

Web Appendix for “Stand and Deliver: Effects of Boston’s Charter High Schools on College Preparation, Entry, and Choice”

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This Web Appendix includes two sets of tables. The first, series B, reports estimates of models that supplement the main results in our article. Table B1 shows lottery-based estimates of effects of Boston’s charter high schools for student subgroups. Table B2 reports results for subsamples that exclude each of the six charter schools in our sample in turn. Table B3 shows estimates in subsamples defined by application cohort. Table B4 displays Lee (2009) bounds on MCAS effects, accounting for differential attrition. Finally, Table B5 shows first- and second-stage estimates from two-stage least squares models treating peer quality as the endogenous variable.

The second set of tables, series C, reports additional descriptive facts. Table C1 details the schools attended by lottery winners and losers in our charter applicant sample. Table C2 reports shares of students taking MCAS tests and alternative exams, separately by special education status. Table C3 reports the percentage of Boston charter schools and other Boston public schools offering AP courses. Table C4 presents additional information about AP offerings, disaggregated by subject.

Table B1: Lottery Estimates of Effects by Subgroup

Outcomes	Gender		Special Education		Baseline Scores		Subsidized Lunch	
	Boy (1)	Girl (2)	Yes (3)	No (4)	Below Median (5)	Above Median (6)	Yes (7)	No (8)
Panel A: 10th- Grade MCAS								
Standardized ELA	0.460*** (0.162) 1690	0.370*** (0.117) 1995	0.496* (0.265) 668	0.377*** (0.105) 3017	0.440*** (0.142) 1771	0.367*** (0.113) 1771	0.398*** (0.115) 2687	0.541*** (0.180) 998
Standardized Math	0.560*** (0.183) 1661	0.615*** (0.143) 1968	0.673*** (0.247) 651	0.572*** (0.125) 2978	0.598*** (0.148) 1728	0.535*** (0.126) 1743	0.541*** (0.132) 2644	0.800*** (0.217) 985
Panel B: SAT Outcomes								
Took SAT	0.051 (0.107) 1720	0.109 (0.076) 1952	0.045 (0.146) 696	0.095 (0.066) 2976	0.073 (0.096) 1667	0.087 (0.080) 1656	0.072 (0.074) 2703	0.096 (0.116) 969
SAT Composite (2400)	90.8 (55.5) 977	105.1*** (40.3) 1401	120.5* (68.2) 331	105.9*** (36.5) 2047	118.1*** (41.2) 959	96.0** (39.7) 1318	85.4** (41.5) 1710	216.7** (94.9) 668
Panel C: AP Outcomes								
Took any AP	0.273*** (0.090)	0.300*** (0.080)	0.293*** (0.102)	0.292*** (0.070)	0.281*** (0.077)	0.323*** (0.091)	0.318*** (0.065)	0.231* (0.119)
Score 3 or Higher, any AP	0.179*** (0.069) 1720	0.074 (0.062) 1952	-0.016 (0.049) 696	0.146** (0.061) 2976	0.028 (0.030) 1667	0.212** (0.087) 1656	0.092 (0.058) 2703	0.237** (0.101) 969
Panel D: High School Graduation Outcomes								
Four-year Graduation	-0.212** (0.091) 1823	-0.091 (0.066) 2097	-0.357*** (0.138) 738	-0.105* (0.060) 3182	-0.277*** (0.078) 1771	-0.025 (0.069) 1771	-0.135** (0.064) 2876	-0.164 (0.116) 1044
Five-year Graduation	-0.004 (0.088) 1476	-0.023 (0.070) 1732	-0.161 (0.153) 574	0.020 (0.063) 2634	-0.115 (0.087) 1443	0.115 (0.076) 1435	-0.020 (0.069) 2356	0.076 (0.110) 852
Panel E: College Enrollment Within 18 Months								
Any	0.221** (0.111)	-0.053 (0.104)	0.010 (0.214)	0.056 (0.084)	0.143 (0.100)	0.059 (0.130)	0.059 (0.087)	0.162 (0.168)
Four-year	0.185* (0.102) 1190	0.174 (0.109) 1409	0.283* (0.169) 454	0.147* (0.085) 2145	0.223** (0.099) 1168	0.099 (0.136) 1158	0.231*** (0.074) 1918	0.027 (0.155) 681

Note: This table reports 2SLS estimates of the effects of Boston charter attendance by subgroup. The above- and below-median samples are constructed by splitting the sample by the median of the sum of baseline ELA and math scores, computed in the MCAS ELA outcome sample. See Table 3 notes for detailed regression specifications. Means are for non-charter attendees.

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

Table B2: Lottery Estimates of Effects Excluding Each School

Outcomes	Excl. School 1 (1)	Excl. School 2 (2)	Excl. School 3 (3)	Excl. School 4 (4)	Excl. School 5 (5)	Excl. School 6 (6)	All Schools (7)
Panel A: 10th- Grade MCAS							
Standardized ELA	0.391*** (0.111)	0.354*** (0.137)	0.397*** (0.105)	0.410*** (0.103)	0.389*** (0.106)	0.432*** (0.149)	0.408*** (0.102)
Standardized Math	0.586*** (0.128)	0.692*** (0.161)	0.554*** (0.119)	0.585*** (0.118)	0.630*** (0.118)	0.508*** (0.180)	0.592*** (0.117)
Panel B: SAT Outcomes							
Took SAT	0.056 (0.070)	0.109 (0.076)	0.065 (0.065)	0.080 (0.064)	0.097 (0.063)	0.117 (0.097)	0.084 (0.063)
SAT Composite (2400)	102.6*** (37.0)	165.2*** (44.6)	99.1*** (36.5)	99.9*** (34.9)	98.5*** (34.8)	71.5 (49.2)	104.3*** (34.3)
Panel C: AP Outcomes							
Took any AP	0.323*** (0.064)	0.384*** (0.085)	0.279*** (0.066)	0.302*** (0.063)	0.314*** (0.063)	0.124 (0.114)	0.298*** (0.062)
Score 3 or Higher, any AP	0.115** (0.052)	0.189*** (0.061)	0.117** (0.053)	0.122** (0.051)	0.120** (0.052)	0.033 (0.057)	0.122** (0.051)
Panel D: High School Graduation Outcomes							
Four-year Graduation	-0.141** (0.058)	-0.080 (0.074)	-0.123** (0.061)	-0.144*** (0.055)	-0.111* (0.064)	-0.233*** (0.089)	-0.145*** (0.055)
Five-year Graduation	0.000 (0.061)	-0.068 (0.079)	-0.024 (0.059)	-0.006 (0.059)	0.000 (0.061)	0.066 (0.087)	-0.003 (0.059)
Panel E: College Enrollment Within 18 Months							
Any	0.042 (0.088)	0.028 (0.094)	0.073 (0.081)	0.075 (0.082)	0.075 (0.081)	0.197 (0.128)	0.075 (0.081)
Four-year	0.166** (0.078)	0.121 (0.095)	0.184** (0.073)	0.182** (0.075)	0.183** (0.073)	0.224* (0.134)	0.183** (0.073)

Note: This table reports 2SLS estimates of the effects of charter attendance, excluding data from each of the six schools in the sample at a time. See Table 2 notes for outcome sample descriptions and Table 3 notes for detailed regression specifications. Sample size is excluded to avoid identifying individual schools.

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

Table B3: Lottery Estimates of Effects by Applicant Cohort

Outcomes	Subsamples by Projected Senior Year		
	Pre-2009	Post-2010	All
	Effect (1)	Effect (2)	Effect (3)
Panel A: 10th- Grade MCAS			
Standardized ELA	0.119 (0.196) 1292	0.527*** (0.115) 2393	0.408*** (0.102) 3685
Standardized Math	0.468** (0.209) N 1278	0.642*** (0.137) 2351	0.592*** (0.117) 3629
Panel B: SAT Outcomes			
Took SAT	0.157 (0.140) N 1134	0.062 (0.070) 2538	0.084 (0.063) 3672
SAT Composite (2400)	64.9 (91.4) N 723	116.7*** (34.4) 1655	104.3*** (34.3) 2378
Panel C: AP Outcomes			
Took any AP	0.344** (0.135)	0.285*** (0.074)	0.298*** (0.062)
Score 3 or Higher, any AP	0.137 (0.097) N 1134	0.117* (0.061) 2538	0.122** (0.051) 3672
Panel D: High School Graduation Outcomes			
Four-year Graduation	0.002 (0.115) N 1382	-0.204*** (0.061) 2538	-0.145*** (0.055) 3920
Five-year Graduation	0.075 (0.099) N 1382	-0.048 (0.073) 1826	-0.003 (0.059) 3208
Panel E: College Enrollment Within 18 Months			
Any	0.129 (0.118)	0.040 (0.104)	0.075 (0.081)
Four-year	0.236** (0.112) N 1382	0.164* (0.093) 1217	0.183** (0.073) 2599

Note: This table reports 2SLS estimates of the effects of Boston charter attendance in two subsamples split by projected senior year 2009. See Table 3 notes for detailed regression specifications.

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

Table B4: Bounds on 10th-grade MCAS Effects

Subject	Reduced Form (Any Offer)			Charter Effect		
	Estimate (1)	Lower bound (2)	Upper bound (3)	Estimate (4)	Lower bound (5)	Upper bound (6)
Standardized ELA	0.142*** (0.042)	0.090** (0.040)	0.235*** (0.039)	0.465*** (0.110)	0.299*** (0.115)	0.742*** (0.105)
N	3685			3685		
Standardized Math	0.187*** (0.053)	0.122** (0.049)	0.245*** (0.052)	0.606*** (0.126)	0.411*** (0.134)	0.775*** (0.115)
N	3629			3629		

Note: This table shows Lee (2009) bounds on reduced forms and charter effects for 10th-grade MCAS scores, accounting for differential attrition. The offer variable is equal to one if a student received either an immediate offer or a waitlist offer. Estimates of the bounds are produced by dropping offered students either above the 96th percentile among offered students (for the lower bound) or below the 4th percentile among offered students (for the upper bound). See Table 3 notes for detailed regression specifications.

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

Table B5: Peer Quality as the Endogenous Variable

Subject	First Stage		Second Stage
	Immediate Offer (1)	Waitlist Offer (2)	Effect (3)
Standardized ELA	0.082*** (0.021)	-0.020 (0.016)	1.828*** (0.594)
	N	3618	
	First-stage F	7.9	
Standardized Math	0.093*** (0.022)	-0.023 (0.018)	2.000*** (0.697)
	N	3562	
	First-stage F	9.4	

Note: This table reports first and second stage estimates of the effects of peer quality in the first year after the lottery on MCAS test scores. The sample includes students projected to graduate in 2006 through 2013. The endogenous variable is peer quality measured as the average baseline ELA (or math) scores for the peers in the first post-lottery year. The instruments are immediate and waitlist offer dummies. See Table 3 notes for detailed regression specifications.

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

Table C1: School Choices Among Charter School Applicants

9th-grade school attended	Offered (1)	Not offered (2)	All (3)
Charters	0.439	0.162	0.343
Traditional public	0.182	0.344	0.238
Exam	0.108	0.124	0.113
Pilot	0.188	0.282	0.221
Alternative	0.006	0.002	0.004
Public school outside Boston	0.060	0.072	0.064
Private/Out of state	0.017	0.015	0.016
N	2410	1275	3685

Note: This table shows the 9th-grade schools attended by charter lottery applicants. The offer variable indicates either an immediate offer or a waitlist offer. Statistics are based on the MCAS ELA sample.

Table C2: Percentage of 10th-grade Taking MCAS and Alternative Exams

		10th grade status	
		Special Ed	Regular Ed
		(1)	(2)
Panel A: Projected Senior Year 2006 - 2013			
Took MCAS ELA			
Study charters		0.975	0.980
BPS (Trad, Pilot, Exam)		0.900	0.939
Took MCAS Math			
Study charters		0.981	0.974
	N	156	780
BPS		0.865	0.929
	N	379	1981
Panel B: Projected Senior Year 2007 - 2013			
Took alternative in ELA			
Study charters		0.013	
BPS		0.016	
Took alternative in Math			
Study charters		0.007	0.000
	N	149	
BPS		0.016	
	N	364	

Note: This table shows the percentage of 10th graders in the lottery sample taking MCAS and alternative exams by 10th-grade special and regular education status. The sample in Panel A includes applicants projected to graduate from 2006 through 2013; the sample in Panel B includes applicants projected to graduate from 2007 through 2013. State MCAS data does not provide status on alternative exam taking before 2005.



Table C3: Schools with AP Taking

	2007	2008	2009	2010	2011	2012	2013	All years
Took any AP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Study charters	0.40	0.40	0.60	0.80	0.83	0.83	0.83	0.68
N schools	5	5	5	5	6	6	6	6
Charters not in study	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
N schools	1	1	1	1	1	2	2	2
BPS	0.73	0.77	0.83	0.90	0.90	0.83	0.83	0.83
N schools	30	30	30	29	29	23	24	35

Note: This table shows the percentage of open schools that had at least five students taking AP, by 12th-grade-year school type. The sample includes all 12th graders in Boston schools from 2007 through 2013. Special education and alternative schools are dropped from the sample. Study charters include Academy of the Pacific Rim, Boston Preparatory, Boston Collegiate, City on a Hill, Codman, and Match High. Charters not in study are Health Careers Academy for years 2007-2011, and Health Careers Academy and Boston Green Academy in 2012 and 2013.

Table C4: Schools with AP-Taking by AP Subject

AP Subject	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	All years (8)
<b>Calculus AB/BC</b>								
Study charters	0.40	0.40	0.60	0.80	0.83	0.83	0.83	0.68
N schools	5	5	5	5	6	6	6	6
Charters not in study	0.00	0.00	0.00	1.00	1.00	0.50	1.00	0.56
N schools	1	1	1	1	1	2	2	2
BPS (Trad., Pilot, Exam)	0.43	0.47	0.50	0.59	0.59	0.65	0.58	0.54
N schools	30	30	30	29	29	23	24	35
<b>US History/Government</b>								
Study charters	0.00	0.40	0.40	0.60	0.67	0.67	0.67	0.50
Charters not in study	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.11
BPS	0.23	0.30	0.33	0.41	0.45	0.61	0.50	0.39
<b>English Literature/Language</b>								
Study charters	0.20	0.20	0.20	0.40	0.33	0.33	0.33	0.29
Charters not in study	0.00	1.00	1.00	1.00	1.00	0.50	0.50	0.67
BPS	0.43	0.50	0.60	0.79	0.83	0.78	0.79	0.67
<b>Biology/Chemistry</b>								
Study charters	0.20	0.20	0.20	0.20	0.33	0.33	0.50	0.29
Charters not in study	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.78
BPS	0.43	0.50	0.50	0.52	0.48	0.61	0.58	0.51
<b>Physics B/Mechanics/Magnetism</b>								
Study charters	0.00	0.20	0.20	0.20	0.17	0.17	0.00	0.13
Charters not in study	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BPS	0.20	0.23	0.23	0.28	0.14	0.26	0.21	0.22
<b>Statistics</b>								
Study charters	0.00	0.00	0.00	0.00	0.17	0.17	0.33	0.11
Charters not in study	0.00	0.00	0.00	0.00	1.00	0.50	0.50	0.33
BPS	0.17	0.20	0.23	0.24	0.31	0.35	0.38	0.26

Note: This table shows the percentage of open schools that had at least five students taking AP test by AP subject and 12th-grade-year school type. The sample includes all 12th graders in Boston schools from 2007 through 2013. Special education and alternative schools are dropped from the sample. Study charters include Academy of the Pacific Rim, Boston Preparatory, Boston Collegiate, City on a Hill, Codman, and Match High. Charters not in study are Health Careers Academy for years 2007-2011, and Health Careers Academy and Boston Green Academy in 2012 and 2013.