



National Alliance for Public Charter Schools

Charter School Achievement: What We Know

5th Edition, April 2009

Over the last year, several outstanding charter school studies were released. The studies use longitudinal student-level data and rigorous research strategies to estimate the impact of attending a public charter school on student performance. From these high-quality studies we learned:

- Students who attend charter schools in Boston make significantly larger gains compared with students who attend traditional public schools (Abdulkadiroglu et al, 2009).
- High school students who attend public charter schools in Chicago and Florida have higher graduation rates and a greater probability of attending college than their peers in traditional public schools (Booker et al, 2007; Booker et al, 2008; Zimmer et al, 2009).
- And students who attend KIPP charter schools in the Bay Area make larger achievement gains than students in the host district, as well as greater gains than would be expected based on national norms (Woodworth et al, 2008).

Additionally, the National Charter School Research Project recently released a meta-analysis of charter school studies¹. This report is the most solid review to date of the empirical research on how public charter schools perform compared to traditional public schools. **Studies that use the best data and the most sophisticated research techniques show charters outperforming comparable traditional public schools.** The findings indicate that public charter schools have the strongest positive effects in elementary school reading and middle school math. **Moreover, the magnitude of the positive charter school effect sizes is relatively large when compared with other school reform efforts, such as reducing class size.**

While the results from these studies are encouraging, high-quality studies make up a very small percentage of the existing charter school research. Based on study design and data necessary to calculate effect sizes, Betts and Tang's meta-analysis includes only 13 studies, covering charter schools in a mere nine states out of the 40 states and the District of Columbia with charter laws. Notwithstanding the positive results of the meta-analysis, we are still left without definitive answers to the question of how charter schools impact students across the nation.

¹ Betts, Julian R. and Y. Emily Tang. *Value added and experimental studies of the effect of charter schools on student achievement*. Seattle, WA: National Charter School Research Project, Center on Reinventing Public Education, University of Washington Bothell.

It is important to note that there are a small but impressive number of public charter schools and networks of charter schools that are dramatically exceeding academic expectations. At the same time, there are a small but depressing number of public charter schools performing at the bottom of the heap. Any study that looks at state-wide or city-wide average student performance will not adequately capture these outliers. The wide variety in the way that charter schools function suggests that we still need to learn much more about what types of charter schools provide excellent learning environments and under what conditions.

To provide a full and fair picture of how public charter schools are performing while shedding additional light on these unanswered questions, the National Alliance for Public Charter Schools first commissioned an extensive review of the available research on charter school achievement in February 2005. This review has been updated periodically as new studies are released, with this current review serving as its 5th edition.

Currently, there are over 200 studies that examine charter school achievement. Of the 210 charter school achievement studies, 140 studies are included in this review based on the following eligibility criteria: they compare charter school achievement with that of traditional public schools, they use serious research methods, and they examine a significant segment of the charter sector. The large increase in the number of studies in this edition is due to improved search procedures for finding unpublished studies, such as policy group and think tank reports, conference presentations, dissertations and theses, and state evaluations.

The eligible studies differ from one another in many ways, but probably the most important differences are based on the type of data and the way in which data are analyzed². In this review, we group the studies into the following three categories and sort by state³:

- **Panel studies** use longitudinally linked student-level data to look at gains or growth in achievement. The studies follow individual students over time and typically control for prior achievement and other student characteristics, as well as school characteristics. These studies provide the best indicators of how public charter schools are performing compared with traditional public schools. Thirty-three studies report findings using student panel data. For detailed descriptions of the panel studies, see Appendix A.
- **Cohort change studies** look at performance changes over time, but through some method other than following individual students. For example, these studies may look at changes in average school-wide test scores from year to year. These studies are not as powerful as the panel studies for comparing public charter schools with traditional public

² Research methodology is a highly complex field and this report does not attempt to touch on the intricacies of method that might arise in a study of charter achievement. Two recent publications provide excellent resources for understanding how to judge the strengths and limitations of various research design strategies: Charter School Achievement Consensus Panel. (2006). *Key issues in studying charter schools and achievement: A review and suggestions for national guidelines*. Seattle, WA: National Charter School Research Project, Center on Reinventing Public Education, University of Washington; Teasley, Bettie. (2009). Charter school outcomes (pp. 209-225). Berends, Mark, Matthew G. Springer, Dale Ballou, and Herbert J. Walberg (Eds.). *Handbook of research on school choice*. Taylor & Francis, Inc.

³ The number of studies in each category adds up to more than 140 because several studies report findings based on more than one type of data and are included in more than one category.

schools because any change could be due to differences in student composition rather than how much learning the school produces. Fifty-three studies report findings using cohort change data. For detailed descriptions of the cohort change studies, see Appendix B.

- **Snapshot studies** look at school performance at one point in time. While some of these studies attempt to control for student or school characteristics, the snapshot studies are unable to gauge how much value public charter schools or traditional public schools add to student learning. Seventy studies report findings using snapshot data. For detailed descriptions of the snapshot studies, see Appendix C.

Key Findings

Notable Evidence of Added Value. Of 140 studies in this review, 53 examine schools over time but lack linked student-level data and 70 look only at a snapshot of performance at one point in time. While the studies that look at school performance over time are an improvement on the snapshot studies, neither provides definitive evidence to draw conclusions about the effectiveness of charter schools.

However, 33 studies use longitudinally linked, student-level data to look at gains or growth in achievement while controlling for prior achievement as well as student and school characteristics. Fourteen of the 33 high quality panel studies (42%) use a majority of data from the academic years prior to 2001-02. Moreover, the studies that use data from earlier years are concentrated in a handful of states (AZ, CA, FL, NC, and TX), whereas the newer studies include a wider range of states. When the results are broken out by the years of academic data in the studies (see Tables 1 and 2), **it becomes dramatically clear that studies examining public charter schools in more recent academic years show that charter schools produce more instances of larger achievement gains in both math and reading when compared to the traditional public schools.**

Table 1: Summary of Charter School Math Achievement, by Years of Data in Studies

	Pre 2001				Post 2001			
	Larger Gains	Similar Gains	Mixed Gains	Smaller Gains	Larger Gains	Similar Gains	Mixed Gains	Smaller Gains
Elementary School	0	2	1	11	3	4	1	4
Middle School	1	2	1	4	6	6	0	3
High School	2	0	1	4	4	5	0	4
Overall	1	0	1	1	4	2	0	3
Total	4	4	4	20	17	17	1	14

Table 2: Summary of Charter School Reading Achievement, by Years of Data in Studies

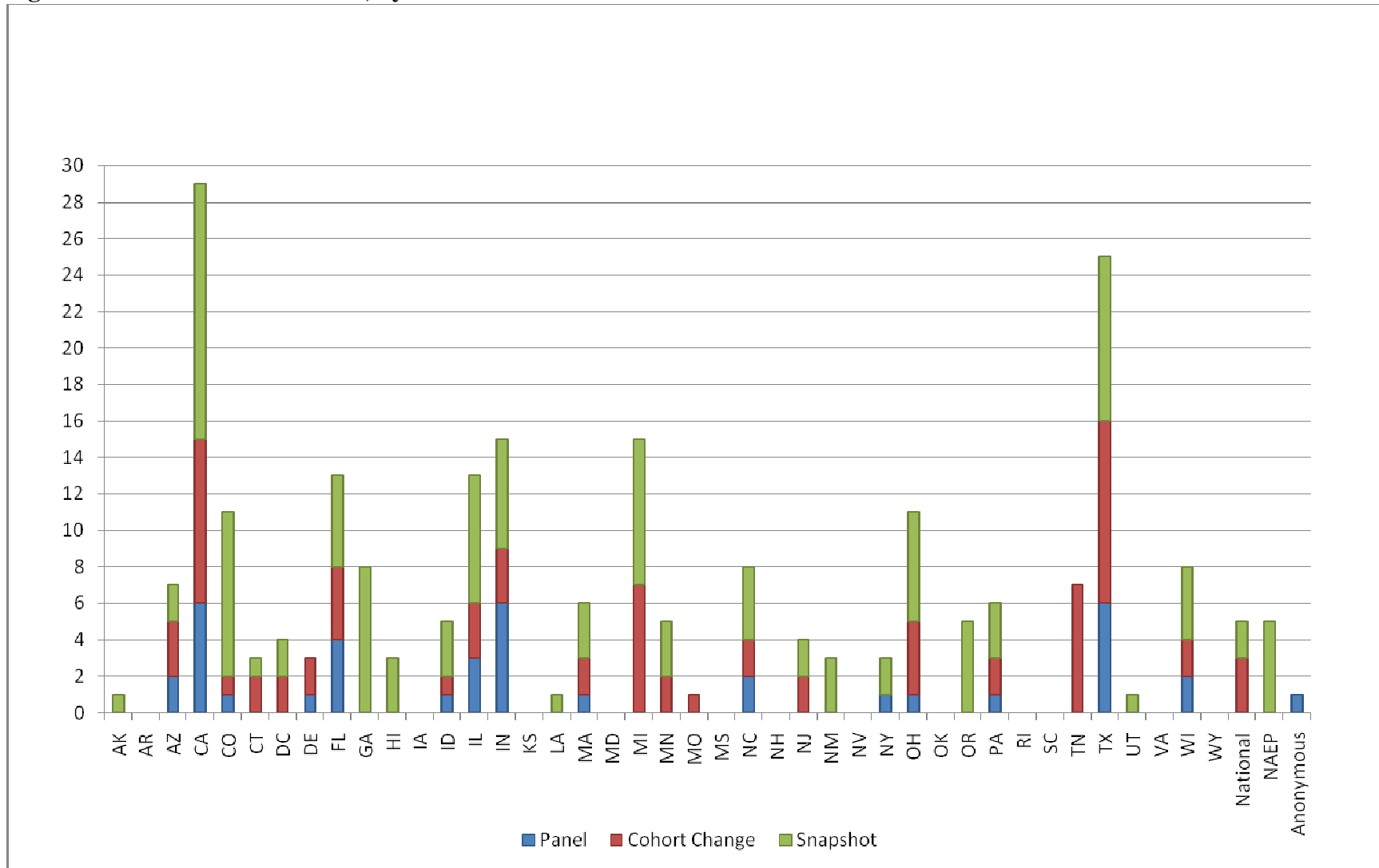
	Pre 2001				Post 2001			
	Larger Gains	Similar Gains	Mixed Gains	Smaller Gains	Larger Gains	Similar Gains	Mixed Gains	Smaller Gains
Elementary School	2	5	1	6	4	1	1	5
Middle School	2	3	0	3	6	4	0	4
High School	3	2	0	3	7	3	0	1
Overall	0	0	2	2	1	4	0	4
Total	7	10	3	14	18	12	1	14

Several studies examine the achievement of students who have stayed at a charter school for an extended period of time compared with traditional public school students. Of the studies that look at this question, 6 find that charter school students show larger gains compared with traditional public school students, while 4 studies find similar or mixed results. None of the studies demonstrate smaller gains for students who stay in charter schools for longer periods of time compared with students who attend traditional public schools for similar amounts of time.

Charter High School Graduation and College Matriculation Results are Promising. Recent studies from Chicago and Florida examine graduation rates and college entry for students who attend charter high schools compared with students in traditional public schools (Booker et al, 2007; Booker et al, 2008; Zimmer et al, 2009). Findings from these longitudinal studies indicate that charter school students have higher ACT scores, higher graduation rates and a greater probability of attending college than students who attend traditional public schools. Many charter high schools are breaking the mold by emphasizing rigorous academic standards and college preparedness, while holding high expectations for all students. Much more research is needed across the country to determine the characteristics of charter high schools that create excellent educational opportunities for all students, but we are encouraged by the promising results from these two studies.

Mixed Findings for Charter School Performance by Age of School. Eleven studies explicitly examine the question of whether charter schools get better as they age. The findings are mixed. Three studies show that charter schools perform better when they are farther along in their life cycle than newer schools, while 3 studies show that mature schools perform worse, 2 find similar results, and 3 have mixed findings.

Figure 1: Charter School Studies, by State



Large Gaps in the Research Persist. Even though panel studies provide the best indicators of how public charter schools are performing, they represent the fewest number of charter school achievement studies published (24% of eligible studies in this review). While more and more school-level data are available to researchers due to No Child Left Behind, student-level data continues to be difficult and expensive to obtain, which is the primary reason for the dearth of panel studies. However, there are a host of questions that still need to be answered about how different types of charter students and schools are performing, and researchers should pursue these research questions with state-wide, longitudinal, student-level data.

The panel studies are currently clustered in a small number of states. Charter schools operate in 40 states plus Washington, D.C., yet we have panel studies in only 15 states (see Figure 1). There are states with large numbers of students enrolled in charter schools that do not have a single longitudinal, student-level study published, such as Michigan, Minnesota, and New Jersey. Moreover, there is a real deficit of studies of any type in states where the charter school sector has been growing at significant levels over the last couple of years, such as Georgia, Louisiana, and South Carolina. These three states saw growth in the number of charter schools of 60%, 23%, and 24%, respectively, from 2007-08 to 2008-09.

Over half of the eligible studies use achievement data from 1995-96 through 2001-02, and nearly 90% of the studies use achievement data from schools prior to the 2005-06 school year. In states where we do have panel studies, like Arizona, California, and North Carolina, the data used for these studies is relatively old. The last high quality, state-wide studies examined data in Arizona in 1999-00 and in California and North Carolina in 2001-02. Although the studies that have been conducted provide some evidence about charter school performance, the continued growth of the charter school movement from year to year may mean that the study samples are not representative of the students enrolled in new charter schools.

The charter school research base lacks definitive studies in many areas. These gaps in the research need to be filled.

Recommendations

A number of conclusions about the state of charter school research—and how to improve it—emerge from this review:

1. We need more studies in more states using more recent longitudinal student-level data to empirically assess how well students in public charter schools are performing.
2. We need more and better research to explain why some public charter schools perform so much better than other charter and non-charter schools.
3. We need more research on public charter school graduation and college matriculation.
4. Charter schooling represents an experiment worth continuing—and transparency in the data will allow for refinement to improve quality further over time.

Anna Nicotera of the National Alliance for Public Charter Schools led the production of the fifth edition of this report. The National Alliance's Todd Ziebarth led the publication of this report's fourth edition. Bryan C. Hassel of Public Impact led the production of the first three editions of this report. Michelle Godard Terrell was lead contributor for the third edition, and Kate Blosveren and Peter Enns provided research assistance for the first two editions. Numerous individuals reviewed drafts of all or part of the paper, including staff and board members of the National Alliance, several authors of the studies examined in the paper, and outside reviewers unaffiliated with the researchers or the National Alliance.

Appendix A: Panel Studies

For a given charter school, what we really want to know is whether students are better off for having attended it. The best way to find out is to examine the learning of individual students over time, seeking to determine how much value schools are adding to student learning.

Panel studies use longitudinally linked student-level data to look at gains or growth in achievement. The panel studies follow individual students over time and typically control for prior achievement and other student characteristics, as well as school characteristics. These studies provide the best indicators of how public charter schools are performing compared with traditional public schools.

The following tables in Appendix A describe the research design and key findings for each of the eligible panel studies.

Research Design	
Year	<i>The span of academic years included in the study's analyses.</i>
State	<i>The state or city examined by the study. If a state abbreviation is indicated, the study included a majority of the state's charter schools. If a city is indicated, the study included charter schools in that city.</i>
Lottery	<i>The study examines students who participate in lotteries to enroll in charter schools. Students who win the lottery and attend public charter schools are compared with students who lose the lottery and attend traditional public schools. The lottery acts as a random assignment mechanism to minimize the differences between charter school attendees and non-attendees. This research design is considered the "gold standard" for evaluating the impact of charter schools.</i>
Fixed-Effects	<i>The study examines performance gains for students who have attended both traditional public schools and public charter schools. Because the same student is compared at different points in time, the research design significantly reduces the unobserved differences that may be introduced when comparisons are made between students without random assignment.</i>
Multivariate	<i>The study uses a regression model to estimate the difference in achievement between students who attend public charter schools and students who attend traditional public schools. The research design controls for student and/or school characteristics.</i>
Pre-Post	<i>The study calculates the average difference in achievement over time between students who attend public charter schools and students who attend traditional public schools.</i>
Proficiency	<i>The study uses data indicating that a student is proficient on state standards-based assessments. Proficiency includes a large span of test scores. If proficiency is not marked, the study uses scale scores.</i>

Appendix A: Panel Studies

Research Design (continued)	
Student-Level	<i>The study uses student-level performance data.</i>
School-Level	<i>The study uses school-level performance data.</i>
Student Controls	<i>The study includes student-level control variables, such as prior achievement and student demographics.</i>
School Controls	<i>The study includes school-level control variables, such as school size and school demographics</i>
Key Findings	
Larger Gains (+)	<i>Students who attend public charter schools have larger achievement gains than comparable students who attend traditional public schools.</i>
Similar Gains (↔)	<i>Students who attend public charter schools experience similar achievement gains as comparable students who attend traditional public schools.</i>
Mixed Gains (+/-)	<i>Students who attend public charter schools have larger achievement gains than comparable students who attend traditional public schools in selected grades and/or subject areas and smaller achievement gains in other grades and/or subject areas.</i>
Smaller Gains (-)	<i>Students who attend public charter schools have smaller achievement gains than comparable students who attend traditional public schools.</i>
Subject Area	<p><i>Math: Study examines performance data from a math assessment.</i></p> <p><i>Reading: Study examines performance data from a reading or Language Arts assessment.</i></p> <p><i>Composite: Study examines performance data from combined math and reading assessments.</i></p> <p><i>Other (Graduation Rate): Study examines graduation rate data.</i></p>
Grade Level	<p><i>Elementary: Study examines performance data from elementary school grades.</i></p> <p><i>Middle: Study examines performance data from middle school grades.</i></p> <p><i>High School: Study examines performance data from high school grades.</i></p> <p><i>Overall: Study examines performance data using combined grade levels.</i></p>

Appendix A: Panel Studies

Report Authors	Years	State	Research Design	Key Findings					
				Subject Area	Grade Level				
Solmon, Paark, & Garcia, 2001	9798 – 9900	AZ	Lottery	✓	Math	✓	Elem	+/-	
			Fixed-Effects			✓	Middle		
			Multivariate			✓	High		
			Pre-Post			✓	Overall		
Proficiency	✓	Read	✓	Elem	+/-				
Student-Level				Middle					
School-Level				High					
Student Controls	✓	Composite	✓	Elem	Overall				
School Controls				Middle					
				Other	Grad Rate				
Solmon & Goldschmidt, 2004	9798 – 9900	AZ	Lottery	✓	Math	✓	Elem	+	
			Fixed-Effects				✓		Middle
			Multivariate				✓		High
			Pre-Post				✓		Overall
Proficiency	✓	Read	✓	Elem	↔				
Student-Level				Middle					
School-Level				High					
Student Controls	✓	Composite	✓	Elem	-				
School Controls				Middle					
				Other	Grad Rate				
Zimmer, Buddin, Chau, Daley, Gill, Guarino, Hamilton, Krop, McCaffrey, Sandler, & Brewer, 2003	9798 – 0102	CA	Lottery	✓	Math	✓	Elem	-	
			Fixed-Effects				✓		Middle
			Multivariate				✓		High
			Pre-Post				✓		Overall
		Proficiency	✓	Read	✓	Elem	↔		
		Student-Level				Middle			
		School-Level				High			
		Student Controls	✓	Composite	✓	Elem	+		
School Controls	Middle								
				Other	Grad Rate				
		Chula Vista, CA	Lottery	✓	Math	✓	Elem	-	
			Fixed-Effects				✓		Middle
			Multivariate				✓		High
			Pre-Post				✓		Overall
		Proficiency	✓	Read	✓	-	Elem	-	
		Student-Level					✓		Middle
		School-Level					✓		High
		Student Controls	✓	Composite	✓	Overall	Elem	-	
		School Controls					✓		Middle
				Other	Grad Rate				
							High		
							Overall		

Appendix A: Panel Studies

				Other	Grad Rate			
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)								
Report Authors	Years	State	Research Design	Key Findings				
				Subject Area	Grade Level			
Zimmer, Buddin, Chau, Daley, Gill, Guarino, Hamilton, Krop, McCaffrey, Sandler, & Brewer, 2003 (continued)	9798 – 0102	Fresno, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math	✓	Elem -		
						Middle		
				High				
				Overall				
		Los Angeles, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Read	✓	Elem -		
						Middle		
				High				
				Overall				
		Napa, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Composite		Elem		
						Middle		
				High				
				Overall				
		San Diego, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Other		Grad Rate		
						Other		
				Los Angeles, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem ↔
								Middle
High								
Overall								
Napa, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Read	✓	Elem ↔				
				Middle				
		High						
		Overall						
San Diego, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Composite		Elem				
				Middle				
		High						
		Overall						
Fresno, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem -				
				Middle				
		High						
		Overall						
Los Angeles, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Read	✓	Elem +				
				Middle				
		High						
		Overall						
Napa, CA	Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Composite		Elem				
				Middle				
		High						
		Overall						

Appendix A: Panel Studies

				Other	Grad Rate
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)					
Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Zimmer, Buddin, Chau, Daley, Gill, Guarino, Hamilton, Krop, McCaffrey, Sandler, & Brewer, 2003 (continued)	9798 – 0102	West Covina, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math ✓	Elem -
					Middle
				Read ✓	High ↔
					Overall
Zimmer & Buddin, 2006	9798 – 0102	Los Angeles, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math ✓	Elem -
					Middle +
				Read ✓	High +
					Overall
Reports using data with same findings: Zimmer & Buddin, 2005	9798 – 0102	San Diego, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math ✓	Elem ↔
					Middle ↔
				Read ✓	High ↔
					Overall
Reports using data with same findings: Betts, Rice, Zau, Tang, & Koedel, 2006 Tang, 2008	9798 – 0102	San Diego, CA	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math ✓	Elem +/-
					Middle +/-
				Read ✓	High +/-
					Overall
				Other	Grad Rate

Appendix A: Panel Studies

				Other	Grad Rate	
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)						
Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009 (This report also analyzes data in CO, FL, OH, PA, TX, WI)	9798 – 0607	San Diego, CA	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall ↔
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle			
School-Level			High			
Student Controls ✓	Composite	✓	Overall ↔			
School Controls ✓			Elem			
				Other	Grad Rate	
Woodworth, David, Guha, Wang, & Lopez-Torkos, 2008	0304 – 0607	Bay Area, CA	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle +
			Multivariate ✓			High
			Pre-Post			Overall
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle +			
School-Level			High			
Student Controls ✓	Composite	✓	Overall			
School Controls			Elem			
				Other	Grad Rate	
Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009 (This report also analyzes data in CA, FL, OH, PA, TX, WI)	0102 – 0506	Denver, CO	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall +
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle			
School-Level			High			
Student Controls ✓	Composite	✓	Overall ↔			
School Controls ✓			Elem			
				Other	Grad Rate	
Miron, Cullen, Applegate, Farrell, 2007	0203 – 0506	DE	Lottery	Math	✓	Elem -
			Fixed-Effects			Middle +
			Multivariate			High +
			Pre-Post ✓			Overall
Proficiency	Read	✓	Elem -			
Student-Level ✓			Middle +			
School-Level			High +			
Student Controls ✓	Composite	✓	Overall			
School Controls ✓			Elem			
				Other	Grad Rate	

Appendix A: Panel Studies

				Other	Grad Rate	
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)						
Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
OPPAGA, 2005a Reports using data with same findings: OPPAGA, 2005b	9899 – 0304	FL	Lottery Fixed-Effects Multivariate ✓ Pre-Post	Math	✓	Elem -
						Middle ↔
						High +
						Overall
			Proficiency Student-Level ✓ School-Level	Read	✓	Elem ↔
						Middle ↔
						High +
						Overall
			Student Controls ✓ School Controls ✓	Composite		Elem
						Middle
						High
						Overall
				Other	Grad Rate	
Florida Department of Education, 2006	0102 – 0405	FL	Lottery Fixed-Effects Multivariate ✓ Pre-Post	Math	✓	Elem -
						Middle ↔
						High ↔
						Overall
			Proficiency Student-Level ✓ School-Level	Read	✓	Elem -
						Middle ↔
						High ↔
						Overall
			Student Controls ✓ School Controls ✓	Composite		Elem
						Middle
						High
						Overall
				Other	Grad Rate	
Sass, 2006	9900 – 0203	FL	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post	Math	✓	Elem -
						Middle -
						High -
						Overall
			Proficiency Student-Level ✓ School-Level	Read	✓	Elem -
						Middle -
						High -
						Overall
			Student Controls ✓ School Controls ✓	Composite		Elem
						Middle
						High
						Overall
				Other	Grad Rate	
Booker, Sass, Gill, & Zimmer, 2008 (This report also analyzes data for Chicago, IL) Reports using data with same findings: Zimmer, Gill, Booker, Lavertu, Sass,	9798 – 0405	FL	Lottery Fixed-Effects Multivariate ✓ Pre-Post	Math		Elem
						Middle
						High
						Overall
			Proficiency Student-Level ✓ School-Level	Read		Elem
						Middle
						High
						Overall
			Student Controls ✓ School Controls ✓	Composite		Elem
						Middle
						High
						Overall

Appendix A: Panel Studies

& Witte, 2009				Other	✓	Grad Rate	+
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)							
Report Authors	Years	State	Research Design	Key Findings			
				Subject Area		Grade Level	
Ballou, Teasley, & Zeidner, 2008 Reports using data with same findings: Ballou, Teasley, & Zeidner, 2006	0203 – 0405	ID	Lottery	Math	✓	Elem	+
			Fixed-Effects			Middle	-
			Multivariate			High	-
			Pre-Post			Overall	
Proficiency	Read		Elem				
Student-Level			Middle				
School-Level			High				
Student Controls	Composite		Elem				
School Controls			Middle				
Other			Grad Rate				
Hoxby & Rockoff, 2004 Reports using data with same findings: Rockoff, 2004 Hoxby & Rockoff, 2005	0001 – 0203	Chicago, IL	Lottery	Math	✓	Elem	+
			Fixed-Effects			Middle	↔
			Multivariate			High	
			Pre-Post			Overall	
Proficiency	Read		Elem	+			
Student-Level			Middle	↔			
School-Level			High				
Student Controls	Composite		Elem				
School Controls			Middle				
Other			Grad Rate				
Booker, Gill, Zimmer, & Sass, 2007 Reports using data with same findings: Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009	9798 – 0607	Chicago, IL	Lottery	Math	✓	Elem	↔
			Fixed-Effects			Middle	↔
			Multivariate			High	↔
			Pre-Post			Overall	
Proficiency	Read		Elem	-			
Student-Level			Middle	-			
School-Level			High	+			
Student Controls	Composite		Elem				
School Controls			Middle				
Other			Grad Rate	+			
Booker, Sass, Gill, & Zimmer, 2008 (This report also analyzes data for FL) Reports using data with same findings: Zimmer, Gill, Booker, Lavertu, Sass,	9798 – 0506	Chicago, IL	Lottery	Math	✓	Elem	
			Fixed-Effects			Middle	
			Multivariate			High	
			Pre-Post			Overall	
Proficiency	Read		Elem				
Student-Level			Middle				
School-Level			High				
Student Controls	Composite		Elem				
School Controls			Middle				
Other			Grad Rate				

Appendix A: Panel Studies

& Witte, 2009				Other	✓	Grad Rate	+
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)							
Report Authors	Years	State	Research Design	Key Findings			
				Subject Area		Grade Level	
Berends, Mendiburo, & Nicotera, 2008	0203 – 0506	Indy, IN	Lottery Fixed-Effects Multivariate Pre-Post Proficiency Student-Level School-Level Student Controls School Controls	✓	Math	✓	Elem ↔
							Middle ↔
							High ↔
							Overall -
Ball State University, 2004	0304 (fall to spring)	IN	Lottery Fixed-Effects Multivariate Pre-Post Proficiency Student-Level School-Level Student Controls School Controls	✓	Math	✓	Elem +/-
							Middle +
							High -
							Overall -
Ball State University, 2005	0304 – 0405	IN	Lottery Fixed-Effects Multivariate Pre-Post Proficiency Student-Level School-Level Student Controls School Controls	✓	Math	✓	Elem -
							Middle -
							High -
							Overall -
Finch, Baker-Boudissa, & Cross, 2007	0304 – 0506	IN	Lottery Fixed-Effects Multivariate Pre-Post Proficiency Student-Level School-Level Student Controls School Controls	✓	Math	✓	Elem +/-
							Middle -
							High +
							Overall +
				Other	Grad Rate		

Appendix A: Panel Studies

					Other	Grad Rate	
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)							
Report Authors	Years	State	Research Design	Key Findings			
				Subject Area	Grade Level		
Akey, Plucker, Hansen, Michael, Branon, Fagen, & Zhou, 2008	0506 – 0607	IN	Lottery	Math	✓	Elem	↔
			Fixed-Effects			Middle	↔
			Multivariate			High	↔
			Pre-Post			Overall	
Proficiency	Read	✓	Elem	↔			
Student-Level			Middle	↔			
School-Level			High	↔			
Student Controls	Composite	✓	Elem				
School Controls			Middle				
			Other	✓	Grad Rate	-	
Ratterman & Reid, 2009	0607 – 0708	IN	Lottery	Math	✓	Elem	
			Fixed-Effects			Middle	
			Multivariate			High	
			Pre-Post			Overall	+
Proficiency	Read	✓	Elem				
Student-Level			Middle				
School-Level			High				
Student Controls	Composite	✓	Elem				
School Controls			Middle				
			Other		Grad Rate		
Abdulkadiroglu, Angrist, Cohodes, Dynarski, Fullerton, Kane, & Pathak, 2009	0102 – 0607	Boston, MA	Lottery	Math	✓	Elem	
			Fixed-Effects			Middle	+
			Multivariate			High	+
			Pre-Post			Overall	
		Proficiency	Read	✓	Elem		
		Student-Level			Middle	+	
		School-Level			High	+	
		Student Controls	Composite	✓	Elem		
School Controls	Middle						
			Other		Grad Rate		
			Lottery	Math	✓	Elem	↔
			Fixed-Effects			Middle	+
			Multivariate			High	+
			Pre-Post			Overall	
			Proficiency	Read	✓	Elem	+
			Student-Level			Middle	+
			School-Level			High	+
			Student Controls	Composite	✓	Elem	
			School Controls			Middle	
			Other		Grad Rate		

Appendix A: Panel Studies

				Other	Grad Rate
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)					
Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Hoxby & Murarka, 2007	0001 – 0506	NYC, NY	Lottery ✓	Math ✓	Elem +
			Fixed-Effects		Middle +
			Multivariate ✓		High ↔
			Pre-Post ✓		Overall
Proficiency	Read ✓	Elem +			
Student-Level ✓		Middle +			
School-Level		High			
Student Controls ✓	Composite	Overall			
School Controls ✓		Elem			
				Other	Grad Rate
Noblit & Dickson, 2001	9798 – 0001	NC	Lottery	Math ✓	Elem ↔
			Fixed-Effects		Middle ↔
			Multivariate		High
			Pre-Post ✓		Overall
Proficiency	Read ✓	Elem ↔			
Student-Level ✓		Middle ↔			
School-Level		High			
Student Controls ✓	Composite	Overall			
School Controls		Elem			
				Other	Grad Rate
Bifulco & Ladd, 2006	9596 – 0102	NC	Lottery	Math ✓	Elem -
			Fixed-Effects ✓		Middle -
			Multivariate ✓		High -
			Pre-Post		Overall
Proficiency	Read ✓	Elem -			
Student-Level ✓		Middle -			
School-Level		High -			
Student Controls ✓	Composite	Overall			
School Controls ✓		Elem			
				Other	Grad Rate
Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009 (This report also analyzes data in CA, CO, FL, PA, TX, WI)	0405 – 0708	OH	Lottery	Math ✓	Elem
			Fixed-Effects ✓		Middle
			Multivariate ✓		High
			Pre-Post		Overall -
Proficiency	Read ✓	Elem			
Student-Level ✓		Middle			
School-Level		High			
Student Controls ✓	Composite	Overall -			
School Controls ✓		Elem			
				Other	Grad Rate
				Other	Grad Rate

Appendix A: Panel Studies

				Other	Grad Rate	
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)						
Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Zimmer, Blanc, Gill, & Christman, 2008 Reports using data with same findings: Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009	0001 – 0607	Philly, PA	Lottery	Math	✓	Elem -
			Fixed-Effects ✓			Middle -
			Multivariate ✓			High +
			Pre-Post			Overall ↔
Gronberg & Jansen, 2001	9798 - 9900	TX	Proficiency	Read	✓	Elem -
			Student-Level ✓			Middle -
			School-Level			High +
			School Controls ✓			Overall ↔
Booker, Gilpatric, Gronberg, & Jansen, 2007	9596 – 0102	TX	Student Controls ✓	Composite		Elem
			School Controls ✓			Middle
						High
						Overall
Reports using data with same findings: Booker, Gilpatric, Gronberg, & Jansen, 2004	9596 – 0102	TX	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall -
Reports using data with same findings: Booker, Gilpatric, Gronberg, & Jansen, 2004	9596 – 0102	TX	Proficiency	Read	✓	Elem
			Student-Level ✓			Middle
			School-Level			High
			School Controls ✓			Overall -
Reports using data with same findings: Booker, Gilpatric, Gronberg, & Jansen, 2004	9596 – 0102	TX	Student Controls ✓	Composite	✓	Elem
			School Controls ✓			Middle
						High
						Overall

Appendix A: Panel Studies

				Other	Grad Rate
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)					
Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Hanushek, Kain, Rivkin, & Branch, 2007 Reports using data with same findings: Hanushek, Kain, & Rivkin, 2002	9596 – 0102	TX	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall -
				Other	Grad Rate
Maloney, 2005b Reports using data with same findings: Maloney, 2005a	9899 – 0102	TX	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite	Elem Middle High Overall
				Other ✓	Grad Rate -
Gronberg & Jansen, 2005	0203 – 0304	TX	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math ✓	Elem Middle ↔ High - Overall
				Read ✓	Elem Middle ↔ High - Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate
Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009 (This report also analyzes data in CA, CO, FL, OH, PA, WI)	9495 – 0304	TX	Lottery Fixed-Effects ✓ Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math ✓	Elem Middle High Overall -
				Read ✓	Elem Middle High Overall -
				Composite	Elem Middle High Overall
				Other	Grad Rate

Appendix A: Panel Studies

				Other	Grad Rate	
Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)						
Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Witte, Weimer, Shober, & Schlomer, 2007	9899 – 0102	WI	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall +
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle			
School-Level			High			
Student Controls ✓	Overall +/-					
School Controls	Composite	✓	Elem			
			Middle			
			High			
	Overall +					
				Other	Grad Rate	
Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009 (This report also analyzes data in CA, CO, FL, OH, PA, TX)	0001 – 0607	WI	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall +
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle			
School-Level			High			
Student Controls ✓	Overall ↔					
School Controls ✓	Composite	✓	Elem			
			Middle			
			High			
	Overall					
				Other	Grad Rate	
Imberman, 2007b Reports using data with same findings: Imberman, 2007a	9899 – 0405	Anon. District	Lottery	Math	✓	Elem
			Fixed-Effects ✓			Middle
			Multivariate ✓			High
			Pre-Post			Overall +
Proficiency	Read	✓	Elem			
Student-Level ✓			Middle			
School-Level			High			
Student Controls ✓	Overall -					
School Controls ✓	Composite	✓	Elem			
			Middle			
			High			
	Overall					
				Other	Grad Rate	

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix A: Panel Studies

Appendix B: Cohort Change Studies

The following set of studies look at performance changes over time, but through some method other than following individual students over time. For example, these studies may look at changes in average school-wide test scores from year to year. If the study uses student-level data, it does not have data that is linked so as to follow the same student from year to year. While these studies contain more information about the effects of public charter schools compared with traditional public schools than do studies that look at one point in time, they are not as powerful as the panel studies. Change over time in school-level averages could well be due to changes in student composition rather than how much learning the schools produce.

The following tables in Appendix B describe the research design and key findings for each of the eligible studies that look at change over time.

Research Design	
Year	<i>The span of academic years included in the study's analyses.</i>
State	<i>The state or city examined by the study. If a state abbreviation is indicated, the study included a majority of the state's charter schools. If a city is indicated, the study included charter schools in that city.</i>
Lottery	<i>The study examines students who participate in lotteries to enroll in charter schools. Students who win the lottery and attend public charter schools are compared with students who lose the lottery and attend traditional public schools. The lottery acts as a random assignment mechanism to minimize the differences between charter school attendees and non-attendees. This research design is considered the "gold standard" for evaluating the impact of charter schools.</i>
Fixed-Effects	<i>The study examines performance gains for students who have attended both traditional public schools and public charter schools. Because the same student is compared at different points in time, the research design significantly reduces the unobserved differences that may be introduced when comparisons are made between students without random assignment.</i>
Multivariate	<i>The study uses a regression model to estimate the difference in achievement between students who attend public charter schools and students who attend traditional public schools. The research design controls for student and/or school characteristics.</i>
Pre-Post	<i>The study calculates the average difference in achievement over time between students who attend public charter schools and students who attend traditional public schools.</i>
Proficiency	<i>The study uses data indicating that a student is proficient on state standards-based assessments. Proficiency includes a large span of test scores. If proficiency is not marked, the study uses scale scores.</i>

Appendix B: Cohort Change Studies

Research Design (continued)	
Student-Level	<i>The study uses student-level performance data.</i>
School-Level	<i>The study uses school-level performance data.</i>
Student Controls	<i>The study includes student-level control variables, such as prior achievement and student demographics.</i>
School Controls	<i>The study includes school-level control variables, such as school size and school demographics</i>
Key Findings	
Larger Gains (+)	<i>Students who attend public charter schools have larger achievement gains than comparable students who attend traditional public schools.</i>
Similar Gains (↔)	<i>Students who attend public charter schools experience similar achievement gains as comparable students who attend traditional public schools.</i>
Mixed Gains (+/-)	<i>Students who attend public charter schools have larger achievement gains than comparable students who attend traditional public schools in selected grades and/or subject areas and smaller achievement gains in other grades and/or subject areas.</i>
Smaller Gains (-)	<i>Students who attend public charter schools have smaller achievement gains than comparable students who attend traditional public schools.</i>
Subject Area	<p><i>Math: Study examines performance data from a math assessment.</i></p> <p><i>Reading: Study examines performance data from a reading or Language Arts assessment.</i></p> <p><i>Composite: Study examines performance data from combined math and reading assessments.</i></p> <p><i>Other (Graduation Rate): Study examines graduation rate data.</i></p>
Grade Level	<p><i>Elementary: Study examines performance data from elementary school grades.</i></p> <p><i>Middle: Study examines performance data from middle school grades.</i></p> <p><i>High School: Study examines performance data from high school grades.</i></p> <p><i>Overall: Study examines performance data using combined grade levels.</i></p>

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Loveless, 2002 (This report also analyzes data for individual states)	9899 – 0001	Nat'l	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem	
					Middle	
					High	
					Overall	
Loveless, 2003	9900 – 0102	Nat'l	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem	
					Middle	
					High	
					Overall	
Greene, Forster, & Winters, 2003 (This report also analyzes data for individual states)	0001 – 0102	Nat'l	Proficiency Student-Level School-Level Student Controls School Controls ✓	Read	Elem	
					Middle	
					High	
					Overall	
Mulholland, 1999	9697 – 9798	AZ	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem	+/-
					Middle	+/-
					High	+/-
					Overall	
Loveless, 2002 (This report also analyzes data for individual states)	9899 – 0001	Nat'l	Proficiency Student-Level School-Level Student Controls School Controls ✓	Composite	Elem	
					Middle	
					High	
					Overall	-
Loveless, 2003	9900 – 0102	Nat'l	Proficiency Student-Level School-Level Student Controls School Controls ✓	Composite	Elem	
					Middle	
					High	
					Overall	+
Greene, Forster, & Winters, 2003 (This report also analyzes data for individual states)	0001 – 0102	Nat'l	Proficiency Student-Level School-Level Student Controls School Controls ✓	Composite	Elem	
					Middle	
					High	
					Overall	
Mulholland, 1999	9697 – 9798	AZ	Proficiency Student-Level School-Level Student Controls School Controls ✓	Composite	Elem	
					Middle	
					High	
					Overall	
Loveless, 2002 (This report also analyzes data for individual states)	9899 – 0001	Nat'l	Other	Other	Grad Rate	

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	AZ	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall ↔
				Other	Grad Rate
Greene, Forster, & Winters, 2003 (This report also analyzes data for other states)	0001 – 0102	AZ	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall ↔
				Read ✓	Elem Middle High Overall ↔
				Composite	Elem Middle High Overall
				Other	Grad Rate
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall ↔
				Other	Grad Rate
Zimmer, Buddin, Chau, Daley, Gill, Guarino, Hamilton, Krop, McCaffrey, Sandler, & Brewer, 2003	9798 – 0102	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem - Middle - High - Overall
				Read ✓	Elem ↔ Middle - High - Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Raymond, 2003	9900 – 0102	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem ↔ Middle ↔ High + Overall
				Other	Grad Rate
Rogosa, 2002	9900 – 0102	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall -
				Other	Grad Rate
Slovacek, Kunnan, & Kim, 2002	9900 – 0102	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall +
				Other	Grad Rate
Rogosa, 2003	9900 – 0203	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall -
				Math	Elem

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Greene, Forster, & Winters, 2003 (This report also analyzes data for other states)	0001 – 0102	CA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall ↔
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall ↔
				Composite	Elem Middle High Overall
				Other	Grad Rate
Woodworth, David, Guha, Wang, & Lopez-Torkos, 2008	0203 – 0607	Bay Area, CA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall +/-
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall +/-
				Composite	Elem Middle High Overall
				Other	Grad Rate
Toney & Murdock, 2008	0506 – 0607	Los Angeles, CA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall + + +
				Other	Grad Rate
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	CO	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall +
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings									
				Subject Area	Grade Level								
Miron & Horn, 2002	9798 – 9900	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math ✓	Elem ↔	+							
					Middle +								
					High +								
					Overall								
	9798 – 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math ✓	Elem +/-	+							
					Middle +	↔							
					High ↔								
					Overall								
	9899 – 0001	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math ✓	Elem ↔	↔							
					Middle ↔								
					High ↔								
					Overall								
	9900 - 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math ✓	Elem ↔	-							
					Middle -								
					High -								
					Overall								
9798 – 9900	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Read ✓	Elem +	+								
				Middle +									
				High +									
				Overall									
9798 – 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Read ✓	Elem +/-	+/-								
				Middle +/-	↔								
				High ↔									
				Overall									
9899 – 0001	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Read ✓	Elem +	+								
				Middle +									
				High +									
				Overall									
9900 - 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Read ✓	Elem +	↔								
				Middle ↔									
				High ↔									
				Overall									
9798 – 9900	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Composite ✓	Elem ↔	↔								
				Middle ↔									
				High ↔									
				Overall									
9798 – 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Composite	Elem									
				Middle									
				High									
				Overall									
9899 – 0001	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Composite ✓	Elem +	↔								
				Middle ↔									
				High ↔									
				Overall									
9900 - 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Composite ✓	Elem +	↔								
				Middle ↔									
				High ↔									
				Overall									
9798 – 9900	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Other	Grad Rate									
				9798 – 0102	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Other	Grad Rate					
								9899 – 0001	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Other	Grad Rate	
												9900 - 0102	CT

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Miron, 2005	0001 – 0304	CT	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math ✓	Elem +
					Middle +
				High +	
				Overall	
Read ✓	Elem +				
	Middle +				
High -					
Overall					
Composite	Elem				
Middle					
High					
Overall					
Other	Grad Rate				
Henig, Holyoke, Lacireno-Paquet, & Moser, 2001	9899 – 9900	DC	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls ✓ School Controls ✓	Math ✓	Elem
					Middle
				High	
				Overall -	
Read ✓	Elem				
	Middle				
High					
Overall -					
Composite	Elem				
Middle					
High					
Overall					
Other	Grad Rate				
Comey, Tatian, Guernsey, & Chang, 2008	0506 – 0607	DC	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls	Math ✓	Elem
					Middle
				High	
				Overall ↔	
Read ✓	Elem				
	Middle				
High					
Overall ↔					
Composite	Elem				
Middle					
High					
Overall					
Other	Grad Rate				
Miron, 2004	9900 – 0304	DE	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math ✓	Elem ↔
					Middle ↔
				High +	
				Overall	
Read ✓	Elem -				
	Middle ↔				
High ↔					
Overall					
Composite	Elem				
Middle					
High					
Overall					
Other	Grad Rate				

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Miron, Wygant, Cullen, & Applegate, 2006	9900 – 0405	DE	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem +
					Middle -
					High +
			Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Read ✓	Overall +
					Elem -
					Middle +
	Lottery Fixed-Effects Multivariate Pre-Post ✓	Composite	High +		
			Overall +		
			Other	Grad Rate	
		Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Math ✓	Elem -	
				Middle ↔	
				High +	
Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Read ✓	Overall +			
		Elem ↔			
		Middle +			
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	FL	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	High +
					Overall +
					Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓
			Middle		
			High		
			Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Composite ✓	Overall ↔
Other	Grad Rate				
Greene, Forster, & Winters, 2003 (This report also analyzes data for other states)	0001 – 0102	FL			Lottery Fixed-Effects Multivariate Pre-Post ✓
			Middle		
			High +		
			Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Read ✓	Overall +
					Elem
					Middle
	Proficiency Student-Level School-Level Student Controls School Controls ✓ ✓	Composite	High +		
			Overall +		
			Other	Grad Rate	

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
FL Department of Education, 2004	0001 – 0203	FL	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls	Math	✓ Elem Middle High Overall +
				Read	✓ Elem Middle High Overall +
				Composite	Elem Middle High Overall
				Other	Grad Rate
FL Department of Education, 2006	0102 – 0506	FL	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls	Math	✓ Elem ↔ Middle ↔ High ↔ Overall
				Read	✓ Elem ↔ Middle ↔ High ↔ Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate
Miller, 2003	0001 – 0102	ID	Lottery Fixed-Effects Multivariate ✓ Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level Student Controls School Controls	Math	✓ Elem - Middle High Overall
				Read	✓ Elem - Middle High Overall
				Composite	✓ Elem Middle High Overall +/-
				Other	Grad Rate
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0102 – 0506	IL	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency ✓ Student-Level ✓ School-Level Student Controls School Controls ✓	Math	✓ Elem + Middle + High + Overall
				Read	✓ Elem + Middle + High + Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings				
				Subject Area	Grade Level			
Wong & Shen, 2008	9798 – 0405	Chicago, IL	Lottery	✓	Math	✓	Elem	↔
			Fixed-Effects				Middle	
			Multivariate				High	
			Pre-Post				Overall	
Proficiency	✓	Read	✓	Elem	+			
Student-Level				Middle				
School-Level				High				
Student Controls	✓	Composite	✓	Elem	Overall			
School Controls				Middle				
				Other	Grad Rate			
Brown & Gutstein, 2009	0506 – 0708	Chicago, IL	Lottery	✓	Math		Elem	
			Fixed-Effects				Middle	
			Multivariate				High	
			Pre-Post				Overall	
Proficiency	✓	Read	✓	Elem	Overall			
Student-Level				Middle				
School-Level				High				
Student Controls	✓	Composite	✓	Elem	-			
School Controls				Middle				
				Other	Grad Rate			
Ball State University, 2004	0102 – 0304	IN	Lottery	✓	Math	✓	Elem	+/-
			Fixed-Effects				Middle	
			Multivariate				High	
			Pre-Post				Overall	
Proficiency	✓	Read	✓	Elem	+/-			
Student-Level				Middle				
School-Level				High				
Student Controls	✓	Composite	✓	Elem	Overall			
School Controls				Middle				
				Other	Grad Rate			
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0203 – 0607	IN	Lottery	✓	Math	✓	Elem	+
			Fixed-Effects				Middle	
			Multivariate				High	
			Pre-Post				Overall	
Proficiency	✓	Read	✓	Elem	+			
Student-Level				Middle				
School-Level				High				
Student Controls	✓	Composite	✓	Elem	Overall			
School Controls				Middle				
				Other	Grad Rate			

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Akey, Plucker, Hansen, Michael, Branon, Fagen, & Zhou, 1008	0506 – 0607	IN	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
			Proficiency Student-Level School-Level ✓	Read	Elem Middle High Overall
			Student Controls School Controls ✓	Composite	Elem Middle High Overall
			Other ✓	Grad Rate	-
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	MA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem Middle High Overall
			Proficiency Student-Level School-Level ✓	Read	Elem Middle High Overall
			Student Controls School Controls ✓	Composite ✓	Elem Middle High Overall -
			Other	Grad Rate	
MA Department of Education, 2006	0001 – 0405	MA	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall +
			Proficiency Student-Level ✓ School-Level ✓	Read ✓	Elem Middle High Overall +
			Student Controls School Controls ✓	Composite	Elem Middle High Overall
			Other	Grad Rate	
Horn & Miron, 2000 Reports using data with same findings: Miron & Nelson, 2002	9596 – 9899	MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem - Middle - High Overall
			Proficiency Student-Level School-Level ✓	Read ✓	Elem - Middle - High Overall
			Student Controls School Controls	Composite	Elem Middle High Overall
			Other	Grad Rate	

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Khoury, Kleine, White, & Cummings, 1999	9697 – 9798	MI	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls	Math	✓	Elem Middle High Overall -
				Read	✓	Elem Middle High Overall ↔
				Composite		Elem Middle High Overall
				Other		Grad Rate
Bettinger, 2005 Reports using data with same findings: Bettinger, 2000	9697 – 9899	MI	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency ✓ Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math	✓	Elem ↔ Middle High Overall
				Read	✓	Elem ↔ Middle High Overall
				Composite		Elem Middle High Overall
				Other		Grad Rate
Eberts & Hollenbeck, 2002 Reports using data with same findings: Eberts & Hollenbeck, 2001	9697 – 0001	MI	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency ✓ Student-Level ✓ School-Level Student Controls ✓ School Controls ✓	Math	✓	Elem - Middle High Overall
				Read	✓	Elem - Middle High Overall
				Composite		Elem Middle High Overall
				Other		Grad Rate
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	MI	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level ✓ Student Controls School Controls ✓	Math		Elem Middle High Overall
				Read		Elem Middle High Overall
				Composite	✓	Elem Middle High Overall -
				Other		Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0203 – 0607	MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem	+
					Middle	+
					High	-
					Overall	
Proficiency Student-Level School-Level ✓	Read ✓	Elem	+			
		Middle	+			
		High	+			
		Overall				
Student Controls ✓ School Controls ✓	Composite	Elem				
		Middle				
		High				
		Overall				
Other	Grad Rate					
MAPSA, 2005	0405 – 0506	MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem	+
					Middle	+
					High	
					Overall	
		Proficiency Student-Level School-Level ✓	Read ✓	Elem	+	
				Middle	+	
				High		
				Overall		
		Student Controls ✓ School Controls ✓	Composite	Elem		
				Middle		
				High		
				Overall		
Other	Grad Rate					
Detroit, MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem	+		
			Middle	-		
			High			
			Overall			
Proficiency Student-Level School-Level ✓	Read ✓	Elem	-			
		Middle	+			
		High				
		Overall				
Student Controls ✓ School Controls ✓	Composite	Elem				
		Middle				
		High				
		Overall				
Other	Grad Rate					
Flint, MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem	-		
			Middle	-		
			High			
			Overall			
Proficiency Student-Level School-Level ✓	Read ✓	Elem	+			
		Middle	+			
		High				
		Overall				
Student Controls ✓ School Controls ✓	Composite	Elem				
		Middle				
		High				
		Overall				
Other	Grad Rate					

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
MAPSA, 2005 (continued)	0405 – 0506	Grand Rapids, MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem +	
					Middle +	
					High	
					Overall	
		Lansing, MI	Lottery Fixed-Effects Multivariate Pre-Post ✓	Read ✓	Proficiency ✓	Elem +
						Middle +
						High
						Overall
Lansing, MI	Proficiency ✓	School-Level ✓	Student Controls	Elem		
				Middle		
				High		
				Overall		
Lansing, MI	School Controls	Composite	Other	Grad Rate		
				Elem +		
				Middle -		
				High		
Metis, 2004	9900 – 0102	Kansas City, MO	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem -	
					Middle -	
					High	
					Overall	
		Kansas City, MO	Proficiency ✓	School-Level ✓	Student Controls	Elem -
						Middle -
						High
						Overall
Kansas City, MO	School Controls	Composite	Other	Elem -		
				Middle -		
				High		
				Overall		
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	MN	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math	Elem	
					Middle	
					High	
					Overall	
		MN	Proficiency ✓	School-Level ✓	Student Controls	Elem
						Middle
						High
						Overall
MN	School Controls	Composite ✓	Other	Elem		
				Middle		
				High		
				Overall -		
MN	School Controls	Other	Other	Grad Rate		

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0102 – 0506	MN	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem + Middle + High + Overall
			Proficiency Student-Level School-Level ✓	Read ✓	Elem + Middle - High + Overall
			Student Controls School Controls ✓	Composite	Elem Middle High Overall
				Other	Grad Rate
Noblit & Dickson, 2001	9798 -0001	NC	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level ✓	Read ✓	Elem Middle High Overall -
			Student Controls School Controls	Composite	Elem Middle High Overall
				Other	Grad Rate
Greene, Forster, & Winters, 2003 (This report also analyzes data for other states)	0001 – 0102	NC	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall ↔
			Proficiency Student-Level School-Level ✓	Read ✓	Elem Middle High Overall ↔
			Student Controls School Controls ✓	Composite	Elem Middle High Overall
				Other	Grad Rate
Barr, 2007	9899 – 0506	NJ	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level ✓	Read ✓	Elem Middle High Overall -
			Student Controls School Controls ✓	Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Barr, Sadovnik, & Visconti, 2006	0203 – 0304	NJ	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem ↔ Middle High Overall
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem - Middle High Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate
Carr & Staley, 2005	0102 – 0304	OH	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem + Middle High Overall
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem + Middle High Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0102 – 0506	OH	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem + Middle + High - Overall
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem + Middle + High + Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate
Hassel, 2007	0102 – 0607	OH	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall +/-
				Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
OAPCS, 2008	0506 – 0607	OH	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level School-Level ✓ Student Controls School Controls	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall +
				Other	Grad Rate
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	PA	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level School-Level ✓ Student Controls School Controls ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall ↔
				Other	Grad Rate
Miron, Nelson, & Risley, 2002	9798 – 0102	PA	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level School-Level ✓ Student Controls School Controls ✓	Math	Elem Middle High Overall
				Read	Elem Middle High Overall
				Composite ✓	Elem Middle High Overall -
				Other	Grad Rate
Zoblotsky, Qian, Ross, & McDonald, 2008	0506 – 0607	TN	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math ✓	Elem +/- Middle High Overall
				Read ✓	Elem + Middle High Overall
				Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings			
				Subject Area		Grade Level	
Zoblotsky, Ross, Qian, & McDonald, 2008	0102 – 0607	TN	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem	+/-
						Middle	+/-
						High	+/-
						Overall	
Ross, McDonald, Alberg, & McSparrin-Gallagher, 2007	0102 – 0203	Memphis, TN	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem	+
						Middle	
						High	
						Overall	
McDonald, Ross, Bol, & McSparrin-Gallagher, 2007	0203 – 0304	Memphis, TN	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem	+
						Middle	+
						High	+
						Overall	+
Ross, McDonald, Layton, Zoblotsky, & Bol, 2008	0203 – 0405	Memphis, TN	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency Student-Level ✓ School-Level Student Controls ✓ School Controls	Math	✓	Elem	+/-
						Middle	+
						High	+
						Overall	
				Other		Grad Rate	

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

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Report Authors	Years	State	Research Design	Key Findings				
				Subject Area	Grade Level			
Ross, McDonald, & McSparrin-Gallagher, 2005	0203 – 0304	Memphis, TN	Lottery	✓	Math	Elem		
			Fixed-Effects			Middle		
			Multivariate			High		
			Pre-Post			Overall		
	Proficiency	✓	Read	Elem				
	Student-Level			Middle				
	School-Level			High				
	Student Controls			Overall	+			
School Controls	✓	Composite	Elem					
			Middle					
			High					
			Overall	+				
		Other	Grad Rate					
Nashville, TN	Lottery	Fixed-Effects	Multivariate	Pre-Post	✓	Math	Elem	
							Proficiency	Middle
							Student-Level	High
							School-Level	Overall
Student Controls	✓	Read	Elem					
School Controls			Middle					
			High					
			Overall	↔				
	✓	Composite	Elem					
			Middle					
			High					
			Overall	↔				
		Other	Grad Rate					
McDonald, Ross, Abney, & Zoblotzky, 2008	0203 – 0506	Memphis, TN	Lottery	✓	Math	Elem		
			Fixed-Effects			Middle		
			Multivariate			High		
			Pre-Post			Overall	+/-	
Proficiency	✓	Read	Elem					
Student-Level			Middle					
School-Level			High					
Student Controls			Overall	+/-				
School Controls	✓	Composite	Elem					
			Middle					
			High					
			Overall					
		Other	Grad Rate					
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	TX	Lottery	✓	Math	Elem		
			Fixed-Effects			Middle		
			Multivariate			High		
			Pre-Post			Overall		
Proficiency	✓	Read	Elem					
Student-Level			Middle					
School-Level			High					
Student Controls			Overall					
School Controls	✓	Composite	Elem					
			Middle					
			High					
			Overall	-				
		Other	Grad Rate					

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings	
				Subject Area	Grade Level
Greene, Forster, & Winters, 2003 (This report also analyzes data for other states)	0001 – 0102	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall +
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall +
				Composite	Elem Middle High Overall
				Other	Grad Rate
TCER, 2000	9697 – 9899	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall -
				Composite ✓	Elem Middle High Overall -
				Other	Grad Rate
TCER, 2001	9798 – 9900	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall -
				Composite	Elem Middle High Overall
				Other	Grad Rate
TCER, 2002	9899 – 0001	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓	Math ✓	Elem Middle High Overall -
			Proficiency Student-Level School-Level Student Controls School Controls ✓	Read ✓	Elem Middle High Overall -
				Composite	Elem Middle High Overall
				Other	Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
TCER, 2002 (continued)	9899 – 0001	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level Student Controls School Controls	Math	✓	Elem Middle High Overall -
				Read	✓	Elem Middle High Overall -
				Composite		Elem Middle High Overall
				Other		Grad Rate
TCER, 2003	9900 – 0102	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls ✓	Math	✓	Elem Middle High Overall -
				Read	✓	Elem Middle High Overall -
				Composite		Elem Middle High Overall
				Other		Grad Rate
			Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level Student Controls School Controls ✓	Math	✓	Elem Middle High Overall +/-
				Read	✓	Elem Middle High Overall +/-
				Composite		Elem Middle High Overall
				Other		Grad Rate
TCER, 2006	0203 – 0405	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls School Controls ✓	Math	✓	Elem Middle High Overall +/-
				Read	✓	Elem Middle High Overall +/-
				Composite		Elem Middle High Overall
				Other	✓	Grad Rate -

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix B: Cohort Change Studies

Report Authors	Years	State	Research Design	Key Findings		
				Subject Area	Grade Level	
TCER, 2007	0203 – 0506	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls ✓ School Controls ✓	Math	✓	Elem Middle High Overall -
				Read	✓	Elem Middle High Overall -
				Composite		Elem Middle High Overall
				Other	✓	Grad Rate -
TCER, 2008	0203 – 0607	TX	Lottery Fixed-Effects Multivariate Pre-Post ✓ Proficiency ✓ Student-Level ✓ School-Level ✓ Student Controls ✓ School Controls ✓	Math	✓	Elem Middle High Overall -
				Read	✓	Elem Middle High Overall -
				Composite		Elem Middle High Overall
				Other	✓	Grad Rate -
Loveless, 2002 (This report also analyzes data for other states)	9899 – 0001	WI	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level ✓ Student Controls ✓ School Controls ✓	Math		Elem Middle High Overall
				Read		Elem Middle High Overall
				Composite	✓	Elem Middle High Overall ↔
				Other		Grad Rate
Miron, Coryn, & Mackety, 2007 (This report also analyzes data for other states)	0001 – 0405	WI	Lottery Fixed-Effects Multivariate ✓ Pre-Post Proficiency Student-Level ✓ School-Level ✓ Student Controls ✓ School Controls ✓	Math	✓	Elem - Middle + High - Overall -
				Read	✓	Elem + Middle + High + Overall +
				Composite		Elem Middle High Overall
				Other		Grad Rate

Findings: Larger Gains (+), Similar Gains (↔), Mixed Gains (+/-), Smaller Gains (-)

Appendix C: Snapshot Studies

The following set of studies look at performance at a snapshot of one point in time. While some of these studies attempt to control for student or school characteristics, the snapshot studies are unable to gauge how much value public charter schools or traditional public schools are adding. The following tables in Appendix C describe the key findings for each of the eligible snapshot studies.

Research Design	
Year	<i>The span of academic years included in the study's analyses.</i>
State	<i>The state or city examined by the study. If a state abbreviation is indicated, the study included a majority of the state's charter schools. If a city is indicated, the study included charter schools in that city.</i>
Control Variables	<i>Study includes control variables for student or school characteristics.</i>
Key Findings	
Positive (+)	<i>Students who attend public charter schools have higher test scores than comparable students who attend traditional public schools.</i>
Neutral (↔)	<i>Students who attend public charter schools have similar test scores as comparable students who attend traditional public schools.</i>
Mixed (+/-)	<i>Students who attend public charter schools have higher test scores than comparable students who attend traditional public schools in selected grades and/or subject areas and lower test scores in other grades and/or subject areas.</i>
Negative (-)	<i>Students who attend public charter schools have lower test scores than comparable students who attend traditional public schools.</i>
Subject Area	<p><i>Math: Study examines performance data from a math assessment.</i></p> <p><i>Reading: Study examines performance data from a reading or Language Arts assessment.</i></p> <p><i>Composite: Study examines performance data from combined math and reading assessments.</i></p> <p><i>Other (Graduation Rate): Study examines graduation rate data.</i></p>
Grade Level	<p><i>Elementary: Study examines performance data from elementary school grades.</i></p> <p><i>Middle: Study examines performance data from middle school grades.</i></p> <p><i>High School: Study examines performance data from high school grades.</i></p> <p><i>Overall: Study examines performance data using combined grade levels.</i></p>

Appendix C: Snapshot Studies

Report Authors	Year	State	Math				Read				Composite				Other
			Elem	Middle	High	Overall	Elem	Middle	High	Overall	Elem	Middle	High	Overall	Grad Rate
Hoxby, 2004b	0203	National	+				+								
Roy, 2005*	0203	National	↔				↔								
Braun, Jenkins, Grigg, & Tirre, 2006*	0203	NAEP	-				-								
Lubienski & Lubienski, 2006*	0203	NAEP	-	↔											
Nelson, Rosenberg, & Van Meter, 2004*	0203	NAEP	-	↔			-	↔							
U.S. Department of Education, 2004*	0203	NAEP	-				↔								
Nelson & Van Meter, 2005*	0405	NAEP	-	-			↔	-							
Hoxby, 2004b	0203	AK	+				+								
Hoxby, 2004b	0203	AZ	+				+								
Roy, 2005*	0203	AZ	↔				↔								
Raymond, 2003*	9900	CA				-									-
Zimmer & Buddin, 2007*	0102	CA	↔	-	-		+	-	-						
Hoxby, 2004b	0203	CA	+				+								
Roy, 2005*	0203	CA	↔				+								
Watkins & Armor, 2004*	0203	CA		-					+/-						
EdSource, 2005	0304	CA	+	+			+	+	+		+	+	+		
Rhim, Faulkner, & McLaughlin, 2006*	0304	CA				+				↔					
EdSource, 2006	0405	CA									+	+	↔		
EdSource, 2007	0506	CA	-	+	-		+	+	+		+	+	+		
David, Woodworth, Grant, Guha, Lopez-Torkos, & Young, 2006	0405	Bay Area, CA		↔					↔						
Woodworth, David, Guha, Wang, & Lopez-Torkos, 2008	0607	Bay Area, CA		+/-					+/-						
McClure & Morales, 2004	0203	San Diego, CA				↔				↔					
McClure, Strick, Jacob-Almeida, & Reicher, 2005	0405	San Diego, CA				+/-				+/-					
McClure & Reicher, 2007	0506	San Diego, CA				↔				↔					

* Study controls for student-level or school-level characteristics.
 Findings: Positive (+), Negative (-), Neutral (↔), Mixed (+/-)

Appendix C: Snapshot Studies

Report Authors	Year	State	Math				Read				Composite				Other
			Elem	Middle	High	Overall	Elem	Middle	High	Overall	Elem	Middle	High	Overall	Grad Rate
CO Department of Education, 1997	9697	CO													+/-
CO Department of Education, 1998	9798	CO													+/-
CO Department of Education, 2002	0001	CO					+			-					+
CO Department of Education, 2003	0102	CO		+	-		+	+		-					
Finnigan, Adelman, Anderson, Cotton, Donnelly, & Price, 2004*	0102	CO													↔
Hoxby, 2004b	0203	CO	+				+								
Roy, 2005*	0203	CO	↔				↔								
CO Department of Education, 2006	0405	CO	↔	↔	-		+	↔		-					
Brodsky, Medler, & Schoals, 2006*	0405	CO													+
Esposito & Cobb, 2008*	0506	CT	↔		↔										
Henig, Holyoke, Lacireno-Paquet, & Moser, 2001*	9900	DC				-									
Hoxby, 2004b	0203	DC	+				+								
Crew & Anderson, 2003	9900	FL	-	-	-		-	-	-						
FL Department of Education, 2004	0203	FL	↔	↔	↔		↔	↔	↔						+
Hoxby, 2004b	0203	FL	↔				+								
Roy, 2005*	0203	FL	↔				-								
Shay, 2006	0405	FL	↔	↔	↔		↔	↔		+/-					
GA Department of Education, 2002	0102	GA	+	+	+		+	+	+						
GA Department of Education, 2004	0203	GA	↔	+	+		+	+	+						
Hoxby, 2004b	0203	GA	↔				+								
GA Department of Education, 2006b	0304	GA			-	↔				-	-				+
GA Department of Education, 2006a	0405	GA			+	↔				+	+				
Plucker, Eckes, Rapp, Ravert, Hansen, & Trotter, 2005*	0405	GA	-	+			-	+							
GA Department of Education, 2006b	0506	GA			+	+				+	+				+
GA Department of Education, 2007	0607	GA			+	+				+	+				+
Kana'iaupuni & Ishibashi, 2005	0203	HI	+	↔	+		↔	↔		+					
Hoxby, 2004b	0203	HI	+				+								
Roy, 2005*	0203	HI	↔				+								
Geiger & Roccograndi, 2002	0102	ID	+	+			+								
Gallant, 2004	0203	ID													+/-
Roy, 2005*	0203	ID	↔				↔								

* Study controls for student-level or school-level characteristics.
Findings: Positive (+), Negative (-), Neutral (↔), Mixed (+/-)

Appendix C: Snapshot Studies

Report Authors	Year	State	Math				Read				Composite				Other
			Elem	Middle	High	Overall	Elem	Middle	High	Overall	Elem	Middle	High	Overall	Grad Rate
Nelson & Miron, 2002	0001	IL													↔
Finnigan, Adelman, Anderson, Cotton, Donnelly, & Price, 2004*	0102	IL													+/-
Hoxby, 2004b	0203	IL	+				+								
Miron, Coryn, & Mackety, 2007*	0506	IL													
Nelson & Miron, 2002	0001	Chicago, IL													+
Chicago Public Schools, 2006*	0405	Chicago, IL													+
Chicago Public Schools, 2007*	0506	Chicago, IL													+
Ball State University, 2005	0405	IN	-	-	-		-	-	-						
Ball State University, 2006	0203	IN	-	-	-		-	-	-						
Ball State University, 2006	0304	IN	-	-	-		-	-	-						
Ball State University, 2006	0405	IN	-	-	-		-	-	-						
Ball State University, 2006	0506	IN	-	-	-		-	-	-						
Miron, Coryn, & Mackety, 2007*	0607	IN	-	-	-		-	-	-						
Hoxby, 2004b	0203	LA	+				+								
Finnigan, Adelman, Anderson, Cotton, Donnelly, & Price, 2004*	0102	MA													↔
Hoxby, 2004b	0203	MA	+				+								
Roy, 2005*	0203	MA	↔				↔								
Hoxby, 2004b	0203	MI	↔				↔								
Roy, 2005*	0203	MI	↔				↔								
Mead, 2006*	0506	MI				+								+	
MI Department of Education, 2006*	0506	MI				+								+	
MI Department of Education, 2007*	0607	MI				+								+	
Miron, Coryn, & Mackety, 2007*	0607	MI	-	-	-		-	-	-						
MAPSA, 2007	0607	MI	+	+			+	+							
MAPSA, 2007	0607	Detroit, MI	+	+			+	+							
MAPSA, 2007	0607	Flint, MI	+	+/-			+/-	+/-							
MAPSA, 2007	0607	Grand Rapids, MI	+	+			+	+							
MAPSA, 2007	0607	Lansing, MI	+/-	-			+	+/-							

* Study controls for student-level or school-level characteristics.

Findings: Positive (+), Negative (-), Neutral (↔), Mixed (+/-)

Appendix C: Snapshot Studies

Report Authors	Year	State	Math				Read				Composite				Other
			Elem	Middle	High	Overall	Elem	Middle	High	Overall	Elem	Middle	High	Overall	Grad Rate
Roy, 2005*	0203	MN	-				-								
Miron, Coryn, & Mackety, 2007*	0506	MN	-	-	-		-	-	-						
Randall, 2008*	0607	MN				-				-					
Finnigan, Adelman, Anderson, Cotton, Donnelly, & Price, 2004*	0102	NC												-	
Hoxby, 2004b	0203	NC	-				-								
Roy, 2005*	0203	NC	↔				↔								
Watkins & Armor, 2004*	0203	NC		-				-							
Hoxby, 2004b	0203	NJ	↔				+								
Roy, 2005*	0203	NJ	↔				↔								
Andreson, 2004	0203	NM	+	↔	+		-	+	+						
Roy, 2005*	0203	NM	↔				↔								
Andreson, Casey, & Yelverton, 2005	0304	NM	-	+	+		+	+	+						
Roy, 2005*	0203	NY	↔				↔								
Stevens, 2006	0405	NY	+	+				+							
LEOE, 2003	0102	OH	-	+/-			-	-							
Jenkins, 2005	0203	OH	-	-			-	-							
Roy, 2005*	0203	OH	↔				↔								
Hassel, 2007	0607	OH				-				-					
Miron, Coryn, & Mackety, 2007*	0506	OH	-	-	-		-	-	-						
Porch, Phillips-Schwartz, & Ryan, 2005	0405	Cincinnati, OH	-	-			-	+/-							
Porch, Phillips-Schwartz, & Ryan, 2005	0405	Cleveland, OH	+/-	+/-			+/-	+/-							
Porch, Phillips-Schwartz, & Ryan, 2005	0405	Columbus, OH	-	-			-	-							
Porch, Phillips-Schwartz, & Ryan, 2005	0405	Dayton, OH	+/-	+/-			+/-	+/-							
Hoxby, 2004b	0203	OR					+								
OR Department of Education, 2004	0304	OR												↔	
Bates & Guile, 2005	0405	OR	+	-	-		+	-	-					-	
Bates & Guile, 2006	0506	OR	+/-	↔	-		+/-	↔	↔					-	
Bates & Guile, 2007	0607	OR												-	

* Study controls for student-level or school-level characteristics.
Findings: Positive (+), Negative (-), Neutral (↔), Mixed (+/-)

Appendix C: Snapshot Studies

Report Authors	Year	State	Math				Read				Composite				Other
			Elem	Middle	High	Overall	Elem	Middle	High	Overall	Elem	Middle	High	Overall	Grad Rate
Hoxby, 2004b	0203	PA					+								
Roy, 2005*	0203	PA	↔				↔								
Enkishev, 2002	9900	Phily, PA			-					-					
Enkishev, 2002	0001	Phily, PA			-					-					
TCER, 1998	9798	TX									-	-	-		
TCER, 2000*	9899	TX												-	-
Finnigan, Adelman, Anderson, Cotton, Donnelly, & Price, 2004*	0102	TX												-	
Hoxby, 2004b	0203	TX	-												
Roy, 2005*	0203	TX	-				↔								
Watkins & Armor, 2004*	0203	TX		-				↔							
TCER, 2005	0304	TX	-	-	-	-	-	-	-	-	-	-	-	-	-
TCER, 2007*	0506	TX				-					↔				
TCER, 2008*	0607	TX				↔					+				
Was & Kristjansson, 2006*	0304	UT	+	+	-		+	+	-						
Witte, Weimer, Shober, & Schlomer, 2007*	0001	WI	↔	-			+	↔							
Witte, Weimer, Shober, & Schlomer, 2007*	0102	WI	↔	+			+	+							
Roy, 2005*	0203	WI	+				+								
Miron, Coryn, & Mackety, 2007*	0506	WI	-	-	-		-	-	-						

* Study controls for student-level or school-level characteristics.

Findings: Positive (+), Negative (-), Neutral (↔), Mixed (+/-)

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