

Appendix (not for publication)
The Elite Illusion: Achievement Effects
at Boston and New York Exam Schools

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A Boston Appendix

Differential Attrition

The figures and estimates with test outcomes were constructed from samples of students who apply to exam schools and for whom we have post-admissions test scores. Students near admissions cutoffs should be similar at the time of application if the regression discontinuity is to approximate an experimental design. Subsequent attrition may lead to differences in the follow-up sample, unless the attrition process is also random. In other words, a threat to our research design is differential and selective attrition by exam offer status. For instance, students just below the cutoff may be less likely to be found than students above the cutoff if students below the cutoff leave the public school system when they do not obtain an exam offer. Differential attrition generates selection bias which in turn may compromise the estimates. One simple test for selection bias is to look at the effect offers have on the likelihood that an applicant contributes MCAS scores to our sample. If differences in follow-up rates are small, then selection bias from differential attrition is also likely to be modest.

Table A1 reports the fraction of exam school applicants with follow-up scores in the discontinuity sample. Between 76-89% of applicants have a follow-up score. This relatively high follow-up rate is likely due to the requirement that our applicant sample is limited to students who were enrolled in BPS at baseline. Follow-up differentials are estimated using both the parametric and IK approach that parallels the estimates presented in Table 4. Most of the estimated differentials for math and English are small and not significantly different from zero using either the parametric or IK method. While the follow up differential is about 3% in the

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All Schools column, this difference seems unlikely to explain our findings as the most likely scenario is that relatively high achievers who miss the cutoff exit the public school system.

Discontinuities in Covariates

Another potential concern with our research design is that exam school offers are not the only variable that changes in a discontinuous manner at admissions cutoffs. If covariates other than the ranking of the applicant are used in the assignment mechanism, then these covariates may confound the interpretation of test score differences at cutoffs as being based solely on exam school offers. The fact that exam school admissions take place in the BPS central office suggest that it is unlikely that schools have much discretion in selecting which applicants obtain offers at particular schools. Nonetheless, discontinuities in the characteristics of applicants may arise in situations where the admissions process is compromised.

We briefly examine this possibility in Table A2. The table reports estimates from models which parallel the reduced-form, but each dependent variable is a covariate. Most of the entries in the table are not statistically significant, with few exceptions. 9th grade offers at Boston Latin are less likely to be black and to receive subsidized lunches according to estimates from the parametric model. These differences are no longer statistically significant with the IK method, which suggests that these are chance findings due to the small number of black and low-income students in the Latin school's grade 9 discontinuity sample. Moreover, the 9th grade applicant sample begins in 2001, after the end of racial preferences. For 7th grade, applicants above the admissions cutoff are *more* likely to be black, casting doubt on a situation where the admissions process is compromised. The p-values from the joint tests of significance of the coefficients lead us to conclude that the few significant differences in covariates seem like chance findings, and discontinuities in covariates do not explain the pattern of our results.

B New York Appendix

Differential Attrition

Table B1 reports estimates of NYC follow-rates as following Table A1. The follow-up rate is lowest for math since many applicants take these Regents exams before 9th grade. For the other subjects, the follow-up rates range from 80-87%. For instance, 80% of students in at least one discontinuity sample have follow up Advanced Math scores, while 87% have follow-up English scores. While some of the attrition differentials are significantly different from zero at school cutoffs, in the All Schools column, the differences are relatively small. For instance, the follow-up differential for English is about 3%, a result which is only significant with the IK method. Advanced Math and Global History have attrition differences of about 4-5% in the All Schools model either with the parametric or IK method, and most of this difference is driven by students from the Brooklyn Technical cutoff.

Discontinuities in Covariates

As in Boston, the NYC admissions process is run in the central office, suggesting limited scope for school discretion in making assignments. In Table B2, we report differences in covariates on

either side of cutoffs which parallel those reported in Table A2. While students are more likely to be Hispanic and less likely to obtain a free lunch near the Stuyvesant cutoff, these differences are muted with the IK method. Even though there are a few small differences at particular school cutoffs, the estimates from the All Schools model do not suggest discontinuous changes in covariates at offer cutoffs. The p-values from the joint test that all covariate discontinuities are significant supports this conclusion in the All Schools model.

Subgroups

New York’s exam schools enroll fewer blacks and Hispanic students than in Boston’s exam schools. About 7.6% of enrolled students are black and 6.7% are Hispanic in New York, compared to 24% and 15%, respectively for 7th graders in Boston. Table B3 presents reduced-form estimates for subgroups by race and sex in New York. Unlike Boston, the results for minorities do not support Regents achievement gains at exam schools. For instance, the impact on English for black or Hispanic students is 0.02σ (with standard error 0.04). The last two columns do not show positive impacts for either sex.

The estimates for New York’s high achievers and for those away from admissions cutoffs in Table B4 are constructed in the same way as for Boston. While almost no student in the discontinuity sample scores below a 65 (a failing grade) on Regents exams, there is still variation in score performance for the high achieving subgroups. Regents scores of 85 or higher are needed for Regents Diplomas with Advanced Designation. For Advanced Math, only 57% of students in the upper half of the baseline score distribution score 85 or more. For other outcomes, this fraction ranges from 71% for Living Environment to 94% for U.S. History. The estimates for these outcomes indicate little evidence for Regents score gains for high achievers, just as in Boston.

C Data Appendix: Boston

Boston Public Schools is the source for four datasets: the exam school application file, the enrollment file which contains student demographic and school attendance information, the Massachusetts Comprehensive Assessment System (MCAS) test score file, and the College Board test file which contains PSAT, SAT and AP scores. This appendix describes these data sets and the procedures used to construct the analysis sample.

C.1 Data Sets

Exam school application file

Data description and sample restrictions

The exam school application file contains a record for each student consisting of a registration number, application year, grade, date of birth, preferences over three exam schools, and scores on the ISEE verbal, quantitative, reading and math sections. Each record also includes the rank of each student by the exam schools on their preference list and the school where the student receives an offer (if any). This dataset covers students in grades 7, 9, and 10 and

application years 1997-2008. Since there are a small number of grade 10 applicants, we kept students applying for grades 7 and 9 only.

Table C1 indicates the steps involved in processing the exam application file. We excluded duplicate observations, applicants from private schools and those who did not rank or were not ranked by any exam school. We also dropped students who obtained an offer at an exam school that is not on their preference list.

Coding the offer variable

For each applicant, the exam school application file indicates whether the student receives an offer at one school on their preference list. For a given application year, grade, and school, we computed the lowest-ranked student to obtain an offer from that school. Each student is then coded as obtaining an offer at an exam school if her score is above this minimum cutoff for any school that is on her preference list.

Enrollment file

Data description

The BPS enrollment file spans school years 1995-1996 through 2008-2009. Each record contains an end-of-year (June) snapshot for each student enrolled in Boston Public Schools, with unique student identifier (the BPS ID), the student's grade and school, and demographic information.

Coding of demographics and attendance

The variables of interest in the enrollment file are grade, year, date of birth, sex, race, special education (SPED) and limited English proficiency (LEP) status, subsidized lunch eligibility, and school. Students are coded as attending an exam school if their year-end enrollment is at an exam school. Years at an exam school is the total number of years where a student is at an exam school at the end of the year. We transformed the enrollment file into a wide-format layout for each student where we compute the grade and exam school years attended for a given year. Finally, we kept only students that attend Boston Public Schools in 6th or 8th grade and use their demographic information from that year.

MCAS test file

Data description and sample restrictions

Each record in the MCAS test file contains a student identifier (BPS ID) and scores on MCAS tests in a given year. We used data from school years 1999-2000 through 2008-2009. The scores we look at are math and English Language Arts (ELA) for grades 4-10. The MCAS test file contains raw scores for all BPS test takers for math, English Language Arts, Writing, and Science. As shown in Table C2, the number of grades tested has increased over time. MCAS Math for grade 8 was the first examination offered in 1999. By the end of our data, there are tests for math and English tests at grade 7, 8, and 10. Baseline scores for grade 7 applicants are from 4th grade MCAS exams. For 9th grade applicants, baseline math is from

8th grade math and baseline English is from 7th grade English, since the 8th grade English exam is first offered in 2006.

We standardized scores to have mean zero and standard deviation one within a subject-grade-year among all test-takers in Boston Public Schools. When there is more than one test score for a student for a particular subject, we used the earliest available one. We converted the file to a wide-format structure where each row contains all available MCAS scores for a student.

College Board test file

Data description and sample restrictions

The College Board provides BPS with reports on the test performance of all BPS test-takers from 2004-2005 through 2009-2010. These files come with the name, date of birth, address, gender, school of test, and test year for each exam. BPS matched the PSAT file for October 2004 and October 2005, the SAT file which is available from 2005-2009, and the Advanced Placement test file, available from 2005-2009. The timing of these tests for our applicant cohorts is shown in Table C2.

The PSAT file is not matched to BPS student IDs for years 2006-2009, so we had to link College Board files to BPS files for these years. The address information in the College Board file is entered by the test-taker and does not immediately concord with the BPS address system. There also appear to be small errors in the date of birth in the College Board file for similar reasons. Our procedure to match these files to the BPS registration files is as follows. First, we take all unique year, date of birth, gender, school of test, and zip code matches between the BPS registration file and the College Board PSAT file. Among the remaining unmatched PSAT records, we take all unique year, date of birth, gender, and school of test matches between the two files. Finally, for the remaining unmatched PSAT test records, we hand-matched the records for these four years to the closest record in the registration file, attempting to correct mismatches due to address misspellings or typos in the date of birth.

BPS students take AP exams across a range of subjects. The tests with 500+ or more takers are Calculus AB, Statistics, Biology, Chemistry, Physics B, English Language and Composition, English Literature and Composition, European History, US Government and Politics, US History, Microeconomics, Macroeconomics, and Spanish Language. The other tests are Art History, Art: Drawing, Art: 2D Design, Art: 3D design, Chinese Language and Culture, Computer Science A, Computer Science AB, Environmental Science, French Language, French Literature, German Language, Comparative Government and Politics, Latin: Vergil, Latin: Literature, Calculus BC, Music Theory, Physics C: Mechanics, Physics C: Electricity and Magnetism, Spanish Literature, and World History.

We standardized the PSAT and SAT scores to have mean zero and standard deviation one within a year among all test-takers in Boston Public Schools. When there is more than one test score for a student, we used the earliest available one. We only use applicant cohorts for whom we might expect to observe PSAT, SAT or AP exams; these are summarized in Table C2.

C.2 Matching Data Sets

Match from the MCAS test file to the enrollment file

Match criteria

The MCAS test file and enrollment files are merged by grade, year, and BPS ID. Any test record that is not be matched to the enrollment file is dropped.

The exam applicant file is matched to the enrollment/MCAS file using an auxiliary table that links exam registration number to BPS ID. This table provides a BPS ID for each exam registration number. For a small number of cases, an exam registration number is matched to more than one BPS ID. In these cases, we matched to the registration number to the BPS ID where the date of birth is the same between the exam applicant and enrollment file.

Match rates

Table C3 reports match rates from exam applicant file to the enrollment/MCAS file. The overall match rate is 96.6 percent (13,730 out of 14,212) for grade 7 applicants and 99.6 (6,155 out of 6,181) for grade 9 applicants. The match rate for offered students in grade 7 is 96.9%, while the match rate for students who were not offered is 96.3%. The lower match rates come from earlier application years 1997-2000. The match rate for not offered is larger than for offered for three of these years, and the differences in match rates are small. For grade 9, where the application cohorts start in 2001, the match rate for offered students is 99.9%, while for non-offered it is 99.5%. Applicants who are not matched to the enrollment file at baseline are dropped as are applicants who enrolled in an exam school before application. This latter restriction only impacts grade 9 applicants, as can be seen comparing columns (7) and (8) of Table C1.

C.3 Construction of the Analysis Sample

The size of the final analysis sample is presented in column (8) of Table C1.

Stacking grades

Some of the analysis stacks grades and includes multiple test scores for individual students. For each student in an application year, Table C4 reports the number of students with at least one follow up test score (column (2)). It also presents the number of test scores expected for each cohort and the number of test scores observed for both math and English. For example, a 7th grade applicant for the 2005-2006 school year contributes math scores in grade 7 (Spring 2006), 8 (Spring 2007), and 10 (Spring 2009). Hence, we expect 3,285 math scores from the 1,095 applicants for this cohort, and we observe at least one score for 1,001 students, which corresponds to a total of 2,650 student-score observations. On the other hand, a 7th grade applicant for the previous school year contributes one fewer test score (no grade 7 math). Table C5 shows a related analysis of expected follow up for PSAT, SAT and AP scores.

D Data Appendix: NYC

The New York City Department of Education is the source for three datasets: the exam school application and Student Enrollment Office (formerly, OSEPO) files which contains demographic information, the registration file which contains school attendance information, and the NYSED and Regents test score file. This appendix describes these data sets and details the procedures used to construct the analysis sample.

D.1 Data

Exam school application and Enrollment Office files

Data description and sample restrictions

The exam school application file is maintained by the Enrollment Office, which runs high school admissions. All applicants must take the Specialized High School Admissions Test (SHSAT) to apply to an exam school. On test day, students also submit a ranking of exam schools. At a later date, students are also required complete a New York City Public High School Admissions Application and submit it to their guidance counselor.

Several Enrollment Office files are used in the analysis. The first contains a record for each student indexed by their ID number (OSISID) and their score on the SHSAT. For each student, the exam school offer file contains a list of the schools ranked and an indicator for the school at which the student obtains an offer (if any). The Enrollment Office student file has demographic information such as grade, sex, race, home language code, and borough of residence for each student. There are also separate files indicating special education and limited English proficiency for each student. Each file for a given application year contains an OSISID number for each student, which allows us to merge the files together.

Registration and enrollment files

Data description and sample restrictions

The NYC registration file is from the Office of School Performance and Accountability and is available as part of data underlying school progress reports. The registration and enrollment cover all public school students in grades 9 to 12 for school years 2002-2003 through 2008-2009. This data set includes each student's NYC ID, grade, and current school as of October in the school year. The registration data are used to determine whether and for how many years a student enrolls in an exam school, where a student who is enrolled in October is counted as enrolling for the entire year. Starting in 2004-2005, there is a separate file which contains a list of all students who obtain a subsidized school lunch in that year. This variable is used to code subsidized lunch status for applicants using the application year. For applicants in 2003-2004, 2004-2005, and 2005-2006, we used the lunch status record from 2004-2005. For application cohort in 2006-2007, we used the lunch status record from 2005-2006.

Table D1 indicates the steps involved in processing the exam application file and merging it with the Student Enrollment files. From the file of exam applicants, we eliminated private school applicants (based on whether their OSISID starts with the letter "A") and those who do not submit a New York City Public School Admissions Application (based on the Round 1 HS ranking file). The 4,000-5,000 private school applicants are excluded because these students do

not have a NYC ID at the time of application, they do not have baseline information, and the relevant counterfactual for this population is unlikely to be a regular NYC public high school. We also excluded students who did not rank at least one of the three original academic exam schools: Bronx Science, Brooklyn Technical, and Stuyvesant.

Baseline test files

Data description and sample restrictions

The NYC Department of Education also provided us with NYSED grade 8 standardized exams in math and English Language Arts for all public school students for years 2002-2003 through 2007-2008. These tests are taken in the winter of grade 8 and are required of all public school students in the state. These tests serve as our baseline math and English scores.

Regents test file

Data description and sample restrictions

The NYC Regents test file contains the date and raw score for each tested student. Regents exams are mandatory state examinations where performance determines whether a student is eligible for a high school diploma in New York. There are Regents examinations in English, Global History, US History, and multiple exams in math and Science. A Regents exam typically has a multiple choice section and a long answer or essay component, and each exam usually lasts for three hours. The English exam, however, consists of two three-hour pieces over two days. The exam has a locally graded component and ? illustrate how test scores bunch near performance thresholds.

The New York State Board of Regents governs and designs the Regents exams. Starting in 2005, they started to modify the math exams. At the beginning of our sample, the two math exams were Elementary Algebra and Planar Geometry (Math A) and Intermediate Algebra and Trigonometry (Math B). Two new math exams, Integrated Algebra I (Math E) and Geometry (Math G), have since been phased in. Since students typically either take Math A or Math E, we focus on the score on the test taken first, taking the Math A score when both are contemporaneous. Likewise, students typically either take Math B or Math G, so we focus on the score which comes first, taking the Math B score when both are contemporaneous. We denote the first test outcome as ‘Math’ and the second outcome as ‘Advanced Math’. There are Regents science exams in Earth Science, Living Environment, Chemistry, and Physics. The science outcome we focus on is Living Environment because it is the only Regents science exam required to obtain a state high school diploma.

In Table D3, for each test, we report the number of applicants and the number of test scores we observe. English and U.S. History Regents exams are typically taken in 11th grade. For the 2006-2007 applicants, we expect to observe these scores in the 2009-2010, a year after the Regents test score file’s last date. Even though there are a small number of students who take these exams before the 11th grade, we do not examine Regents English and U.S. History outcomes for the 2006-2007 applicant cohort, since the vast majority do not.

Since students may take Regents exams multiple times, there can be multiple test scores per student in the Regents test file. Table D3 presents the number of students who have taken each exam more than once among the exam applicant sample. This fraction is about 10%, with

slightly higher retake rates for math and Global History. Some students may also take Regents exams before exam school enrollment. Table D3 shows the fraction of students who take exams before enrolling in an exam school. A large fraction of exam school applicants take math before enrolling. Most Regents exams are offered in January, June, and August, with most students usually taking tests in June.

For some subjects, such as Global History, most applicants take the test at the end of 10th grade. For other tests, such as math (Math A or E), many students take the exam before entering high school and some students take the exam multiple times. The exact number of students who take the exam before 9th grade, the number who take the exam more than once after 9th grade, and the number who take the exam on a date other than the most common date are presented in Table D3. For each test where there is a re-take, we only use the first test outcome.

For each test, students who have scores before the 9th grade are omitted because they tested prior to potential exam enrollment. If a student takes the test more than once after 9th grade, we used the test score from the earliest date. There are a small number of cases where there is more than one score on the same date, and this date is the first date after entering 9th grade. In some of these cases, there are two different test codes, where one code ends with a “2.” We used the score corresponding to the test that does not end with a “2.” Otherwise, we treated the score as missing.

For each subject, we standardized scores to have mean zero and standard deviation one within year-semester-subject among the universe of students: 8th graders from public school who participated in Round 1 of the HS Admissions process, have valid demographic information, and did not take the SHSAT test in a previous year.

D.2 Matching Data Sets

Match between Exam Applicant file and Enrollment Office student file

We matched the exam application to the student file using the OSISID. Table D2 shows the match rates. Nearly every student who has applied to an exam school can be matched to the corresponding Enrollment Office student file. The student file allows us to identify whether an applicant is in grade 8 or 9. Since there are a limited number of 9th grade applicants for grade 10 spots, we kept only students applying for grade 9. Finally, our sample is limited to first-time SHSAT takers.

Coding the offer variable

For each exam school and applicant year, the exam school offer file indicates the school at which a student obtains an offer (if any). The offered school is the student’s most preferred school where a student has a high enough SHSAT score. For each school, we computed the minimum score needed to obtain an offer at each exam school. We coded anyone with an SHSAT score above the lowest score offered as having received an offer.

Coding Attendance

Students are coded as attending an exam school if they are enrolled at an exam school in the registration file.

D.3 Construction of the Analysis Sample

After processing the exam application file, we next matched it to the registration file for grade 9. An exam applicant may not match to the registration file if she leaves New York City's Public Schools following application. Such an applicant would not contribute any follow up scores.

To generate the final analysis dataset, we merged the student registration and test file with the exam application file. The exam application file contains the NYC ID, a list of exam schools that students have ranked, and the student's raw SHSAT test score. This data spans four cycles of admissions years: 2003-04 through 2006-07.

Next, we merged baseline scores for students for whom they are available. Finally, we merged the dataset of cleaned Regents outcome scores. For each test, we compute the implied years of exam school attendance based on the test date and enrollment status. If a student took a Regents test in the fall semester, we computed years assuming the exam date is January 31st. Otherwise, we compute years assuming the exam date is June 1st. The resulting file is our analysis sample. An applicant who is matched to the registration file for grade 9 may not contribute follow up scores if the applicant leaves New York City's Public Schools before taking a Regents exam. The last column of Table D1 indicates the sample of students who contribute at least one follow up score.

Table A1. Boston Attrition Differentials

Application Grade	Test Grade	Fraction with Follow Up	Parametric Estimates				Non-parametric (IK) Estimates			
			O'Bryant (1)	Latin Academy (2)	Latin School (3)	All Schools (4)	O'Bryant (5)	Latin Academy (6)	Latin School (7)	All Schools (8)
<i>A. Math</i>										
7th	7th and 8th	0.879	0.066	0.035	-0.033	0.024	0.042	0.044*	0.003	0.030*
			(0.054)	(0.044)	(0.043)	(0.032)	(0.029)	(0.023)	(0.024)	(0.016)
		7576	3284	3229	2899	9412	3079	3229	2819	9127
7th and 9th	10th	0.765	0.027	0.085	0.028	0.046	0.049	0.024	0.025	0.034
			(0.070)	(0.069)	(0.064)	(0.040)	(0.037)	(0.036)	(0.037)	(0.022)
		5592	2592	2381	1993	6966	2592	2356	1821	6769
7th and 9th	7th, 8th, and 10th	0.830	0.048	0.057	-0.008	0.034	0.045*	0.036*	0.011	0.032**
			(0.044)	(0.039)	(0.037)	(0.029)	(0.023)	(0.020)	(0.020)	(0.015)
		13168	5876	5610	4892	16378	5671	5585	4640	15896
<i>B. English</i>										
7th	7th and 8th	0.895	0.062	0.049	0.009	0.040	0.038	0.054**	-0.007	0.026
			(0.057)	(0.045)	(0.043)	(0.035)	(0.033)	(0.026)	(0.024)	(0.020)
		6671	2905	2829	2474	8208	2421	2207	2376	7004
7th and 9th	10th	0.766	0.034	0.059	0.051	0.047	0.052	0.016	0.033	0.035
			(0.070)	(0.069)	(0.063)	(0.039)	(0.036)	(0.037)	(0.036)	(0.022)
		5592	2592	2381	1993	6966	2592	2144	1913	6649
7th and 9th	7th, 8th, and 10th	0.836	0.048	0.054	0.028	0.044	0.046*	0.033	0.011	0.031*
			(0.045)	(0.040)	(0.037)	(0.030)	(0.025)	(0.024)	(0.021)	(0.017)
		12263	5497	5210	4467	15174	5013	4351	4289	13653

Notes: This table reports estimates of the effects of exam school offers on an indicator for non-missing outcome scores. The specification and estimation procedures are the same as used to construct the estimates in Table 4. The fraction with follow-up is the follow-up rate for applicants who appear in any school-specific discontinuity sample.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A2. Boston Covariate Discontinuities

Covariate	Mean	Parametric Estimates				Non-parametric (IK) Estimates			
		O'Bryant (1)	Latin Academy (2)	Latin School (3)	All Schools (5)	O'Bryant (5)	Latin Academy (6)	Latin School (7)	All Schools (8)
<i>A. 7th Grade Applicants</i>									
Female	0.565	0.074 (0.077)	-0.069 (0.079)	0.053 (0.082)	0.020 (0.046)	-0.012 (0.042)	-0.017 (0.051)	0.039 (0.044)	0.005 (0.026)
	6049	2616	2592	2338	7546	2589	1765	2338	6692
Black	0.327	0.048 (0.074)	0.034 (0.075)	0.098 (0.069)	0.059 (0.042)	0.040 (0.043)	-0.009 (0.039)	0.039 (0.035)	0.023 (0.022)
	6043	2615	2591	2333	7539	2333	2591	2333	7257
Hispanic	0.195	-0.070 (0.063)	-0.073 (0.063)	-0.062 (0.066)	-0.068* (0.037)	-0.059 (0.037)	-0.028 (0.036)	-0.053 (0.042)	-0.046** (0.022)
	6043	2615	2591	2333	7539	2316	2414	1767	6497
Free Lunch	0.707	0.084 (0.060)	-0.149** (0.064)	-0.133* (0.071)	-0.062 (0.038)	0.018 (0.036)	-0.119*** (0.039)	-0.061 (0.041)	-0.051** (0.022)
	6049	2616	2592	2338	7546	2343	2098	2212	6653
LEP [†]	0.125	0.009 (0.056)	-0.053 (0.053)	-0.018 (0.047)	-0.020 (0.031)	-0.013 (0.028)	-0.015 (0.028)	-0.070** (0.031)	-0.026 (0.017)
	5608	2404	2389	2134	6927	2404	2389	1558	6351
SPED [‡]	0.014	-0.046 (0.043)	0.004 (0.021)	0.008 (0.023)	-0.012 (0.018)	-0.016 (0.019)	0.003 (0.013)	0.002 (0.014)	-0.005 (0.010)
	3621	1543	1544	1388	4475	1543	1269	1297	4109
Joint p-value		0.465	0.191	0.313	0.336	0.602	0.104	0.087	0.099
<i>B. 9th Grade Applicants</i>									
Female	0.607	-0.024 (0.116)	-0.032 (0.134)	-0.070 (0.158)	-0.038 (0.077)	-0.010 (0.060)	-0.031 (0.071)	-0.048 (0.083)	-0.025 (0.038)
	1885	1022	809	612	2443	1022	809	612	2443
Black	0.386	-0.016 (0.115)	0.064 (0.126)	-0.230* (0.121)	-0.042 (0.071)	0.035 (0.069)	-0.022 (0.068)	-0.092 (0.070)	-0.018 (0.039)
	1883	1022	807	612	2441	893	807	612	2312
Hispanic	0.230	-0.151 (0.096)	0.025 (0.116)	0.052 (0.127)	-0.046 (0.064)	-0.095 (0.065)	0.049 (0.056)	0.047 (0.069)	0.003 (0.035)
	1883	1022	807	612	2441	720	807	612	2139
Free Lunch	0.784	-0.084 (0.091)	-0.091 (0.101)	-0.225* (0.126)	-0.120** (0.060)	-0.024 (0.051)	-0.024 (0.069)	0.016 (0.070)	-0.013 (0.035)
	1885	1022	809	612	2443	1022	518	612	2152
LEP [†]	0.120	0.060 (0.076)	-0.079 (0.111)	0.032 (0.089)	0.009 (0.053)	0.030 (0.046)	-0.025 (0.050)	0.025 (0.049)	0.008 (0.027)
	1885	1022	809	612	2443	969	809	612	2390
SPED [‡]	0.023	0.059 (0.053)	0.000 (0.027)	-0.028 (0.026)	0.019 (0.025)	0.022 (0.031)	-0.009 (0.009)	-0.034 (0.027)	-0.003 (0.016)
	1040	545	464	374	1383	474	320	361	1155
Joint p-value		0.506	0.947	0.209	0.441	0.737	0.863	0.619	0.991

Notes: This table reports estimated discontinuities in covariates using models like those used to construct the reduced form estimates in Table 4. The joint p-value is from a F-test looking at all covariate discontinuities at once.

[†] LEP only available beginning in year 1998.

[‡] SPED only available for years 1998-2004.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table B1. New York Attrition Differentials

	Fraction with Follow Up	Parametric Estimates				Non-parametric (IK) Estimates			
		Brooklyn Tech (1)	Bronx Science (2)	Stuyvesant (3)	All Schools (4)	Brooklyn Tech (5)	Bronx Science (6)	Stuyvesant (7)	All Schools (8)
Math	0.535	-0.087* (0.049)	0.059 (0.049)	0.059 (0.046)	0.012 (0.028)	0.010 (0.026)	0.017 (0.025)	0.050* (0.026)	0.026* (0.015)
	17713	7622	6829	7553	22004	6707	6829	6786	20322
Advanced Math	0.804	0.126*** (0.043)	0.041 (0.039)	-0.010 (0.033)	0.050** (0.022)	0.070*** (0.021)	0.032 (0.021)	0.025 (0.016)	0.043*** (0.011)
	17713	7622	6829	7553	22004	7622	6829	7553	22004
English	0.874	0.017 (0.038)	0.032 (0.036)	0.028 (0.031)	0.026 (0.020)	0.034* (0.019)	0.032 (0.021)	0.025 (0.016)	0.030*** (0.011)
	13147	5867	5268	5695	16830	5867	4834	5695	16396
Global History	0.866	0.082** (0.038)	0.035 (0.033)	0.035 (0.028)	0.050*** (0.019)	0.062*** (0.022)	0.036* (0.020)	0.020 (0.017)	0.039*** (0.011)
	17713	7622	6829	7553	22004	5782	5396	5739	16917
US History	0.814	0.035 (0.046)	0.032 (0.044)	0.008 (0.035)	0.024 (0.024)	0.041 (0.030)	0.039 (0.024)	0.009 (0.022)	0.030** (0.014)
	13147	5867	5268	5695	16830	3706	5086	4342	13134
Living Environment	0.797	0.015 (0.041)	0.040 (0.038)	0.024 (0.035)	0.026 (0.022)	0.033* (0.020)	0.012 (0.021)	0.003 (0.017)	0.017 (0.011)
	17713	7622	6829	7553	22004	7622	6829	7553	22004

Notes: This table reports estimates of the effect of exam school offers on indicators for non-missing outcome scores. Models and estimation procedures are the same as for Table 11. The fraction with follow-up is the follow-up rate for applicants who appear in any school-specific discontinuity sample.

*significant at 10%; **significant at 5%; ***significant at 1%

Table B2. New York Covariate Discontinuities

	Mean of Variable	Parametric Estimates				Non-parametric (IK) Estimates			
		Brooklyn Tech (1)	Bronx Science (2)	Stuyvesant (3)	All Schools (4)	Brooklyn Tech (5)	Bronx Science (6)	Stuyvesant (7)	All Schools (8)
Female	0.468	-0.038 (0.049)	-0.017 (0.049)	-0.004 (0.046)	-0.019 (0.028)	0.001 (0.025)	-0.012 (0.029)	-0.018 (0.025)	-0.009 (0.015)
	17713	7622	6829	7553	22004	7622	5848	7469	20939
Black	0.106	-0.056 (0.037)	-0.002 (0.031)	0.033 (0.022)	-0.006 (0.017)	-0.033* (0.018)	-0.002 (0.015)	0.015 (0.011)	-0.005 (0.009)
	17713	7622	6829	7553	22004	7622	6829	7553	22004
Hispanic	0.104	0.011 (0.035)	-0.010 (0.030)	0.048** (0.021)	0.018 (0.017)	0.032* (0.017)	-0.015 (0.015)	0.025* (0.015)	0.013 (0.010)
	17713	7622	6829	7553	22004	7622	6829	4626	19077
Free Lunch [#]	0.668	-0.064 (0.046)	0.062 (0.046)	-0.080* (0.043)	-0.030 (0.026)	-0.007 (0.024)	0.040* (0.023)	-0.042* (0.024)	0.000 (0.014)
	17713	7622	6829	7553	22004	7339	6829	6972	21140
LEP	0.005	0.009 (0.006)	-0.002 (0.004)	0.002 (0.006)	0.003 (0.003)	0.004 (0.004)	-0.003 (0.003)	-0.002 (0.003)	-0.001 (0.002)
	17713	7622	6829	7553	22004	5330	6829	7553	19712
Joint test: p-value		0.234	0.780	0.056	0.581	0.207	0.397	0.136	0.775

Notes: This table reports estimated discontinuities in covariates using models like those used to construct the reduced form estimates in Table 11. The joint p-value is from an F-test looking at all covariate discontinuities at once.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table B3. NYC Reduced Form Estimates for Subgroups

	By Race				By Sex	
	Black (1)	Hispanic (2)	Black or Hispanic (3)	Not Black or Hispanic (4)	Men (5)	Women (6)
Math	0.042 (0.070) 1120	0.020 (0.056) 1121	0.024 (0.047) 2381	-0.055*** (0.019) 8091	-0.025 (0.022) 6,040	-0.074*** (0.028) 4,912
Advanced Math	0.010 (0.078) 1469	-0.032 (0.064) 1585	0.002 (0.051) 3126	-0.027 (0.020) 14436	-0.020 (0.033) 8,698	-0.044 (0.032) 7,333
English	0.041 (0.060) 1319	-0.015 (0.055) 1377	0.021 (0.044) 2947	0.008 (0.012) 11734	0.008 (0.021) 7,393	0.023 (0.022) 6,059
Global History	-0.034 (0.059) 1747	-0.138** (0.062) 1258	-0.063 (0.043) 3060	-0.010 (0.014) 14295	-0.037* (0.019) 8,792	-0.008 (0.020) 7,821
US History	0.013 (0.044) 1205	-0.071* (0.043) 926	-0.013 (0.034) 2522	0.001 (0.014) 9458	0.003 (0.020) 6,344	-0.005 (0.016) 5,667
Living Environment	-0.078 (0.050) 1606	-0.059 (0.045) 1421	-0.075** (0.036) 3092	-0.013 (0.012) 13362	-0.014 (0.018) 9,306	-0.026 (0.018) 7,764

Notes: This table reports reduced form estimates for minorities and by sex. The table shows non-parametric estimates with bandwidth computed as in the all schools model in Table 11.

* significant at 10%, ** significant at 5%, *** significant at 1%

Table B4. NYC Estimates for High Achievers and Away from Admission Cutoffs

	Conditional on Baseline				Extrapolation			
	Baseline in Upper Half		Baseline in Upper Quartile		Parametric		Non-parametric (IK)	
	Baseline Mean	Estimates	Baseline Mean	Estimates	1 unit away from cutoff	3 units away from cutoff	1 unit away from cutoff	Derivative
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Math	1.425	-0.054*** (0.018)	1.495	-0.037* (0.021)	0.041 (0.082)	0.406 (0.369)	-0.057*** (0.018)	-0.002 (0.006)
	9049	10471	6744	7570	11810	11810	10906	10906
Advanced Math	0.937	-0.020 (0.021)	1.027	-0.007 (0.019)	-0.065 (0.119)	-0.054 (0.525)	-0.022 (0.023)	0.002 (0.007)
	13854	17261	10990	13446	17727	17727	17727	17727
English	1.097	0.013 (0.014)	1.161	0.008 (0.018)	0.013 (0.069)	-0.032 (0.297)	0.022 (0.015)	0.009* (0.005)
	10772	12624	7703	9018	14681	14681	14317	14317
Global History	1.236	-0.026 (0.016)	1.284	-0.025 (0.015)	-0.015 (0.064)	0.036 (0.274)	-0.024 (0.017)	0.000 (0.008)
	14251	12296	10365	10858	19065	19065	14678	14678
US History	1.151	0.003 (0.015)	1.186	-0.003 (0.015)	-0.002 (0.058)	0.036 (0.265)	-0.009 (0.019)	-0.003 (0.008)
	10034	10096	7216	8114	13708	13708	10753	10753
Living Environment	1.335	-0.020 (0.012)	1.380	-0.019 (0.015)	0.041 (0.061)	0.213 (0.266)	-0.012 (0.013)	0.012** (0.005)
	13610	16975	10585	13242	17585	17585	17585	17585

Notes: This table reports reduced form estimates for students with high baseline scores and for applicants away from admission cutoffs. Baseline means and the proportion of the applicants at an advanced level are computed for those who belong to at least one discontinuity sample. Conditional on baseline are non-parametric estimates with bandwidth computed as in the all schools model in Table 11. Parametric extrapolation estimates use the parametric model to form counterfactuals 1 and 3 units from the cutoff. Non-parametric estimates are based on approximations of the derivative of the treatment effect at the cutoff.

* significant at 10%, ** significant at 5%, *** significant at 1%

Table C1. Processing of Boston Exam School Application Data

Application Year	Total number of records (1)	Excluding duplicate observations (2)	Excluding applicants from private schools (3)	Excluding students who did not rank an exam school (4)	Excluding students who are not ranked by an exam school (5)	Excluding students who obtain an offer at a school they do not rank (6)	Excluding students not matched to Boston Public Schools at baseline (7)	Excluding students previously enrolled in exam school (8)	Excluding students with no observed outcome MCAS test scores (9)
<i>A. 7th Grade Applicants</i>									
1997	2376	2375	1319	1299	1299	1299	1185	1185	1009
1998	2264	2264	1237	1215	1215	1215	1081	1081	917
1999	2353	2353	1353	1307	1307	1307	1180	1180	1000
2000	2283	2283	1252	1165	1165	1165	1125	1125	1032
2001	2317	2317	1299	1196	1196	1196	1193	1193	1100
2002	2365	2365	1304	1237	1236	1236	1235	1235	1118
2003	2494	2494	1386	1251	1251	1251	1240	1240	1127
2004	2217	2217	1206	1174	1174	1174	1172	1172	1083
2005	2062	2062	1116	1105	1105	1099	1095	1095	1001
2006	2079	2079	1184	1166	1166	1161	1158	1158	1052
2007	1992	1992	1086	1081	1080	1073	1068	1068	974
2008	1874	1874	1050	1049	1040	1036	998	998	898
All Years	26676	26675	14792	14245	14234	14212	13730	13730	12311
<i>B. 9th Grade Applicants</i>									
2001	1520	1520	863	787	787	787	783	680	496
2002	1607	1607	876	829	828	828	826	755	553
2003	1750	1750	951	812	812	812	809	727	546
2004	1723	1723	936	918	918	918	912	815	631
2005	1630	1630	936	924	924	924	918	832	642
2006	1729	1729	992	981	981	981	977	889	677
2007	1684	1683	945	936	931	931	930	842	612
All Years	11643	11642	6499	6187	6181	6181	6155	5540	4157

Notes: This table summarizes the steps going from the raw application data to the analysis sample.

Table C2. Data Structure and Test Outcomes for Boston

Application Year	Math 7 (1)	Math 8 (2)	Math 10 (3)	English 7 (4)	English 8 (5)	English 10 (6)	PSAT (7)	SAT (8)	AP (9)
<i>A. 7th Grade Applicants</i>									
1997		1999							
1998		2000							
1999		2001	2003			2003		2005	2005
2000		2002	2004	2001		2004	2004	2006	2006
2001		2003	2005	2002		2005	2005	2007	2007
2002		2004	2006	2003		2006	2006	2008	2008
2003		2005	2007	2004		2007	2007	2009	2009
2004		2006	2008	2005	2006	2008	2008	2010	2010
2005	2006	2007	2009	2006	2007	2009	2009		
2006	2007	2008		2007	2008				
2007	2008	2009		2008	2009				
2008	2009			2009					
<i>B. 9th Grade Applicants</i>									
2001			2003			2003		2005	2005
2002			2004			2004	2004	2006	2006
2003			2005			2005	2005	2007	2007
2004			2006			2006	2006	2008	2008
2005			2007			2007	2007	2009	2009
2006			2008			2008	2008	2010	2010
2007			2009			2009	2009		

Notes: This table reports the applicant cohorts and test year outcomes. Application year refers to the fall of application year, while test outcome year refers to the spring of year. Test outcomes are available based on the schedule of the MCAS and availability of SAT, PSAT and AP score outcomes.

Table C3. Match from Boston Exam Application to Enrollment Data

Application Year	Number of Students (1)	Fraction with Match		
		Total (2)	Offered (3)	Not Offered (4)
<i>A. 7th Grade Applicants</i>				
1997	1299	0.912	0.906	0.917
1998	1215	0.890	0.888	0.891
1999	1307	0.903	0.919	0.890
2000	1165	0.966	0.958	0.972
2001	1196	0.997	0.996	0.998
2002	1236	0.999	1.000	0.999
2003	1251	0.991	0.996	0.987
2004	1174	0.998	1.000	0.997
2005	1099	0.996	0.996	0.996
2006	1161	0.997	0.995	1.000
2007	1073	0.995	1.000	0.991
2008	1036	0.963	0.980	0.946
All Years	14212	0.966	0.969	0.963
<i>B. 9th Grade Applicants</i>				
2001	787	0.995	1.000	0.993
2002	828	0.998	1.000	0.997
2003	812	0.996	1.000	0.995
2004	918	0.993	1.000	0.992
2005	924	0.994	0.992	0.994
2006	981	0.996	1.000	0.994
2007	931	0.999	1.000	0.999
All Years	6181	0.996	0.999	0.995

Notes: This table provides summary statistics on the match between the exam school application data and the Boston Public School enrollment file. The sample in column (1) is the sample in column (6) of Table C1.

Table C4. Test Outcome Data for Boston Exam School Applicants

Application Year	Number of students (1)	Number of Math		Number of English		
		Number with an observed test score (2)	test scores expected (3)	Math test scores observed (4)	test scores expected (5)	English test scores observed (6)
<i>7th Grade</i>						
1997	1185	1009	1185	1017	0	9
1998	1081	917	1081	978	0	67
1999	1180	1000	2360	1765	1180	800
2000	1125	1032	2250	1776	2250	1792
2001	1193	1100	2386	1843	2386	1897
2002	1235	1118	2470	1894	2470	1945
2003	1240	1127	2480	1897	2480	2006
2004	1172	1083	2344	1842	3516	2890
2005	1095	1001	3285	2650	3285	2650
2006	1158	1052	2316	2039	2316	2038
2007	1068	974	2136	1884	2136	1879
2008	998	898	998	895	998	897
All Years	13730	12311	25291	20480	23017	18870
<i>9th Grade</i>						
2001	680	496	680	496	680	495
2002	755	553	755	551	755	550
2003	727	546	727	545	727	543
2004	815	631	815	621	815	630
2005	832	642	832	630	832	636
2006	889	677	889	662	889	673
2007	842	612	842	603	842	610
All Years	5540	4157	5540	4108	5540	4137

Notes: This table summarizes the observed test score outcomes for exam school applicants. The sample is restricted to students in column (8) of Table C1.

Table C5. Matching of College Board Test Outcome Data for Boston Applicants

Application Year	Number of applicants (1)	Number with an expected PSAT		Number with an expected SAT		Number with an expected AP test	
		Number with an observed PSAT test score (2)	test score (enrolled as of grade 11) (3)	Number with an observed SAT test score (4)	test score (enrolled as of grade 11) (5)	Number with an observed AP test score (6)	score (enrolled as of grade 12) (7)
<i>A. 7th Grade</i>							
1997	1,185	1	0	5	0	0	0
1998	1,081	7	0	46	0	12	0
1999	1,180	50	0	640	0	291	1,180
2000	1,125	707	1,125	647	1,125	341	1,125
2001	1,193	826	1,193	710	1,193	432	1,193
2002	1,235	834	1,235	683	1,235	427	1,235
2003	1,240	844	1,240	687	1,240	481	1,240
2004	1,172	788	1,172	679	1,172	499	1,172
2005	1,095	664	1,095	3	0	345	0
2006	1,158	10	0	0	0	14	0
2007	1,068	0	0	0	0	0	0
2008	998	0	0	0	0	0	0
All Years	13,730	4,731	7,060	4,100	5,965	2,842	7,145
<i>B. 9th Grade</i>							
2001	680	22	0	374	680	113	680
2002	755	462	755	413	755	159	755
2003	727	520	727	426	727	177	727
2004	815	635	815	478	815	235	815
2005	832	598	832	454	832	255	832
2006	889	612	889	481	889	290	889
2007	842	528	842	2	0	142	0
All Years	5,540	3,377	4,860	2,628	4,698	1,371	4,698

Notes: This table summarizes the observed College Board test score outcomes for exam school applicants. The sample is restricted to students in column (8) of Table C1.

Table D1. Processing of NYC Exam School Application Data

Application Year	Total number of records	Excluding applicants from private schools	Excluding applicants not in Round 1 of the application process	Excluding students who did not rank an exam school	Excluding students who did not rank Brooklyn Tech, Bronx Science or Stuyvesant
	(1)	(2)	(3)	(4)	(5)
2003-04	28,136	23,637	22,293	22,287	22,205
2004-05	28,279	24,123	22,894	22,859	22,776
2005-06	28,442	23,971	22,810	22,810	22,376
2006-07	26,616	22,377	21,278	21,278	20,824
All Years	111,473	94,108	89,275	89,234	88,181

Application Year	Excluding students not matched to student file	Excluding 9th graders	Excluding students who took SHSAT in previous years	Excluding students without post-assignment numeric outcome test scores at all
	(6)	(7)	(8)	(9)
2003-04	22,108	21,091	21,091	18,361
2004-05	22,776	21,883	21,880	19,106
2005-06	22,376	21,448	21,446	18,842
2006-07	20,824	20,124	20,122	17,431
All Years	88,084	84,546	84,539	73,740

Notes: This table summarizes the steps going from raw application data to the analysis sample.

Table D2. Match from NYC Exam Application to Student Data

Application Year	Number of Students (1)	Fraction with Match		
		Total (2)	Offered (3)	Not Offered (4)
2003-04	22,205	0.996	0.997	0.995
2004-05	22,776	1	1	1
2005-06	22,376	1	1	1
2006-07	20,824	1	1	1
All Years	88,181	0.999	0.999	0.999

Notes: This table reports the fraction of applicants with a match between the exam application file and the student demographic file. The sample corresponds to column (5) of Table D1.

Table D3. Match from NYC Exam Applicants to Regents Test Score Outcomes

Record Availability	Application School Year				
	2003-04 (1)	2004-05 (2)	2005-06 (3)	2006-07 (4)	All Years (5)
	I. Math				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	2,685	3,157	3,673	3,975	13,490
Number with score observed after treatment	15,055	15,307	14,206	12,492	57,060
Number with different multiple scores observed after treatment	1,795	2,360	2,000	1,821	7,976
Number with different multiple scores observed after treatment, on first date	3	20	10	2	35
Number with score observed on most common date	5,822	5,873	6,078	8,033	25,806
Number with score observed before most common date	3,522	3,875	4,348	2,022	13,767
Number with score observed after most common date	5,711	5,559	3,779	2,437	17,486
	II. Advanced Math				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	7	9	13	29	58
Number with score observed after treatment	10,375	10,691	10,939	12,130	44,135
Number with different multiple scores observed after treatment	1,469	1,750	898	235	4,352
Number with different multiple scores observed after treatment, on first date	13	4	0	0	17
Number with score observed on most common date	3,913	3,938	5,496	11,177	24,524
Number with score observed before most common date	4,310	4,671	5,443	953	15,377
Number with score observed after most common date	2,152	2,082	0	0	4,234
	III. English				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	2	1	0	n.a	14
Number with score observed after treatment	16,847	17,322	17,202	n.a	54,410
Number with different multiple scores observed after treatment	1,979	2,024	1,501	n.a	5,641
Number with different multiple scores observed after treatment, on first date	11	3	0	n.a	14
Number with score observed on most common date	9,333	8,614	8,985	n.a	29,389
Number with score observed before most common date	1,829	2,587	2,705	n.a	7,703
Number with score observed after most common date	5,685	6,120	5,512	n.a	17,317
	IV. Global History				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	3	19	18	8	48
Number with score observed after treatment	17,057	17,735	16,434	15,429	66,655
Number with different multiple scores observed after treatment	2,321	2,882	1,771	203	7,177
Number with different multiple scores observed after treatment, on first date	19	59	1	0	79
Number with score observed on most common date	13,746	13,471	13,100	14,328	54,645
Number with score observed before most common date	796	844	1,037	1,101	3,778
Number with score observed after most common date	2,514	3,420	2,296	0	8,230
	V. US History				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	41	23	91	n.a	256
Number with score observed after treatment	15,766	16,015	14,270	n.a	47,906
Number with different multiple scores observed after treatment	1,152	1,102	496	n.a	2,962
Number with different multiple scores observed after treatment, on first date	20	0	3	n.a	23
Number with score observed on most common date	10,252	10,365	11,844	n.a	33,431
Number with score observed before most common date	1,464	2,068	2,426	n.a	6,013
Number with score observed after most common date	4,049	3,582	0	n.a	8,461
	VI. Living Environment				
Number of applicants	21,091	21,880	21,446	20,122	84,539
Number with score observed before treatment	440	878	894	922	3,134
Number with score observed after treatment	16,562	16,807	16,310	14,102	63,781
Number with different multiple scores observed after treatment	1,356	1,807	1,484	977	5,624
Number with different multiple scores observed after treatment, on first date	2	7	8	0	17
Number with score observed on most common date	11,601	11,455	11,286	11,071	45,413
Number with score observed before most common date	207	324	344	209	1,084
Number with score observed after most common date	4,754	5,027	4,679	2,822	17,282

Notes: This table summarizes the match between Regents test score outcomes and exam school applicants. The sample is restricted to students in column (8) of Table D1.