNY GPA, rather than graduation, as the success indicator. Seven schools beat the odds for CUNY GPA when controlling for eighth grade reading scores, while four schools beat the odds for CUNY GPA when controlling for eighth grade math scores. Two schools beat the odds in all four categories.

The thirteen schools that beat the odds in at least one category serve almost 8,000 students. These nine academic or comprehensive high schools, two vocational schools and two alternative schools differ from the typical New York City public high school in our sample in several important ways.⁶

- o All thirteen Beat the Odds schools are small -- all but one has fewer than 1,000 students -- with an average enrollment of approximately 600 students.
- o Beat the Odds schools spend from \$8,700 to \$15,000 per student, on average about \$1,400, more than 10% greater than the typical sample school.
- o Almost all Beat the Odds schools have fewer licensed and experienced teachers than the average school. Only two schools have a higher percentage of licensed teachers, and only one has a higher percentage of teachers with at least five years' teaching experience, compared to the typical sample school.
- o Students in Beat the Odds schools are almost all black or Hispanic, and are less likely to be foreign-born or an English language learner than students in the typical sample school. They are slightly more likely, on average, to be poor and to be overage for their grade at entry to high school.

⁶ According to information included in the 1996 New York City High School Directory, these schools reportedly have significant external partnerships. About half report collaborations with CUNY colleges. Most report a strong focus, such as community service, a specific academic curriculum or training for particular careers. Five schools offer AP courses, and ten give priority to residents of their zone, district or borough.

- o Beat the Odds schools have a higher four-year graduation rate than the typical sample school, though their students' academic performance prior to entering high school is below average.⁷
- o A very high percentage of students graduating from Beat the Odds schools receive local diplomas.
- o About half the Beat the Odds schools have a higher than average percentage of students who take three or more years of math and/or science courses.
- o Graduates of Beat the Odds schools are almost as likely to enroll in a CUNY college, or even a CUNY senior college, as are graduates from the typical sample school.

Two schools beat the odds for both graduation and GPA, based on both their mean reading and math scores. Automotive Trades High School and Banana Kelly Collaborative High School spend almost 40% more per student than the typical high school. Their students are much more likely, compared to the typical high school or even compared to other Beat the Odds schools, to be overage and poor and have very low eighth grade scores. Nevertheless, these highly successful schools have an average graduation rate of close to 50%. In one school, a very high percentage of students take three years of math courses and a high percentage of graduates enroll in CUNY senior colleges.

There are two vocational schools that, perhaps unexpectedly, beat the odds. Although larger than the other Beat the Odds schools, with an average of about 1,200 students, Automotive Trades High School and East New York Transit Tech High School are still small by New York City standards -- the typical sample school has 1,769 students. One noteworthy feature of these two schools is that their teachers are more likely to be licensed and experienced than the average New York City high school. Moreover, their students are almost all male. Other student characteristics are similar to the other Beat the Odds schools, except that students in these two schools are less likely to take three years of math or science courses.

Two schools that beat the odds in terms of their students' eighth grade math scores, using both graduation and CUNY GPA as success measures, are Foreign Language Academy of Global Studies, and Humanities and the Arts Magnet High School, which serve primarily female students who perform less well on their eighth grade math tests than on their reading tests. Nevertheless, students at these two schools are more likely to take three units of science than students in the average high school, and students at one of these schools are more likely to take three years of math. The schools' graduation rates (64%) are also higher than that of the average sample school (57%).

⁷ The schools' mean eighth grade reading and math scores are 0.3 and 0.4 standard deviations below respective mean eighth grade reading and math scores for the typical sample school.

IX. Conclusion

The New York City school system is very large, serving more than one million students in about 1,400 schools. About 300,000 students attend almost 300 very diverse high schools. Many are highly successful, others are dismal failures, and the majority fall somewhere in between. During the course of this study, we came to understand that school success varies, depending on how we assess success and on the kind of student whose success we want to measure.

If we define a successful high school as one that produces students who are highly likely to graduate in four years, after controlling for student demographic and prior performance characteristics, the most successful high schools tend to fall into two groups:

- o One group of highly successful high schools, almost all of whose graduates earn Regents diplomas, consists of five mostly large schools that spend less than the average New York City high school, and have a high percentage of licensed, experienced teachers. The 11,600 students in these schools are mostly male, white or Asian, native-born, English-speaking and not likely to be poor or overage, unlike the student composition of the average high school in our 148-school sample. The students were extremely high achievers prior to entering high school, as well as during high school. Virtually all take at least three years of math and science courses and graduate within four years, well prepared for success in college and beyond.
- o One group of successful high schools that produce four-year graduates who earn mostly local diplomas consists of sixteen small schools that spend more than the average New York City high school, and have fewer licensed, experienced teachers. Their 8,700 students are more typical for a New York City high school than the group described above. Compared to the average high school, the students are about as likely to be poor, overage or an English language learner, more likely to be female and black or Hispanic, and less likely to be foreign-born. The students were average achievers prior to entering high school, and are about as likely to take three years of math and science in high school as students in the average school.

If we define a successful high school as one that has at least average graduation and CUNY enrollment rates and produces students who do very well at CUNY, we see that the four most successful schools vary in size from small to very large. Their teachers are much more likely to be licensed and experienced. Their student bodies have similar demographic characteristics: their students have a poverty level similar to that of the typical high school's, are less likely to be overage and were more likely to be high achievers prior to entering high school. These schools typically produce students who take at least three years of math and science courses.

However, if we define a successful school as one that helps low-achieving ninth graders beat the odds and do better than predicted in terms of four-year graduation rate and/or good grades at CUNY, a striking result emerges. The thirteen Beat the Odds schools:

- o Are all small schools, only one-third the size of the average New York City public high school.
- o Spend more money per student than the average school, but have teachers who are less likely to be licensed or experienced.
- o Have student bodies that are far more likely to be black or Hispanic, and less likely to be foreign-born or an English language learner.
- o Often push students to take math and science courses. About half the Beat the Odds schools have a higher percentage taking three or more years of math or science than the average school.
- o Graduate a higher percentage of students, almost entirely with local diplomas, and enroll almost as many graduates in CUNY, including CUNY senior colleges, as the average high school.

All of New York City's diverse students deserve to be educated in a successful high school, structured according to the evidence of what works best for their diversity. Students who enter high school as low or average achievers seem to require schools that are small, that spend more resources per student than the average school, that offer local diplomas, and that provide an academic press that propels students toward graduation, college, and ultimately a career.

Students with less than sterling academic records, coming from backgrounds associated with high rates of school failure, can succeed in high school, but only if the school system provides the variety of schools those students need to succeed. New York City's Beat the Odds schools indicate some of the school characteristics necessary for success. Qualitative research that probes more intensively into the instructional core, professional culture and school climate of these schools could provide valuable insight into *how* these schools use their resources to achieve their success.

Appendix 1: Brief overview of the methodology

If a school is successful, its success should not be attributed to a more advantaged, better prepared student population. The centerpiece of our empirical work is a set of student-level models of student outcomes, which control for the influence of student demographic characteristics, including sex, race and immigrant status, and prior (eighth grade) performance. Including the student's performance on eighth grade reading and math tests creates a value-added specification of the model, providing some control for differences in student ability.

These student-level models include indicators (or fixed effects) for each high school in our sample. These indicators capture unobserved characteristics of the schools that affect student outcomes. Each indicator represents the contribution of each school to student success, beyond the characteristics of the students. The larger the fixed effect, the greater the contribution of that particular school. Thus, school contribution can be measured and compared across schools.

With this model, we identify the schools whose students who go to CUNY do best in their first CUNY semester, and we call these the top schools for CUNY GPA.¹ We estimate similar models to identify the schools where the probabilities of going to CUNY and graduating high school are highest.

¹ We define as the first semester, the first semester when a student is enrolled in CUNY, takes credits and earns a GPA.

Appendix 2: Student-level data

Data sources

As described in detail in the interim report, we have assembled a dataset that combines data on six high school cohorts, of approximately 80,000 students each, of students who were expected to graduate from the New York City high schools between 1997 and 2002. The NYCDOE provided data on high school students, their demographic characteristics (including race, sex and immigrant status), their performance on the Regents exams, Regents Competency Tests and on eighth grade reading and math tests, the schools they attended throughout their high school career and whether they graduated high school within four years, and if so, with what type of degree. CUNY provided additional information on high school graduates, the courses they took in high school and how well they did on them, their SAT scores, to which CUNY college they applied and where they enrolled, whether they were Search for Education, Elevation and Knowledge (SEEK) / College Discovery (CD) students,² or full-time, Honors or transfer students. CUNY also provided exemption and performance information on the CUNY entrance exams, degree pursued, credits, GPA and remedial course information for each semester of enrollment, and CUNY graduation information.

Sample definition

We conduct this study on a sample of about 50,000 students who were expected to graduate in 2001. We dropped 16 students with data for some variables that was clearly wrong. Next, we dropped students who were discharged from high school (about 14,000), as well as students who graduated with a GED (2,700 students) or special education certificate (160), because these students' behavior is unlikely to be captured by the same models that describe the students who have a regular high school experience, i.e., students who, after four years, are still enrolled, graduate with high school or Regents diplomas, or drop out.³

In addition, in very small schools, the averages of the variables of interest will be very sensitive to the presence of outliers. To avoid the resulting potentially skewed results, we limit the sample to students in schools with more than ten students.⁴ Accordingly, the model focuses on high school graduates uses students in high schools with more than ten graduates, and the model that focuses on CUNY enrollees uses students in high schools with more than ten enrollees.

² SEEK and CD are two special CUNY programs for students who need academic and financial support in order to be successful in college.

³ Students are discharged when they leave the NYC public high school system. Most students in this situation (71%) leave the city. Others are admitted to a parochial or private school or a high school equivalency program, are home-schooled or institutionalized. Some leave the system when they reach 21. Suspension, expulsion and death are other reasons for discharge.

⁴ This eliminates 22 schools enrolling a total of 74 students.

Further, estimating reliable fixed effects for high schools requires a minimum number of students in each high school who have data on the dependent variables of interest. We drop from the remaining sample students from high schools with five or fewer students who enroll in CUNY and have a GPA, SAT scores and English and math Regents scores. The resulting sample has 50,494 students in 148 high schools. This sample includes 31,453 high school graduates and 13,342 CUNY enrollees. Descriptive statistics for model variables for this sample are presented in Table A2-1.

Table A2-1: Means for the sample students (standard deviations in parentheses)

<u>Variable</u>	(1) <u>All</u>	(2) <u>Graduates</u>	(3) <u>Enrollees</u>
Student is a high school graduate	0.62 (0.48)	1.00 (0.00)	1.00 (0.00)
Student applied to CUNY	0.68 (0.47)	0.68 (0.47)	1.00 (0.00)
Student enrolled in CUNY	0.43 (0.50)	0.43 (0.50)	1.00 (0.00)
First semester CUNY GPA	2.57 (0.83)	2.57 (0.83)	2.57 (0.83)
First semester CUNY credits accumulated	11.02 (7.39)	11.02 (7.39)	11.02 (7.39)
Verbal SAT	439.76 (100.14)	439.76 (100.14)	430.55 (96.65)
Math SAT	471.97 (108.87)	471.97 (108.87)	461.18 (103.15)
English Regents score	67.55 (11.10)	70.17 (9.38)	68.90 (8.42)
Sequential 1 Regents score	68.91 (19.50)	74.54 (15.45)	73.06 (14.61)
Student is female	0.52 (0.50)	0.55 (0.50)	0.59 (0.49)
Age as of 2001	17.33 (0.73)	17.22 (0.66)	17.24 (0.68)
Student is white	0.18 (0.38)	0.23 (0.42)	0.23 (0.42)
Student is black	0.34 (0.47)	0.31 (0.46)	0.28 (0.45)
Student is Hispanic	0.32 (0.47)	0.27 (0.44)	0.28 (0.45)
Student is Asian	0.16 (0.36)	0.19 (0.39)	0.20 (0.40)
Student is native American	0.00 (0.06)	0.00 (0.05)	0.00 (0.05)
Student is eligible for free lunch	0.78 (0.41)	0.75 (0.43)	0.76 (0.43)
Student is eligible for reduced-price lunch	0.06 (0.25)	0.07 (0.26)	0.07 (0.25)
Student is not eligible for school lunch	0.15 (0.35)	0.18 (0.38)	0.17 (0.37)
Student is foreign-born	0.23 (0.42)	0.23 (0.42)	0.27 (0.44)
Student is native-born	0.77 (0.42)	0.77 (0.42)	0.73 (0.44)

Table A2-1 (Continued). Means for the sample students (standard deviations in parentheses)

<u>Variable</u>	(1)	(2)	(3)
	<u>All</u>	<u>Graduates</u>	<u>Enrollees</u>
Student entered the system before 9th grade	0.91 (0.29)	0.91 (0.29)	0.91 (0.29)
Student entered the system in the 9th grade or later	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)
Student is an English-language learner	0.12 (0.33)	0.10 (0.30)	0.13 (0.34)
Student speaks English at home	0.50 (0.50)	0.49 (0.50)	0.45 (0.50)
Student receives part-time education services	0.05 (0.21)	0.03 (0.17)	0.03 (0.17)
8th grade reading z-score	0.15 (1.00)	0.46 (0.94)	0.32 (0.85)
8th math reading z-score	0.16 (1.01)	0.49 (0.95)	0.35 (0.87)
LAB percentile (8th grade) ¹	19.79 (26.09)	25.45 (29.05)	23.90 (28.28)
Student took the English Regents exam in 1994	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Student took the English Regents exam in 1995	0.00 (0.00)	0.00 (0.01)	0.00 (0.00)
Student took the English Regents exam in 1996	0.00 (0.01)	0.00 (0.01)	0.00 (0.00)
Student took the English Regents exam in 1997	0.00 (0.02)	0.00 (0.01)	0.00 (0.01)
Student took the English Regents exam in 1998	0.00 (0.03)	0.00 (0.04)	0.00 (0.03)
Student took the English Regents exam in 1999	0.06 (0.23)	0.08 (0.27)	0.06 (0.25)
Student took the English Regents exam in 2000	0.58 (0.49)	0.77 (0.42)	0.79 (0.41)
Student took the English Regents exam in 2001	0.13 (0.33)	0.11 (0.31)	0.12 (0.32)
Student took the English Regents exam in 2002	0.02 (0.16)	0.01 (0.10)	0.01 (0.10)
Student took the English Regents exam in 2003	0.01 (0.08)	0.00 (0.00)	0.00 (0.00)
Student took the Sequential 1 Regents exam in 1994	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Student took the Sequential 1 Regents exam in 1995	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Student took the Sequential 1 Regents exam in 1996	0.00 (0.06)	0.01 (0.08)	0.00 (0.06)

Table A2-1 (Continued). Means for the sample students (standard deviations in parentheses)

<u>Variable</u>	(1)	(2)	(3)
	<u>All Graduates</u>		<u>Enrollees</u>
Student took the Sequential 1 Regents exam in 1997	0.02 (0.15)	0.03 (0.17)	0.02 (0.15)
Student took the Sequential 1 Regents exam in 1998	0.35 (0.48)	0.49 (0.50)	0.47 (0.50)
Student took the Sequential 1 Regents exam in 1999	0.14 (0.34)	0.16 (0.37)	0.18 (0.39)
Student took the Sequential 1 Regents exam in 2000	0.12 (0.33)	0.13 (0.34)	0.15 (0.36)
Student took the Sequential 1 Regents exam in 2001	0.12 (0.33)	0.11 (0.32)	0.11 (0.32)
Student took the Sequential 1 Regents exam in 2002	0.03 (0.16)	0.01 (0.10)	0.01 (0.09)

¹The Language Assessment Battery (LAB) tests are a set of tests used to assess English proficiency and eligibility for specialized instructional services.

In column (1), N=50,494, except student applied to CUNY and student enrolled in CUNY (N=31,020), first semester CUNY GPA and credits (N=11,718), verbal SAT (N=16,335), math SAT (N=16,336), English Regents score (N=40,283), Sequential 1 Regents score (N=39,952), race (N=50,402), eligibility for school lunch (N=34,995), time of entry into the system (N=46,152), 8th grade reading z-score (N=34,663), 8th grade math reading z-score (N=36,454), 8th grade LAB percentile (N=6,083).

In column (2), N=31,453, except student applied to CUNY and student enrolled in CUNY (N=31,020), first semester CUNY GPA and credits (N=11,718), verbal SAT (N=16,335), math SAT (N=16,336), English Regents score (N=30,915), Sequential 1 Regents score (N=29,865), race (N=31,445), eligibility for school lunch (N=22,057), time of entry into the system (N=28,616), 8th grade reading z-score (N=22,326), 8th grade math reading z-score (N=23,195), 8th grade LAB percentile (N=3,136).

In column (3), N=13,342, except first semester CUNY GPA and credits (N=11,718), verbal SAT (N=10,423), math SAT (N=10,424), English Regents score (N=13,150), Sequential 1 Regents score (N=12,726), race (N=13,340), eligibility for school lunch (N=9,290), time of entry into the system (N=12,020), 8th grade reading z-score (N=9,111), 8th grade math reading z-score (N=9,555), 8th grade LAB percentile (N=1,612).

Appendix 3: Highlights from student-level regression results**Graduation model**

Results for the graduation model suggest that females are more likely to graduate than males. Black students are less likely to graduate than white students; the probability for Hispanics is even lower and that for Native Americans is lowest. Asians, on the other hand, are more likely to graduate than their white counterparts. Not surprisingly, older students, poor students, and students who received part-time special education services in the eighth grade are less likely to graduate than other students. Students born outside the United States, who entered the New York City school system during or after the ninth grade and are not English language learners, are more likely to graduate than all other students. Among the rest of the students, being born in the United States, having entered the system before ninth grade, and being an English-language learner each reduce the likelihood of graduating.

CUNY enrollment model

Results for the model assessing the likelihood of enrolling in CUNY suggest that females, English language learners, and students who do not speak English at home are more likely to enroll than other students. The probability of enrolling in CUNY consistently decreases as eighth grade math scores increase. Finally, while there is no difference among whites and Asians, blacks, and to a lesser extent, Hispanics, are less likely to enroll in CUNY than are white students.

CUNY GPA model

The regression of first semester GPA on student variables and fixed effects indicates that female students outperform male students in their first semester at CUNY. Blacks and Hispanics have lower GPAs than their white counterparts, although Hispanics do a little better than blacks. While Asians have the highest GPAs among the students of color, whites outperform them. Students eligible for reduced-price lunch in the eighth grade have lower GPAs than the rest of the sample but, strikingly, students eligible for free lunch do not. Students who speak languages other than English at home outperform the other students. Native-born students have lower GPAs than all other students, yet the English language learners among them do better than those who are not. Students who did better in eighth grade math have a higher GPA than other students. Interestingly, students tend to obtain a higher GPA if they wait a while before enrolling.

Appendix 4: Schools included in the 148-school sample

High School for Environmental Studies	Foreign Language Academy of Global Studies
Coalition School for Social Change	Bronx Leadership Academy
Wadleigh School	Banana Kelly Community Learning Center ¹
Health Professions & Human Services High School	Alfred E. Smith High School
Leadership/Public Service High School	Jane Addams Vocational High School
Manhattan Center Math and Science	S. Gompers Vocational And Technical High School
Manhattan Village Academy	Grace H. Dodge High School
Bayard Rustin High School For The Humanities	Health Opportunities High School
Seward Park High School	Wings Academy
Washington Irving High School	Lafayette High School
George Washington High School	Midwood High School
Louis D. Brandeis High School	Abraham Lincoln High School
Stuyvesant High School	Samuel J. Tilden High School
Beacon High School	Science Skills Center ¹
Fiorello H. LaGuardia High School	Franklin K. Lane High School
High School Of Economics And Finance	James Madison High School
Martin Luther King, Jr. High School	Brooklyn School for Global Studies ¹
Frederick Douglass Academy	Brooklyn Technical High School
Unity High School	Thomas Jefferson High School
Edward A. Reynolds West Side High School	Prospect Heights High School
Chancellor's Model School Project	New Utrecht High School
Lower East Side Prep School	Boys and Girls High School
Talent Unlimited School	Erasmus Hall Campus: High School for Science & Math
Murry Bergtraum High School For Business	John Jay High School
Jacqueline Kennedy Onassis High School	Erasmus Hall Campus: High School for Humanities
New York City Public School Repertory	George Wingate High School
Park West High School	Progress High School
A. Philip Randolph High School	High School for Legal Studies
City-As-School High School	High School for Enterprise, Business and Technology
Satellite Academy	Erasmus Hall Campus: High School for Business & Technology
Manhattan Comprehensive Night & Day School	Bushwick High School
High School of Teaching	High School of Telecommunications Arts & Technology
Fashion Industries High School	Fort Hamilton High School
Chelsea High School	Sheepshead Bay High School
Norman Thomas High School	Acorn Community High School
Graphic Communication Arts High School	Canarsie High School
High School of Art And Design	Franklin D. Roosevelt High School
Cascades Center for Teaching and Learning ¹	South Shore High School
Heritage School	Edward R. Murrow High School
Morris High School	Leon M. Goldstein School
Herbert H. Lehman High School	John Dewey High School
William H. Taft High School	EBC/Public Service Bushwick High School
Christopher Columbus High School	Brooklyn College Academy ¹
Evander Childs High School	Middle College High School at Medgar Ever ¹
Walton High School	Clara Barton High School
Theodore Roosevelt High School	George Westinghouse High School
Dewitt Clinton High School	Automotive Trades High School
Bronx High School of Science	East New York Transit Technology
Adlai E. Stevenson High School	
Harry S. Truman High School	
South Bronx High School	
John F. Kennedy High School	
Hostos-Lincoln Academy	

William E. Grady High School
Paul Robeson High School
Harry Van Arsdale High School
EBC/East NY High School For Public Safety
Sarah J. Hale High School
William H. Maxwell Vocational High School
Benjamin Banneker Academy¹
Brooklyn Studio Secondary
August Martin High School
Beach Channel High School
Benjamin Cardozo High School
Springfield Gardens High School
John Bowne High School
Francis Lewis High School
Martin Van Buren High School
Forest Hills High School
William C. Bryant High School
Long Island City High School
Newtown High School
Flushing High School
Far Rockaway High School
Jamaica High School
Richmond Hill High School
John Adams High School
Grover Cleveland High School
Math/Science Research Tech Center
Magnet School of Law & Government
Bayside High School
Business/Comp Applications/Entrepreneurship
Humanities & The Arts Magnet High School
Hillcrest High School
Townsend Harris High School
Arts and Business
Newcomers High School: Academy for New
Americans
Robert Wagner Jr. Institute for Art &
Technology¹
Academy of American Studies
Queens Vocational High School
Aviation High School
Thomas A. Edison High School
Robert F. Kennedy Community High School¹
Queens Gateway to Health Services High
School
New Dorp High School
Port Richmond High School
Curtis High School
Tottenville High School
Susan E. Wagner High School
Staten Island Technical High School

¹ Indicates New Visions school

Appendix 5: Schools excluded from the 148-school sample

Schools for which we have no data for 2001

The NYC Public School for Dance
 Global Schools - D75
 University Neighborhood
 High School for Media & Communications
 Martin L. King, Jr. GED
 Second Opportunity Schools: Manhattan
 Samuel J. Tilden GED
 W.E.B. Dubois Young Adult Borough Center
 Acorn High School for Social Justice
 Bard High School Early College
 South Brooklyn Community High School for
 Leadership
 Westinghouse Evening High School T/R
 (Program)
 Eight Plus Learning Academies
 Three schools with name unknown

School that has all GED students

Park West GED

Schools that have fewer than 11 students in the cohort

Washington Irving GED
 School for International Business & Finance
 George Washington GED
 School for Law & Public Service
 High School for Health Careers & Science
 Life Sciences
 Christopher Columbus YABC
 Second Opportunity Schools: Bronx
 Evander Childs Evening High School (Program)
 George Wingate GED
 John F. Kennedy High School
 Bushwick GED
 Cobble Hill School of American Studies
 John Dewey High School GED (Program)
 Brooklyn Academic Continuum
 Second Opportunity Schools: Brooklyn
 George Westinghouse Evening High School
 (Program)
 Horizons Academy
 Staten Island YABC
 Three schools with name unknown

Schools that have fewer than six students who enroll in CUNY and obtain a GPA

Baruch College Campus High School
 NYC Lab School for Collaborative. Studies
 School of The Future
 NYC Museum School¹

Institute for Collaborative Education High School
 Professional Performing Arts School
 Landmark High School
 Seward Park GED
 Vanguard High School
 East Side Community High School¹
 Choir Academy of Harlem
 Park East High School
 Outreach - West Manhattan
 Outreach Sites
 Auxiliary Services - Manhattan
 Project Blend
 Liberty
 Gregorio Luperon High School for Science and
 Mathematics
 Central Park East Secondary School
 Urban Academy Laboratory School
 Borough Academies
 Brandeis YABC
 Career Education Center
 Project You
 Offsite Education Services - Manhattan
 Offsite Education Services - Manhattan
 Humanities Preparatory Academy¹
 Young Women's Leadership Institute
 Environmental Science Secondary.School
 School Of Co-Op Technical Education
 Park East High School
 Thurgood Marshall Academy¹
 Leadership Secondary School
 School for the Physical City¹
 Urban Peace Academy
 Center for Continuing Education (Pregnant
 Teens)
 Mt. Morris GED
 William H. Taft GED
 Christopher Columbus GED
 Evander Childs GED
 Walton GED
 Theodore Roosevelt GED
 Dewitt Clinton GED
 Adlai Stevenson GED
 John F. Kennedy High School
 Bronx Regional High School
 Phoenix Academy In Shrub Oak, NY
 University Heights High School
 Bronx School for Law, Government & Justice¹
 Outreach Sites
 Auxiliary Services - Bronx
 High School of World Cultures
 Borough Academies

James Baldwin Academy (Bronx Literacy Center)
Offsite Education Services - Bronx
Local 1199 Social Change
Bronx Coalition Community School
New School for Arts and Sciences
Monroe Academy for Business & Law
Monroe Academy for Visual Arts & Design
Passages Academy (3 Sites)
Martha Neilson (Pregnant / Parenting)
East New York Family Academy
Franklin K. Lane GED
James Madison GED
Prospect Heights, GED
John Jay GED
Erasmus Hall GED
Williamsburg Charter School
W.E.B. Dubois Academic High School
Ft. Hamilton GED
Freedom Academy
Auxiliary Services - Brooklyn
Outreach Sites
Brooklyn Learning Center
Pacific High School
Edward R. Murrow GED
H.S. Redirection
Borough Academies
Street Academy
Literacy Center (Brooklyn)
Brooklyn Comprehensive Night School
Offsite Ed. Services - Brooklyn
Harry Van Arsdale High School GED (Program)
John Jay YABC
NYC Vocational Training Center
El Puente Academy for Peace and Justice¹
Teen Aid (Pregnant / Parenting Teen Program)
Community School for Continuing Education (Pregnant teens)
HS Arts and Business YABC
Auxiliary Services - Queens
Outreach Sites
Middle College La Guardia¹
International La Guardia
Island Academy
Rosewood
Offsite Ed. Services - Queens
Rikers Island Educational Facility
Renaissance Charter School¹
Ida B. Wells (Pregnant / Parenting Teen Program)
Michael J. Petrides School
Concord High School
Auxiliary Services - Staten Island
Offsite Educational Services - Staten Island
Ralph McKee High School
One school with name unknown

Schools that have fewer than six students who enroll in CUNY and have an English Regents score

Manhattan International High School
Bread & Roses Integrated Arts HS¹

Schools that have fewer than six students who enroll in CUNY and have a Sequential 1 Math Regents score

Legacy School for Integrated Studies¹
Fannie Lou Hamer Freedom School
The Brooklyn International High School
Metropolitan Corporate Academy

New Visions high school for which we do not have data

Ballet Tech¹

¹ New Visions school

Table 1a: School size and resources, 2001 New York City high school sample (N=148)

	<u>Number of schools</u>	<u>Mean</u>	<u>Minimum</u>	<u>Maximum</u>
<u>School size and type</u>				
Enrollment (SBER)	148	1769	151	4631
Enrollment in academic/comprehensive high schools	111	377	37	1001
Enrollment in specialized academic high schools	4	686	501	881
Enrollment in vocational high schools	16	227	118	356
Enrollment in articulated alternative high schools	17	136	48	334
% in academic comprehensive high schools	148	75.0	0.0	100.0
% in specialized academic high schools	148	2.7	0.0	100.0
% in vocational high schools	148	10.8	0.0	100.0
% in articulated alternative high schools	148	11.5	0.0	100.0
<u>School resources</u>				
Total expenditure per pupil (SBER)	148	10171	7308	39409
Expenditure per pupil on direct services (SBER)	148	9102	6321	36773
Expenditure per pupil on instruction (SBER)	148	5027	3582	12440
Expenditure per pupil on teachers (SBER)	148	4136	2864	9850
% teachers in school for more than 2 years (ASR)	135	70.9	24.2	100.0
% teachers with 5 or more years' experience (ASR)	136	60.8	14.8	89.5
% teachers fully licensed/permanently assigned (ASR)	136	83.9	52.3	100.0
% teachers with a masters degree or higher (ASR)	136	79.8	50.0	95.2

Note: Unless otherwise indicated, the school size and type variables are from the aggregated student-level data that includes only students who were expected to graduate in 2001. Total enrollment and school resource variables are from the school-level Annual School Report (ASR) and School-Based Expenditure Report (SBER) databases that includes data for all high school students in 2001.

Table 1b. Peers, 2001 New York City high school sample (N=148)

<u>Peer demographics</u>	<u>Number of schools</u>	<u>Mean</u>	<u>Minimum</u>	<u>Maximum</u>
% overage for grade	148	26.6	1.2	86.8
% female	148	52.9	4.9	84.0
% white	148	13.2	0.0	79.6
% black	148	39.8	2.9	97.4
% Hispanic	148	35.3	2.6	92.3
% Asian	148	11.2	0.0	67.1
% Native American	148	0.4	0.0	2.9
% foreign born	148	20.1	0.0	98.5
% native born	148	79.9	1.5	100.0
% English language learner	148	10.3	0.0	90.5
% special education (ASR)	136	6.7	0.0	19.1
% Free lunch eligible (8 th grade)	147	58.0	22.4	82.4
% Reduced price lunch eligible (8 th grade)	147	4.5	0.0	10.6
% Not eligible for lunch (8 th grade)	147	8.8	0.0	43.1
% in part-time special education (8 th grade)	143	5.0	0.3	11.8
% who entered the system before 9th grade	148	84.2	1.1	100.0
% who entered the system in 9th grade or later	148	8.0	0.0	39.6
% living in Manhattan	148	14.7	0.0	90.4
% living in Bronx	148	19.7	0.0	98.3
% living in Brooklyn	148	36.6	0.0	100.0
% living in Queens	148	24.8	0.0	99.0
% living in Staten Island	148	4.3	0.0	99.5
% living outside New York City	148	0.6	0.0	8.0
<u>Peer achievement prior to high school</u>				
CTB Z-Score (8 th grade)	147	0.0	-0.7	2.1
CAT Z-Score (8 th grade)	147	0.0	-0.7	2.1
% took CTB (8 th grade)	148	70.9	0.0	93.2
% took CAT (8 th grade)	148	74.1	0.0	94.6
Attendance rate (8 th grade)	147	91.0	84.0	97.0

Note: The peer variables are from the aggregated student-level data that includes *only* students who were expected to graduate in 2001. The special education variable is from the school-level Annual School Report (ASR) database that includes data for *all* high school students in 2001

Table 1c. Academic quality, 2001 New York City high school sample (N=148)

High school course units taken	Number of schools	Mean	Minimum	Maximum
% took at least 3 units of math	148	29.7	0.0	99.4
% took at least 3 units of science	148	31.5	0.0	99.4
English units	142	3.6	0.0	5.9
Foreign language #1 units	142	2.6	0.0	3.9
Foreign language #2 units	142	0.2	0.0	2.0
Math units	142	2.6	0.0	6.0
Science units	142	2.6	0.0	5.3
Social studies unit	142	4.1	0.2	6.8
Performing arts units	142	1.0	0.5	1.0
Total units	142	16.7	1.0	24.6
High school performance				
% took the Sequential 1 Regents exam	148	79.0	19.1	100.0
% took the Sequential 2 Regents exam	148	49.9	0.0	100.0
% took the Sequential 3 Regents exam	148	31.8	0.0	99.1
% took the English Regents exam	148	79.5	42.3	100.0
% took the Chemistry Regents exam	148	38.9	0.0	100.0
% passing Math Sequential I Regents exam (ASR)	145	35.3	0.0	100.0
% passing Math Sequential III exam (ASR)	134	54.8	0.0	100.0
% passing English Regents exam (ASR)	143	55.1	0.0	100.0
Sequential 1 Regents score	148	65.4	36.6	95.0
English Regents score	148	66.0	55.6	88.8
% meeting graduation requirements in English (ASR)	148	77.3	25.7	100.0
% meeting graduation requirements in Math (ASR)	148	71.3	0.0	100.0
High school academic average	141	77.0	66.4	90.2
Graduation and Post-Graduation				
% graduated within four years	148	56.9	13.5	100.0
% still enrolled after four years	148	30.2	0.0	74.7
% dropped out in first four years	148	12.9	0.0	50.0
% graduated with a Regents diploma	148	16.3	0.0	98.1
% graduated with a local diploma	148	40.6	0.4	82.3
% taking the SATs (ASR)	132	35.1	8.5	90.1
% graduates enrolling in CUNY	148	42.0	6.4	65.8
% graduates enrolling in CUNY senior colleges	148	26.2	4.0	55.6

Note: The academic quality variables are from the aggregated student-level data that includes *only* students who were expected to graduate in 2001, unless otherwise noted. Some variables are from the school-level Annual School Report (ASR) database that includes data for *all* high school students in 2001.

Table 2: Schools whose students have the highest probability of graduating high school in four years, 2001 New York City high school sample

	<u>Percent students who graduate</u>	<u>Percent receiving Regents diploma</u>
Manhattan Village Academy	83.5	1.3
Foreign Language Academy of Global Studies	75.6	19.5
Staten Island Technical High School	100.0	97.1
Hostos-Lincoln Academy	80.0	16.3
Bronx Leadership Academy	75.9	3.4
Stuyvesant High School	97.8	96.6
Robert F. Kennedy Community High School	84.3	46.1
Bronx High School of Science	98.0	96.0
Jacqueline Kennedy Onassis High School	84.9	6.6
Wadleigh School	60.5	1.2
Benjamin Banneker Academy	75.3	18.2
HS for Enterprise, Business and Technology	61.9	2.1
East New York Transit Technology High Schl	68.0	4.0
Banana Kelly Community Learning Center	53.7	0.0
Academy of American Studies	89.2	67.6
Townsend Harris High School	98.5	98.1
EBC/Public Service Bushwick High School	62.0	3.0
Midwood High School	85.8	61.0
Progress High School	48.5	0.8
Leon M. Goldstein School for the Sciences	89.2	48.0
Middle College HS at Medgar Evers College	75.3	12.3
Edward R. Murrow High School	86.7	52.0
Brooklyn College Academy	73.5	16.3
Susan E. Wagner High School	76.8	28.1
Benjamin Cardozo High School	86.8	58.4
Beacon High School	81.5	30.1
Heritage School	70.3	2.7
Brooklyn Technical High School	92.5	84.9
Curtis High School	73.5	22.6
Leadership/Public Service High School	67.0	15.0

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables, ranked in descending order by size of the fixed effect. The dependent variable is an indicator for whether each student graduated high school in four years.

Table 3: Schools whose graduates have the highest probability of enrolling in CUNY after graduating within four years, 2001 New York City high school sample

	<u>Percent students who graduate</u>	<u>Percent graduates enrolling in CUNY</u>	<u>Percent graduates enrolling in CUNY senior college</u>
Richmond Hill High School	54.4	63.5	25.1
Franklin D. Roosevelt High School	57.9	65.8	31.9
Brooklyn School for Global Studies	33.3	61.5	15.5
Sarah J. Hale High School	43.3	59.6	11.7
Brooklyn College Academy	73.5	57.0	29.6
Brooklyn Studio Secondary	65.0	61.6	32.0
Robert F. Kennedy Community High School	84.3	60.0	35.3
New Dorp High School	63.8	59.8	38.2
Hillcrest High School	51.3	58.0	17.8
Erasmus Hall Campus: HS for Humanities	42.9	56.1	12.1
Queens Gateway to Health Services HS	84.1	52.8	36.5
Health Professions & Human Services High	79.4	60.0	38.2
Middle College HS at Medgar Evers College	75.3	53.3	29.9
Abraham Lincoln High School	60.4	60.0	23.9
Clara Barton High School	69.6	55.0	26.9
Long Island City High School	44.7	59.5	15.4
Leon M. Goldstein School for the Sciences	89.2	55.2	35.1
Jacqueline Kennedy Onassis High School	84.9	56.7	20.8
Arts and Business	47.6	58.3	15.6
Newtown High School	49.1	59.7	17.7
James Madison High School	73.6	54.7	30.0
New Utrecht High School	53.3	56.4	22.6
William C. Bryant High School	58.2	57.1	19.8
John Adams High School	42.1	53.2	14.7
Sheepshead Bay High School	62.4	52.1	24.9
Heritage School	70.3	53.8	27.0
Queens Vocational High School	49.5	53.3	14.5
Unity High School	49.2	48.6	13.8
Lower East Side Prep School	46.2	58.3	23.3
Flushing High School	47.1	53.2	14.0

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables, ranked in descending order by size of the fixed effect. The dependent variable is an indicator for whether each student enrolled in CUNY after graduating within four years.

Table 4: Schools whose graduates obtain the highest GPAs in first semester at CUNY, 2001 New York City high school sample

	<u>Percent students who graduate</u>	<u>Percent graduates enrolling in CUNY</u>	<u>Percent graduates enrolling in CUNY senior college</u>
Cascades Center for Teaching and Learning	16.5	50.0	4.4
Stuyvesant High School	97.8	6.4	5.5
Staten Island Technical High School	100.0	15.1	14.5
Bronx High School of Science	98.0	11.5	10.7
Townsend Harris High School	98.5	18.2	17.2
Aviation High School	37.1	34.6	9.4
Talent Unlimited School	80.5	40.0	19.5
Martin Luther King Jr. High School	41.7	44.5	12.5
Brooklyn Technical High School	92.5	31.6	27.4
Automotive High School	45.3	17.3	2.0
Fiorello H. Laguardia High School	85.8	26.1	19.0
Seward Park High School	29.7	49.4	12.9
Bushwick High School	24.1	40.2	5.5
Science Skills Center	63.5	41.1	20.4
Wings Academy	33.3	31.4	15.5
Brooklyn School for Global Studies	57.0	61.5	10.1
High School of Economics and Finance	78.3	26.5	16.1
High School of Teaching	54.6	51.8	15.5
Humanities & the Arts Magnet Hs	52.9	31.9	10.3
Foreign Language Academy of Global Studies	75.6	33.3	14.6
Edward R. Murrow High School	86.7	44.3	30.7
Jacqueline Kennedy Onassis High School	84.9	56.7	20.8
High School of Telecommunications Arts & Technology	65.2	48.7	24.9
Park West High School	27.7	26.1	6.1
Adlai E. Stevenson High School	26.0	33.7	4.2
Francis Lewis High School	75.8	49.3	26.6
William H. Taft High School	29.8	38.6	5.6
Long Island City High School	44.7	59.5	15.4
Lower East Side Prep School	46.2	58.3	23.3
Walton High School	30.6	42.9	7.0

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables, and the number of semesters the students waited to enroll, ranked in descending order by size of the fixed effect. The dependent variable is first semester CUNY GPA.

Table 5: Schools whose graduates obtain the highest GPAs in first semester at CUNY, sorted by percent of students graduating high school, 2001 New York City high school sample

School^{1,2}	<u>Percent students who graduate</u>	<u>Percent graduates enrolling in CUNY</u>
<i>Staten Island Technical High School</i>	100.0	15.1
<i>Townsend Harris High School</i>	98.5	18.2
<i>Bronx High School of Science</i>	98.0	11.5
<i>Stuyvesant High School</i>	97.8	6.4
<i>Brooklyn Technical High School</i>	92.5	31.6
Edward R. Murrow High School	86.7	44.3
<i>Fiorello H. Laguardia High School</i>	85.8	26.1
Jacqueline Kennedy Onassis High School	84.9	56.7
<i>Talent Unlimited School</i>	80.5	40.0
<i>High School of Economics and Finance</i>	78.3	26.5
Francis Lewis High School	75.8	49.3
<i>Foreign Language Academy of Global Studies</i>	75.6	33.3
HS of Telecommunication Arts & Technology	65.2	48.7
<i>Science Skills Center</i>	63.5	41.1
Brooklyn School for Global Studies	57.0	61.5
High School of Teaching	54.6	51.8
Humanities & the Arts Magnet High School	52.9	31.9
Lower East Side Prep School	46.2	58.3
Automotive High School	45.3	17.3
Long Island City High School	44.7	59.5
Martin Luther King Jr. High School	41.7	44.5
Aviation High School	37.1	34.6
Wings Academy	33.3	31.4
Walton High School	30.6	42.9
William H. Taft High School	29.8	38.6
Seward Park High School	29.7	49.4
Park West High School	27.7	26.1
Adlai E. Stevenson High School	26.0	33.7
Bushwick High School	24.1	40.2
Cascades Center for Teaching and Learning	16.5	50.0
Thirty-school average	78.0	40.1
Average of 148-school sample	56.9	42.0

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables and the number of semesters the students waited to enroll (the dependent variable is first semester CUNY GPA).

¹Schools in italics have an above average graduation rate

² Schools in bold also have an above average CUNY enrollment rate.

Table 6: School-level variables for schools whose graduates have the highest average GPA at CUNY and have at least average high school graduation and CUNY enrollment rates

	<u>Number of students</u>	<u>% licensed teachers</u>	<u>% teachers with 5+ years experience</u>	<u>\$ per pupil</u>	<u>% female</u>	<u>% black/Hispanic</u>	<u>% foreign born</u>	<u>% English Language Learner</u>	<u>% overage at 9th grade</u>	<u>% free-price lunch</u>
Jacqueline Kennedy Onassis HS of Telecomm Arts & Technology	568	87.5	62.5	9983	70.8	84.9	12.3	2.8	14.2	66.0
Francis Lewis High	1155	89.7	55.9	10212	48.1	81.1	15.9	7.7	16.7	70.4
Edward R. Murrow	3745	93.9	75.7	8515	51.3	24.6	30.3	15.7	19.3	42.9
Edward R. Murrow	3835	96.0	75.0	9261	63.9	31.2	23.9	7.9	12.3	57.9
Four-school average	2326	91.8	67.3	9493	58.5	55.5	20.6	8.5	15.6	59.3
Average, top 30 schools for GPA	1704	87.1	64.1	9895	50.8	66.3	19.5	11.0	25.7	60.2

	<u>8th grade reading Z-score</u>	<u>8th grade math Z-score</u>	<u>% took 3+ units math</u>	<u>% took 3+ units science</u>	<u>% took English Regents</u>	<u>English Regents score</u>	<u>% took Seq. 1 Regents</u>	<u>Seq.1 Regents score</u>	<u>Academic average</u>
Jacqueline Kennedy Onassis HS of Telecomm Arts & Technology	0.1	0.2	50.9	58.5	96.2	65.6	97.2	65.7	76.6
Francis Lewis High	0.2	0.2	38.2	25.8	89.7	65.2	85.4	68.8	75.8
Edward R. Murrow	0.6	0.7	60.5	61.6	89.9	72.5	87.5	79.5	81.2
Edward R. Murrow	0.8	0.8	74.5	70.1	95.5	74.5	96.3	79.0	83.6
Four-school average	0.4	0.5	56.0	54.0	92.8	69.5	91.6	73.3	79.3
Average, top 30 schools for GPA	0.3	0.3	36.8	38.0	78.7	68.0	77.7	68.3	78.7

Table 7: School-level variables for schools whose students have the highest probability of graduating high school in four years, ranked by percentage of students receiving a Regents diploma (highest to lowest)

	Number of students	% licensed teachers	% teachers with 5+ yrs experience	\$ per pupil	% female	% black/Hispanic	% foreign born	% English Language Learners	% average at 9 th grade	% free or reduced price lunch
<u>Top quintile</u>										
Townsend Harris HS	1061	92.3	76.9	8833	67.2	17.9	3.4	0.0	4.2	37.4
Staten Island Technical HS	710	95.2	83.3	11201	47.7	12.2	11.6	0.0	1.2	33.1
Stuyvesant HS	3011	91.2	80.5	9426	41.5	6.7	8.8	0.0	5.6	51.0
Bronx HS Of Science	2716	92.2	76.7	8383	42.3	17.2	6.7	0.0	7.5	49.8
Brooklyn Technical HS	4115	93.5	74.1	7996	44.7	37.0	10.2	0.0	5.6	65.6
Top quintile average	2323	92.9	78.3	9168	48.7	18.2	8.1	0.0	4.8	47.4
<u>Middle three quintiles</u>										
Academy of American Studies HS	464	88.9	14.8	8333	52.9	40.2	14.7	1.0	10.8	65.7
Midwood HS	3705	87.4	71.7	7652	58.2	41.7	14.8	2.8	10.0	63.6
Benjamin N. Cardozo HS	4138	94.2	71.7	7770	56.2	24.5	15.8	7.1	12.9	37.7
Edward R. Murrow HS	3835	96.0	75.0	9261	63.9	31.2	23.9	7.9	12.3	57.9
Leon M. Goldstein HS for the Sciences	816	90.5	61.9	9089	48.0	24.3	18.2	0.7	6.1	50.0
Robert F. Kennedy Community HS	394	87.0	60.9	11321	55.9	31.4	8.8	2.9	13.7	49.0
The Beacon School	815	81.4	32.6	9303	56.8	38.4	8.2	0.0	12.3	54.8
Susan E. Wagner HS	2489	92.8	68.0	9771	44.8	22.7	13.2	7.8	14.5	45.7
Curtis HS	2475	93.8	71.1	9409	55.5	47.5	15.1	9.8	21.0	52.7
Middle three quintiles average	2126	90.2	58.6	9101	54.7	33.5	14.8	4.4	12.6	53.0
<u>Bottom quintile</u>										
Foreign Language Acad. of Global Studies	243	77.8	55.6	12535	65.9	100.0	0.0	7.3	31.7	75.6
Benjamin Banneker Academy	598	63.0	45.7	12107	62.3	90.9	5.2	0.0	10.4	37.7
Brooklyn College Academy	480	.	.	11230	60.2	87.8	11.2	0.0	9.2	60.2
Hostos-Lincoln Academy of Science	344	80.0	55.0	8551	71.3	93.8	17.5	13.8	23.8	42.5
Leadership and Public Service	599	75.0	31.3	10895	63.0	89.0	6.0	0.0	16.0	79.0
Middle College HS/Medgar Evers College	719	57.9	18.4	9657	53.9	100.0	26.0	0.0	16.9	65.6
Jacqueline Kennedy Onassis HS	568	87.5	62.5	9983	70.8	84.9	12.3	2.8	14.2	66.0
East New York Transit Technology HS	1445	80.7	64.8	9998	16.0	98.0	6.5	2.0	12.5	82.5
Bronx Leadership Academy HS	576	66.7	22.2	10378	64.7	98.3	15.5	90.5	17.2	62.9
EBC HS for Public Service in Bushwick	589	52.3	36.4	10208	52.0	100.0	9.0	15.0	22.0	60.0
The Heritage School	292	64.7	23.5	9813	67.6	97.3	5.4	2.7	21.6	75.7
Enterprise, Business and Technology	587	88.9	28.9	15079	54.6	99.0	17.5	18.6	37.1	59.8
Manhattan Village Academy	438	.	.	9905	51.9	83.5	7.6	0.0	19.0	68.4
Wadleigh Secondary School	429	.	.	12624	55.8	98.8	7.0	1.2	30.2	72.1
Progress HS for Professional Careers	602	81.8	39.4	12044	51.5	98.5	30.3	6.1	39.4	66.7
Banana Kelly HS	219	55.6	27.8	14949	50.0	96.3	9.3	1.9	33.3	81.5
Bottom quintile average	546	71.7	39.3	11247	57.0	94.8	11.6	10.1	22.2	66.0
Thirty-school average	1316	81.8	53.0	10257	54.9	63.6	12.0	6.7	16.4	59.0
Average of 148-school sample	1769	83.9	60.8	10171	52.9	86.3	20.1	10.3	26.6	62.5

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables (the dependent variable is an indicator for whether each student graduated).

8th grade reading Z-score	8th grade math Z-score	% took 3+ units math	% took 3+ units science	% took English Regents	English Regents score	% took Seq. 1 Regents	Seq. 1 Regents score	Academic average	
<u>Top quintile</u>									
1.7	1.7	.	.	97.7	88.8	85.1	92.8	87.3	Townsend Harris HS
1.6	1.7	99.4	99.4	100.0	83.3	99.4	91.9	89.6	Staten Island Technical HS
2.1	2.1	97.9	97.9	99.1	83.5	94.8	95.0	90.2	Stuyvesant HS
1.8	1.9	97.7	97.8	98.8	83.4	99.8	91.7	86.7	Bronx HS Of Science
1.4	1.7	91.9	92.2	97.4	76.0	97.8	89.4	82.2	Brooklyn Technical HS
1.7	1.8	96.7	96.8	98.6	83.0	95.4	92.2	87.2	Top quintile average
<u>Middle three quintiles</u>									
0.5	0.5	87.3	62.7	96.1	76.9	96.1	81.5	80.3	Academy of American Studies HS
0.8	0.9	76.4	78.9	96.2	72.6	97.7	81.3	82.8	Midwood HS
0.7	0.9	69.2	70.9	96.3	74.1	93.1	80.6	82.3	Benjamin N. Cardozo HS
0.8	0.8	74.5	70.1	95.5	74.5	96.3	79.0	83.6	Edward R. Murrow HS
0.8	0.9	87.2	87.2	97.3	72.9	98.6	78.5	80.2	Leon M. Goldstein HS for the Sciences
0.3	0.5	53.9	39.2	97.1	70.5	100.0	77.7	78.2	Robert F. Kennedy Community HS
0.8	0.7	54.8	28.1	92.5	65.2	34.2	72.9	82.4	The Beacon School
0.2	0.3	45.0	43.9	89.2	68.5	87.9	71.5	80.2	Susan E. Wagner HS
0.4	0.3	40.9	37.9	88.6	70.1	87.4	69.3	79.8	Curtis HS
0.6	0.7	65.5	57.7	94.3	71.7	87.9	76.9	81.1	Middle three quintiles average
<u>Bottom quintile</u>									
0.2	-0.2	48.8	61.0	85.4	67.1	82.9	65.1	74.6	Foreign Language Acad. of Global Studies
0.1	0.4	54.5	64.9	88.3	66.1	90.9	65.9	76.2	Benjamin Banneker Academy
0.2	0.3	45.9	33.7	91.8	68.4	91.8	71.8	77.8	Brooklyn College Academy
0.0	0.0	12.5	31.3	91.3	68.7	93.8	68.4	73.5	Hostos-Lincoln Academy of Science
0.2	0.0	52.0	68.0	83.0	67.2	90.0	63.8	76.2	Leadership and Public Service
0.1	0.1	75.3	70.8	92.2	70.7	96.8	70.6	73.9	Middle College HS/Medgar Evers College
0.1	0.2	50.9	58.5	96.2	65.6	97.2	65.7	76.6	Jacqueline Kennedy Onassis HS
-0.1	0.0	18.0	7.0	95.5	64.8	99.0	64.3	73.8	East New York Transit Technology HS
0.1	0.0	9.5	23.3	94.0	63.7	90.5	63.5	76.2	Bronx Leadership Academy HS
-0.5	-0.3	11.0	53.0	86.0	60.5	87.0	56.1	75.4	EBC HS for Public Service in Bushwick
-0.2	-0.2	24.3	27.0	89.2	66.7	94.6	60.7	75.6	The Heritage School
-0.3	-0.4	0.0	2.1	80.4	66.1	79.4	63.6	66.4	Enterprise, Business and Technology
-0.1	-0.2	1.3	1.3	87.3	62.4	89.9	58.6	86.0	Manhattan Village Academy
-0.4	-0.3	1.2	50.0	77.9	64.6	86.0	58.9	73.3	Wadleigh Secondary School
-0.5	-0.5	12.1	1.5	80.3	62.9	81.8	59.4	72.7	Progress HS for Professional Careers
-0.5	-0.6	51.9	0.0	77.8	62.5	79.6	63.0	74.9	Banana Kelly HS
-0.1	-0.1	29.3	34.6	87.3	65.5	89.5	63.7	75.2	Bottom quintile average
-0.1	-0.1	29.3	34.6	87.3	65.5	89.5	63.7	75.2	Thirty-school average
0.4	0.4	49.8	50.3	91.3	70.3	90.0	72.4	79.0	Average of 148-school sample

Table 8: School-level variables for schools whose graduates have the highest probability of enrolling in CUNY, ranked by percentage of students in a CUNY senior college (highest to lowest)

	Number of students	% licensed teachers	% teachers with 5+ yrs experience	\$ per pupil	% female	% black/Hispanic	% foreign born	% English Language Learners	% average at 9 th grade	% free or reduced price lunch
<u>Top quintile</u>										
Health Professions	1273	91.9	59.7	7815	75.3	62.4	14.7	3.5	15.9	72.9
New Dorp HS	1877	92.9	70.4	11506	48.7	29.3	11.1	3.7	23.9	49.9
Queens Gateway to Health Services	549	.	.	8802	61.9	88.9	9.5	0.0	12.7	69.8
Robert F. Kennedy Community HS	394	87.0	60.9	11321	55.9	31.4	8.8	2.9	13.7	49.0
Leon M. Goldstein HS for the Sciences	816	90.5	61.9	9089	48.0	24.3	18.2	0.7	6.1	50.0
Top quintile average	982	90.6	63.2	9707	58.0	47.3	12.5	2.2	14.5	58.3
<u>Middle three quintiles</u>										
Brooklyn Studio Secondary School	505	80.0	25.7	8569	51.0	28.0	9.0	0.0	8.0	65.0
Franklin D. Roosevelt HS	3469	91.1	70.3	8823	46.9	27.3	48.7	31.7	26.5	52.4
James Madison HS	3819	86.2	63.3	7769	45.4	23.0	31.9	13.9	18.2	49.3
Middle College HS/Medgar Evers College	719	57.9	18.4	9657	53.9	100.0	26.0	0.0	16.9	65.6
Brooklyn College Academy	480	.	.	11230	60.2	87.8	11.2	0.0	9.2	60.2
The Heritage School	292	64.7	23.5	9813	67.6	97.3	5.4	2.7	21.6	75.7
Clara Barton HS	1773	93.6	75.2	9912	84.0	96.8	16.0	8.6	15.8	78.2
Richmond Hill HS	3103	88.7	58.9	8165	51.9	53.9	37.8	13.8	23.1	56.9
Sheepshead Bay HS	3388	83.4	63.9	8509	56.1	64.0	29.6	15.5	25.5	53.6
Abraham Lincoln HS	2563	94.5	65.6	8722	44.7	38.6	32.9	17.4	24.5	59.3
Lower East Side Preparatory HS	571	100.0	71.9	10038	48.6	31.9	69.5	61.4	77.6	24.8
New Utrecht HS	2643	89.5	73.4	8741	48.8	25.9	30.5	20.7	23.2	53.7
Jacqueline Kennedy Onassis HS	568	87.5	62.5	9983	70.8	84.9	12.3	2.8	14.2	66.0
William C. Bryant HS	4061	87.2	53.9	7308	49.4	48.9	38.0	28.2	24.8	58.2
Hillcrest HS	3081	94.2	70.8	9012	60.7	70.7	28.5	7.6	31.1	55.1
Newtown HS	4631	86.7	65.8	7596	47.3	63.0	46.8	34.6	34.8	50.7
Middle three quintiles average	2229	85.7	57.5	8991	55.5	58.9	29.6	16.2	24.7	57.8
<u>Bottom quintile</u>										
HS for Arts and Business	737	77.8	42.2	8322	61.9	83.0	28.6	15.6	27.9	61.9
The Brooklyn School for Global Studies	611	.	.	9017	51.2	83.3	4.8	7.1	21.4	63.1
Long Island City HS	3325	90.4	56.2	8822	45.2	54.6	33.9	19.9	28.3	62.7
John Adams High School	3964	86.9	61.3	7439	53.2	60.7	26.6	8.3	28.9	57.6
Queens Vocational and Technical HS	1080	90.5	61.9	9715	48.5	82.0	15.5	8.5	21.5	70.5
Flushing HS	2364	90.8	65.4	9048	42.0	61.7	36.5	27.4	36.7	57.2
Unity HS	199	91.7	66.7	10881	61.5	90.8	6.2	0.0	18.5	67.7
Erasmus Hall: HS for Humanities	837	74.1	55.2	10642	50.7	98.6	29.3	3.6	40.7	66.4
Sarah J. Hale HS	151	90.5	76.2	34979	65.0	95.0	28.3	11.7	61.7	47.5
Bottom quintile average	1474	86.6	60.6	12096	53.2	78.8	23.3	11.3	31.7	61.6
Thirty-school average	1795	86.7	59.3	10042	55.2	62.9	24.9	12.4	25.1	59.0
Average of 148-school sample	1769	83.9	60.8	10171	52.9	86.3	20.1	10.3	26.6	62.5

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables (the dependent variable is an indicator for whether each student enrolled in CUNY).

8 th grade reading Z-score	8 th grade math Z-score	% took 3+ units math	% took 3+ units science	% took English Regents	English Regents score	% took Seq. 1 Regents	Seq.1 Regents score	Academic Average	
<u>Top quintile</u>									
0.4	0.4	57.6	66.5	91.8	71.4	96.5	73.3	78.5	Health Professions
0.1	0.2	32.8	39.9	82.1	66.0	79.5	66.1	77.6	New Dorp HS
0.5	0.6	68.3	61.9	95.2	74.7	100.0	80.0	77.5	Queens Gateway to Health Services
0.3	0.5	53.9	39.2	97.1	70.5	100.0	77.7	78.2	Robert F. Kennedy Community HS
0.8	0.9	87.2	87.2	97.3	72.9	98.6	78.5	80.2	Leon M. Goldstein HS for the Sciences
0.4	0.5	59.9	58.9	92.7	71.1	94.9	75.1	78.4	Top quintile average
<u>Middle three quintile</u>									
0.1	0.4	69.0	65.0	89.0	71.3	94.0	68.6	78.3	Brooklyn Studio Secondary School
0.0	0.1	41.0	52.0	79.6	67.7	81.6	74.0	77.8	Franklin D. Roosevelt HS
0.4	0.5	53.9	62.5	88.1	69.5	91.4	74.3	80.1	James Madison HS
0.1	0.1	75.3	70.8	92.2	70.7	96.8	70.6	73.9	Middle College HS/Medgar Evers College
0.2	0.3	45.9	33.7	91.8	68.4	91.8	71.8	77.8	Brooklyn College Academy
-0.2	-0.2	24.3	27.0	89.2	66.7	94.6	60.7	75.6	The Heritage School
0.1	0.0	54.7	42.4	90.3	65.6	88.0	62.3	76.4	Clara Barton HS
-0.2	-0.2	23.6	16.8	81.2	66.2	75.4	64.8	76.3	Richmond Hill HS
0.0	0.0	25.9	41.3	81.0	68.2	77.3	68.2	76.5	Sheepshead Bay HS
0.3	0.3	37.1	21.4	81.3	66.7	83.6	71.2	76.3	Abraham Lincoln HS
-0.3	-0.4	36.7	4.8	44.8	55.6	72.4	71.7	83.6	Lower East Side Preparatory HS
0.0	0.1	26.3	34.2	76.3	65.4	74.1	65.7	77.3	New Utrecht HS
0.1	0.2	50.9	58.5	96.2	65.6	97.2	65.7	76.6	Jacqueline Kennedy Onassis HS
0.1	0.1	30.5	25.5	81.9	67.9	80.3	71.8	79.5	William C. Bryant HS
0.1	0.1	18.8	30.9	75.7	68.3	74.8	59.0	76.1	Hillcrest HS
-0.1	-0.2	26.2	16.6	74.4	63.5	73.6	69.0	77.1	Newtown HS
0.0	0.1	40.0	37.7	82.1	66.7	84.2	68.1	77.4	Middle three quintiles average
<u>Bottom quintile</u>									
-0.1	-0.3	15.6	27.2	77.6	65.6	78.2	62.4	76.0	HS for Arts and Business
-0.2	-0.3	0.0	15.5	66.7	61.5	19.0	36.6	75.8	The Brooklyn School for Global Studies
0.0	-0.1	19.7	32.7	72.6	68.4	64.2	59.1	76.3	Long Island City HS
-0.1	-0.1	12.9	20.5	67.0	66.6	70.0	65.3	78.2	John Adams High School
-0.1	-0.1	27.0	41.5	81.0	63.5	87.5	57.9	75.3	Queens Vocational and Technical HS
0.0	-0.1	21.1	29.0	76.1	64.1	73.4	68.2	77.5	Flushing HS
0.2	0.3	4.6	4.6	81.5	62.1	84.6	63.8	76.3	Unity HS
-0.4	-0.6	10.0	21.4	63.6	62.5	70.0	58.0	72.6	Erasmus Hall: HS for Humanities
-0.4	-0.4	11.7	1.7	47.5	60.5	52.5	55.6	77.5	Sarah J. Hale HS
-0.1	-0.3	15.6	27.2	77.6	65.6	78.2	62.4	76.0	Bottom quintile average
0.1	0.1	35.4	36.4	80.3	66.6	80.7	66.4	77.2	Thirty-school average
0.0	0.0	29.7	31.5	79.5	66.0	79.0	65.4	77.0	Average of 148-school sample

Table 9: School-level variables for schools whose graduates receive the highest GPA at CUNY, ranked by percentage of students enrolling in a CUNY senior college (highest to lowest)

	Number of students	% licensed teachers	% teachers with 5+ yrs experience	\$ per pupil	% female	% black/Hispanic	% foreign born	% English Lang Lrnrs	% coverage at 9 th grade	% free or reduced price lunch
<u>Top quintile</u>										
Edward R. Murrow HS	3835	96.0	75.0	9261	63.9	31.2	23.9	7.9	12.3	57.9
Brooklyn Technical HS	4115	93.5	74.1	7996	44.7	37.0	10.2	0.0	5.6	65.6
Francis Lewis HS	3745	93.9	75.7	8515	51.3	24.6	30.3	15.7	19.3	42.9
Telecom. Arts & Technology HS	1155	89.7	55.9	10212	48.1	81.1	15.9	7.7	16.7	70.4
Top quintile average	3212.5	93.3	70.2	8996.0	52.0	43.5	20.1	7.8	13.5	59.2
<u>Middle three quintiles</u>										
Lower East Side Prep HS	571	100.0	71.9	10038	48.6	31.9	69.5	61.4	77.6	24.8
Jacqueline Kennedy Onassis HS	568	87.5	62.5	9983	70.8	84.9	12.3	2.8	14.2	66.0
Science Skills Center HS	734	67.6	37.8	7612	54.0	92.7	11.7	0.0	14.6	51.1
Talent Unlimited HS	413	88.5	61.5	9991	66.7	78.2	4.6	0.0	11.5	70.1
Fiorello H. LaGuardia HS	2271	91.1	63.7	10896	63.1	42.7	11.8	2.6	11.0	55.3
Townsend Harris HS	1061	92.3	76.9	8833	67.2	17.9	3.4	0.0	4.2	37.4
HS of Economics and Finance	730	75.0	34.1	10369	53.8	60.1	25.2	16.1	21.7	64.3
Wings Academy	611	.	.	9017	55.7	94.9	10.1	7.6	22.8	75.9
Richard R. Green HS of Teaching	654	81.1	64.9	9822	83.5	94.8	4.1	3.1	19.6	78.4
Long Island City HS	3325	90.4	56.2	8822	45.2	54.6	33.9	19.9	28.3	62.7
Foreign Lang. Acad. of Global Stds.	243	77.8	55.6	12535	65.9	100.0	0.0	7.3	31.7	75.6
Staten Island Technical HS	710	95.2	83.3	11201	47.7	12.2	11.6	0.0	1.2	33.1
Seward Park HS	2118	89.2	74.6	10477	44.4	50.8	46.2	35.4	47.1	49.4
Martin Luther King Jr. HS	2263	91.7	81.4	10537	53.6	96.1	34.7	23.6	37.2	58.1
Bronx HS of Science	2716	92.2	76.7	8383	42.3	17.2	6.7	0.0	7.5	49.8
Humanities & The Arts Magnet HS	625	83.3	52.8	8697	56.3	97.7	9.2	2.3	19.5	72.4
The Brooklyn School for Global Stds.	416	62.1	24.1	12336	51.2	83.3	4.8	7.1	21.4	63.1
Aviation HS	1933	88.8	60.8	9979	4.9	77.2	11.2	8.0	16.5	74.1
Middle three quintiles average	1220.1	85.5	61.1	9973.8	54.2	66.0	17.3	11.0	22.6	59.0
<u>Bottom quintile</u>										
Walton HS	2931	78.8	66.9	8993	55.8	93.2	26.4	18.5	38.1	64.5
Park West HS	2231	85.1	65.7	9817	37.3	94.1	27.0	14.7	42.9	65.0
William H. Taft HS	2314	88.0	76.0	10500	49.5	97.2	35.2	18.4	58.2	60.2
Stuyvesant HS	3011	91.2	80.5	9426	41.5	6.7	8.8	0.0	5.6	51.0
Bushwick HS	1837	67.3	61.7	9645	49.8	97.1	22.5	15.8	41.5	74.0
Cascades Center	225	100.0	55.6	9000	50.5	47.3	47.3	15.4	45.1	49.5
Adlai E. Stevenson HS	2835	94.0	74.9	10839	49.4	96.3	19.0	12.0	42.4	64.2
Automotive HS	936	93.3	58.7	13112	6.8	95.3	6.8	5.4	35.1	78.4
Bottom quintile average	2040	87.2	67.5	10166.5	42.6	78.4	24.1	12.5	38.6	63.3
Thirty-school average	1704	87.1	64.1	9894.8	50.8	66.3	19.5	11.0	25.7	60.2
Average of 148-school sample	1769	83.9	60.8	10171	52.9	86.3	20.1	10.3	26.6	62.5

Note: These are the 30 schools with the largest school fixed effects from student-level regressions that control for peer variables and the number of semesters the students waited to enroll (the dependent variable is first semester CUNY GPA).

8th grade reading Z-score	8th grade math Z-score	% took 3+ units math	% took 3+ units science	% took English Regents	English Regents score	% took Seq. 1 Regents	Seq. 1 Regents score	Academic Average	
<u>Top quintile</u>									
0.8	0.8	74.5	70.1	95.5	74.5	96.3	79.0	83.6	Edward R. Murrow HS
1.4	1.7	91.9	92.2	97.4	76.0	97.8	89.4	82.2	Brooklyn Technical HS
0.6	0.7	60.5	61.6	89.9	72.5	87.5	79.5	81.2	Francis Lewis HS
0.2	0.2	38.2	25.8	89.7	65.2	85.4	68.8	75.8	HS of Telecomm. Arts & Technology
0.7	0.9	66.3	62.4	93.1	72.0	91.8	79.2	80.7	Top quintile average
<u>Middle three quintiles average</u>									
-0.3	-0.4	36.7	4.8	44.8	55.6	72.4	71.7	83.6	Lower East Side Prep School
0.1	0.2	50.9	58.5	96.2	65.6	97.2	65.7	76.6	Jacqueline Kennedy Onassis HS
0.3	0.4	62.8	59.9	76.6	72.7	80.3	72.3	75.0	Science Skills Center
0.5	0.4	50.6	57.5	95.4	71.0	92.0	70.7	78.1	Talent Unlimited School
1.1	1.0	76.4	65.5	95.0	77.3	94.0	81.7	82.3	Fiorello H. LaGuardia HS
1.7	1.7	.	.	97.7	88.8	85.1	92.8	87.3	Townsend Harris HS
0.4	0.6	1.4	0.0	92.3	67.7	90.9	73.2	75.6	HS of Economics and Finance
-0.1	-0.2	0.0	0.0	65.8	58.6	78.5	52.6		Wings Academy
-0.1	-0.1	24.7	44.3	82.5	67.3	77.3	55.6	76.7	HS of Teaching
0.0	-0.1	19.7	32.7	72.6	68.4	64.2	59.1	76.3	Long Island City HS
0.2	-0.2	48.8	61.0	85.4	67.1	82.9	65.1	74.6	Foreign Language Acad. of Global Stds.
1.6	1.7	99.4	99.4	100.0	83.3	99.4	91.9	89.6	Staten Island Technical HS
-0.4	-0.2	29.9	25.7	58.9	63.2	56.6	68.6	79.3	Seward Park HS
-0.2	-0.2	24.4	35.3	68.3	63.8	72.2	59.6	74.9	Martin Luther King Jr. HS
1.8	1.9	97.7	97.8	98.8	83.4	99.8	91.7	86.7	Bronx HS of Science
-0.4	-0.5	2.3	29.9	82.8	63.6	94.3	49.0	75.6	Humanities & The Arts Magnet HS
-0.2	-0.3	0.0	15.5	66.7	61.5	19.0	36.6	75.8	Brooklyn School for Global Studies
0.1	0.1	22.8	20.5	83.9	69.8	90.2	66.9	72.4	Aviation HS
0.3	0.3	38.1	41.7	81.3	69.4	80.3	68.0	78.8	Middle three quintiles average
<u>Bottom quintile</u>									
-0.5	-0.4	11.2	2.8	75.5	61.5	69.4	58.4	75.1	Walton HS
-0.3	-0.4	14.5	18.9	57.8	58.8	58.8	64.9	74.9	Park West HS
-0.6	-0.6	8.7	6.9	56.9	59.3	52.0	59.6	76.1	William H. Taft HS
2.1	2.1	97.9	97.9	99.1	83.5	94.8	95.0	90.2	Stuyvesant HS
-0.5	-0.5	10.0	3.5	54.3	61.2	56.6	53.9	75.0	Bushwick HS
-0.2	-0.2	0.0	0.0	45.1	58.8	45.1	61.7	.	Cascades Center
-0.4	-0.4	7.7	2.8	58.9	59.1	56.6	60.6	74.2	Adlai E. Stevenson HS
-0.4	-0.5	4.1	12.2	77.0	60.7	85.8	54.9	74.4	Automotive HS
-0.1	-0.1	19.3	18.1	65.6	62.9	64.9	63.6	77.1	Bottom quintile average
0.3	0.3	36.8	38.0	78.7	68.0	77.7	68.3	78.7	Thirty-school average
0.0	0.0	29.7	31.5	79.5	66.0	79.0	65.4	77.0	Average of 148-school sample

Table 10: Schools that “beat the odds”

	<u>8th grade reading test scores¹</u>	<u>8th grade math test scores¹</u>	<u>8th Grade reading GPA²</u>	<u>8th grade math GPA²</u>
ACORN Community High School	x	x	x	
Automotive High School	x	x	x	x
Banana Kelly High School	x	x	x	x
East New York Transit Technology High School	x			
EBC High School for Public Service Bushwick	x	x	x	
Erasmus Hall: HS for Business & Technology	x	x	x	
Foreign Language Academy of Global Studies		x		x
The Heritage School	x			
High School for Enterprise, Business, and Technology	x	x		
Humanities & The Arts Magnet High School		x		x
Manhattan Village Academy	x	x		
Progress High School for Professional Careers	x	x	x	
Wadleigh Secondary School	x	x	x	

¹These are schools whose students, on average, had below average 8th grade z-scores in math and/or reading. Yet, the contribution of these schools to the likelihood that their students graduate is much higher than expected. Specifically, these schools average 8th grade z-scores (in reading and/or math) are below the 50th percentile, and the graduation fixed effects are at least five deciles higher than the deciles for the 8th grade z-scores.

²These schools also “beat the odds” for reading and/or math GPA, in that the deciles for 8th grade reading and/or math GPA fixed effects are at least five deciles higher than the deciles for 8th grade z-scores.

Table 11: School-level variables for schools that “beat the odds”

	Number of students	\$ per pupil	% licensed teachers	% teachers with 5+ yrs experience	% female	% black/Hispanic	% foreign born	% English Language Learner	% free or reduced price lunch
Acorn Community High School	623	9,234	62.9	22.9	55.8	99.2	8.3	1.7	74.2
Automotive Trades High School	936	13,112	93.3	58.7	6.8	95.3	6.8	5.4	78.4
Banana Kelly Collaborative High	219	14,949	55.6	27.8	50.0	96.3	9.3	1.9	81.5
East New York Transit Tech High	1,445	9,998	80.7	64.8	16.0	98.0	6.5	2.0	82.5
EBC/High School for Public Service in Bushwick	589	10,208	52.3	36.4	52.0	99.0	9.0	15.0	60.0
Erasmus Hall: High School for Business and Technology	896	10,534	74.6	54.2	45.3	96.9	32.9	7.5	60.9
Foreign Language Academy	243	12,535	77.8	55.6	65.9	100.0	0.0	7.3	75.6
High School for Enterprise, Business & Technology	587	15,079	88.9	28.9	54.6	99	17.5	18.6	59.8
The Heritage School	292	9,813	64.7	23.5	67.6	97.3	5.4	2.7	75.7
Humanities and the Arts	625	8,697	83.3	52.8	56.3	97.7	9.2	2.3	72.4
Manhattan Village Academy	438	9,905	.	.	51.9	83.5	7.6	0	68.4
Progress High School	602	12,044	81.8	39.4	51.5	97.7	30.3	6.1	66.7
Wadleigh Secondary School	429	12,624	..		55.8	97.7	7.0	1.2	72.1
13-school average	609.5	11,441	74.2	42.3	48.4	96.7	11.5	5.5	71.4
Average of 148-school sample	1769	10,171	83.9	60.8	52.9	86.3	20.1	10.3	62.5

	<i>% average at 9th grade</i>	<i>8th grade reading score</i>	<i>8th grade math score</i>	<i>% took 3+ units math</i>	<i>% took 3+ units science</i>	<i>% graduate in 4 years</i>	<i>% graduate with Regents diploma</i>	<i>% enrolled in CUNY</i>	<i>% enroll in CUNY senior college</i>	
	21.7	-0.4	-0.4	2.5	2.5	55.0	0.8	32.9	21.4	Acorn Community High School
	35.1	-0.4	-0.5	4.1	12.2	45.3	2.0	17.3	4.0	Automotive Trades High School
	33.3	-0.5	-0.6	51.9	0.0	53.7	0.0	35.3	29.4	Banana Kelly Collaborative High
	12.5	-0.1	0.0	18.0	7.0	68.0	4.0	38.6	28.3	East New York Transit Tech High
	22.0	-0.5	-0.3	11.0	53.0	62.0	3.0	38.8	22.4	EBC/High School for Public Service in Bushwick
	46.0	-0.6	-0.6	33.5	44.7	51.6	4.3	32.6	15.8	Erasmus Hall: High School for Business and Technology
	31.7	0.2	-0.2	48.8	61.0	75.6	19.5	33.3	18.2	Foreign Language Academy
	37.1	-0.3	-0.4	0.0	2.1	61.9	2.1	40.0	24.6	High School for Enterprise, Business & Technology
	21.6	-0.2	-0.2	24.3	27.0	70.3	2.7	53.8	38.5	The Heritage School
	19.5	-0.4	-0.5	2.3	29.9	52.9	1.1	31.9	19.1	Humanities and the Arts
	19.0	-0.1	-0.2	1.3	1.3	83.5	1.3	38.8	22.4	Manhattan Village Academy
	39.4	-0.5	-0.5	12.1	1.5	48.5	0.8	25.9	7.1	Progress High School
	30.2	-0.4	-0.3	1.2	50.0	60.5	1.2	23.3	8.3	Wadleigh Secondary School
	28.4	-0.3	-0.4	16.2	22.5	60.7	3.3	34.0	20.0	13-school average
	26.6	0.0	0.0	29.7	31.5	56.9	16.3	42.0	26.2	Average of 148-school sample

Notes: These schools' students, on average, had below average 8th grade scores in math and/or reading. Yet, the contribution of these schools to the likelihood that their students graduate is much higher than predicted.