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National Charter School Study
Supplementary Findings Appendix

2013

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List of Acronyms

PI Pacific Islander

TPS Traditional Public School

VCR Virtual Control Record

Demographics

Table 1: Charter Student Profiles by State

States	White Students	Black Students	Hispanic Students	Special Education Students	English Language Learners	Students in Poverty
27-State Total	37%	27%	30%	6%	6%	55%
Arizona	59.5%	5.6%	29.8%	2.1%	1.2%	36.8%
Arkansas	54.6%	42.5%	2.4%	4.9%	0.5%	50.9%
California	35.8%	10.0%	46.0%	3.6%	11.8%	50.4%
Colorado	61.8%	6.1%	28.1%	4.7%	4.8%	28.1%
District of Columbia	1.9%	93.5%	4.5%	10.7%	1.2%	74.8%
Florida	40.1%	20.4%	36.4%	7.2%	1.6%	48.4%
Georgia	38.4%	46.1%	10.0%	7.3%	3.6%	50.2%
Illinois	4.4%	63.4%	30.7%	9.9%	4.1%	89.2%
Indiana	27.4%	63.5%	5.6%	10.0%	1.8%	72.5%
Louisiana	13.5%	84.0%	1.5%	4.7%	0.2%	80.7%
Massachusetts	54.2%	20.9%	20.5%	11.5%	0.9%	44.0%
Michigan	34.1%	58.4%	4.9%	6.8%	3.3%	66.9%
Minnesota	64.9%	22.4%	3.8%	11.1%	4.7%	45.5%
Missouri	4.3%	89.2%	6.2%	8.0%	4.5%	89.7%
Nevada	55.2%	15.0%	21.5%	8.7%	2.6%	18.1%
New Jersey	8.4%	60.4%	28.9%	8.4%	0.7%	75.7%
New Mexico	33.8%	1.1%	59.0%	9.1%	9.7%	51.4%
New York	20.4%	70.1%	8.9%	7.0%	0.4%	69.9%
New York City	2.7%	62.3%	33.1%	10.3%	3.1%	84.1%
North Carolina	69.4%	26.3%	3.3%	4.1%	0.8%	23.3%
Ohio	39.7%	55.8%	2.6%	13.0%	0.7%	74.8%
Oregon	85.4%	3.1%	6.8%	6.5%	0.1%	34.5%
Pennsylvania	40.3%	46.8%	10.3%	11.9%	1.5%	64.2%
Rhode Island	23.9%	20.1%	53.3%	9.5%	2.2%	70.7%
Tennessee	1.5%	97.1%	1.4%	5.5%	0.3%	59.7%

States	White Students	Black Students	Hispanic Students	Special Education Students	English Language Learners	Students in Poverty
Texas	16.1%	21.4%	59.2%	6.9%	7.2%	68.5%
Utah	90.7%	0.4%	7.0%	1.4%	1.3%	24.5%

The following pie charts contain the proportion of charter students in each race/ethnic group for the 27 states by location: urban, suburban, town and rural areas.

Figure 1: Urban Charter Student Race/Ethnicity in 27 States
n = 257,724

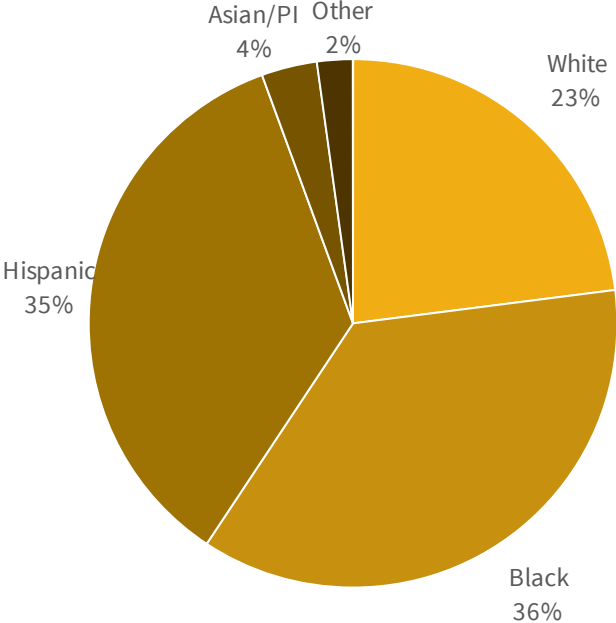


Figure 2: Suburban Charter Student Race/Ethnicity in 27 States
n = 106,252

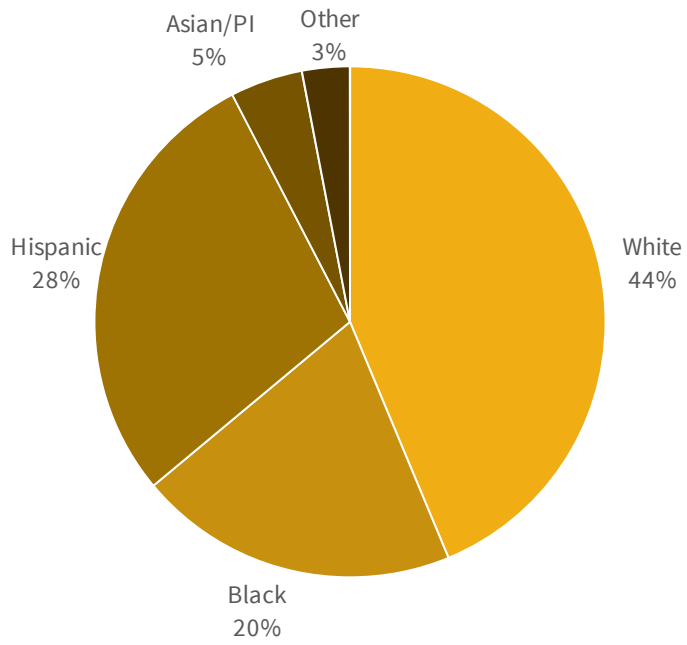


Figure 3: Town Charter Student Race/Ethnicity in 27 States
n = 29,403

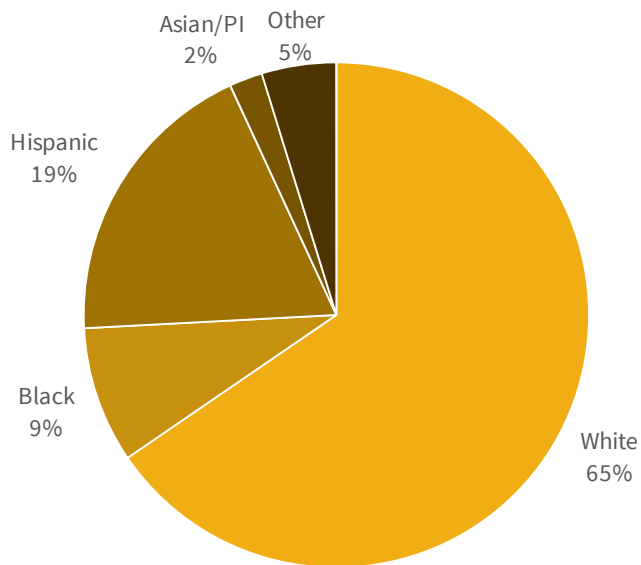


Figure 4: Rural Charter Student Race/Ethnicity in 27 States
n = 63,761

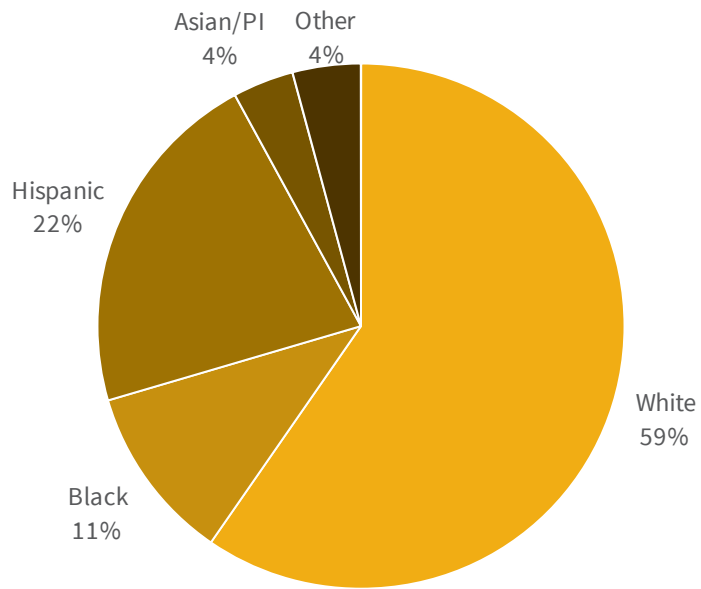
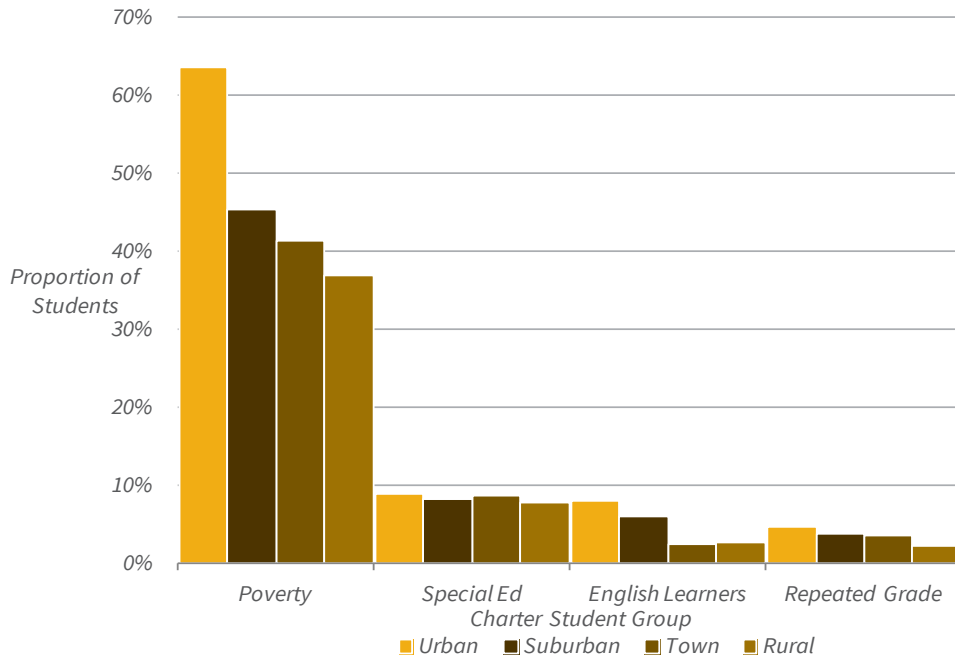
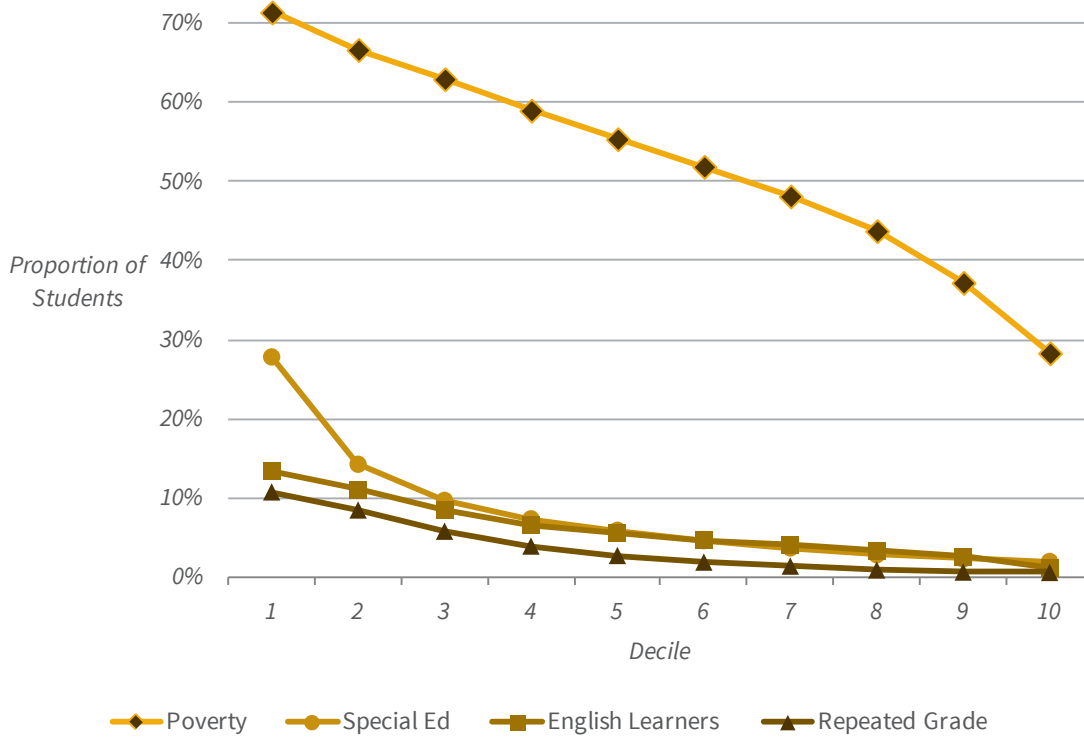


Figure 5: Charter Student Groups by Location in 27 States



The figure above shows the proportion of charter students in each location who belong to each student group. For example, 64 percent of urban charter students are in poverty, while 37 percent of rural charter students are in poverty.

Figure 6: Starting Deciles by Charter Student Group in 27 States



The figure above shows the proportion of students in each decile who belong to each student group. For example, 71 percent of charter students in decile 1 are in poverty, while 28 percent of students in decile 10 are in poverty. Decile 1 represents the lowest-achieving 10 percent of all students in a state (both charter and traditional public schools), while decile 10 represents the highest-achieving 10 percent of students in a state.

16 States

Table 2: School Years and Growth Periods by State for 2009 Report and Now

State	2009 Report			Now		
	Beginning School Year	Ending School Year	Growth Periods	Beginning School Year	Ending School Year	Growth Periods
Arkansas	2003-04	2007-08	4	2007-08	2010-11	3
Arizona	2004-05	2007-08	3	2007-08	2010-11	3
California	2005-06	2007-08	2	2007-08	2010-11	3
Colorado (Denver)	2003-04	2007-08	4	2007-08	2010-11	3
District of Columbia	2005-06	2007-08	2	2007-08	2010-11	3
Florida	2000-01	2007-08	7	2007-08	2010-11	3
Georgia	2003-04	2007-08	4	2007-08	2010-11	3
Illinois (Chicago)	2004-05	2007-08	3	2008-09	2010-11	2
Louisiana	2000-01	2007-08	7	2007-08	2010-11	3
Massachusetts	2004-05	2006-07	2	2006-07	2010-11	4
Minnesota	2004-05	2007-08	3	2007-08	2010-11	3
Missouri	2005-06	2007-08	4	2007-08	2010-11	3
New Mexico	2004-05	2007-08	3	2007-08	2010-11	3
North Carolina	2002-03	2006-07	4	2006-07	2010-11	4
Ohio	2004-05	2007-08	3	2007-08	2010-11	3
Texas	2002-03	2006-07	4	2006-07	2010-11	4

Table 3: Number of Observations by Variable for 16 States

Variable	2009 Schools Now	New Schools	Both Cohorts
Charter	1,198,974	226,656	1,425,630
Black	522,550	122,394	645,230
Hispanic	896,758	185,858	1,082,044
Asian/Pacific Islander	96,606	13,599	112,126
Native American	10,354	0	11,604
Multi-ethnic	32,528	4,533	37,852
Is Special Ed	137,572	22,666	161,524
Is English Learner	169,210	40,798	209,896
Is in Poverty	1,322,606	276,520	1,598,016
Repeated Grade	62,740	9,066	73,440
Arizona	153,652	17,982	171,634
Arkansas	14,704	7,192	21,896
California	810,348	130,992	941,340
Colorado	15,866	4,328	20,194
DC	34,498	6,522	41,020
Florida	286,920	50,914	337,834
Georgia	103,530	26,214	129,744
Illinois	26,562	13,596	40,158
Louisiana	56,074	16,288	72,362
Massachusetts	78,740	7,894	86,634
Minnesota	35,790	5,720	41,510
Missouri	29,680	2,546	32,226
New Mexico	14,744	2,374	17,118
North Carolina	91,616	8,688	100,304
Ohio	103,312	9,746	113,058
Texas	402,362	127,730	530,092
grade_01	98	6	104
grade_02	8,996	1,264	10,260

Variable	2009 Schools Now	New Schools	Both Cohorts
grade_03	89,434	17,988	107,422
grade_04	273,398	52,052	325,450
grade_05	297,738	55,854	353,592
grade_06	354,616	79,752	434,368
grade_07	361,012	65,300	426,312
grade_08	348,644	50,274	398,918
grade_09	232,010	54,476	286,486
grade_10	239,882	45,654	285,536
grade_11	173,048	27,014	200,062
grade_12	19,072	3,678	22,750
Observations	2,397,948	453,312	2,851,260

Table 4: Percent of Charter School Closures by State for Schools from 2009 Report

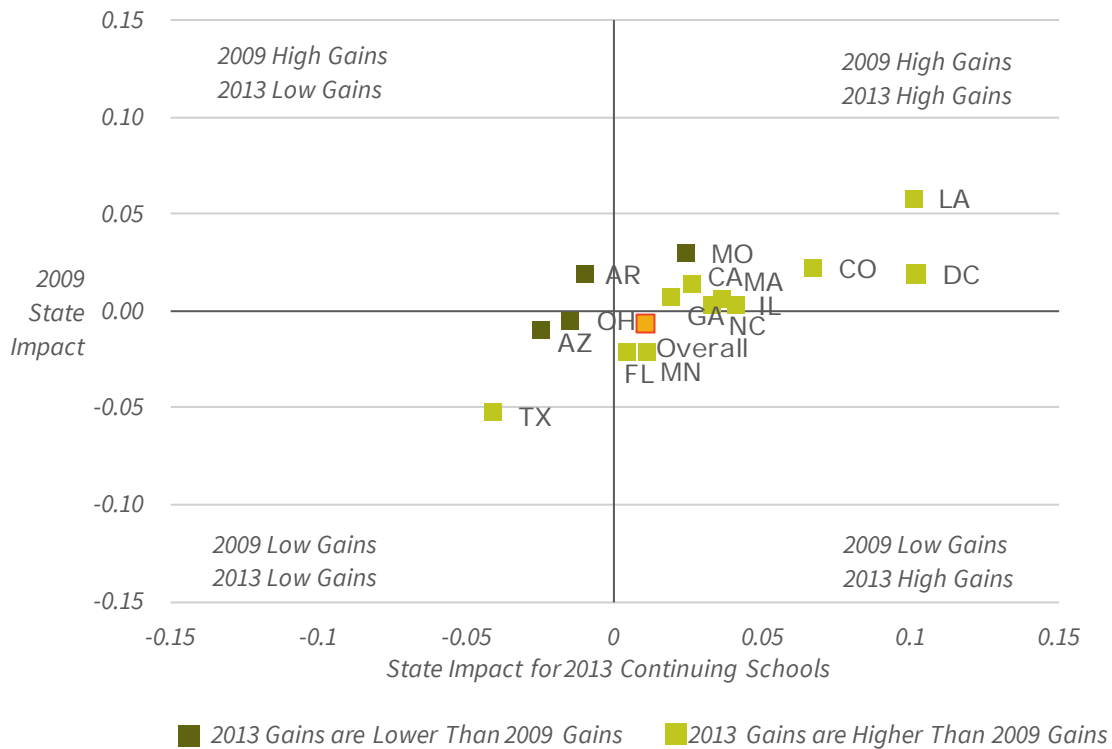
State	Closures
Arkansas	14%
Arizona	7%
California	6%
Colorado (Denver)	17%
District of Columbia	23%
Florida	7%
Georgia	21%
Illinois (Chicago)	3%
Louisiana	8%
Massachusetts	4%
Minnesota	6%
Missouri	19%
New Mexico	2%
North Carolina	4%
Ohio	9%
Texas	9%
Pooled 16 States	8%

Figure 7 below locates each of the 16 states in the 2009 report in two dimensions – their 2009 reading impacts and their current performance with the same schools. Each quadrant of the chart represents a different combination of starting and ending points; for example, the bottom right quadrant consists of states that had lower reading gains (relative to TPS) in 2009 but whose contemporary performance is better than TPS.

In the 2009 results, there were six states with significantly positive charter school impacts in reading compared to their TPS peers: Arkansas, California, Missouri, Colorado (Denver), Louisiana and the District of Columbia. An additional four states had positive results that were not significantly different from TPS: Massachusetts, Georgia, North Carolina and Illinois (Chicago). These 10 states can be found in the top half of the figure below. Only two of these 10 states had a decline in charter impact in the current time period – Arkansas and Missouri. The charter impact in Arkansas went from significantly positive to negative but not significantly different from TPS. Missouri’s charter impact declined slightly but remained positive relative to TPS. The remaining six states had lower learning gains at charters

relative to TPS in 2009: Arizona, Florida, Minnesota, New Mexico, Ohio and Texas. (In one of these states, Ohio, the original result was negative but not significantly different from TPS.) Two of these states, Arizona and Ohio, had worse impacts in the current period for the schools that were included in the 2009 report. Three states with negative charter impacts for reading in the original time period had positive impacts in the current time period – Florida, Minnesota, and New Mexico.

Figure 7: Reading Impacts by State for 2009 Schools and 2013 Continuing Schools

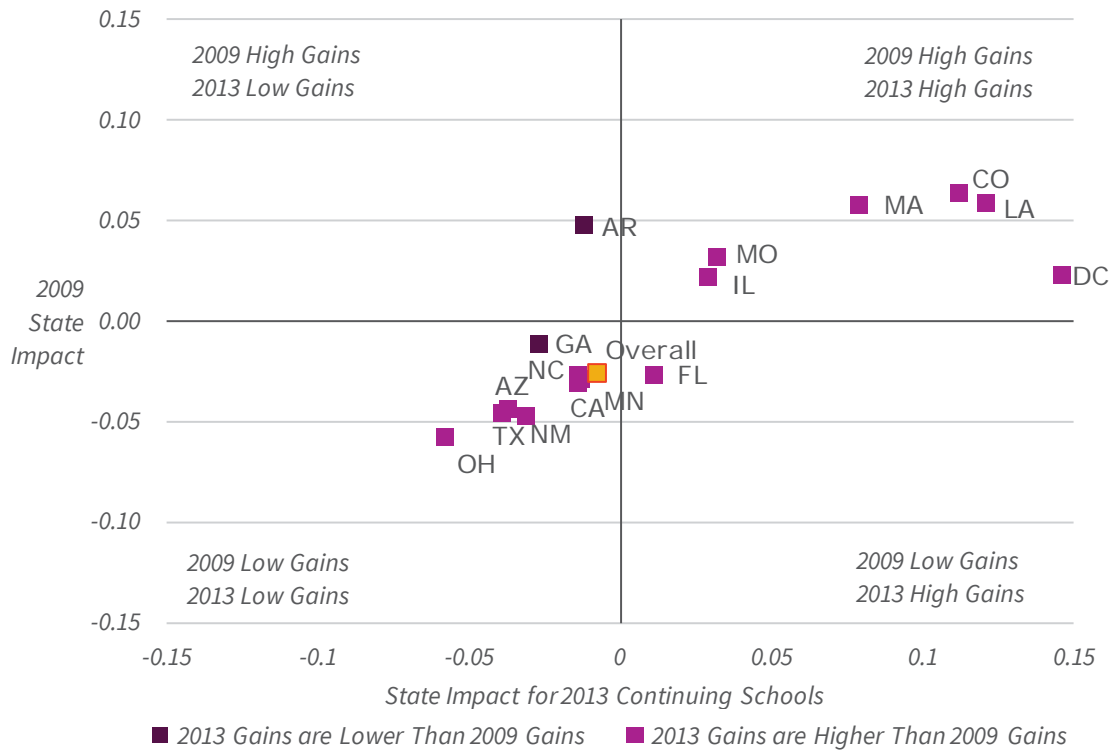


In math, all states except Georgia and Arkansas maintained or improved their charter performance with 2009 schools, as shown in Figure 8 below. Florida was the only state with a negative charter impact in the first time period that improved to a positive charter impact with the same schools in the current period. Another notable state is the District of Columbia, which had a large improvement in math learning gains from the original to the current time period.

Most of the 16 states had improved charter impacts relative to TPS from the original to the current time period with the 2009 schools. Just four states – Arkansas, Arizona, Missouri, and Ohio – saw declines in charter performance in reading and only two states – Arkansas and Georgia – had declines in math. Although the improvement in most states was modest, these findings indicate that the majority of existing charter schools in these states can maintain or even improve slightly their performance over

time. School closures help to explain part of this result, a practice that was associated with several of the high-performing states.

Figure 8: Math Impacts by State for 2009 Schools and 2013 Continuing Schools

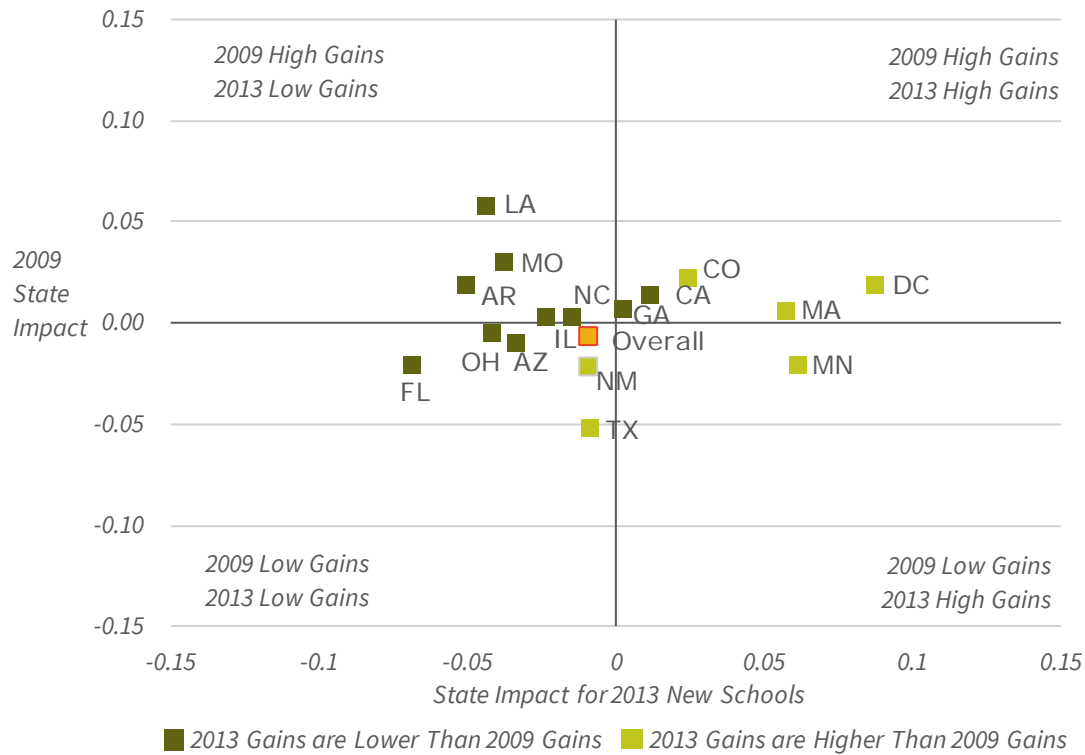


Another way to answer the question of whether state charter impacts improve over time is to consider how new charter school impacts differ from the 2009 results. One could speculate that differences between these two groups could be a function of changes in authorizing. If the authorizing focus has shifted toward quality, newer schools would be expected to have more positive impacts than older schools. One could also speculate that the differences between the new charter school impacts and the 2009 schools follow from differences in the cohorts. The new charter schools have lower starting scores – and their VCRs have lower growth – than the 2009 schools. Both of these factors could be related to charter impacts for these new schools.

Figure 9 below compares the state charter impacts in reading; each state’s location reflects their 2009 reading impacts and the current performance of the new schools. In contrast to the comparison of the 2009 and continuing school results, the direction of changes between the two school groups is preponderantly negative. Looking at the 10 states with positive effects in 2009, five have negative charter impacts in the new schools, and an additional two of the ten have smaller positive charter impacts for the new schools. There were six states with negative charter impacts in 2009. The learning

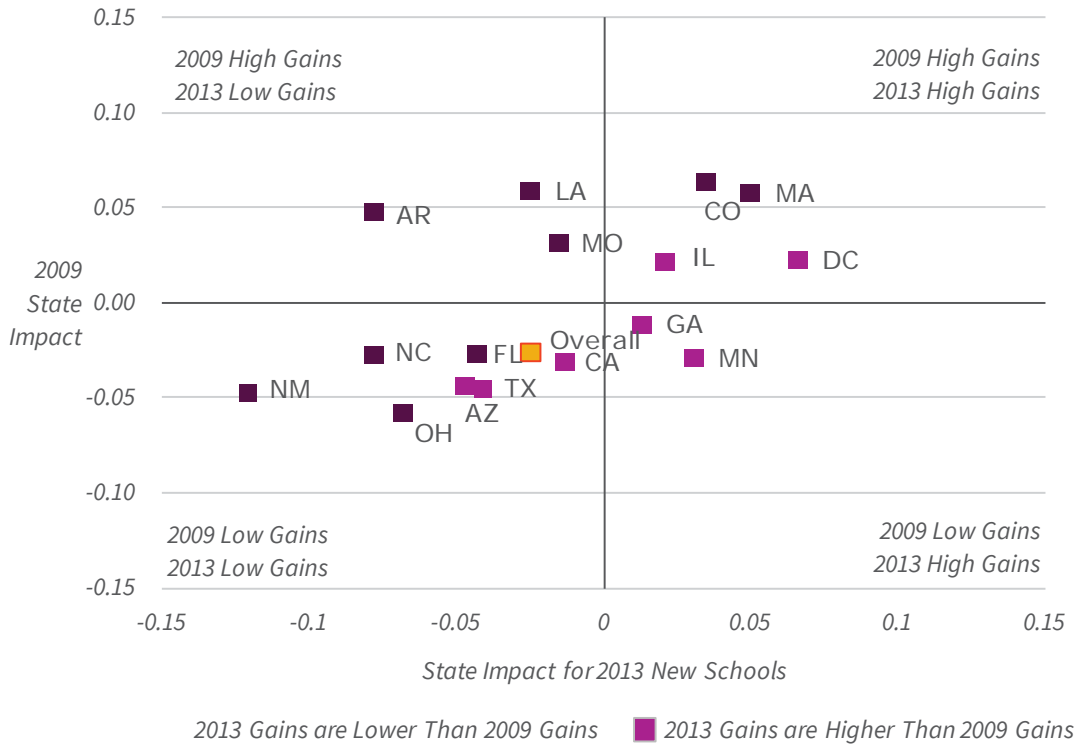
impacts in the new schools got worse in three of these states. In three states, the new charter schools have impacts that are better than the 2009 results. There are three additional states that bear mention for the large positive change from the 2009 results to the new schools – the District of Columbia, Massachusetts, and Minnesota. Despite these few positive examples, generally the newer schools in the majority of the original 16 states are not delivering performance as strong as was noticed four years ago in the original cohort of schools.

Figure 9: Reading Impacts by State for 2009 Schools and 2013 New Schools



Shown in Figure 10 is the comparison of charter impacts for 2009 schools and new schools in math. As with the reading results, the majority of state charter impacts in math are lower for new schools than they were for the 2009 schools. There were seven states with positive charter impacts originally, but only four of these have positive results for new charters. Of the nine states with negative charter impacts for 2009, five of them have similar or better learning gains for the new charter schools. Two of these states – Georgia and Minnesota – have positive impacts for new charters.

Figure 10: Math Impacts by State for 2009 Schools and 2013 New Schools



In summary, newer charter schools have lower quality than the existing charters in the majority of the 16 states. If this pattern continues with future new schools, the higher-performing 2009 cohort will become a smaller proportion of the sector in these states and charter sector quality will degrade over time. Lower-quality new schools are not the rule everywhere, however. These exceptions imply that it is possible to build a strong quality focus, consistently applied, into the authorizing process.

27 States

Table 5: Number of Observations by Variable for 27 States (5 growth periods)

Variable	Observations
Charter	2,425,146
Black	1,325,254
Hispanic	1,498,842
Asian or Pacific Islander	104,794
Native American	16,973
Multi-Ethnic	52,135
Is Special Ed	297,481
Is English Learner	273,357
Is In Poverty	2,645,962
Repeated Grade	96,470
Urban	257,724
Suburban	106,252
Rural	63,761
Town	29,403
Arizona	255,960
Arkansas	29,910
California	1,368,218
Colorado	236,224
DC	60,464
Florida	503,584
Georgia	185,890
Illinois	40,158
Indiana	56,166
Louisiana	96,810
Massachusetts	103,730
Michigan	345,188
Minnesota	58,166
Missouri	45,204

Variable	Observations
Nevada	25,778
New Jersey	33,094
New Mexico	27,002
New York	47,640
New York City	82,044
North Carolina	120,718
Ohio	168,508
Oregon	42,738
Pennsylvania	176,574
Rhode Island	8,478
Tennessee	22,780
Texas	618,524
Utah	90,742
grade_01	208
grade_02	17,178
grade_03	237,426
grade_04	652,022
grade_05	704,780
grade_06	818,040
grade_07	789,390
grade_08	658,556
grade_09	390,128
grade_10	346,064
grade_11	207,106
grade_12	29,394
Total Number of Observations	4,850,292

The table below presents the charter school impact – relative to the TPS comparison – **separately** for each of the five growth periods included in the study. As with the results presented in the report, these results indicate that charter performance is improving over time.

Table 6: Charter School Impact by Growth Period, Errors in Variables Regression¹

Subject	Period				
	2007	2008	2009	2010	2011
Reading	.008**	-.002	.009**	.009**	.012**
Math	-.010*	-.019**	-.009**	-.006**	-.001

* Significant at $p \leq 0.05$

** Significant at $p \leq 0.01$

To identify changes in the entering students, below, we examine the average starting score for charter students in their first year as a charter student for each growth period in the study. This group will include some students who have been in a charter school for multiple years, but are in their first tested year in a charter school. Since this is the case in every growth period examined, the inclusion of these students should not skew the results of this analysis.

Figure 11 below shows the starting scores by year and subject of charter students in their first year in the data set. While there was some flux in the average starting score, the general trend in scores has remained stable since 2005. This suggests that, on a national level, changes in the performance of charter schools are not the result of enrolling higher-performing individuals over time.

¹ The error in variables regression is an alternative specification which was run as a specification check to the OLS with clustered standard errors.

Figure 11: Reading and Math Starting Score for Charter Students

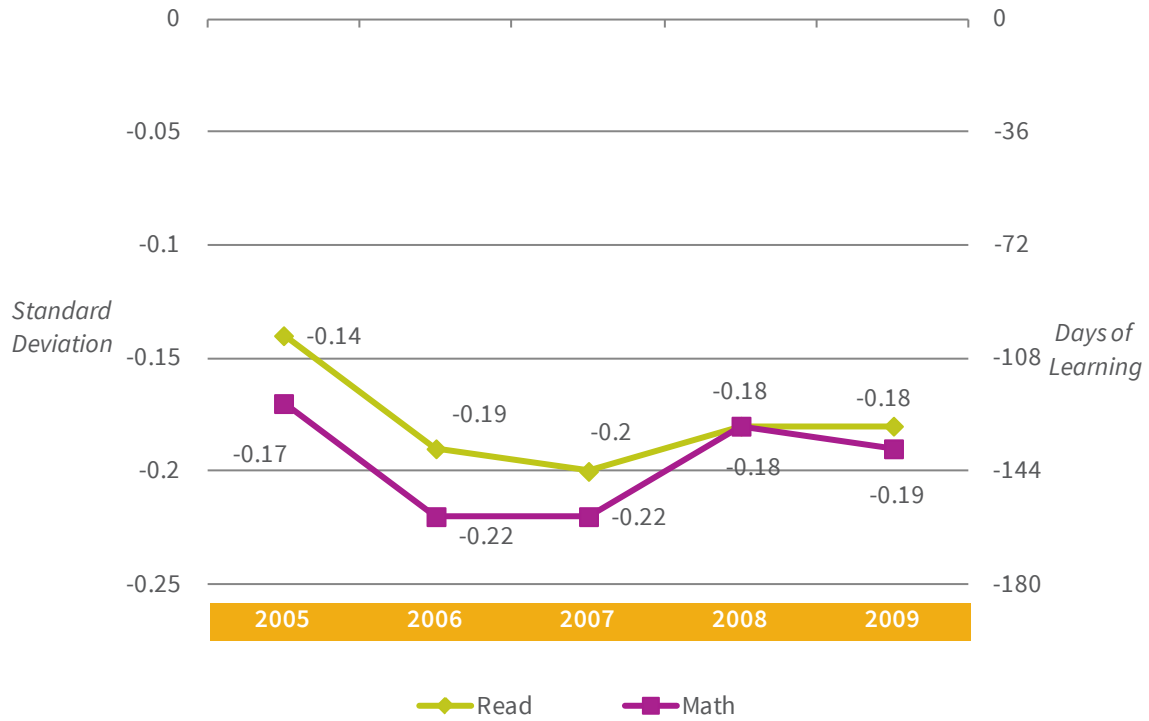


Table 7: Average Starting Scores by Race for Charter Students

Student Group	Overall		Non-Poverty		Poverty	
	Reading	Math	Reading	Math	Reading	Math
White	0.28	0.19	0.40	0.31	-0.05	-0.13
Black	-0.38	-0.48	-0.12	-0.26	-0.45	-0.55
Hispanic	-0.22	-0.20	0.03	-0.01	-0.31	-0.26
Asian	0.45	0.64	0.68	0.79	0.00	0.32

Table 8: Average Starting Scores by Charter Student Group

Student Group	Reading	Math
Students in Poverty	-0.31	-0.34
English Language Learners	-0.91	-0.66
Special Education Students	-1.05	-1.02
Students who Repeated a Grade	-0.84	-1.03

Tables 9 through 12 below provide an alternative view of the performance of the most disadvantaged students in our data, black and Hispanic students living in poverty. The charter effect sizes contained in the body of this report provide the best measure of the “value add” that charters provide their students compared to traditional public schools. However, these effect sizes are not necessarily additive and thus their cumulative impact is unknown. By looking at the average performance of each subgroup compared to their state’s average score by year, we can see whether charter schools are raising the absolute level of achievement for their students. An average zcore of 0 implies that the subgroup has reached educational parity with the average student in their state.

Tables 9 and 11 provide average z-scores for all students in both subjects by year. The primary advantage of this measure is that it looks at the performance of all students in the subgroup of interest. However, this includes students who have only spent one or two years in charter schools, not allowing much time for their cumulative impact to be seen. Tables 10 and 12 also provide average z-scores in both subjects by year, but these are limited to only students with either four or five growth periods in charter schools. This is a better measure of the cumulative impact of charter schools on their students. However, students that persist in charters for five or more years are not necessarily representative of the broader charter student population.

Table 9: Average Achievement Level for Black Charter Students in Poverty by Year

Year	Reading	Math
2005	-.43	-.54
2006	-.45	-.53
2007	-.44	-.51
2008	-.41	-.48
2009	-.40	-.46

Table 10: Average Achievement Level for Longitudinal Group of Black Charter Students in Poverty

Year	Reading	Math
2005	-.38	-.47
2006	-.39	-.44
2007	-.38	-.41
2008	-.33	-.37
2009	-.28	-.32

Table 11: Average Achievement Level for Hispanic Charter Students in Poverty by Year

Year	Reading	Math
2005	-.27	-.24
2006	-.26	-.23
2007	-.25	-.21
2008	-.23	-.17
2009	-.22	-.16

Table 12: Average Achievement Level for Longitudinal Group of Hispanic Charter Students in Poverty

Year	Reading	Math
2005	-.13	-.05
2006	-.13	-.06
2007	-.11	-.04
2008	-.08	-.02
2009	-.03	-.03

For the table and figure below, students are grouped according to their initial scores on their baseline state achievement tests. The achievement tests for each state, year and subject are divided into 10 equal groups (known as deciles), and the students' starting scores are sorted accordingly. Decile 1 represents the lowest-achieving 10 percent of all students in a state (both charter and traditional public schools), while decile 10 represents the highest-achieving 10 percent of students in a state.

Table 13: Proportion of Charter Students with Exact VCR Matches on Starting Score by Decile

Decile	Reading	Math
1	38.17%	32.30%
2	43.41%	38.27%
3	48.51%	42.69%
4	52.89%	45.20%
5	57.62%	48.13%
6	60.45%	50.00%
7	64.09%	52.66%
8	65.80%	55.97%
9	62.47%	56.85%
10	55.85%	48.37%

Table 14 shows the racial composition of each decile. The values represent the percentage of students in each decile from the various race/ethnicity groups. Hispanic students are evenly distributed across the deciles, although they are slightly underrepresented in the top decile. White and Asian students make up an increasing percentage of the upper deciles, especially the top achieving decile. Black students make up a disproportionately large percentage of the lower deciles and a disproportionately small part of the upper decile. The dearth of black students in the top decile is so strong that the percentage of the top decile made up of Asian students, 11 percent, is higher than the percentage of the top decile made up of black students, 10 percent, even though black students make up a much larger portion of the entire data set.

Table 14: Racial Composition by Decile

Decile	White	Black	Hispanic	Asian/PI	Other
1	21%	43%	32%	1%	2%
2	24%	38%	33%	2%	3%
3	28%	35%	32%	2%	3%
4	32%	32%	31%	2%	3%
5	35%	28%	31%	3%	3%
6	39%	25%	31%	3%	3%
7	41%	21%	31%	4%	3%
8	44%	17%	31%	5%	3%
9	48%	13%	29%	8%	3%
10	56%	10%	20%	11%	3%

A key breakout for understanding the impact of charter schools on the achievement gap was decomposition by achievement decile. Regardless of the starting point of a charter student, the charter school must be capable of promoting learning gains. It is therefore important to policy discussions to investigate if charter schools have a stronger impact on students along different points of the achievement range.

For this analysis, students were assigned to a decile based on their performance on their state test using each student's first test score in the data set. This was the same base test score that was used in the matching process. These analyses were conducted separately in both reading and math. The final results allow for an evaluation of the differential impacts of charter school attendance on the growth of students with different levels of academic achievement.

In reading, the analysis shows that charter students have significantly stronger growth than their traditional public school (TPS) peers for all five of the lower deciles. The values ranged from 14 to 24 days of additional learning. Students in the five upper deciles have similar growth relative to their counterparts in TPS. The results show that charter students and their TPS counterparts have identical growth in eight of the ten deciles in math. Growth in two of the higher deciles was 9 to 18 fewer days of learning for charter students than for students at TPS.

Figure 12: Charter Impact by Students' Starting Decile

