New York City Independent Budget Office Schools Brief

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Phased Out:

As the City Closed Low-Performing Schools How Did Their Students Fare?

Summary

A number of studies have found that when a persistently low-performing school is closed and replaced with one or more new schools, the replacement schools typically (though not always) have improved student outcomes such as four-year graduation rates. Far less attention has been focused on the outcomes for students who were attending the schools to be phased out when the announcements for closing were made.

This report looks at the outcomes for students who were attending three large, comprehensive high schools (Samuel J. Tilden, South Shore, and Lafayette) when the announcement for their closing was made in school year 2006-2007. We track the outcomes for those ninth, tenth, and eleventh graders—nearly 3,700 students—who had the option of staying at their schools as enrollments declined, budgets decreased, and classes and services diminished. Students were tracked regardless of whether or not they remained at the closing school. The report also compares the outcomes for each grade cohort with a demographically similar group of students at other low-performing schools, although these schools were not targeted for closing. In addition, the report replicates the study for another group of ninth, tenth, and eleventh graders whose schools faced a gradual shutdown beginning in school year 2008-2009. Among our findings:

- In terms of graduating on time, the effects of being in a school that was to be shut down were mixed. For the students at the three high schools slated for closing in 2006-2007, the probability of graduating on time was not significantly different than for students in the comparison group. For students in the 2008-2009 set of closing high schools we tracked, there was a negative effect on graduating on time.
- The type of diploma earned by students appears to have been more clearly affected by being in a closing school. For students in both the 2006-2007 and 2008-2009 cohorts, the likelihood for earning a local diploma instead of the more rigorous Regents diploma was higher among those in closing schools than for their peers at other low-performing schools.
- Students in the 2006-2007 cohort of closing schools tended to graduate "college ready" at lower rates than their peers at other low-performing schools.

With the de Blasio Administration announcing that it will begin closing some schools, these findings are especially noteworthy. While the city gradually shut low-performing schools over several years under the Bloomberg Administration, not all cities take that approach. In Chicago, for example, schools are closed immediately and students sent to other schools throughout the system.

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Introduction

For many years, policymakers have struggled to either improve or close schools that have been categorized as persistently failing. Former Mayor Michael Bloomberg preferred to phase out and eventually close underperforming schools. Current Mayor Bill de Blasio initially renounced the phaseout policy in favor of the Renewal Schools program that is designed to turn the schools around by providing extra services.[1] The Renewal Schools program was launched in the 2014-2015 school year for 94 schools, including 50 schools that the State Education Department also identified as struggling. The Department of Education (DOE) has outlined specific targets for academic improvement for each of the three years of the program—through school year 2016-2017. However, both Governor Andrew Cuomo and state education Commissioner MaryEllen Elia have warned that if the 50 schools do not improve by 2016-2017, the state could move to either take over or perhaps even close those schools. Most recently, Mayor de Blasio and schools Chancellor Carmen Fariña announced a proposal to close three small, under-enrolled schools in Brooklyn at the end of the 2015-2016 school year. Two of the schools are part of the Renewal Schools program.[2]

Under the Bloomberg Administration, the DOE began phasing out 154 low-performing public schools; 35 of those were large, comprehensive high schools. When the DOE announced that a high school was being phased out, the school would not admit a ninth grade class the following fall. Students who were currently enrolled at the school were allowed to continue at the school until it graduated its final class of students three years later. As enrollment at the school fell each year, the school's budget also shrank and principals would often have to prioritize the classes and teachers that would best serve the needs of the students that remained. The school closure policy was partnered with a policy to create new, usually small schools that would take over the space being vacated by the closing schools. In other cases, charter schools took some of the space being vacated.

There have been several studies that have found positive effects on school performance for the new small schools that replaced failing high schools that were phased out, but fewer that have attempted to analyze the effect of gradually shutting down a school on the students that were attending the high school at that time.[3] In this report, IBO focuses on the last groups of students that attended such schools when the phase out announcement was made. One other study, by the Research Alliance for New York City Schools, also analyzed this aspect of the phase out process.[4] Key differences in methodology in identifying comparison samples, the time period that was studied, and the students who were tracked over time make it difficult to directly compare the results. Our study stands as a complement to existing studies on the relative quality of the new replacement schools, and not as an alternative evaluation of the entire school closure/new school creation policy.

In an attempt to isolate the impact of school closure, we have carefully chosen two samples of students: those who attended a school announced for phaseout and a comparison group of similar students who attended a school that was low-performing but not announced for phaseout. In order to track students through their expected graduation date, we needed to use data from a number of years ago. This report is largely focused on a group of students who were ninth, tenth, or eleventh graders in 2006-2007, when it was announced that their school would be phased out. Since twelfth graders had almost completed their presumed final year by the time of the announcement, they were excluded from the analysis. Later in the report, we present a replication of our results for a second cohort of students—those who were ninth, tenth, or eleventh graders attending schools announced for phaseout in 2008-2009.

We focus on three large comprehensive high schools in Brooklyn that were among the list of schools announced for phase out during school year 2006-2007. The three high schools were: Samuel J. Tilden High School (Tilden), South Shore High School (South Shore), and Lafayette High School (Lafayette). Tilden and South Shore are located just 1.5 miles apart in East Flatbush and Canarsie, respectively. Lafayette is about six miles southwest in the Bath Beach section of Brooklyn, close to Coney Island. It is worth noting that these phaseouts were announced about halfway through Mayor Bloomberg's large-scale push to phase out large underperforming high schools. It is possible that these schools may have been affected by nearby schools that had previously been closed, as students who would have attended the schools closed earlier were diverted.[5]

At the time of the announcement, there were 3,677 ninth, tenth, and eleventh graders attending those three schools. This report provides a descriptive analysis of those students and tracks the outcomes for those cohorts for the next three years, two years, and one year, respectively, based on their expected four-year graduation date. Therefore, the "treatment" effect can be described as the effect of attending a school as a ninth, tenth, or eleventh grader at the time that a phaseout was announced. This

report compares the outcomes of the treatment group with the outcomes of a comparison group of students to see if they were significantly different. The results are also presented by cohort to see if there was a differential impact for ninth, tenth, and eleventh graders.

Data

Our analysis is based on student-level data provided by the DOE. The data included demographic information about each student and also allowed IBO to track students' movements within and out of the school system. IBO could monitor student performance before and during high school using achievement data (New York State test score data for eighth grade and high-school level Regents exams) and course and credit data. School-level datasets were constructed by aggregating across students. In addition to the student-level data, we obtained school utilization rates from the Enrollment, Capacity & Utilization Report (Blue Book).

Demographic variables of interest included ethnicity, gender, English Language Learner (ELL) status, special education status (students in self-contained or integrated settings), free or reduced-price lunch eligibility, and whether or not a student was over age upon entry to ninth grade. Student attendance rates were also used. Students' incoming English Language Arts (ELA) and math test scores from eighth grade, when available, were standardized to a mean of zero relative to the citywide average—represented as a z-score.[6]

Comparison of Three Treatment Schools With All City High Schools

Tilden, South Shore, and Lafayette had graduation rates significantly below the citywide average for high school students in 2005-2006, the year prior to the phaseout announcements. All three schools served ninth graders whose incoming eighth grade test scores were well below the city average for math and ELA, but Tilden and South Shore served different student populations than Lafayette. The demographic and academic profiles for Tilden and South Shore, shown in Table 1 below, portray stark differences from city averages. Compared with the overall city high school population, Tilden and South Shore served significantly fewer Asian or white students and students eligible for free or reduced-price lunch, but more special education students. Both schools had very low attendance rates. Lafayette, on the other hand, served a share of Asian or white students that was comparable to the city average, but also served a significantly greater share of ELLs and students eligible for free or reduced-price lunch, and a slightly smaller share of special education students. Despite having an attendance rate in line with the citywide average, Lafayette had a graduation rate that was much lower than the city average, as did Tilden and South Shore.

Student Characteristics for Ninth, Tenth, and Eleventh Graders in Treatment Group

Similar demographic patterns are evident in Table 2 (page 4) when we look at the treatment group of ninth through eleventh graders at the three phaseout schools in 2006-2007, the year the phaseouts were announced. Lafayette had much higher shares of students who were ELL or Asian or white and much lower shares of students who were in special education settings or eligible for free or reduced-price lunch. In all three schools, almost half of the remaining students were over age for ninth grade when they entered it. There were a number of students in

Table 1: Demographic and Academic Profiles of Schools Announced for Phase Out, 2005-2006

Percent of Students Who Were:	Lafayette	Samuel J. Tilden	South Shore	All City High Schools
Male	50.1%	54.3%	55.6%	50.5%
Asian or White	28.8%	1.1%	2.7%	28.1%
English Language Learner	26.4%	8.7%	5.0%	9.9%
Special Education	8.6%	13.4%	14.9%	10.5%
Free or Reduced-Price Lunch Eligible	71.9%	44.2%	21.8%	50.6%
Averages	**Lafayette**	**Samuel J. Tilden**	**South Shore**	**All City High Schools**
Eighth Grade ELA Z-Score: For School's Ninth Graders	-0.45	-0.60	-0.58	-0.13
Eighth Grade Math Z-Score: For School's Ninth Graders	-0.46	-0.68	-0.62	-0.12
Attendance Rate	84.6%	71.4%	73.0%	83.5%
Graduation Rate	37.2%	39.0%	32.7%	55.2%

SOURCE: IBO analysis of Department of Education data
NOTE: The average z-score for all city high schools is not zero because there are some eighth graders who do not attend public high schools.
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Table 2: Characteristics of Students in Schools Announced for Phase Out

Percent of Ninth, Tenth, and Eleventh Graders in 2006-2007 Who Were:	Lafayette	Samuel J. Tilden	South Shore
Male	49.7%	57.1%	56.8%
Asian or White	30.6%	0.5%	2.5%
English Language Learner	37.8%	15.6%	6.6%
Self-Contained Special Education	3.7%	9.8%	11.3%
Integrated Special Education	1.7%	2.9%	2.4%
Free or Reduced-Price Lunch Eligible	24.9%	48.9%	34.4%
Over Age for Ninth Grade	45.8%	47.5%	45.4%
Total Students Remaining	**1,137**	**1,361**	**1,179**

	Lafayette		Samuel J. Tilden		South Shore	
	Mean	Median	Mean	Median	Mean	Median
Attendance Rate	80.9%	92.9%	67.0%	81.2%	63.1%	76.5%
Avg. Grade 8 ELA Z-Score	-0.37	-0.33	-0.53	-0.47	-0.49	-0.46
Avg. Grade 8 Math Z-Score	-0.42	-0.27	-0.59	-0.41	-0.50	-0.35

Grade	Number of Students	Percent of Students
9	1,695	46.1%
10	1,267	34.5%
11	715	19.5%

SOURCE: IBO analysis of Department of Education data

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each school with extremely poor attendance, pulling down the average (mean) attendance rate for each school. The median attendance rate, which is not skewed as much by those extreme cases, showed that Lafayette had the highest attendance rate by over 10 percentage points, followed by Tilden and South Shore. All three schools generally served students that fell below the average in terms of standardized incoming eighth grade ELA and math test scores, though students at Lafayette had slightly higher averages (closer to zero) compared with the other two schools' students. Finally, ninth graders comprised the largest share of the treatment group—almost half of students. Another third were tenth graders and the remaining roughly 20 percent were eleventh graders.

Methodology for Constructing a Comparison Sample

Since students were not randomly assigned to the schools being phased out, we needed a methodology that would allow us to make valid comparisons between these students and similar students in schools that were not phasing out. We did this by creating a synthetic comparison sample using a technique known as propensity score matching. This allowed us to answer the question: What would the outcomes for students in phased out schools have been had their schools not closed? This design was intended to mimic a randomized experiment. Our matching process had two steps: selecting comparison schools and then selecting students within those schools that matched the characteristics of the students in our treatment sample. For more details on our methodology, please see the appendix.

Students Who Switched Schools. Roughly a quarter of students (almost 1,800) switched schools at some point between school year 2006-2007 and the time of their expected graduation. A third of all ninth graders switched schools, as did 21 percent of tenth graders, and about 8 percent of eleventh graders. About 26 percent of students in the treatment group switched schools and 22 percent of students in the comparison school did. More than a third of all students in the treatment and comparison groups (616 students) who switched schools transferred to a school in administrative district 79. District 79 is comprised of alternative schools and programs designed to serve students who are under the age of 21 but whose path towards a high school diploma has been disrupted. Students in the treatment and comparison groups transferred to a district 79 program at roughly the same rate—7.8 percent of students in the treatment group and 8.9 percent of students in the comparison group.

Our goal was to isolate the impact of school phaseout on the students who were in schools at the time of the phaseout announcement. The study was not designed to isolate the impact of remaining in a school as it phases out. Thus, we continued to count these students who switched schools as part of the initial school to which they were assigned as of the time of the announcement. If those students who switched schools were dropped from the analysis, the results could be biased if the students who left were systematically different from those who stayed at the schools. This is true for both the treatment group and the comparison group.

Final Four-Year Outcomes

For each of the three grade cohorts, IBO determined students' final outcomes at the end of the school year in which they were expected to graduate based on a traditional four-year timeline (see Table 3 below). Eleventh graders were tracked through September 2008, tenth graders were tracked through September 2009, and ninth graders were tracked through September 2010. Students were determined to fall into 1 of 5 outcomes: graduated, discharged, dropped out, still enrolled, or obtained a General Equivalency Diploma (GED). Discharged students are those who did not graduate or drop out, but left the school system for some other reason, such as to transfer to a school outside of New York City.[7] Students who graduated could have received one of several different types of diplomas, including: a local high school diploma, a Regents high school diploma, an advanced Regents high school diploma, diplomas with honors, diplomas with career and technical education endorsements, and Individualized Education Program (IEP) diplomas for special education students only. During this time, the local diploma was in the process of being phased out.[8]

The rate at which ninth, tenth, and eleventh graders graduated on time was low—less than half of students—and similar for both the treatment and comparison groups. The share of students in the treatment group that graduated, excluding discharges, was 46.2 percent while the share of students in the comparison group that graduated was slightly higher at 47.3 percent, though this difference was not statistically significant. The difference between the treatment and comparison groups was similarly small for the other outcomes—with just a 1 to 2 percentage-point difference. The difference between the two groups in the shares of students who dropped out was not statistically significant.

A more detailed breakdown of student outcomes by cohort is provided below in Table 4. The increasing trend in the share of graduates between the three grade cohorts reflects the fact that more students in tenth and eleventh grades that would have dropped out had already done so by the time the phaseout was announced. Similarly, the shares of students who were discharged or dropped out were

Table 3: Four-Year Student Outcomes

Category	Comparison	Treatment	Total	Percent of Comparison Students	Percent of Treatment Students
Discharged	533	551	1,084	14.5%	15.0%
Dropped Out	1,017	1,046	2,063	32.3%	33.5%
Still Enrolled	571	562	1,133	18.2%	18.0%
Received GED	70	74	144	2.2%	2.4%
Graduated	1,486	1,444	2,930	47.3%	46.2%
TOTAL	**3,677**	**3,677**	**7,354**		

SOURCE: IBO analysis of Department of Education data
NOTE: Percent of students discharged was calculated based on the total number of students in each group (3,677). Percents for all other categories were calculated based on the number of students in each group excluding discharges (3,144 in the comparison group and 3,126 in the treatment group). This is similar to how the Department of Education reports these figures, though these figures should not be compared to published Department of Education figures as they cover multiple cohorts of students and track students over different time horizons.

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Table 4: Four-Year Student Outcomes by Cohort

Final Outcome	Ninth		Tenth		Eleventh	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Discharges	20.5%	20.6%	12.6%	12.3%	6.2%	3.9%
Dropouts	49.0%	47.4%	29.6%	28.7%	8.5%	8.7%
Still Enrolled	17.0%	18.0%	19.8%	19.8%	17.0%	15.9%
GED	2.4%	3.4%	3.3%	1.9%	0.6%	0.4%
Graduated	31.5%	31.2%	47.2%	49.6%	73.9%	75.0%
Local Diploma*	60.5%	36.4%	61.7%	48.9%	60.0%	51.2%
Regents Diploma*	39.5%	63.6%	38.3%	51.1%	40.0%	48.8%

SOURCE: IBO analysis of Department of Education data
NOTE: *These are the reported shares of only those graduates that received local or Regents diplomas.

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much larger for the ninth grade cohort than for the tenth and eleventh grade cohorts because the latter two cohorts were already whittled down to mainly students who were on track to graduate or making progress towards graduation.

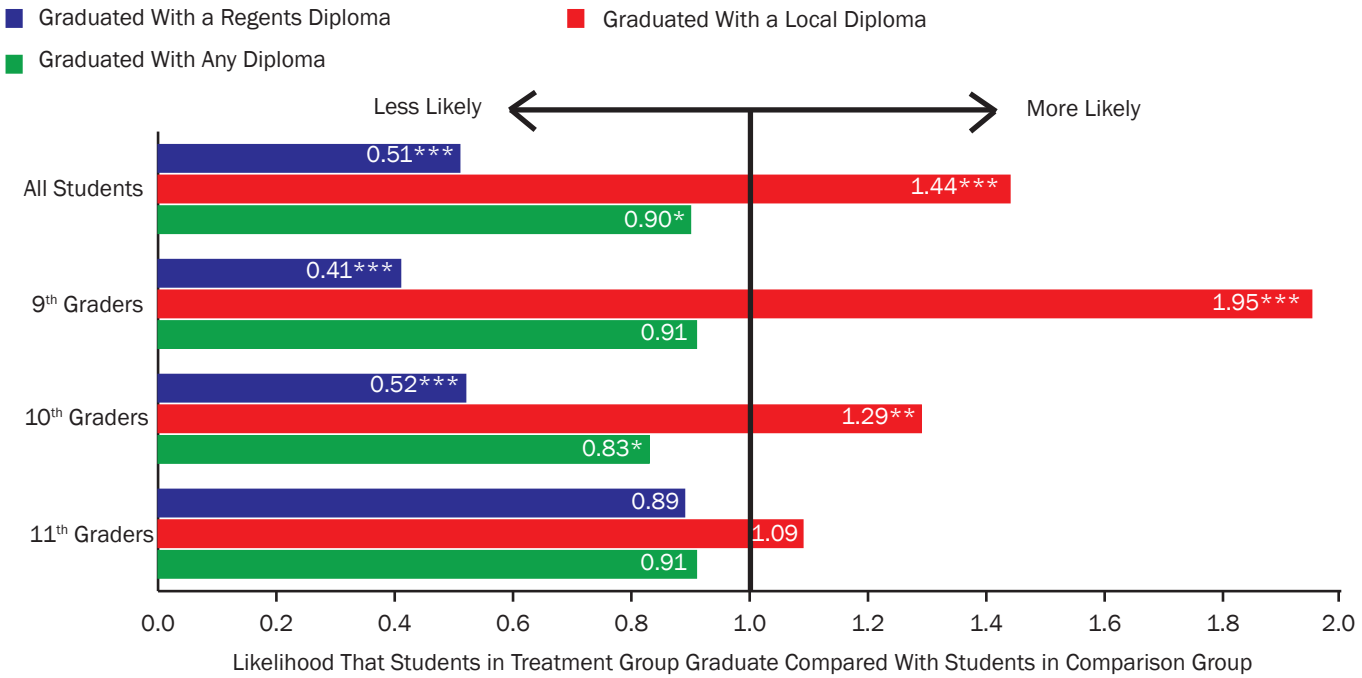
Regression analysis, presented below, indicates that the observed differences between the treatment and comparison groups for graduates were statistically significant only when taking into account the type of diploma a graduate received. A closer look at the type of diploma that students received showed that students in the treatment group were far more likely to receive a local diploma—more than 60 percent of graduates received a local diploma. The difference between the treatment and comparison group for each cohort was also striking. For the ninth grade students, 60 percent of the graduates in the treatment group received a local diploma and 40 percent received a Regents diploma. For ninth graders in the comparison group, the results were the opposite. In tenth and eleventh grades, the comparison group was evenly split between local and Regents diplomas but students in the treatment group were far more likely to get a local diploma—roughly 60 percent did so.

Regression Analysis

In order to test whether these differences between the two groups of students were statistically significant, IBO used regression analysis to determine if students in the treatment group were more or less likely to graduate than students in the comparison group. We also tested if the type of diploma was significantly different: Were students in the treatment group significantly more likely to receive a local diploma and significantly less likely to receive a Regents diploma? We first looked at the impact on all ninth, tenth, and eleventh graders and controlled for grade level in the regression, then looked at the impact by cohort.

The regressions aimed to predict a student's probability of graduating (in some cases also taking into account the type of the diploma earned), controlling for the student's characteristics at the time of the announcement and the student's status in the treatment or comparison group. We report the odds ratios rather than the regression coefficients. The odds ratio corresponding to a particular independent variable shows the effect of that variable on the relative probability that the outcome (dependent) variable will happen, controlling for other factors. Figure 1, below, displays results for students in the treatment group. The numbers represent the likelihood that students in the treatment group would attain the same outcome as

Figure 1: Regression Results for Treatment Group Relative to Comparison Group: Predicting Students' Probability of Graduating On Time



Source: IBO analysis of Department of Education data
NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.

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students in the comparison group. For example, the results indicated that a student in the treatment group was 90 percent as likely to attain any diploma as students in the comparison group (though the difference was only weakly significant in statistical terms). Figure 1 also breaks down the results by grade cohort. The full regression results are provided in the appendix.

The regression results indicated that a student in the treatment group was no more likely to graduate in general compared with a student in the comparison group, but was more likely to graduate with a local diploma and was less likely to graduate with a Regents diploma. This finding also held true when considering ninth and tenth graders separately. The contrast in the type of the diploma obtained between the treatment and comparison groups was greatest for ninth graders, and statistically significant for ninth and tenth graders.

Treatment students were only 51 percent as likely as comparison group students to attain a Regents diploma and were 144 percent as likely to attain a local diploma. This finding was even larger in magnitude for ninth graders, where students in the treatment group were less than half as likely to attain a Regents diploma and almost two times as likely to attain a local diploma as students in the comparison group. There was also a significant difference for tenth graders in the treatment group, who were only 52 percent as likely to attain a Regents diploma and 129 percent as likely to attain a local diploma. Notably, there was no statistically significant difference for eleventh graders for any graduation outcome, which seems reasonable considering that by the time the school phase out was announced, those students were already very close to their expected graduation date.

Regents Examination Scoring Post-Announcement

To further examine the type of the diploma that students obtained, IBO looked at the distribution of Regents exam test scores in the post-announcement period for treatment and comparison students in the five main areas: English, math, science, world history, and U.S. history. In a prior report, IBO documented the high incidence of students scoring exactly a 65 on the Regents exam, the passing grade for a Regents diploma. Similarly, here we looked at the incidence of students scoring exactly a 55 (passing at the local diploma level) or a 65 by treatment status. Generally, there were large spikes in the number of students scoring exactly a 55 and 65 among both treatment and comparison students in all subjects. The spike was more pronounced at 65 than at 55, likely reflecting the fact that the local diploma was being phased out during that time. Recall that our treatment and comparison groups include students who have moved on to other schools subsequent to the closing announcement, so these distributions are not for specific schools, but for specific cohorts of students.

As shown in Figure 2, there were clear patterns in certain subjects where students in either the treatment or comparison group tended to score exactly a 55 or 65 more frequently. Students in the treatment group scored both 55 and 65 more frequently than students in the comparison group in math, especially ninth graders. In English, science, and world history, students in the treatment group were more likely to score 55 and students in the comparison group were more likely to score 65.[9]

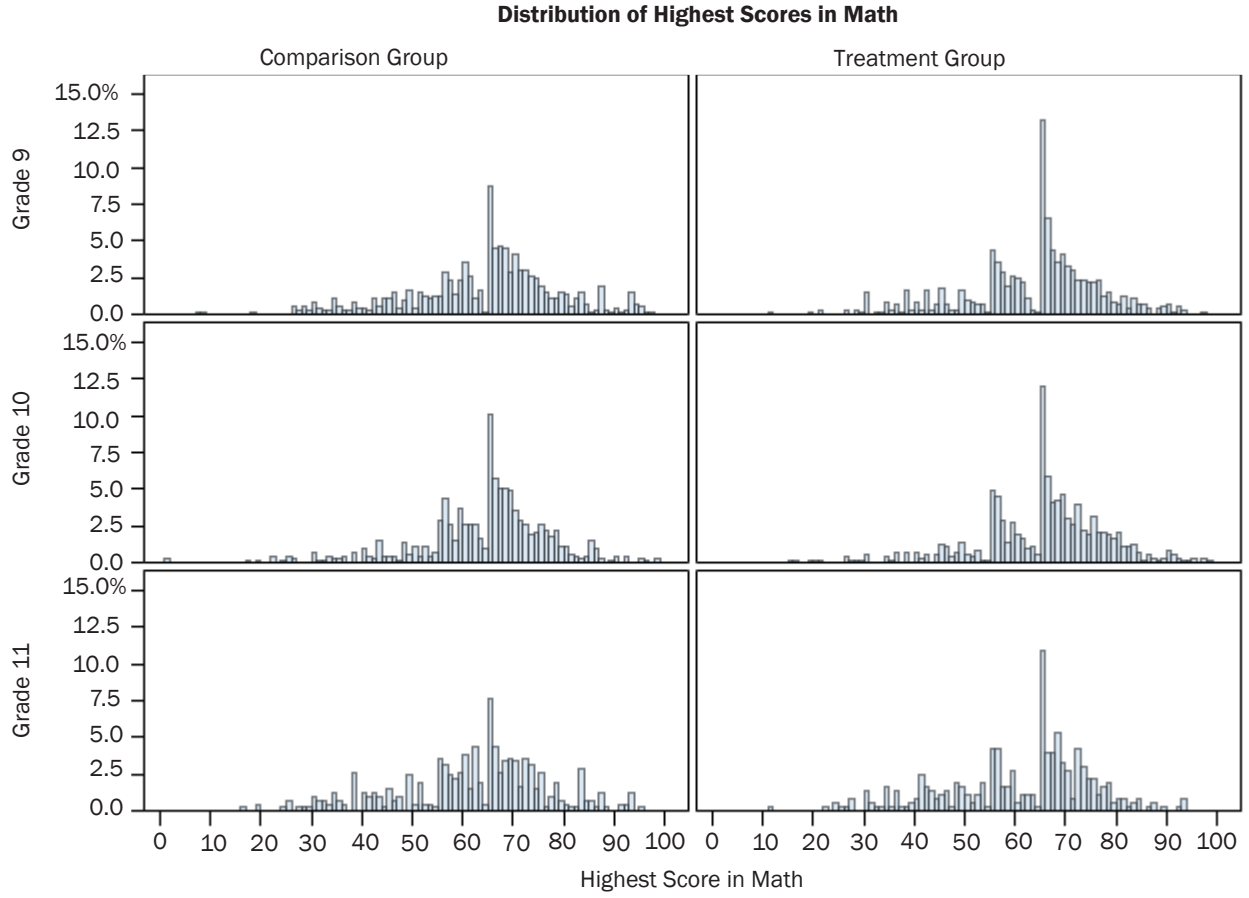
Except for math, there were some differences by subject as far as which of the groups (treatment or comparison) was more likely to score exactly a 55 or 65. Among ninth graders, those in the treatment group tended to score 55 more frequently in world history and U.S. history whereas students in the comparison group tended to score 65 more frequently in world history and science. Among tenth graders, those in the treatment group tended to score 55 more frequently in English and science while those in the comparison group tended to score 65 more frequently in English and world history. There were fewer significant differences among eleventh graders, though students in the comparison group tended to score 65 more frequently in English and U.S. history. Since we only tracked eleventh graders for one additional year after the announcement was made, it was not surprising that such patterns were not as evident.

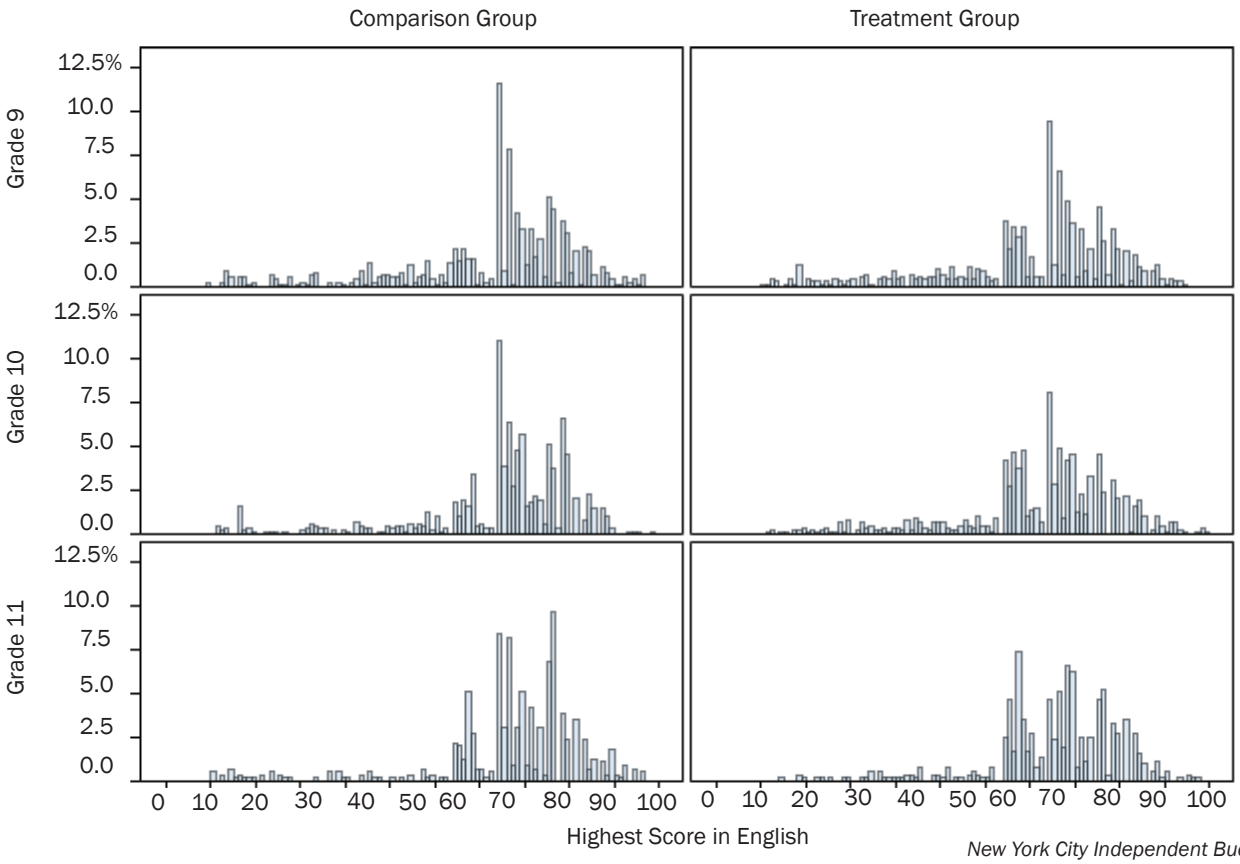
While we cannot discern the reasons behind this trend in our sample, city and state officials also had sufficient concern about the high incidence of students scoring exactly the passing scores on the Regents exams and have subsequently implemented changes to reduce its incidence. In February 2012, the DOE reported that in an effort to improve the integrity of its data, schools would no longer score their own students' Regents exams.[10]

College Readiness Among Graduates

For those graduates who received either a local or Regents diploma, IBO also examined the share that graduated college ready in one or both subjects (English and math). Students who scored at least a 75 on the English Regents and at least an 80 on the math Regents are generally considered "college ready." Based on a 2010 study

Figure 2: Distributions of Highest Scores in Math and English Regents Exams by Cohort





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conducted for the New York State Education Department, students who were deemed college ready according to this definition were likely to earn at least a grade of C or better in college-level courses in those subjects.

Only 42.6 percent of local or Regents diploma graduates in the combined treatment and comparison sample were deemed college ready in at least one or both subjects; in most cases those students were college ready only in English. In all, 36.5 percent were college ready in English, but just 15.3 percent were college ready in math. And very few—9.2 percent—were college ready in both subjects.

There was a larger share of local or Regents diploma graduates that were college ready in the comparison group compared with the treatment group. The difference between the two groups was statistically significant with about 45 percent of graduates in the comparison group deemed college ready in at least one or both subjects versus less than 40 percent of graduates in the treatment group. The difference between the treatment and comparison groups was larger for those college ready in English—there was a 7.6 percentage-point statistically significant difference between the treatment group (32.6 percent) and the comparison group (40.2 percent). In math, however, there was a difference of just 1.0 percentage point between the treatment group (14.8 percent) and the comparison group (15.8 percent). Among students that were college ready in only one subject, we found statistically significant differences between the comparison and treatment groups. There was a smaller share of students in the treatment group who were college ready in English only and a larger share of students in the treatment group who were college ready in math only. There was also a statistically significant difference in the share of students in the two groups who were college ready in both subjects; the share was greater for the comparison group.

Table 5: Percent of Regents or Local Graduates Who Were College Ready

	Treatment	Comparison	Total
English Only	25.2%	29.4%**	**27.3%**
Math Only	7.3%	4.9%***	**6.1%**
Both English and Math	7.5%	10.8%***	**9.2%**
English, Math, or Both	39.9%	45.1%***	**42.6%**
English With or Without Math	32.6%	40.2%***	**36.5%**
Math With or Without English	14.8%	15.8%	**15.3%**

SOURCE: IBO analysis of Department of Education data
NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.
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Credit Recovery

Under the Department of Education's credit recovery program, struggling students are allowed to earn make-up credits for courses they have failed after completing "targeted, intensive instruction" in particular subjects.[11] The use of credit recovery increased steadily over the years covered in this analysis, with the percent of high school students citywide with at least one credit recovery attempt ranging from 3.7 percent in 2007-2008 to 9.2 percent in 2009-2010.[12] During this time, critics argued that more frequent use of credit recovery in some schools was artificially boosting graduation rates.[13] An internal audit found that the rigor of coursework for students who passed courses using credit recovery may have been less than for those students who passed by traditional means.[14]

In this study, IBO found that a small share of Regents or local diploma graduates in the sample of treatment and comparison students—just 4.1 percent—used credit recovery in English, math, social studies, science, or a foreign language. However, credit recovery was three times more prevalent among graduates in the treatment group compared with graduates in the comparison group. There was a statistically significant difference between graduates in the two groups in the propensity to use credit recovery in a core course. More than 6 percent of graduates in the treatment group—86 students—used credit recovery in a core course; in the comparison group, 28 graduates (2.0 percent) did so. Similar to efforts to improve data integrity for Regents exam scoring, the New York State Education Department has since implemented more stringent requirements for students' use of credit recovery. The changes included: making the opportunity available only to those students who regularly attended class; limiting its use to no more than three credits per student; limiting the time frame only to courses within the past year; and setting strict standards for all online credit recovery programs.[15]

Similar Results: Second Cohort of Schools Phased Out

IBO replicated the analysis for a second and more recent cohort of large comprehensive, low-performing high schools announced for phase out during the 2008-2009 school year and found similar results in terms of graduation rates and differences in the type of the diploma earned. The three phaseout schools were Bayard Rustin High School (Bayard Rustin), Louis D. Brandeis High School (Brandeis), and Franklin K. Lane High School (Lane). Bayard Rustin and Brandeis were located in Manhattan—in Chelsea and the Upper West Side, respectively; Lane was located in

Cypress Hills in Brooklyn near the Queens border. IBO used a similar but amended matching methodology to select an appropriate comparison sample for this cohort of phaseout schools. For more details on our methodology, please see the appendix.

Students' final four-year outcomes yielded similar results to the previous cohort: The shares of graduates in the treatment and comparison groups were low (below 50 percent), but this time student-level regressions found the difference to be statistically significant. The final four-year outcomes showed that the share of graduates in the treatment group (44.6 percent) was significantly lower than the share of graduates in the comparison group (47.2 percent). The differences between the two groups were also statistically significant when considering students' grade level and the type of their diplomas.

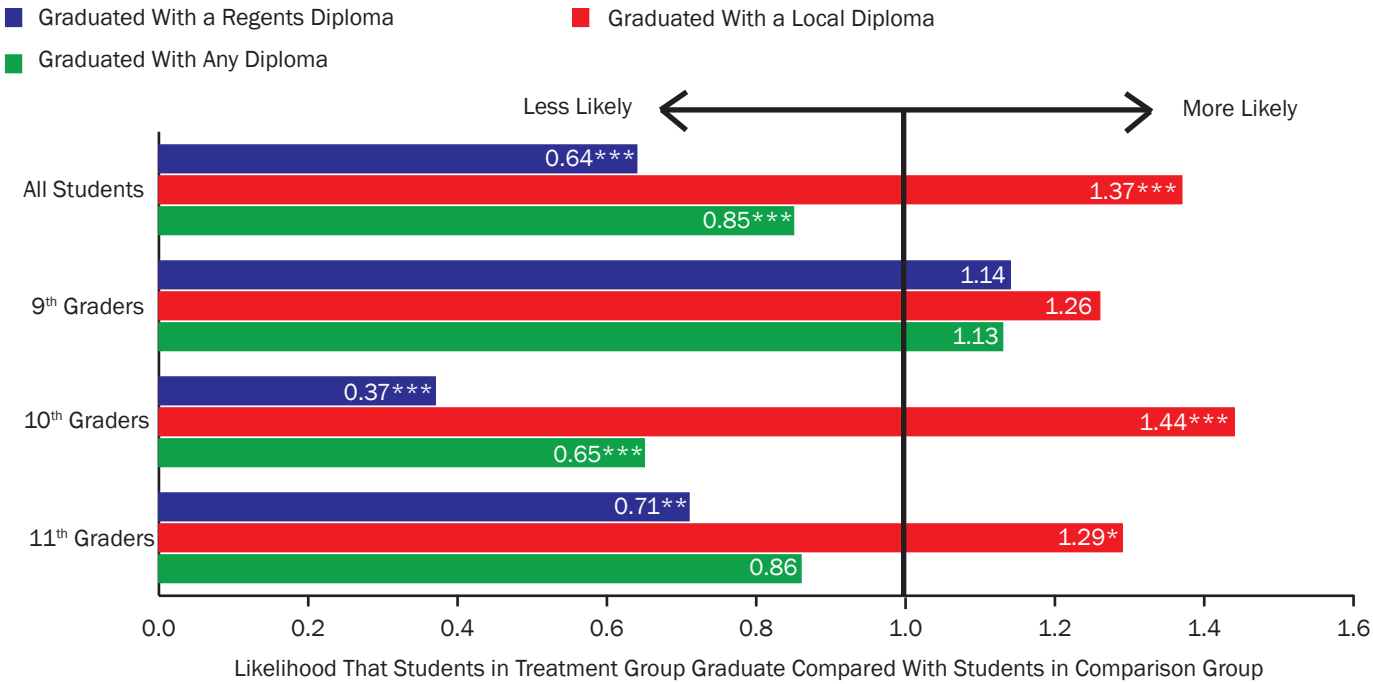
Student-level regressions on the full sample of 7,504 treatment and comparison students, controlling for student demographics, showed that students in the treatment group were 85 percent as likely to graduate as were students in the comparison group (see Figure 3 below). The magnitude of that difference was largest and statistically significant only for tenth graders—tenth graders in the treatment group were 65 percent as likely as tenth graders in the comparison group to graduate on time.

As in the prior cohort, students in the treatment group were more likely to graduate with a local diploma and less likely to graduate with a Regents diploma; these results were statistically significant for the entire cohort, although when looking by grade the differences were significant only for tenth graders. Generally, students in the treatment group were 137 percent as likely to graduate with a local diploma and 64 percent as likely to graduate with a Regents diploma. There was no significant effect for ninth graders in this cohort, presumably because first-time ninth graders could no longer obtain a local diploma. Tenth grade students were 144 percent as likely to obtain a local diploma and 37 percent as likely to obtain a Regents diploma. For eleventh graders, the difference for local diploma graduates was only marginally significant, but the difference for Regents diploma graduates was statistically significant—students in the treatment group were 71 percent as likely to graduate with a Regents diploma.

Conclusion

Historically, there has been evidence that there are long-

Figure 3: Regression Results for Treatment Group Relative to Comparison Group: Predicting Students' Probability of Graduating On Time (Second Cohort of Closing Schools)



Source: IBO analysis of Department of Education data
NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.

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term positive effects of closing failing high schools on the overall quality of New York City's public school system, although much of this research has focused on the performance at schools that replaced the closed schools. This study focused on the students who were attending large comprehensive low-performing high schools when their phase out was announced—the treatment group—along with a comparison group of students matched on the basis of school-level and student-level characteristics.

Based on IBO's analysis of two cohorts of treatment and comparison students—one based on schools selected for phase out in 2006-2007 and their comparison schools and the second based on schools from the 2008-2009 round of closures and their comparison schools—there were some negative impacts on the students in the treatment groups. There was either no impact (for the 2006-2007 cohort analysis) or a negative impact (for the 2008-2009 cohort analysis) on a student's probability of graduating on time. For both cohorts, however, there was a significant negative impact on the type of the diploma obtained by students. Those in the treatment groups tended to earn a local diploma more often and a Regents diploma less often. In both cohorts of closed schools, the impacts on tenth graders were statistically significant. In the earlier cohort, the impacts on ninth graders were also significant. The impacts on eleventh graders were more muted, as expected since they were already close to their expected graduation date at the time of the announcements (though those in the second cohort were less likely to get a Regents diploma).

The recent Research Alliance study looked at the impact of phase outs on first-time ninth graders and they found no significant impact on students' graduation rate or the type of diploma they earned. Their study focused on the large high schools that began phase out from 2003-2004 to 2008-2009 (for Regents and local diploma analyses, schools that began to phase out from 2005-2006 to 2008-2009 were included). IBO's study focused on two cohorts of large high schools that began to phase out in 2006-2007 and 2008-2009. We looked at the impact of phase outs on all ninth, tenth, and eleventh graders who attended those schools when the phaseout was announced and we also found no significant impact on students' probability of graduating on time in the 2006-2007 cohort analysis. We did, however, find that students in the 2008-2009 analysis were significantly less likely to graduate on time. Additionally in both cohorts of phaseouts, we found that students in the treatment group are more likely to earn a local diploma and less likely to earn a Regents diploma. This trend was most prominent among tenth graders in both phaseout cohorts.

Although the distinction between the local and Regents diploma no longer exists, other measures also suggested poorer outcomes for graduates in the treatment group compared with students in the comparison group. Following the greater incidence of local diploma graduates among ninth and tenth graders in the treatment group for the 2006-2007 cohort analysis, IBO observed that those students tended to score exactly a 55 more frequently than students in the comparison group on math, English, science, and world history Regents exams. Local or Regents diploma graduates in the treatment group tended to graduate college ready at a lower rate than students in the comparison group, particularly in English. And though credit recovery was used very infrequently in the sample as a whole, it was about three times more prevalent among graduates in the treatment group than among graduates in the comparison group. While the DOE has since implemented policy changes to improve data integrity by addressing the high incidence of both of these issues, similar adjustments may occur in cases where schools perceive pressure to help students graduate—which calls into question the rigor of the diplomas graduates receive.

The shares of students who graduated on time in both the treatment and comparison groups were very low: less than half of the ninth, tenth, and eleventh graders attending those schools at the time of the closing announcement did so. While there is certainly a strong argument for closing low-performing high schools, these results suggest that policymakers should be aware that, in the past, students that attended those schools at the time of the announcement tended to graduate with less rigorous diplomas than those in otherwise similar schools that were not being phased out.

Not all school districts phase out low-performing schools once selected for closure. For example, in Chicago, the typical approach is to close the school immediately and disperse the students to other schools. Based on the results of this study, it would be appropriate to give consideration to eliminating the phaseout period here in New York. As Governor Cuomo has increased pressure on the de Blasio Administration to close long-struggling New York City high schools, such as Boys and Girls High School—one of the comparison schools used in our analysis—policymakers should be aware of the detrimental effects on the educational outcomes of students attending schools being phased out.[16]

Report prepared by Sarita Subramanian

Appendix: Methodology for Constructing a Comparison Sample

School-Level Matching. The first step in constructing a comparison sample was to select a group of schools that were also large, comprehensive, low-performing high schools that had a high likelihood of being on the phaseout list but were not. Using stepwise logistic regression we predicted a school's probability of being on the phaseout list in 2006-2007 after controlling for both the demographic composition of students and their academic performance in the prior school year. The variables included for 2005-2006 were: the four-year graduation rate, the ethnic composition, the share of ELL students, the share of students in special education, the share of students qualifying for free or reduced-price lunch, the average student attendance rate, the share of students with an attendance rate below 90 percent, incoming students' average z-scores in ELA and math, school utilization rate, and school enrollment. The regression also accounted for three-year trends in: incoming students' ELA and math scores and the four-year graduation rate.

The results of this analysis indicated that the 2005-2006 four-year graduation rate most accurately predicted the probability of the school being on the closing list in 2006-2007. This probability is also known as a propensity score. There were many schools that had propensity scores that were close to the three phaseout schools but were eliminated as potential comparison schools because they were fundamentally different from the phaseout schools. The types of schools that were excluded were: career and technical education schools (specialized vocational schools), small schools, and schools that ended up on future phaseout lists during the years students were tracked.[17] After these exclusions, five schools were chosen as comparison schools: Jamaica High School, Flushing High School, Boys and Girls High School, Norman Thomas High School, and Newtown High School (see Table A1 below).

Table A1: School-Level Matching Results

School Name	School Group	Four-Year Graduation Rate (2005-2006)	Propensity Score
Newtown High School	Comparison	43.2%	4.2%
Norman Thomas High School	Comparison	43.1%	4.3%
Boys and Girls High School	Comparison	42.7%	4.4%
Flushing High School	Comparison	41.8%	4.7%
Jamaica High School	Comparison	41.7%	4.8%
Samuel J. Tilden High School	Treatment	39.0%	5.9%
Lafayette High School	Treatment	37.2%	6.7%
South Shore High School	Treatment	32.7%	9.5%

SOURCE: IBO analysis of Department of Education data

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A second step in our sampling procedure was needed because the students in these comparison schools, taken as a whole, differed significantly from the treatment group on all but 2 of the 11 student-level measures observed before the closing announcement, referred to as the pretreatment measures. In order to make valid comparisons between the treatment and comparison groups, it was critical that, of the characteristics that we could measure with the available data, the only one differentiating the students in the two groups was the school that they attended at the time of the announcement. Thus, we chose to select a sample of students in the comparison schools who matched those in our treatment schools on the important pretreatment characteristics. A second level of propensity score matching was done at the student level, matching each student in the treatment group with one of the 11,500 ninth, tenth, or eleventh grade students that attended 1 of the 5 comparison schools.

Student-Level Matching. Similar to the school-level matching, we used logistic regression to predict a student's probability of attending a school that was announced for phaseout in 2006-2007, controlling for demographic factors. The same variables as were used for the school-level matching were used in this second stage with the addition of one variable: a student's progress towards earning a diploma in 2006-2007. The matching process was completed separately in four groups, depending on what eighth grade test score data was available for treatment and comparison students. (Students entering a New York City high school from outside the system would not have eighth grade scores available in our data system.) The four groups were based on availability of ELA and/or math test score data and students were only matched to other students with similar availability of test score data. For example, treatment students for whom eighth grade test score data were not available were only matched to students in comparison schools for whom eighth grade test score data were not available. Students were matched on

Table A2: Tabulation of Matches for Each Student in the Comparison Group

Number of Times Comparison Student Matched	Frequency	Percent of Matches
1	1,998	75.20%
2	448	16.90%
3	129	4.90%
4	48	1.80%
5	18	0.70%
6	6	0.20%
7	1	0.00%
8	4	0.20%
9	2	0.10%
10	1	0.00%
11	1	0.00%
TOTAL	**2,656**	**100.00%**

SOURCE: IBO analysis of Department of Education data

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four dimensions: the propensity score (approximate match), attendance rate (approximate match), gender (exact match), and grade level (exact match).[18]

Because the goal was to find the best match for each student in the treatment group, students were matched with replacements. This meant that one student in the comparison group could be matched to multiple students in the treatment group. Still, 75 percent of the matched pairs were unique, and over 92 percent of students in the comparison group were matched to two or fewer treatment students (see Table A2 on this page). Three comparison schools accounted for 71 percent of matched students: Newtown High School, Boys and Girls High School, and Jamaica High School.

Table A3: The Treatment and Comparison Groups Were Balanced on All Pretreatment Variables

	All Students	
	Treatment	Comparison
Over Age	46.29%	46.29%
Male	54.72%	54.72%
Asian or White	10.47%	10.42%
English Language Learner	19.58%	19.53%
Self-Contained Special Education	8.38%	8.35%
Integrated Special Education	2.37%	2.09%
Free or Reduced-Price Lunch Eligible	36.80%	37.37%
Attendance Rate	70.06%	70.14%
Progress Towards Diploma	18.48%	17.98%
Average Eighth Grade ELA Z-Score	-0.47	-0.47
Average Eighth Grade Math Z-Score	-0.51	-0.51
Number of Students	3,677	3,677

SOURCE: IBO analysis of Department of Education data

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The matched samples for the treatment and comparison groups were balanced on all of the pretreatment variables (see Table A3 bottom left). That is, students in both groups were not significantly different from each other in terms of demographic characteristics.

Comparison Group Construction for 2008-2009 Cohort of Phaseout Schools

A similar but amended matching methodology was used to identify comparison schools separately for each phaseout school based on the school's propensity scores. Since this cohort of phaseout schools came later, there were fewer large, comprehensive low-performing high schools remaining as match candidates, so IBO did not limit the potential comparison schools by school size. However, career and technical education schools and transfer schools (those that served only students who were over age and under-credited) were again excluded as possible comparison schools.

Additionally, there were greater differences among the phaseout schools themselves. For example, Lane had a graduation rate of 28.9 percent in 2007-2008, the year prior to the announcement, while Brandeis and Bayard Rustin had graduation rates of 32.4 percent and 48.2 percent, respectively. The schools' attendance rates varied as well, though far less than their graduation rates—from 68.5 percent at Lane to 77.8 percent at Bayard Rustin. The attendance rate turned out to be the best predictor of a school's probability of being on the phaseout list in 2008-2009 after controlling for students' demographics and academic performance in the prior school year. Still, Lane was found to have a much higher probability of being on the phaseout list compared with the other two treatment schools. In other words, based on the set of statistics that did the best job of predicting whether a school would be on the phaseout list in 2008-2009, Lane was a much more likely candidate than Bayard Rustin or Brandeis.

Each treatment school was matched to at least one large comprehensive high school, and one large school was used as a comparison school for two of the treatment schools (see Table A4on the next page for the matching results). Bayard Rustin had four comparison schools: Unity Center for Urban Technologies, Monroe Academy for Visual Arts & Design, Legacy School for Integrated Studies, and John Adams High School—the only large school. Brandeis had two comparison

Table A4: School-Level Matching Results for 2008-2009 Cohort of Phase Out Schools

School	Attendance Rate (2007-2008)	Propensity Score
Bayard Rustin	**77.8%**	**3.5%**
Unity Center for Urban Technologies	78.2%	3.1%
Monroe Academy for Visual Arts & Design	77.5%	3.8%
Legacy School for Integrated Studies	77.3%	4.0%
John Adams High School	77.3%	4.0%
Brandeis	**75.3%**	**6.8%**
Metropolitan Corporate Academy High School	76.3%	5.3%
Washington Irving High School	73.0%	12.8%
Frederick K. Lane	**68.5%**	**35.3%**
Washington Irving High School	73.0%	12.8%
Bronx High School for Medical Science	68.3%	36.2%

SOURCE: IBO analysis of Department of Education data
NOTE: Data for the three schools in the treatment group are shown in bold, with data for their respective comparison schools listed below.
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schools: Metropolitan Corporate Academy High School and Washington Irving High School. Washington Irving High School also served as a comparison school for Lane, as did the Bronx High School for Medical Science.

A second-level student match was also completed to find a comparison student for each student in the treatment group; the student matches were chosen separately for each treatment school because their comparison schools differed. Students were matched by the propensity score (approximate match), gender (exact match), and grade level (exact match). For Franklin K. Lane, ELL status (exact match) and special education self-contained status (exact match) were also added to the matching algorithm because there was not balance in those two variables in the treatment and comparison group samples without matching explicitly on both variables.

Regression Results: 2006-2007 Cohort of Phaseout Schools

Table A5: Regression Results for Treatment Group Relative to Comparison Group: Predicting Students' Probability of Graduating on Time

	All Students	Ninth Graders	Tenth Graders	Eleventh Graders
Treatment Group	0.90*	0.91	0.83*	0.91
Progress Towards Graduation	1.04***	1.06***	1.04***	1.03***
Attendance Rate (percent)	1.07***	1.07***	1.08***	1.07***
Male	0.56***	0.52***	0.59***	0.57***
Asian or White	0.94	1.18	0.92	0.52**
Over Age	0.73***	0.54***	0.81*	1.15
English Language Learner	0.57***	0.56***	0.53***	0.57***
Special Education Self-Contained	2.15***	1.69***	2.93***	2.23***
Special Education Integrated	1.66***	1.16	2.08***	1.62
Free or Reduced-Price Lunch Eligible	0.99	1.05	0.93	0.95
Tenth Grade	0.96	--	--	--
Eleventh Grade	1.16	--	--	--
Percent Correct Prediction	81.6%	82.7%	79.6%	82.2%
Percent False Positives	22.3%	29.2%	25.2%	17.0%
Percent False Negatives	16.0%	14.5%	16.5%	20.8%
Number of Students	7,354	3,390	2,534	1,430

NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.

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Table A6: Regression Results for Treatment Group Relative to Comparison Group: Predicting Students' Probability of Graduating with a Local Diploma on Time

	All Students	Ninth Graders	Tenth Graders	Eleventh Graders
Treatment Group	1.44***	1.95***	1.29**	1.09
Progress Towards Graduation	0.99***	1.00***	0.99***	0.98***
Attendance Rate (percent)	1.05***	1.06***	1.06***	1.04***
Male	0.74***	0.72***	0.75***	0.75**
Asian or White	0.52***	0.47***	0.66**	0.40***
Over Age	0.88	0.67***	0.85	1.20
English Language Learner	0.75	0.91	0.67***	0.61
Special Education Self-Contained	0.33***	0.82	0.40***	0.07***
Special Education Integrated	0.83	0.95	1.10	0.34***
Free or Reduced-Price Lunch Eligible	0.99	1.10	1.04	0.81
Tenth Grade	2.25***	--	--	--
Eleventh Grade	5.57***	--	--	--
Percent Correct Prediction	81.1%	88.6%	77.8%	69.4%
Percent False Positives	40.7%	100.0%	53.5%	38.4%
Percent False Negatives	17.5%	11.3%	21.1%	27.4%
Number of Students	7,354	3,390	2,534	1,430

NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.

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Table A7: Regression Results for Treatment Group Relative to Comparison Group: Predicting Students' Probability of Graduating with a Regents Diploma on Time

	All Students	Ninth Graders	Tenth Graders	Eleventh Graders
Treatment Group	0.51***	0.41***	0.52***	0.89
Progress Towards Graduation	1.07***	1.06***	1.06***	1.11***
Attendance Rate (percent)	1.06***	1.07***	1.06***	1.06***
Male	0.69***	0.54***	0.77**	0.98
Asian or White	1.57***	1.94***	1.27	1.04
Over Age	0.65***	0.56***	0.76*	0.70*
English Language Learner	0.75**	0.54***	0.75	2.82***
Special Education Self-Contained	0.04***	0.00	0.19	0.00
Special Education Integrated	0.88	1.02	0.38	3.75
Free or Reduced-Price Lunch Eligible	0.99	1.01	0.90	1.34
Tenth Grade	0.18***	--	--	--
Eleventh Grade	0.03***	--	--	--
Percent Correct Prediction	89.1%	89.4%	88.9%	87.8%
Percent False Positives	25.3%	36.2%	27.2%	22.2%
Percent False Negatives	8.7%	9.2%	8.3%	7.7%
Number of Students	7,354	3,390	2,534	1,430

NOTE: One asterisk (*) denotes statistical significance at the 10 percent level, two asterisks denote statistical significance at the 5 percent level, and three asterisks denote statistical significance at the 1 percent level.

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ENDNOTES

[1]For more details on the Renewal Schools program, see IBO's Focus On: The Executive Budget, "Alternative to School Closure: Significant Resources Directed Towards 94 Renewal Schools."
[2]"In a first, Chancellor Farina will move to close three struggling district schools," Patrick Wall, Chalkbeat, December 14, 2015, accessed December 15, 2015.
[3]Three reports that have analyzed student performance in schools that have phased out and their replacement schools are: The Center for New York City Affairs' report entitled "The New Marketplace: How Small-School Reforms and School Choice Have Reshaped New York City's High Schools," MDRC's report entitled "Transforming the High School Experience: How New York City's New Small Schools are Boosting Student Achievement and Graduation Rates," and New York University's Institute for Education and Social Policy's report entitled "Does Small High School Reform Lift Urban Districts? Evidence From New York City."
[4]The Research Alliance for New York City Schools, "High School Closures In New York City: Impacts on Students' Academic Outcomes, Attendance, and Mobility," November 2015.
[5]IBO has published several reports documenting the increasingly disproportionate populations of students with greater academic need in phaseout schools, including: "Demographics, Performance, and Resources: Schools Proposed for Closing Compared with Other City Schools," "Statistical Profile of Schools on DOE's 2012 Closure List," and "Statistical Profile of Schools on DOE's 2013 Closure List." Other articles and reports have provided anecdotal reports on the effects on nearby schools: "Once sold as the solution, small high schools are now on the back burner," Hechinger Report, Meredith Kolodner, September 29, 2015, accessed December 10, 2015; and a Center for New York City Affairs report from 2010 entitled "A Case of Collateral Damage."
[6]The z-score represents the number of standard deviations away from the citywide average that the student's test score falls. A negative z-score means the student's test score fell below the average; a z-score of zero means the student's test score is equal to the average; a positive z-score means the student's test score was above the average.
[7]The student-level data available to IBO does not include enough information to determine whether a student left for a school outside the city or left for a nonpublic school in the city.
[8]Originally, a student could obtain a local diploma by passing five Regents exams with a grade of at least a 55 on each; a Regents diploma was awarded with a passing grade of at least 65 on five Regents exams. As the local diploma began being phased out, each subsequent entering cohort of ninth graders had to pass an additional test at 65 rather than at 55. For example, in this sample, the ninth graders were awarded a local diploma if they passed two Regents exams at 55, but they needed a 65 on the other three exams. The tenth graders could get a local diploma by scoring a 55 on three exams and a 65 on the other two exams.
[9]T-tests were used to identify statistically significant differences (at the 5 percent level) between students in the treatment and comparison groups.
[10]DOE press release from February 23, 2012 "New York City Department of Education Announces New Data Integrity Protections", accessed April 14, 2014.
[11]Ibid.
[12]New York City Independent Budget Office, "New York City Public School Indicators: Demographics, Resources, Outcomes," July 2014, Table 4.16.
[13]"Critics blast credit recovery as city data reveals frequent use by public high school students," New York Daily News, September 24, 2013, accessed April 13, 2015.
[14]DOE press release from February 23, 2012 "New York City Department of Education Announces New Data Integrity Protections," accessed April 14, 2014.
[15]Ibid.
[16]"'Failing' city schools running out of time to avoid closure," New York Post, January 6, 2015, accessed January 6, 2015.
[17]Two of the schools that were chosen as comparison schools were later phased out themselves; however they were announced for phase out only after the 2009-2010 school year, through which outcomes for the youngest cohort, the ninth graders, were tracked.
[18]The attendance rate was added to the matching algorithm since there was not balance in attendance rates in the treatment and comparison group samples without matching explicitly on attendance.