ONLINE APPENDICES

The Impact of Charter School Openings on Traditional Public Schools in Massachusetts and North Carolina

Kirsten Slungaard Mumma

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Appendix A. School Location Data

School addresses and coordinates were first reported in the CCD for Massachusetts and North Carolina in SY 2000-01, with some addresses (but no coordinates) reported for North Carolina in SY 1998-99 and 1999-00. I used publicly available CCD files from the National Center for Education Statistics for MA. For North Carolina, I used versions of the public CCD data that were made available to me by the North Carolina Education Data Research Center (NCERDC). The NCERDC versions of the CCD files are attached to internal school identifiers used by NCERDC to match data to other sources used for this project and deletes some non-operational schools.

I identified the latitude/longitude of each site using the U.S. Census Bureau's online geocoding service. I calculated distances between schools/sites using the Stata *geodist* command. I assigned a stable latitude/longitude coordinate for each address. I also reviewed the addresses of charter schools individually for consistency and to address errors, as noted in the table below.

State	School Name	Address Cleaning Notes
MA	Salem Academy Charter School	CCD lists address in 2004-05 as 125 Washington Street. This may refer to charter organization's office location; newspaper coverage suggests this school opened at 45 Congress Street in Salem, MA (the address reported in subsequent years). Address changed to 45 Congress Street for SY 04-05.
MA	KIPP Academy Boston Charter School	This school appears to have co-located with another charter school in its first year (SY 12-13). For SY 15-16, CCD reports address as "Poydras Street"; per KIPP accountability report, this seems like a satellite campus that only housed grades K-1 and operated at the same time as the main campus at 384 Warren Street. I change address to 384 Warren Street for SY 15-16.
NC	Piedmont Charter	The CCD reports an address for Piedmont Charter in 2000 and 2001 that seems to correspond to a bus company with the same name; corrected to reflect the address on Second Avenue (reported in SY 02-03). Corrected address reported in SY 14-15 to Second Avenue address; reported address reflects smaller secondary campus.
NC	Bethany Community Middle School	The CCD reports an address on “North Carolina 65” in 2000; this appears to be the same as the address on Bethany Road reported in other years. I assign to the Bethany Road address.
NC	Henderson Collegiate	The CCD reports an address in 2015 that seems to correspond to a second campus; I assign the school to the Health Center Road address since that appears to have remained occupied.
NC	Uwwharrie Charter School	The CCD address for 2015 refers to a secondary campus that housed only the high school while elementary school appears to have continued operating at 301 Lewallen Road; changed to 301 Lewallen Road. n
NC	Phoenix Academy Inc	The CCD reports addresses at Medenhall and Meeting Way; these addresses appear to be the same. I assign to the Medenhall address.
NC	Union Academy	Address reported on Old Charlotte Road appears to refer to a mailing/management address; changed to MLK address.
NC	Haliwa-Saponi Tribal School	The HaliWa Saponi school reports multiple addresses that refer to the same location. A mailing address (Box) is reported in 2001; I assign the coordinates for the following year.
NC	Artspace Charter	I look up the latitude/longitude coordinates of the Brookside Avenue address reported for 2001.
NC	Mountain Discovery School	I look up the latitude/longitude coordinates of the Highway 19 West address reported in 2002 and 2003.

B. Data Appendix

Sources

Student-level data for students in Massachusetts can be obtained from the Massachusetts Department of Elementary and Secondary Education (DESE) by applying to their research office. The datasets used for this analysis include Student Information Systems (SIMS) files for spring 2002-2017, Massachusetts Comprehensive Assessment System (MCAS) test scores data for spring 2002-2014, and SSRD disciplinary data for spring 2013-2016.

Data for students and schools in North Carolina can be obtained from the North Carolina Education Research Data Center (NCERDC) at Duke University. The datasets used for this analysis include masterbuild (test score/enrollment/demographics) files for spring 1997-2016, end of grade test score data for spring 1997-2016, accdemo (student demographic) files for spring 2006-2017, matsusp (disciplinary) files for spring 2001-2017, and NCERDC school universe files for fall 1995-2016.

Data on race/ethnicity by school and school addresses for Massachusetts come from the National Center for Education Statistics (NCES) Common Core of Data (CCD) public elementary/secondary school universe survey for fall 1995-2015.

Data on race/ethnicity by school and school addresses for North Carolina come from NCERDC NCES CCD school universe data files for spring 1995-2016.

Local demographic data by census tract for actual/proposed schools are from the 1990 and 2000 U.S. Census.

Finally, data on the proposed locations of charter schools were compiled by the author from charter school applications submitted by the charter operator to the state charter school authorizer. Many of these applications are available to the public online or in the Boston State House Library. In addition, I contacted the Office of Charter Schools at DESE and at the North Carolina Department of Public Instruction to request access to charter applications that were not available online.

Test Score Coverage

The tables below summarize the availability of test scores by state for my sample. I drop observations for students taking an exam out-of-grade (for example, students re-taking the 10^{th} grade MCAS). In Massachusetts, the MCAS was replaced with an alternative assessment program beginning in SY 2014-15. In North Carolina, students above grade 8 take "end-of-subject" exams that may not coincide with their grade-level.

Massachusetts Comprehensive Assessment System (MCAS)		
	2001-02 to 2004-05	2005-06 to 2013-14
Grd 3	ELA	ELA + Math
Grd 4	ELA + Math	ELA + Math
Grd 5	N/A	ELA + Math

Grd 6	Math	ELA + Math
Grd 7	ELA	ELA + Math
Grd 8	Math	ELA + Math
Grd 9	N/A	
Grd 10	ELA + Math	
Grd 11+	N/A	

North Carolina End-of-Grade Assessments	
	1996-97 to 2015-16
Grds 3-8	ELA + Math
Grd 9+	N/A (End of Subject)

References

Massachusetts Department of Elementary and Secondary Education. 2002-2014. Massachusetts Comprehensive Assessment System (MCAS). Commonwealth of Massachusetts. Multiple electronic files.

Massachusetts Department of Elementary and Secondary Education. 2002-2017. Student Information Management System (SIMS). Commonwealth of Massachusetts. Multiple electronic files.

Massachusetts Department of Elementary and Secondary Education. 2013-2017. SSRD. Commonwealth of Massachusetts. Multiple electronic files.

National Center for Education Statistics Common Core of Data Public Elementary/Secondary School Data. 1995-2015. Multiple electronic files. Downloadable from: https://nces.ed.gov/ccd/files.asp.

North Carolina Education Data Research Center at Duke University. 2006-2017. AccDemo Files. Multiple electronic files.

North Carolina Education Data Research Center at Duke University. 1995-2016. CCD School Universe Files. Multiple electronic files.

North Carolina Education Data Research Center at Duke University. 1997-2016. End of Grade Test Files. Multiple electronic files.

North Carolina Education Data Research Center at Duke University. 1997-2016. MasterBuild Files. Multiple electronic files.

North Carolina Education Data Research Center at Duke University. 2001-2017. MastSusp Files. Multiple electronic files.

U.S. Census Bureau. 1990, 2000. Census Tract Geographic Files and Tract-Level Estimates. Multiple files.

Appendix C: Schools Included in Initial Sample

North Carolina: Charter Openings Included in Initial Sample								
#	Name	Town	Urban	App Submitted (Winter)	School Opened (Fall)	Grades (thru 2015)	# Proposed Sites	Operated in Proposed
1	Washington Montessori	Washington	No	1999	2000	K-9	2	No
2	Piedmont Community Charter School	Gastonia	Yes	1999	2000	K-12	4	No
3	Metrolina Regional Scholars Academy	Charlotte	Yes	1999	2000	K-8	1	No
4	Union Academy	Monroe	No	1999	2000	K-12	1	No
5	Mountain Discovery Charter School	Bryson City	No	2001	2002	K-8	2	No
6	Socrates Academy	Matthews	Yes	2004	2005	K-8	1	No
7	Voyager Academy	Durham	Yes	2006	2007	K-12	1	No
8	Roxboro Community School	Roxboro	No	2005	2006	6-12	2	Yes
9	Endeavour Charter	Wake Forest	Yes	2007	2008	K-8	1	No
10	Henderson Collegiate	Henderson	No	2009	2010	4-9	3	No
11	North East Carolina Prep	Tarboro	No	2011	2012	K-11	3	Yes
12	College Prep and Leadership Academy	Jamestown	Yes	2011	2012	K-8	1	No
13	Island Montessori Charter School	Wilmington	No	2012	2013	K-7	1	No
14	Invest Collegiate Transform	Charlotte	Yes	2012	2013	K-8	1	No
15	Uwharrie Charter Academy	Asheboro	No	2012	2013	6-12	1	No
16	Oxford Preparatory	Oxford	No	2012	2013	8-11	1	No
17	Douglass Academy	Wilmington	Yes	2012	2013	K-3	2	No
18	Carbarrus Charter Academy	Concord	Yes	2012	2013	K-8	1	No
19	Aristotle Preparatory Academy	Charlotte	Yes	2012	2013	K-5	3	Yes

Massachusetts: Charter Openings Included in Initial Sample

#	Name	Town	Urban	App Submitted (Winter)	School Opened (Fall)	Grades (thru 2015)	# Proposed Sites	Operated in Proposed
1	Christa McAuliffe Charter Public School	Framingham	Yes	2000	2002	6-8	2	No
2	Sizer School: A North Central Charter	Fitchburg	No	2000	2002	7-12	3	No
3	Helen Y. Davis Leadership Academy	Boston	Yes	2001	2003	6-8	3	No
4	Boston Preparatory Charter Public School	Hyde Park	Yes	2002	2004	6-12	2	No
5	KIPP Academy Lynn Charter School	Lynn	No	2003	2004	K-12	2	No
6	Hill View Montessori Charter	Haverhill	No	2002	2004	K-8	9	Yes
7	Salem Academy Charter School	Salem	No	2002	2004	6-12	2	No
8	Advanced Math and Science Academy	Marlborough	No	2003	2005	6-12	3	No
9	Holyoke Community Charter School	Holyoke	No	2000	2005	K-8	3	No
10	Martin Luther King Jr. Charter School of Excellence	Springfield	Yes	2004	2006	K-5	3	No
11	Pioneer Valley Chinese Immersion Charter School	Hadley	No	2006	2007	K-11	2	No
12	Pioneer Charter School of Science	Everett	No	2005	2007	7-12	1	No
13	Dorchester Collegiate Academy Charter	Dorchester	Yes	2007	2009	4-8	1	No
14	Hampden Charter School of Science	Chicopee	No	2007	2009	6-12	2	Yes
15	Gloucester Community Arts Charter	Gloucester	No	2008	2010	K-8	3	No
16	Alma del Mar Charter School	New Bedford	Yes	2010	2011	K-6	1	No
17	Bridge Boston Charter School	Dorchester	Yes	2010	2011	K-4	2	No
18	Brooke Charter School Mattapan	Boston	Yes	2010	2011	K-8	2	Yes
19	Community Day Charter Public School - R. Kingman Webster	Lawrence	No	2010	2012	PK-4	2	Yes
20	Veritas Preparatory Charter School	Springfield	Yes	2010	2012	5-8	3	No
21	KIPP Academy Boston Charter School	Hyde Park	Yes	2010	2012	K-8	1	No
22	Community Day Charter - Gateway	Lawrence	No	2010	2012	PK-4	2	Yes
23	Brooke Charter School East Boston	East Boston	Yes	2010	2012	K-8	2	No
24	Pioneer Charter School of Science II	Saugus	No	2012	2013	7-11	1	No
25	Paulo Freire Social Justice Charter School	Holyoke	No	2011	2013	9-12	1	No
26	Baystate Academy Charter Public School	Springfield	Yes	2011	2013	6-9	1	No

Appendix D: Horizontally and Non-Horizontally Differentiated Charter Schools

I identify schools as horizontally-differentiated if they expressed a specific curricular focus (e.g. arts, Chinese immersion) or emphasis on project-based or alternative learning approaches in their application. I do not consider the “math and science” schools listed here as horizontally-differentiated because the math and science components of their curriculum appeared to be part of a traditional, achievement-focused approach. The column on the far right indicates whether the school was part of the Gilraine, Petronijevic, and Singleton (2019) sample. Where this was the case, I accept their designation.

State	School	Horiz-Diff	Reason	GPS (2019)
MA	Christa McAuliffe Charter Public School	Yes	"Expeditionary Learning design"; "hands-on, personalized education" (Application, p. 1)	No
MA	Sizer School: A North Central Charter	Yes	Sizer/”Essential School” affiliate	No
MA	Helen Y. Davis Leadership Academy	No		No
MA	Boston Preparatory Charter Public School	No		No
MA	KIPP Academy Lynn Charter School	No		No
MA	Hill View Montessori Charter	Yes	Montessori	No
MA	Salem Academy Charter School	No		No
MA	Advanced Math and Science Academy	No		No
MA	Holyoke Community Charter School	No		No
MA	Martin Luther King Jr. Charter School of Excellence	No		No
MA	Pioneer Valley Chinese Immersion Charter School	Yes	Chinese (Mandarin) immersion school	No
MA	Pioneer Charter School of Science	No		No
MA	Dorchester Collegiate Academy Charter	No		No
MA	Hampden Charter School of Science	No		No
MA	Gloucester Community Arts Charter	Yes	Art-focused	No
MA	Alma del Mar Charter School	Yes	"Expeditionary Learning"; partnership with "Expeditionary Learning" (Application, p. 1)	No
MA	Bridge Boston Charter School	No		No
MA	Brooke Charter School Mattapan	No		No
MA	Community Day Charter Public School - R. Kingman Webster	No		No

MA	Veritas Preparatory Charter School	No		No
MA	KIPP Academy Boston Charter School	No		No
MA	Community Day Charter - Gateway	No		No
MA	Brooke Charter School East Boston	No		No
MA	Pioneer Charter School of Science II	No		No
MA	Paulo Freire Social Justice Charter School	Yes	Social-justice emphasis; "We achieve educational excellence and social responsibility for all our students through high expectations and a rigorous academic and social justice curriculum" (Application, p. 3)	No
MA	Baystate Academy Charter Public School	No		No
NC	Washington Montessori	Yes	Montessori	No
NC	Piedmont Community Charter School	No		No
NC	Metrolina Regional Scholars Academy	Yes	"Exceptionally flexible and challenging education in a supportive environment designed especially for students with extremely high intellectual or academic ability" (Application, p. 24); "grade distinctions are not age specific" (p. 41)	No
NC	Union Academy	No		No
NC	Mountain Discovery Charter School	Yes	"Experientially rich, hands-on learning course of study developed to maximize each child's potential to become a responsible citizen of the local and global communities" (Application, p. 8)	No
NC	Socrates Academy	Yes	"Particular emphasis on proficiency in reading, writing, and mathematics both in English and Greek through the Socratic method." (Application, p. 88)	
NC	Voyager Academy	No		No
NC	Roxboro Community School	No		No
NC	Endeavour Charter	No		No
NC	Henderson Collegiate	No		No
NC	North East Carolina Prep	Yes	"teach and inspire through a challenging curriculum that integrates technology, experiential learning and critical thinking skills" (Application, p. 8)	Yes
NC	College Prep and Leadership Academy	No		Yes
NC	Island Montessori Charter School	Yes	Montessori	Yes
NC	Invest Collegiate Transform	Yes	"The entire school community builds upon the collaboration across six active domains of learning: imagine, nurture, value, engage, sustain, and transform" (Application, p. 9)	Yes
NC	Uwharrie Charter Academy	No		No

NC	Oxford Preparatory	No		No
NC	Douglass Academy	No		Yes
NC	Carbarrus Charter Academy	No		Yes
NC	Aristotle Preparatory Academy	No		Yes

(a) Massachusetts (b) North Carolina

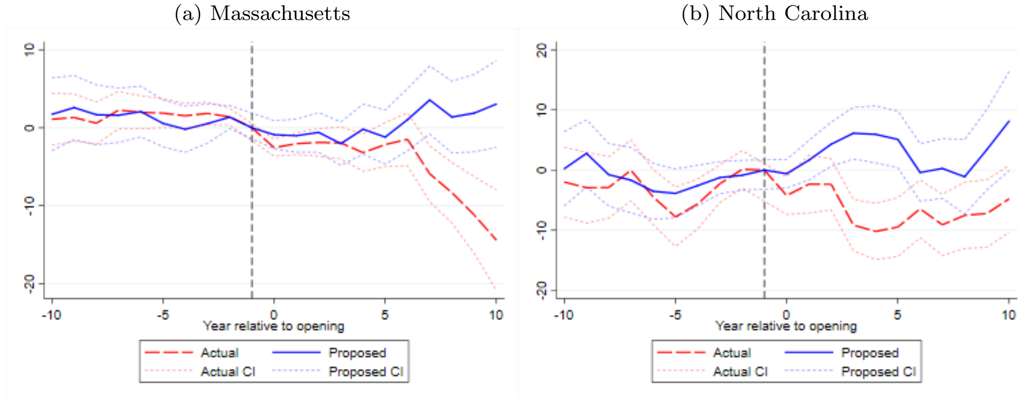
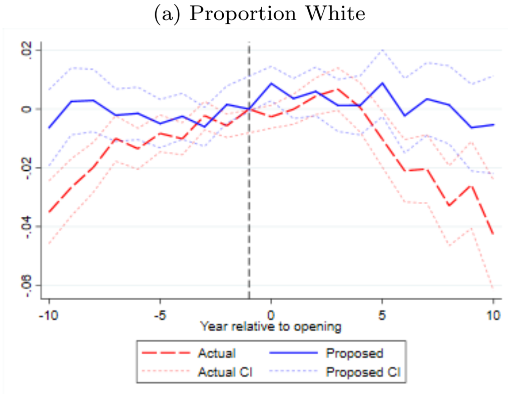


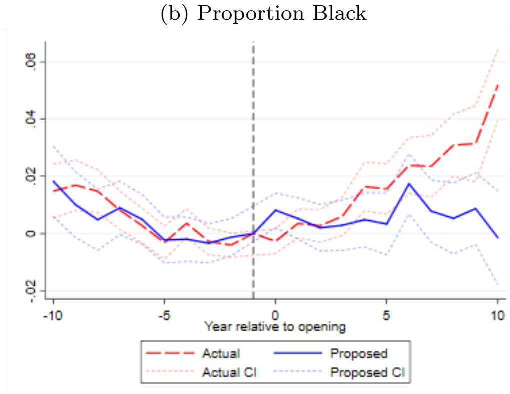
Figure A1. Effect of Charter Openings on Grade-Level Enrollment

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (2) with grade-level enrollment as the outcome estimated separately for each state subsample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A8. Dotted lines represent 95% confidence intervals. Source: CCD.

(a) Proportion White



(b) Proportion Black



(c) Proportion Hispanic

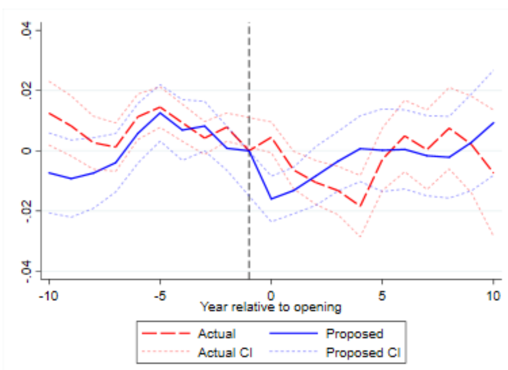


Figure A2. Effect of Charter Openings on Proportion Students by Race/Ethnicity (Massachusetts)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (2) for the proportion of students in a grade for each race/ethnicity estimated for the Massachusetts subsample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A9-A11. Dotted lines represent 95% confidence intervals. Unbalanced panel. Source: CCD.

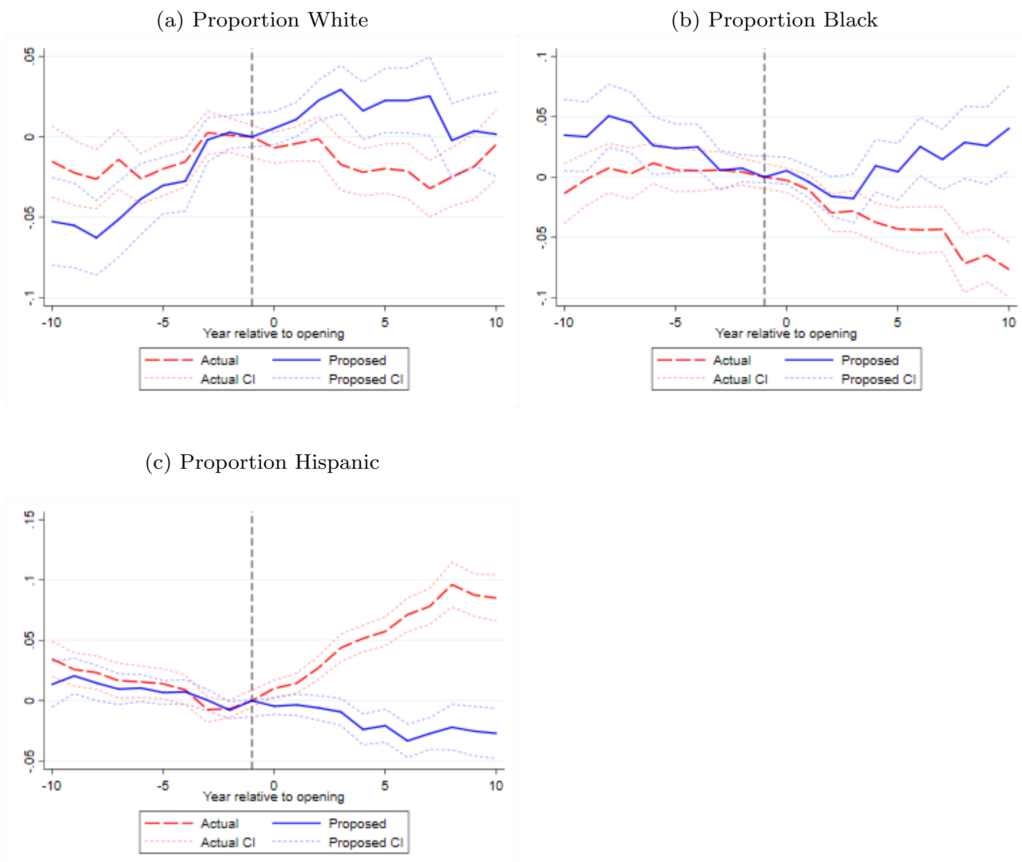


Figure A3. Effect of Charter Openings on Proportion Students by Race/Ethnicity (North Carolina)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (2) for the proportion of students in a grade for each race/ethnicity estimated for the North Carolina subsample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A9-A11. Dotted lines represent 95% confidence intervals. Unbalanced panel. Source: CCD.

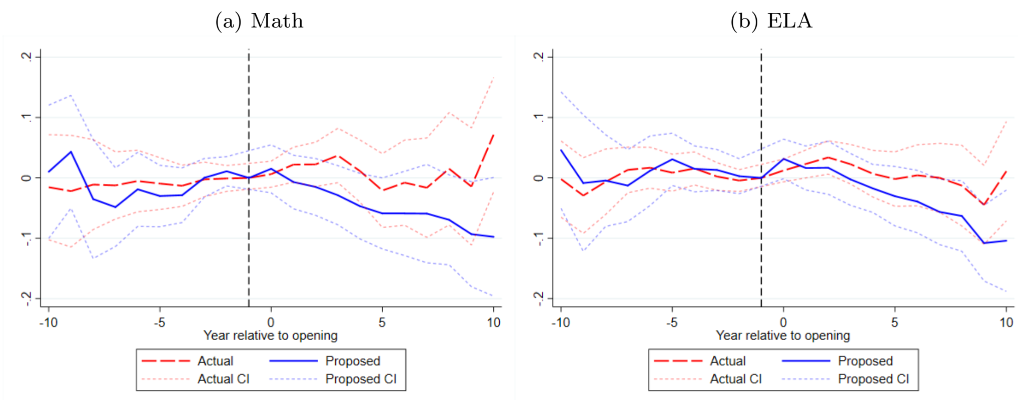


Figure A4. Effect of Charter Openings on Achievement (Massachusetts)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (4) for test scores using the Massachusetts subsample. Regressions include student covariates and polynomials of once- and twice-lagged test scores to the third order. I require one non-missing prior score in the tested subject for all observations included in the sample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A12-13. Unbalanced panel. Dotted lines represent 95% confidence intervals.

(a) Math (b) ELA

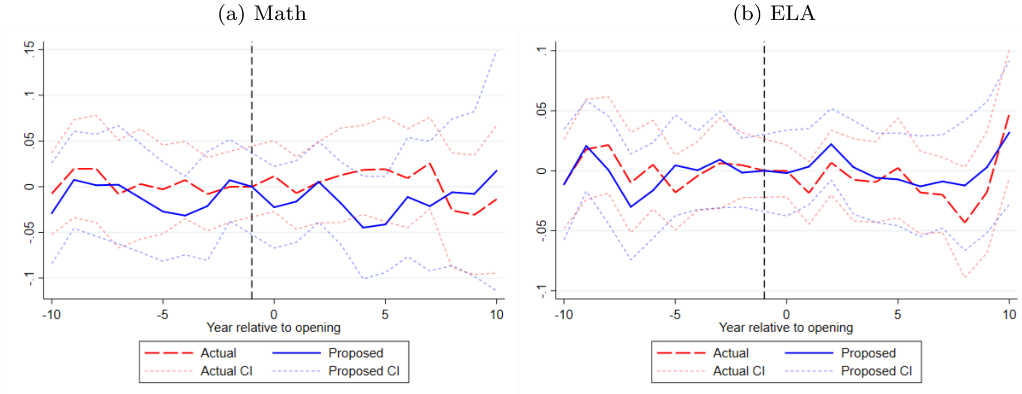


Figure A5. Effect of Charter Openings on Achievement (North Carolina)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (4) for test scores using the North Carolina subsample. Regressions include student covariates and polynomials of once- and twice-lagged test scores to the third order. I require one non-missing prior score in the tested subject for all observations included in the sample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A12-A13. Unbalanced panel. Dotted lines represent 95% confidence intervals.

(a) Attendance　(b) Suspensions

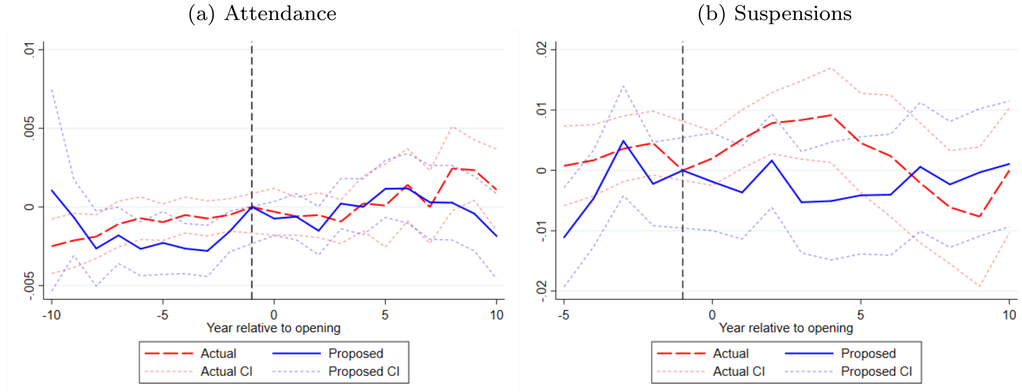


Figure A6. Effect of Charter Openings on Attendance and Suspensions (Massachusetts)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (4) for attendance and suspensions using the Massachusetts subsample. Regressions include student covariates, once- and twice-lagged attendance, and indicators for having an out-of-school suspension reported one- and two-years prior. I require one non-missing prior attendance observation for all observations included in the sample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A14-A15. Dotted lines represent 95% confidence intervals. Unbalanced panel.

(a) Attendance (b) Suspensions

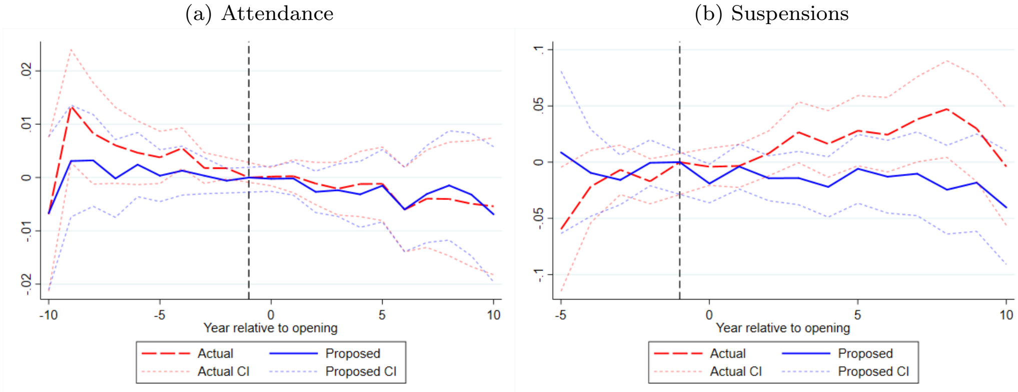


FIGURE A7. EFFECT OF CHARTER OPENINGS ON ATTENDANCE AND SUSPENSIONS (NORTH CAROLINA)

Note: This figure plots the coefficients δ_{Ap} and δ_{Pp} estimated by equation (4) for attendance and suspensions using the North Carolina subsample. Regressions include student covariates, once- and twice-lagged attendance, and indicators for having an out-of-school suspension reported one- and two-years prior. I require one non-missing prior attendance observation for all observations included in the sample. Coefficients are transformed to express the difference in δ_{Ap} and δ_{Pp} relative to δ_{A-1} and δ_{P-1}, respectively. Transformed values of δ_{Ap} and δ_{Pp} are reported in Table A14-A15. Dotted lines represent 95% confidence intervals. Unbalanced panel.

(a) Math (b) ELA

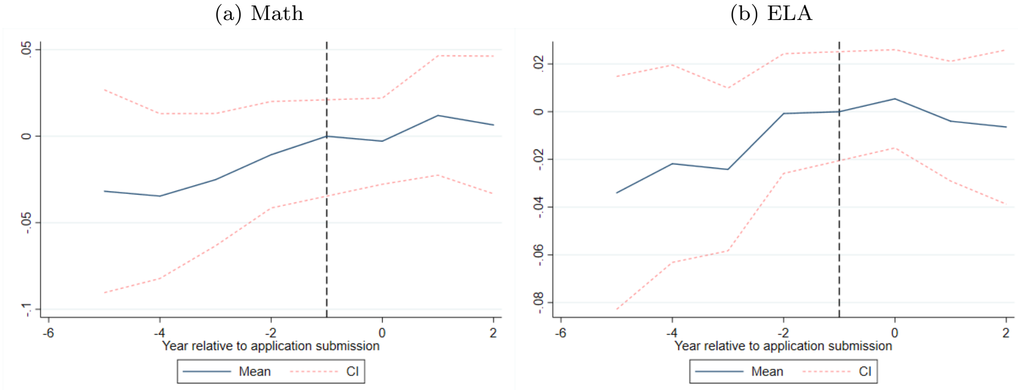


Figure A8. Trends in School Performance around Charter Application Submission

Note: This figure plots point estimates for mean math and ELA scores at schools within two miles of proposed sites (actual or proposed-only) of charters included in my initial sample. I generate these by regressing student test scores on dummy variables for each period from $p = -5$ to $p = 2$, where $p = 0$ in the year the charter submitted its application. Regressions control for state-by-grade-by-year fixed effects. I adjust point estimates by subtracting the value at $p = -1$ to center the graph at 0 in the last year of the pre-period. All but one charter opened at $p = 1$ or $p = 2$. Unbalanced panel. Corresponding point estimates are reported in Table A16. See text for detail.

Table A1—Timeline for Opening a Charter School in North Carolina

June 2019	Application for new schools becomes available online
July 2019	Application for fast-track applications due
August 2019	Application for regular timeline applicants due
October 2019	State Board of Education (SBE) issues decisions on fast-track applicants
April 2020	SBE issues decisions on regular timeline applicants, approved applicants begin planning year
August 2020	Fast-track approved charter schools open
August 2021	Regular timeline approved charter schools open

This process reflects the 2019 application process and was adapted from information found on https://files.nc.gov/dpi/documents/charterschools/applications accessed on May 8, 2020. The fast-track application process is aimed at operators with a track record of success and was formalized in 2014. Prior to this, final applications were generally due in April the year before the charter school was set to open (in August).

Table A2—Timeline for Opening a Charter School in Massachusetts

June 2019	Letter of intent due for all charter applicants
July 2019	Prospectus (preliminary application) and "proven provider" status request due
September 2019	Commissioner decides on "proven provider" status, invites selected applicants to submit final applications
October 2019	Final application due
February 2020	Decisions on charter applications issued
August 2020	Some approved charters open
August 2021	Remaining charters open

This process reflects the 2019-20 application process and was adapted from information found on http://www.doe.mass.edu/charter/new/?section=all accessed on May 8, 2020. Approved charters in Massachusetts must open within 19 months of charter approval, in general. The "proven provider" process, created in 2010, is for charter operators with proven track records of success. Charters that open in the lowest-performing districts in Massachusetts that have met the limit on charter growth must be from proven-providers.

Table A3—Charters That Listed Multiple Sites/One Site

	Number of Sites Listed		
	Multiple Sites	One Site	t-stat (p-value)
	(1)	(2)	(3)
A. Number of Schools			
All	28	32	
Urban	11	14	
Non-Urban	17	18	
Massachusetts	19	11	
North Carolina	28	32	
B. Students			
Grade Size	62.86	68.62	-0.67
			(0.50)
Proportion White	0.38	0.48	-1.11
			(0.27)
Proportion Black	0.28	0.25	0.32
			(0.75)
Proportion Hispanic	0.28	0.17	1.77
			(0.08)
Proportion Disadvantaged	0.39	0.30	0.80
			(0.43)
C. Test Scores			
Average ELA	0.07	0.11	-0.31
			(0.76)
Average Math	0.01	0.03	-0.15
			(0.88)
School Value-Added	-0.07	-0.00	-0.86
			(0.40)
D. Neighborhood			
Proportion White	0.58	0.63	-0.57
			(0.57)
Proportion Black	0.15	0.08	1.74
			(0.09)
Proportion Hispanic	0.22	0.23	-0.13
			(0.90)
Median Income	$25,710	$27,971	-0.97
			(0.34)
E. Year Opened			
2000-2002	5	10	
2003-2005	7	1	
2006-2008	3	4	
2009-2011	6	3	
2012-2013	7	14	

Sample includes charter schools that included at least one identifiable proposed site on their application. See notes for Table 3.

Table A4—Charters That Did/Did Not Operate in a Proposed Site

	Operated in Proposed Site		
	Yes	No	t-stat (p-value)
	(1)	(2)	(3)
A. Number of Schools			
All	23	37	
Urban	5	20	
Non-Urban	18	17	
Massachusetts	9	21	
North Carolina	23	37	
B. Students			
Grade Size	61.48	68.51	-0.80
			(0.43)
Proportion White	0.48	0.40	0.89
			(0.38)
Proportion Black	0.24	0.28	-0.59
			(0.56)
Proportion Hispanic	0.19	0.24	-0.62
			(0.53)
Proportion Disadvantaged	0.36	0.29	0.65
			(0.52)
C. Test Scores			
Average ELA	0.03	0.12	-0.86
			(0.39)
Average Math	-0.05	0.06	-0.82
			(0.42)
School Value-Added	-0.06	0.00	-1.12
			(0.27)
D. Neighborhood			
Proportion White	0.62	0.60	0.16
			(0.87)
Proportion Black	0.10	0.12	-0.58
			(0.56)
Proportion Hispanic	0.23	0.22	0.12
			(0.91)
Median Income	$26,029	$27,468	-0.62
			(0.54)
E. Year Opened			
2000-2002	8	7	
2003-2005	1	7	
2006-2008	2	5	
2009-2011	4	5	
2012-2013	8	13	

Sample includes charter schools that included at least one identifiable proposed site on their application. See notes for Table 3.

Table A5—Balance Tests: Massachusetts

	Actual (1)	Proposed (2)	t-stat (p-value) (3)	Obs (4)
A. Student Demographics				
Grade Size	145.83	145.81	0.00	475
			(1.00)	
Change in Grade Size (5 years)	-0.96	0.74	-0.28	469
			(0.78)	
Proportion White	0.37	0.41	-0.69	486
			(0.49)	
Proportion Black	0.18	0.20	-0.51	486
			(0.61)	
Proportion Hispanic	0.37	0.32	1.06	486
			(0.29)	
Proportion Disadvantaged	0.58	0.56	0.45	485
			(0.65)	
B. Test Scores				
Average Math	-0.31	-0.34	0.12	453
			(0.91)	
Average ELA	-0.35	-0.36	0.02	454
			(0.98)	
Change in Average Math (3 years)	-0.00	-0.02	0.60	361
			(0.55)	
Change in Average ELA (3 years)	0.00	-0.03	1.34	360
			(0.18)	
C. Neighborhood Characteristics				
Proportion White	0.57	0.61	-0.77	486
			(0.44)	
Proportion Black	0.15	0.14	0.26	486
			(0.79)	
Proportion Hispanic	0.20	0.18	0.43	486
			(0.67)	
Median Household Income	$40,848	$44,906	-1.09	486
			(0.27)	
Change in Population (1990- 2000)	29.89	191.95	-0.85	486
			(0.39)	
F-stat for joint probability test				1.47
P-value for F-test				(0.11)
Observations				468

Sample is limited to charters with at least one treatment and control school at the 2-mile radius. Schools near actual sites are within two miles of any actual site of a charter. Schools near proposed sites are within two miles of any proposed-only site of a charter (and are not also within two miles of an actual site). Observations are weighted to give each charter "case" equal weight, as described. Characteristics are defined in the year before the charter school opens. Column (3) reports results from a t-test for equivalence of (weighted) means in columns (1) and (2). F-test results are for a regression predicting being at an actual site with all covariates listed here and indicators for missing test score values. Standard errors are clustered at the school-level.

Table A6—Balance Tests: North Carolina

	Actual (1)	Proposed (2)	t-stat (p-value) (3)	Obs (4)
A. Student Demographics				
Grade Size	154.19	131.98	0.90	112
			(0.37)	
Change in Grade Size (5 years)	2.63	3.58	-0.19	108
			(0.85)	
Proportion White	0.41	0.37	0.75	112
			(0.46)	
Proportion Black	0.43	0.46	-0.54	112
			(0.59)	
Proportion Hispanic	0.10	0.13	-0.96	112
			(0.34)	
Proportion Disadvantaged	0.59	0.63	-0.67	102
			(0.50)	
B. Test Scores				
Average Math	-0.07	-0.11	0.34	105
			(0.73)	
Average ELA	-0.08	-0.14	0.59	105
			(0.56)	
Change in Average Math (3 years)	0.00	0.05	-0.80	101
			(0.42)	
Change in Average ELA (3 years)	-0.01	0.02	-0.88	101
			(0.38)	
C. Neighborhood Characteristics				
Proportion White	0.61	0.63	-0.30	112
			(0.76)	
Proportion Black	0.31	0.28	0.46	112
			(0.65)	
Proportion Hispanic	0.05	0.06	-0.85	112
			(0.39)	
Median Household Income	43148.69	37912.85	1.35	112
			(0.18)	
Change in Population (1990-2000)	1046.03	850.47	0.31	112
			(0.76)	
F-stat for joint probability test				2.98
P-value for F-test				(0.00)
Observations				98

Sample is limited to charters with at least one treatment and control school at the 2-mile radius. Schools near actual sites are within two miles of any actual site of a charter. Schools near proposed sites are within two miles of any proposed-only site of a charter (and are not also within two miles of an actual site). Observations are weighted to give each charter "case" equal weight, as described. Characteristics are defined in the year before the charter school opens. Column (3) reports results from a t-test for equivalence of (weighted) means in columns (1) and (2). F-test results are for a regression predicting being at an actual site with all covariates listed here and indicators for missing test score values. Standard errors are clustered at the school-level.

Table A7—Effect of Charter Openings on Number of Students by Race/Ethnicity

	Pooled (1)	Massachusetts (2)	North Carolina (3)
White	-5.464	-3.315	-12.746
	(0.872)	(0.959)	(1.951)
Mean	30.230	28.555	38.261
Black	-0.408	0.308	-2.887
	(0.741)	(0.798)	(1.837)
Mean	30.196	26.056	50.048
Hispanic	1.609	0.425	6.123
	(0.680)	(0.830)	(0.999)
Mean	30.813	35.411	8.764
Observations	32,539	25,379	7,160
Charters	36	23	13

Regression coefficients estimated using equation (1) with a dataset of school-by-grade-by-year observations for grades that are ever-served by a charter in the estimation sample using a 2-mile radius. All outcomes defined at the grade-level. Grade-level enrollment is available from SY 1995-96 to SY 2015-16; number and proportion of students are available from SY 1998-99 to SY 2015-16. Robust standard errors (in parentheses) are clustered at the school-by-grade level. Mean refers to the mean of observations in sample before the grade is served.

Table A8—Event Time Period Point Estimates for Grade-Level Enrollment

	Pooled		Massachusetts		North Carolina	
Event Period	Actual (1)	Proposed (2)	Actual (3)	Proposed (4)	Actual (5)	Proposed (6)
p=-10	-0.175	1.011	1.1	1.732	-1.983	0.225
	(1.179)	(1.772)	(1.698)	(2.385)	(2.94)	(3.155)
p=-9	0.006	2.347	1.314	2.587	-2.937	2.78
	(1.114)	(1.566)	(1.542)	(2.092)	(3.008)	(2.852)
p=-8	-0.526	0.892	0.593	1.676	-2.886	-0.77
	(1.038)	(1.487)	(1.382)	(1.954)	(2.618)	(2.656)
p=-7	1.296	0.606	2.273	1.607	-0.028	-1.672
	(0.956)	(1.404)	(1.226)	(1.78)	(2.569)	(2.781)
p=-6	0.445	0.464	1.988	2.081	-4.476	-3.526
	(0.884)	(1.3)	(1.076)	(1.661)	(2.325)	(2.373)
p=-5	-0.384	-0.918	1.875	0.563	-7.775	-3.873
	(0.866)	(1.213)	(0.945)	(1.528)	(2.518)	(2.074)
p=-4	-0.33	-1.162	1.544	-0.187	-5.625	-2.577
	(0.772)	(1.187)	(0.817)	(1.514)	(2.105)	(1.728)
p=-3	0.576	-0.263	1.846	0.538	-2.268	-1.245
	(0.667)	(0.994)	(0.745)	(1.283)	(1.604)	(1.359)
p=-2	0.944	0.564	1.404	1.367	0.131	-0.868
	(0.53)	(0.648)	(0.548)	(0.751)	(1.579)	(1.271)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	-2.655	-0.628	-2.552	-0.89	-4.234	-0.6
	(0.542)	(0.743)	(0.558)	(0.924)	(1.597)	(1.217)
p=1	-1.801	-0.136	-2.034	-1.017	-2.342	1.648
	(0.751)	(0.908)	(0.716)	(1.084)	(2.444)	(1.679)
p=2	-1.61	0.937	-1.881	-0.587	-2.364	4.302
	(0.831)	(1.063)	(0.906)	(1.3)	(2.163)	(1.875)
p=3	-3.002	0.524	-1.939	-2.033	-9.146	6.131
	(0.944)	(1.179)	(1.051)	(1.421)	(2.179)	(2.195)
p=4	-4.401	1.756	-3.195	-0.187	-10.2	5.948
	(1.108)	(1.332)	(1.216)	(1.638)	(2.397)	(2.418)
p=5	-3.502	0.997	-2.147	-1.196	-9.464	5.102
	(1.251)	(1.383)	(1.441)	(1.767)	(2.499)	(2.408)
p=6	-1.918	0.852	-1.48	1.036	-6.44	-0.401
	(1.403)	(1.522)	(1.727)	(2.039)	(2.448)	(2.438)
p=7	-5.494	2.696	-5.904	3.572	-9.096	0.274
	(1.501)	(1.618)	(1.829)	(2.224)	(2.596)	(2.538)
p=8	-6.382	1.123	-8.33	1.381	-7.524	-1.111
	(1.592)	(1.806)	(1.981)	(2.352)	(2.816)	(3.158)
p=9	-8.038	2.734	-11.17	1.879	-7.218	3.407
	(1.854)	(1.978)	(2.507)	(2.534)	(2.867)	(3.416)
p=10	-8.472	4.78	-14.41	3.045	-4.778	8.152
	(2.161)	(2.312)	(3.287)	(2.832)	(2.839)	(4.206)
Observations	37,243	37,243	29,002	29,002	8,241	8,241

Estimates in this table are plotted in Figures 3 and A1. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period. Data come from the CCD from SY 1995-96 to SY 2015-16. Grade-level enrollment is available from SY 1995-96 to SY 2015-16; number and proportion of students are available from SY 1998-99 to SY 2015-16.

Table A9—Event Time Period Point Estimates for Proportion White Students

	Pooled		Massachusetts		North Carolina	
Event Period	Actual (1)	Proposed (2)	Actual (3)	Proposed (4)	Actual (5)	Proposed (6)
p=-10	-0.024	-0.011	-0.035	-0.006	-0.015	-0.053
	(0.004)	(0.006)	(0.005)	(0.007)	(0.011)	(0.014)
p=-9	-0.019	-0.006	-0.027	0.003	-0.022	-0.055
	(0.004)	(0.006)	(0.005)	(0.006)	(0.01)	(0.013)
p=-8	-0.015	-0.008	-0.02	0.003	-0.026	-0.063
	(0.004)	(0.005)	(0.004)	(0.005)	(0.009)	(0.012)
p=-7	-0.006	-0.01	-0.01	-0.002	-0.014	-0.051
	(0.003)	(0.005)	(0.004)	(0.005)	(0.009)	(0.012)
p=-6	-0.011	-0.006	-0.014	-0.001	-0.026	-0.039
	(0.003)	(0.004)	(0.004)	(0.005)	(0.008)	(0.011)
p=-5	-0.006	-0.007	-0.008	-0.005	-0.02	-0.03
	(0.003)	(0.004)	(0.003)	(0.004)	(0.009)	(0.009)
p=-4	-0.007	-0.005	-0.01	-0.002	-0.016	-0.028
	(0.003)	(0.004)	(0.003)	(0.004)	(0.008)	(0.01)
p=-3	0	-0.003	-0.002	-0.006	0.003	-0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.007)	(0.007)
p=-2	-0.004	0.003	-0.006	0.002	0.001	0.003
	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.005)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	-0.004	0.007	-0.003	0.009	-0.007	0.005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.005)
p=1	-0.002	0.004	0	0.004	-0.004	0.011
	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
p=2	0.001	0.009	0.004	0.006	-0.001	0.023
	(0.003)	(0.003)	(0.003)	(0.004)	(0.007)	(0.006)
p=3	0	0.007	0.007	0.001	-0.017	0.029
	(0.003)	(0.004)	(0.004)	(0.005)	(0.008)	(0.008)
p=4	-0.008	0.003	0.001	0.001	-0.022	0.016
	(0.004)	(0.004)	(0.004)	(0.005)	(0.007)	(0.009)
p=5	-0.017	0.01	-0.01	0.009	-0.02	0.023
	(0.004)	(0.005)	(0.005)	(0.006)	(0.008)	(0.01)
p=6	-0.027	0.003	-0.021	-0.002	-0.021	0.023
	(0.004)	(0.005)	(0.005)	(0.006)	(0.009)	(0.01)
p=7	-0.031	0.008	-0.02	0.003	-0.032	0.025
	(0.005)	(0.006)	(0.006)	(0.006)	(0.009)	(0.013)
p=8	-0.037	-0.004	-0.033	0.001	-0.025	-0.002
	(0.005)	(0.006)	(0.007)	(0.007)	(0.009)	(0.012)
p=9	-0.032	-0.009	-0.026	-0.006	-0.019	0.004
	(0.005)	(0.006)	(0.008)	(0.008)	(0.01)	(0.011)
p=10	-0.037	-0.011	-0.043	-0.005	-0.005	0.002
	(0.007)	(0.007)	(0.01)	(0.008)	(0.011)	(0.013)
Observations	32,539	32,539	25,379	25,379	7,160	7,160

Estimates in this table are plotted in Figures 4, A2, and A3. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period.

Table A10—Event Time Period Point Estimates for Proportion Black Students

	Pooled		Massachusetts		North Carolina	
Event Period	Actual (1)	Proposed (2)	Actual (3)	Proposed (4)	Actual (5)	Proposed (6)
p=-10	-0.002	0.013	0.015	0.018	-0.014	0.035
	(0.004)	(0.006)	(0.005)	(0.006)	(0.013)	(0.015)
p=-9	0.004	0.009	0.017	0.01	-0.002	0.033
	(0.004)	(0.006)	(0.004)	(0.006)	(0.011)	(0.015)
p=-8	0.005	0.01	0.015	0.005	0.007	0.051
	(0.004)	(0.006)	(0.004)	(0.005)	(0.01)	(0.013)
p=-7	-0.001	0.012	0.008	0.009	0.003	0.045
	(0.003)	(0.005)	(0.003)	(0.005)	(0.011)	(0.013)
p=-6	-0.004	0.005	0.003	0.005	0.012	0.026
	(0.003)	(0.005)	(0.003)	(0.004)	(0.009)	(0.012)
p=-5	-0.009	0	-0.003	-0.002	0.006	0.024
	(0.003)	(0.004)	(0.003)	(0.004)	(0.009)	(0.01)
p=-4	-0.002	0.001	0.004	-0.002	0.005	0.025
	(0.003)	(0.004)	(0.003)	(0.004)	(0.009)	(0.01)
p=-3	-0.005	-0.003	-0.003	-0.003	0.006	0.006
	(0.003)	(0.003)	(0.002)	(0.003)	(0.008)	(0.008)
p=-2	-0.003	0	-0.004	-0.001	0.004	0.007
	(0.002)	(0.003)	(0.002)	(0.003)	(0.006)	(0.006)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	-0.003	0.008	-0.003	0.008	-0.003	0.005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.006)
p=1	0.002	0.004	0.004	0.005	-0.011	-0.004
	(0.002)	(0.003)	(0.003)	(0.004)	(0.006)	(0.007)
p=2	-0.002	-0.001	0.003	0.002	-0.03	-0.016
	(0.003)	(0.004)	(0.003)	(0.004)	(0.008)	(0.008)
p=3	0.001	-0.001	0.006	0.003	-0.028	-0.018
	(0.003)	(0.004)	(0.003)	(0.004)	(0.009)	(0.01)
p=4	0.007	0.008	0.016	0.005	-0.038	0.009
	(0.004)	(0.005)	(0.004)	(0.005)	(0.008)	(0.011)
p=5	0.006	0.007	0.016	0.003	-0.043	0.004
	(0.004)	(0.005)	(0.005)	(0.006)	(0.009)	(0.012)
p=6	0.011	0.024	0.024	0.017	-0.044	0.025
	(0.004)	(0.005)	(0.005)	(0.005)	(0.01)	(0.012)
p=7	0.011	0.015	0.024	0.008	-0.043	0.015
	(0.005)	(0.006)	(0.006)	(0.006)	(0.01)	(0.013)
p=8	0.008	0.018	0.031	0.005	-0.072	0.029
	(0.005)	(0.007)	(0.006)	(0.006)	(0.012)	(0.015)
p=9	0.009	0.02	0.031	0.009	-0.065	0.026
	(0.006)	(0.007)	(0.007)	(0.006)	(0.011)	(0.016)
p=10	0.012	0.017	0.052	-0.001	-0.077	0.041
	(0.006)	(0.008)	(0.006)	(0.008)	(0.012)	(0.018)
Observations	32,539	32,539	25,379	25,379	7,160	7,160

Estimates in this table are plotted in Figures 4, A2, and A3. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period. Grade-level enrollment is available from SY 1995-96 to SY 2015-16; number and proportion of students are available from SY 1998-99 to SY 2015-16.

Table A11—Event Time Period Point Estimates for Proportion Hispanic Students

	Pooled		Massachusetts		North Carolina	
Event Period	Actual (1)	Proposed (2)	Actual (3)	Proposed (4)	Actual (5)	Proposed (6)
p=-10	0.025	0.005	0.013	-0.007	0.035	0.014
	(0.004)	(0.006)	(0.005)	(0.007)	(0.007)	(0.01)
p=-9	0.018	0.003	0.008	-0.009	0.026	0.021
	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)
p=-8	0.013	0.003	0.003	-0.007	0.023	0.015
	(0.004)	(0.005)	(0.004)	(0.006)	(0.007)	(0.007)
p=-7	0.01	0.003	0.001	-0.004	0.017	0.01
	(0.004)	(0.004)	(0.004)	(0.005)	(0.007)	(0.006)
p=-6	0.018	0.01	0.011	0.006	0.016	0.011
	(0.003)	(0.004)	(0.004)	(0.005)	(0.007)	(0.006)
p=-5	0.02	0.013	0.015	0.013	0.014	0.007
	(0.003)	(0.004)	(0.003)	(0.005)	(0.006)	(0.005)
p=-4	0.014	0.008	0.009	0.007	0.009	0.007
	(0.003)	(0.004)	(0.003)	(0.005)	(0.006)	(0.005)
p=-3	0.006	0.007	0.004	0.008	-0.007	0
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.004)
p=-2	0.005	-0.001	0.008	0.001	-0.007	-0.008
	(0.002)	(0.003)	(0.002)	(0.004)	(0.004)	(0.004)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	0.006	-0.013	0.004	-0.016	0.01	-0.005
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
p=1	-0.002	-0.011	-0.006	-0.013	0.014	-0.003
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
p=2	-0.003	-0.009	-0.011	-0.008	0.027	-0.006
	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
p=3	-0.002	-0.007	-0.013	-0.003	0.044	-0.009
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)
p=4	-0.004	-0.008	-0.018	0.001	0.052	-0.024
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
p=5	0.009	-0.009	-0.003	0	0.057	-0.021
	(0.004)	(0.005)	(0.005)	(0.007)	(0.006)	(0.007)
p=6	0.02	-0.013	0.005	0	0.071	-0.033
	(0.005)	(0.005)	(0.006)	(0.007)	(0.007)	(0.007)
p=7	0.02	-0.015	0	-0.002	0.078	-0.027
	(0.005)	(0.005)	(0.007)	(0.007)	(0.008)	(0.007)
p=8	0.029	-0.012	0.008	-0.002	0.096	-0.022
	(0.005)	(0.006)	(0.007)	(0.007)	(0.009)	(0.01)
p=9	0.026	-0.009	0.002	0.003	0.088	-0.025
	(0.006)	(0.007)	(0.008)	(0.008)	(0.009)	(0.011)
p=10	0.024	-0.003	-0.007	0.009	0.085	-0.027
	(0.007)	(0.007)	(0.011)	(0.009)	(0.01)	(0.011)
Observations	32,539	32,539	25,379	25,379	7,160	7,160

Estimates in this table are plotted in Figures 4, A2, and A3. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period. Grade-level enrollment is available from SY 1995-96 to SY 2015-16; number and proportion of students are available from SY 1998-99 to SY 2015-16.

Table A12—Event Time Period Point Estimates for Math Scores

	Pooled		Massachusetts		North Carolina	
Event	Actual	Proposed	Actual	Proposed	Actual	Proposed
Period	(1)	(2)	(3)	(4)	(5)	(6)
p=-10	-0.008	-0.009	-0.015	0.01	-0.008	-0.029
	(0.022)	(0.031)	(0.044)	(0.056)	(0.023)	(0.028)
p=-9	-0.006	0.025	-0.022	0.043	0.02	0.007
	(0.026)	(0.027)	(0.047)	(0.048)	(0.027)	(0.027)
p=-8	0	-0.022	-0.011	-0.035	0.02	0.002
	(0.022)	(0.029)	(0.038)	(0.05)	(0.03)	(0.029)
p=-7	-0.008	-0.032	-0.012	-0.048	-0.008	0.002
	(0.017)	(0.023)	(0.028)	(0.033)	(0.03)	(0.033)
p=-6	0	-0.017	-0.005	-0.019	0.003	-0.013
	(0.018)	(0.021)	(0.026)	(0.031)	(0.031)	(0.03)
p=-5	-0.005	-0.03	-0.009	-0.03	-0.003	-0.027
	(0.015)	(0.018)	(0.022)	(0.026)	(0.025)	(0.028)
p=-4	-0.007	-0.031	-0.013	-0.029	0.007	-0.032
	(0.013)	(0.017)	(0.017)	(0.023)	(0.022)	(0.022)
p=-3	-0.002	-0.006	-0.002	0	-0.008	-0.021
	(0.011)	(0.014)	(0.015)	(0.016)	(0.021)	(0.03)
p=-2	0.001	0.01	-0.001	0.011	0	0.007
	(0.009)	(0.011)	(0.011)	(0.012)	(0.02)	(0.023)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	0.007	0.007	0.006	0.015	0.012	-0.023
	(0.009)	(0.017)	(0.011)	(0.02)	(0.02)	(0.023)
p=1	0.013	-0.006	0.022	-0.007	-0.007	-0.016
	(0.012)	(0.017)	(0.015)	(0.023)	(0.02)	(0.023)
p=2	0.016	-0.007	0.023	-0.015	0.005	0.005
	(0.014)	(0.018)	(0.019)	(0.024)	(0.023)	(0.023)
p=3	0.03	-0.022	0.037	-0.029	0.013	-0.018
	(0.015)	(0.018)	(0.023)	(0.025)	(0.026)	(0.023)
p=4	0.011	-0.043	0.011	-0.047	0.018	-0.045
	(0.016)	(0.019)	(0.026)	(0.028)	(0.025)	(0.029)
p=5	-0.011	-0.051	-0.021	-0.059	0.019	-0.041
	(0.018)	(0.019)	(0.031)	(0.03)	(0.029)	(0.027)
p=6	-0.004	-0.043	-0.008	-0.059	0.009	-0.011
	(0.019)	(0.022)	(0.036)	(0.036)	(0.028)	(0.033)
p=7	-0.001	-0.046	-0.016	-0.059	0.026	-0.021
	(0.02)	(0.026)	(0.042)	(0.042)	(0.026)	(0.036)
p=8	-0.002	-0.049	0.015	-0.069	-0.026	-0.006
	(0.024)	(0.025)	(0.048)	(0.038)	(0.032)	(0.041)
p=9	-0.024	-0.053	-0.014	-0.093	-0.031	-0.008
	(0.025)	(0.03)	(0.05)	(0.044)	(0.033)	(0.046)
p=10	0.014	-0.025	0.072	-0.098	-0.014	0.017
	(0.031)	(0.044)	(0.048)	(0.05)	(0.041)	(0.067)
Observations	1,092,499	1,092,499	758,083	758,083	334,416	334,416

Estimates in this table are plotted in Figures 5, A4, and A5. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (4) for the indicated sample. All regressions include student covariates and cubics of once- and twice-lagged test scores, as in estimates of equation (3) (see Table 8 notes). Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period.

Table A13—Event Time Period Point Estimates for ELA Scores

	Pooled		Massachusetts		North Carolina	
Event Period	Actual (1)	Proposed (2)	Actual (3)	Proposed (4)	Actual (5)	Proposed (6)
p=-10	0.006	0.018	-0.015	0.01	-0.011	-0.011
	(0.019)	(0.026)	(0.044)	(0.056)	(0.019)	(0.024)
p=-9	-0.01	0.004	-0.022	0.043	0.018	0.021
	(0.02)	(0.032)	(0.047)	(0.048)	(0.021)	(0.019)
p=-8	0.005	-0.001	-0.011	-0.035	0.022	0.001
	(0.018)	(0.024)	(0.038)	(0.05)	(0.021)	(0.023)
p=-7	0.013	-0.019	-0.012	-0.048	-0.01	-0.03
	(0.013)	(0.02)	(0.028)	(0.033)	(0.021)	(0.023)
p=-6	0.017	0	-0.005	-0.019	0.005	-0.016
	(0.012)	(0.02)	(0.026)	(0.031)	(0.019)	(0.02)
p=-5	0.006	0.02	-0.009	-0.03	-0.018	0.004
	(0.012)	(0.016)	(0.022)	(0.026)	(0.016)	(0.021)
p=-4	0.012	0.008	-0.013	-0.029	-0.004	0
	(0.011)	(0.014)	(0.017)	(0.023)	(0.015)	(0.017)
p=-3	0.002	0.009	-0.002	0	0.006	0.009
	(0.01)	(0.014)	(0.015)	(0.016)	(0.019)	(0.021)
p=-2	-0.002	0.001	-0.001	0.011	0.005	-0.002
	(0.008)	(0.012)	(0.011)	(0.012)	(0.014)	(0.015)
p=-1	0	0	0	-0.069	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	0.009	0.024	0.006	0.015	0	-0.002
	(0.008)	(0.013)	(0.011)	(0.02)	(0.011)	(0.018)
p=1	0.011	0.014	0.022	-0.007	-0.019	0.003
	(0.009)	(0.015)	(0.015)	(0.023)	(0.013)	(0.016)
p=2	0.025	0.02	0.023	-0.015	0.007	0.022
	(0.011)	(0.017)	(0.019)	(0.024)	(0.014)	(0.015)
p=3	0.011	-0.001	0.037	-0.029	-0.007	0.003
	(0.012)	(0.016)	(0.023)	(0.025)	(0.018)	(0.02)
p=4	0	-0.014	0.011	-0.047	-0.009	-0.006
	(0.014)	(0.015)	(0.026)	(0.028)	(0.017)	(0.019)
p=5	-0.003	-0.024	-0.021	-0.059	0.002	-0.007
	(0.015)	(0.018)	(0.031)	(0.03)	(0.021)	(0.02)
p=6	-0.004	-0.028	-0.008	-0.059	-0.018	-0.013
	(0.015)	(0.019)	(0.036)	(0.036)	(0.018)	(0.021)
p=7	-0.007	-0.038	-0.016	-0.059	-0.02	-0.009
	(0.016)	(0.019)	(0.042)	(0.042)	(0.016)	(0.02)
p=8	-0.021	-0.044	0.015	-0.069	-0.043	-0.012
	(0.021)	(0.021)	(0.048)	(0.038)	(0.024)	(0.028)
p=9	-0.03	-0.064	-0.014	-0.093	-0.018	0.003
	(0.02)	(0.023)	(0.05)	(0.044)	(0.026)	(0.028)
p=10	0.038	-0.026	0.072	-0.098	0.048	0.032
	(0.023)	(0.029)	(0.048)	(0.05)	(0.027)	(0.031)
Observations	1,091,735	1,091,735	758,083	758,083	333,230	333,230

Estimates in this table are plotted in Figures 5, A4, and A5. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (4) for the indicated sample. All regressions include student covariates and cubics of once- and twice-lagged test scores, as in estimates of equation (3) (see Table 8 notes). Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period.

Table A14—Event Time Period Point Estimates for Attendance

Event Period	Pooled Actual (1)	Pooled Proposed (2)	Massachusetts Actual (3)	Massachusetts Proposed (4)	North Carolina Actual (5)	North Carolina Proposed (6)
p=-10	-0.001	0.002	-0.003	0.001	-0.007	-0.007
	(0.001)	(0.003)	(0.001)	(0.003)	(0.007)	(0.007)
p=-9	-0.001	0	-0.002	-0.001	0.013	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)
p=-8	-0.001	-0.002	-0.002	-0.003	0.008	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.004)
p=-7	0	-0.002	-0.001	-0.002	0.006	0
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
p=-6	0	-0.002	-0.001	-0.003	0.005	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
p=-5	0	-0.002	-0.001	-0.002	0.004	0
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
p=-4	0	-0.002	-0.001	-0.003	0.006	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
p=-3	0	-0.002	-0.001	-0.003	0.002	0
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
p=-2	0	-0.001	-0.001	-0.002	0.002	-0.001
	(0)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
p=-1	0	0	0	0	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	0	-0.001	0	-0.001	0	0
	(0.001)	(0)	(0.001)	(0.001)	(0.001)	(0.001)
p=1	0	0	-0.001	-0.001	0	0
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
p=2	0	-0.002	-0.001	-0.002	-0.001	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
p=3	-0.001	0	-0.001	0	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
p=4	0	0	0	0	-0.001	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
p=5	0	0.001	0	0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
p=6	0	0	0.001	0.001	-0.006	-0.006
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
p=7	0	0	0	0	-0.004	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)
p=8	0.001	0	0.002	0	-0.004	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)
p=9	0.001	-0.001	0.002	0	-0.005	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)
p=10	0.001	-0.002	0.001	-0.002	-0.005	-0.007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.006)
Observations	1,940,027	1,940,027	1,594,079	1,594,079	345,948	345,948

Estimates in this table are plotted in Figures 6, A6, and A7. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (4) for the indicated sample. All regressions include student covariates and once- and twice-lagged attendance and indicators for any reported suspensions one- or two-years prior, as in estimates of equation (3) (see Table 9 notes). Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period.

Table A15—Event Time Period Point Estimates for Suspensions

	Pooled		Massachusetts		North Carolina	
Event	Actual	Proposed	Actual	Proposed	Actual	Proposed
Period	(1)	(2)	(3)	(4)	(5)	(6)
p=-5	-0.003	-0.012	0.001	-0.011	-0.06	0.009
	(0.003)	(0.004)	(0.003)	(0.004)	(0.028)	(0.037)
p=-4	-0.001	-0.006	0.002	-0.005	-0.022	-0.01
	(0.003)	(0.004)	(0.003)	(0.004)	(0.016)	(0.02)
p=-3	0.002	0.002	0.004	0.005	-0.007	-0.016
	(0.003)	(0.004)	(0.003)	(0.005)	(0.011)	(0.011)
p=-2	0.002	-0.002	0.005	-0.002	-0.017	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)	(0.01)	(0.01)
p=-1	0	0	0	-0.002	0	0
	n/a	n/a	n/a	n/a	n/a	n/a
p=0	0.002	-0.004	0.002	-0.002	-0.004	-0.019
	(0.002)	(0.004)	(0.002)	(0.004)	(0.008)	(0.009)
p=1	0.004	-0.003	0.005	-0.004	-0.003	-0.004
	(0.002)	(0.004)	(0.002)	(0.004)	(0.01)	(0.01)
p=2	0.007	0	0.008	0.002	0.008	-0.014
	(0.002)	(0.004)	(0.003)	(0.004)	(0.01)	(0.01)
p=3	0.009	-0.005	0.008	-0.005	0.027	-0.014
	(0.003)	(0.004)	(0.003)	(0.004)	(0.014)	(0.012)
p=4	0.008	-0.006	0.009	-0.005	0.016	-0.022
	(0.004)	(0.005)	(0.004)	(0.005)	(0.015)	(0.014)
p=5	0.006	-0.002	0.005	-0.004	0.028	-0.006
	(0.004)	(0.005)	(0.004)	(0.005)	(0.016)	(0.016)
p=6	0.004	-0.002	0.002	-0.004	0.024	-0.013
	(0.005)	(0.005)	(0.005)	(0.005)	(0.017)	(0.017)
p=7	0.004	0.002	-0.002	0.001	0.038	-0.01
	(0.005)	(0.005)	(0.005)	(0.005)	(0.019)	(0.019)
p=8	0.002	-0.002	-0.006	-0.002	0.047	-0.025
	(0.005)	(0.005)	(0.005)	(0.005)	(0.022)	(0.02)
p=9	0.002	0.001	-0.008	0	0.03	-0.018
	(0.005)	(0.005)	(0.006)	(0.005)	(0.024)	(0.022)
p=10	-0.002	-0.003	0	0.001	-0.004	-0.04
	(0.004)	(0.005)	(0.005)	(0.005)	(0.027)	(0.026)
Observations	1,847,917	1,847,917	1,603,735	1,603,735	244,182	244,182

Estimates in this table are plotted in Figures 6, A6, and A7. Columns (1), (3), and (5) display the transformed values of δ_{Ap} estimated using equation (4) for the indicated sample. All regressions include student covariates and once- and twice-lagged attendance and indicators for any reported suspensions one- or two-years prior, as in estimates of equation (3) (see Table 9 notes). Columns (2), (4), and (6) display the transformed values of δ_{Ap} estimated using equation (2) for the indicated sample. Estimates are defined relative to value of $\delta_{Ap=-1}$ or $\delta_{Pp=-1}$. Transformed coefficients can be interpreted as the difference in the outcome relative to levels in the last pre-period.

Table A16—School-Level Performance Prior to Charter Application Submission

Event-Time Period	Math (1)	ELA (2)
p=-5	-0.0318	-0.0340
	(0.0299)	(0.0249)
p=-4	-0.0346	-0.0218
	(0.0243)	(0.0211)
p=-3	-0.0251	-0.0242
	(0.0195)	(0.0174)
p=-2	-0.0107	-0.000774
	(0.0157)	(0.0128)
p=-1	0	0
	n/a	n/a
p=0	-0.00285	0.00541
	(0.0127)	(0.0105)
p=1	0.0120	-0.00398
	(0.0176)	(0.0128)
p=2	0.00650	-0.00642
	(0.0203)	(0.0165)
Observations	1,796,815	1,780,498

This table reproduces the point estimates plotted in Figure A8.I generate these by regressing student test scores on dummy variables for each period from $p = -5$ to $p = 2$, where $p = 0$ in the year the charter submitted its application using a dataset of student-by-year observations for students at traditional public schools within 2 miles of a proposed site of a charter in my sample. Regressions control for state-by-grade-by-year fixed effects. I adjust point estimates by subtracting the value at $p = -1$ to center the graph at 0 in the last year of the pre-period. All but one charter opened at $p = 1$ or $p = 2$. Unbalanced panel.